

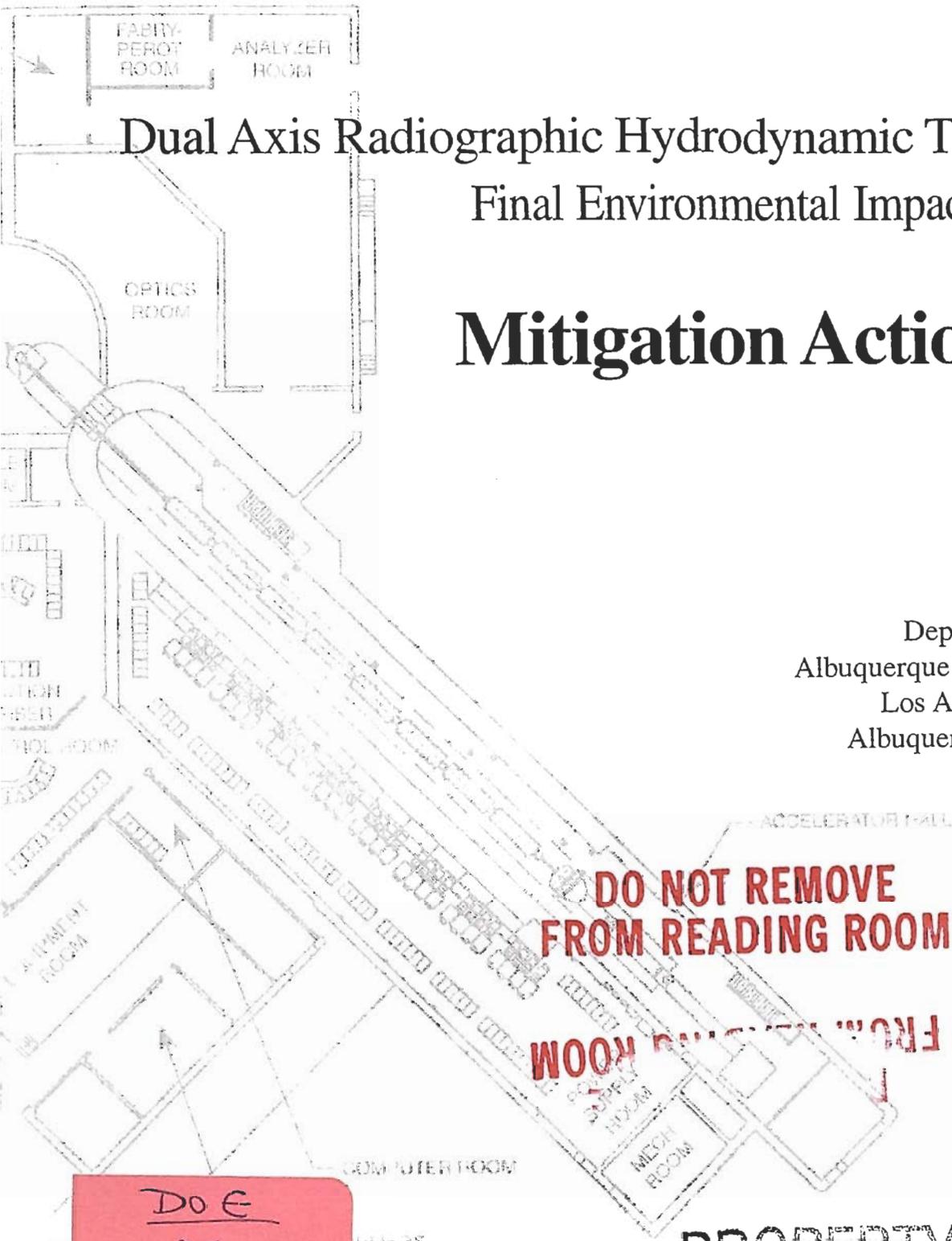
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DOE/EIS-0228

Dual Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement

Mitigation Action Plan



Department of Energy
Albuquerque Operations Office
Los Alamos Area Office
Albuquerque, New Mexico

January 23, 1996

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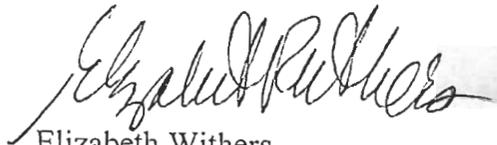
Memorandum

DATE: FEB 15 1996
COPY TO: LAAMEP:7EW-074
SUBJECT: Distribution of the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility Mitigation Action Plan (MAP)

TO: Those on Attached List

Attached please find a copy of the approved DOE MAP for the DARHT Facility, Final Environmental Impact Statement, January 23, 1996, for your information and use. The MAP addresses in detail how DOE will mitigate certain aspects of the DARHT project as committed to in the Record of Decision issued following completion of the Final Environmental Impact Statement. All actions, as applicable, regarding the construction, operation and ultimate decommissioning of the DARHT Facility will be required to be conducted in accordance with the MAP. The status of mitigation actions associated with the MAP will be reported in a DOE MAP Annual Report to be published by March 1 for the preceding calendar year, beginning one year after resumption of construction of the DARHT Facility and continuing annually thereafter, until the completion of decontamination and decommissioning of DARHT. Specific mitigation actions and the responsible organizations are listed in Table 1 of the MAP. Following the anticipated resumption of DARHT activities, I will be in contact with some of you to discuss the development of the MAP Annual Report.

If you have any questions or comments on this memorandum or the attached MAP, please contact me at (505) 667-8690.



Elizabeth Withers
NEPA Compliance Officer
Office of Environment and Projects

Attachment

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MITIGATION ACTION PLAN FOR DARHT

I. Introduction

The U.S. Department of Energy (DOE) has published a Final Environmental Impact Statement (EIS) on the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT) at the Los Alamos National Laboratory (LANL), DOE/EIS-0228. The U.S. Environmental Protection Agency (EPA) published a Notice of Availability of this EIS in the Federal Register on September 8, 1995 (60 FR 46833). The Final EIS identifies and discusses measures that DOE considered in order to mitigate potential adverse effects resulting from the various alternatives promulgated in the Draft EIS.

DOE published a Record of Decision (ROD) on this Final EIS in the Federal Register on Monday, October 16, 1995 (60 FR 53588), pursuant to regulations of the Council on Environmental Quality (CEQ) (40 CFR 1500-1508). The ROD states that the DOE has decided to complete and operate the DARHT facility at LANL while implementing a program to conduct most tests inside steel containment vessels with containment to be phased in over ten years (the Phased Containment Option of the Enhanced Containment Alternative). The ROD further states that DOE developed several mitigation measures to protect soils, water, biotic and cultural resources. Also, DOE has agreed to an ongoing consultation process with affected American Indian tribes to ensure protection of resources of cultural, historic, or religious importance to the tribes. The DOE will also take special precautions to protect the Mexican spotted owl (*Strix occidentalis lucida*), will prepare a laboratory-wide Habitat Management Plan for all threatened and endangered species occurring throughout LANL, and will implement the mitigation measures discussed in section 5.11, Volume 1 of the DARHT Final EIS. This Mitigation Action Plan (MAP) elaborates upon those commitments.

The DOE's Final Rule and Notice for implementing the National Environmental Policy Act (NEPA) [10 CFR 1021, section 331(a)], issued April 24, 1992, states that

"Following completion of each EIS and its associated ROD, DOE shall prepare a Mitigation Action Plan that addresses mitigation commitments expressed in the ROD. The Mitigation Action Plan shall explain how the corresponding mitigation measures, designed to mitigate adverse environmental impacts associated with the course of action directed by the ROD, will be planned and implemented. The Mitigation Action Plan shall be prepared before DOE takes any action directed by the ROD that is the subject of a mitigation commitment."

II. Background on DARHT

As discussed in the ROD, DOE will provide enhanced high-resolution radiography capability to perform hydrodynamic tests and dynamic experiments in support of its historical mission and near-term stewardship of the nuclear weapons stockpile. DOE began the preliminary design for DARHT in the early 1980s and conducted a series of environmental reviews for the project between 1982 and 1989. DOE concluded that no significant environmental impact should result from constructing and operating the facility. Funding for DARHT was authorized and appropriated by Congress in 1988. Construction of the DARHT Radiographic Support Laboratory began in 1988 and was completed in 1990. In 1993, DOE decided to fund the accelerator and x-ray equipment for the second axis of DARHT under a separate budget line item. Construction of the DARHT firing-site facility began in April 1994.

In October 1994, three citizen groups wrote to the Secretary of Energy asking, among other things, that DOE prepare an EIS on the DARHT Facility. They also asked that further construction of the facility be halted until an EIS was completed. On November 16, 1994, two of these groups (the Los Alamos

Study Group and the Concerned Citizens for Nuclear Safety) filed a lawsuit in U.S. District Court, Albuquerque, New Mexico, to enjoin DOE from proceeding with the DARHT project until completion of the EIS and issuance of the Record of Decision (ROD). On November 22, 1994, DOE published a notice in the Federal Register of its intent to prepare this DARHT EIS [59 FR 60134]. On January 27, 1995, the court issued a preliminary injunction enjoining DOE from further construction of the DARHT Facility and related activities, such as procuring special facility equipment, pending completion of this EIS and the related ROD. At the time of publication of this Mitigation Action Plan, no construction had taken place since January 27, 1995.

III. Site Description

The DARHT site is located in the southeastern part of LANL TA-15 on Threemile Mesa (see Figure 1). TA-15 is located in the center of the high-explosives research, development, and testing area, in the southwestern part of LANL, which makes up about 20 mi² (52 km²), or about half of the area of LANL.

For the purpose of analysis, the DARHT and nearby sites are considered to be Area III in TA-15, as defined by LANL for safety, security, and control of the firing site at the DARHT Facility. Area III includes the mesa top from the southeast boundary of TA-15, extending northwestward a little over 1 mi (about 2 km), to a fence line near Building R-183. The total area for the DARHT Facility is about 9 ac (3.6 ha). This area includes about 1 ac (0.4 ha) previously disturbed for the DARHT Facility access road and utilities, 7 ac (2.8 ha) disturbed by the DARHT construction, and 1 ac (0.4 ha) not yet disturbed, for the vessel cleanout facility, which will be constructed at TA-15 for the purposes of cleaning out and recycling the steel containment vessels and recycling experimental material after each use. Previous DARHT construction activities through 1994 account for the clearing of trees yielding 14,000 board-feet of lumber. At this site, the mesa is about 1,600 ft (490 m) wide. It is bounded on the north by the upper reaches of Potrillo Canyon and on the south by Water Canyon. The site lies only a few hundred feet from the mesa rim for Water Canyon.

The elevation on the mesa top in Area III is about 7,180 ft (2,190 m). In the vicinity of Area III, vegetation is characteristic of the Ponderosa pine plant community. This plant community within the 8 ac (2.3 ha) associated with DARHT has been altered due to construction. Most reptile, amphibian, bird, and large mammal populations utilizing this area have been displaced by these activities. Small mammals such as rodents have also been displaced; however, as disturbed areas surrounding the DARHT facility begin to revegetate, these areas will gradually be repopulated. Soils on the nearby portions of the mesa top include the Pogna fine sandy loam, rock outcrop, and Seaby loam. The surface is well drained, and the main aquifer lies approximately 1,200 ft (370 m) below the surface. Beneath the site, the Bandelier Tuff is likely to be more than 700 ft (215 m) thick, and the underlying Puye formation makes up the remaining interval to the water table.

IV. Phased Containment Option

Under the Phased Containment Option, containment for tests and experiments at DARHT would be provided according to an incremental, phased plan. The materials to be contained are beryllium, depleted uranium, and Resource Conservation and Recovery Act (RCRA) characteristic metals. Products from the detonation of the high explosives itself are not contained. Limits on the total releases of materials are based on percentages of the amounts projected for use (see DARHT EIS, Table 3-4 and Section 3.7). The final contained amount is the total annual savings resulting from three actions: containment, program scheduling, and post-test site cleaning. The Phased Containment Option approach has the advantage of allowing the lessons learned in each phase to be incorporated in the next phase and provides for a lower initial expenditure for design and capital cost.

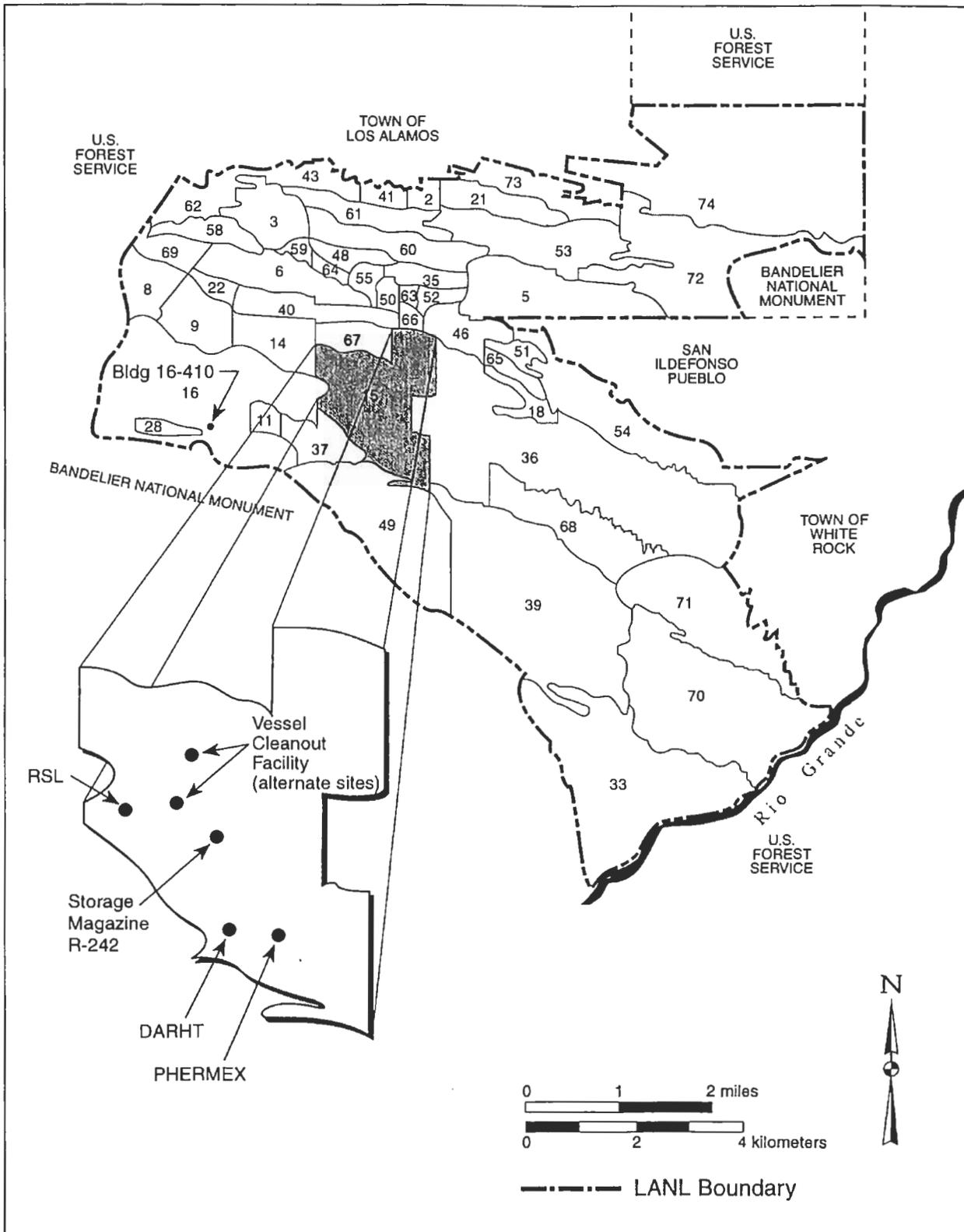


FIGURE 1.—The location of DARHT in relation to nearby facilities at LANL.

Containment will be phased into DOE's long-term hydrotest program according to the following plan:

- Phase 1 – Demonstration (years 1 through 5): DOE will put into place at DARHT a prototype vessel system and portable cleanout unit as part of a process to reduce the material released to the open air over this 5-year period. Based upon the analyses in the DARHT EIS, DOE expects that such a reduction would be at least 5% compared to the releases from the testing program if containment were not used. During this period DOE will design and build an additional vessel system, incorporating experience gained during this phase. Based on the final vessel design, DOE will design and start construction of the Vessel Cleanout Facility.
- Phase 2 – Containment (years 6 through 10): Over the second 5-year period DOE will put into place a 5-vessel containment system which will be used to further reduce the material released over this 5-year period. Based upon the analyses in the DARHT EIS, DOE expects that this reduction would be at least 40%. DOE will start to operate the Vessel Cleanout Facility during this phase.
- Phase 3 – Enhanced Containment (years 11 through 30): Based on DOE's experience gained from the first two phases, the modular containment vessels will be continually improved. DOE will use the vessel system to further reduce the material released over the next 20-year period. Based upon the analyses in the DARHT EIS, DOE expects that this reduction would be at least 75%.
- Phase 4 – 440-lb (200-kg) Containment Option: If justified by the development effort and operating experience after Phase 1, DOE may develop and use a vessel to contain material from tests and experiments larger than 110 pounds (50 kilograms). These could include tests of up to 440 pounds (200 kilograms) of high explosives, thus allowing DOE to contain a greater percentage of material. Phase 4 may be implemented at any time after Phase 1.

V. Function and Organization of the Mitigation Action Plan

The functions of this MAP are to (1) document potentially adverse environmental impacts of the Phased Containment Option delineated in the Final EIS, (2) identify commitments made in the Final EIS and ROD to mitigate those potential impacts, and (3) establish Action Plans to carry out each commitment.

Potential impacts are categorized into five areas of concern: General Environment, including impacts to air and water; Soils, especially impacts affecting soil loss and contamination; Biotic Resources, including impacts affecting threatened and endangered species; Cultural/Paleontological Resources, especially impacts affecting the archeological site known as Nake'muu; and Human Health and Safety, especially impacts pertaining to noise and radiation. Each potential impact includes a brief statement of the nature of the impact and its cause(s). The commitment made to mitigate the potential impact is identified and the Action Plan for each commitment is described in detail, with a description of actions to be taken, pertinent time frames for the actions, verification of mitigation activities, and identification of agencies/organizations responsible for satisfying the requirements of the commitment.

VI. Mitigation Actions Summary Table (Table 1)

Table 1, located at the end of this plan, summarizes the potential impacts and mitigation measures; indicates whether the mitigation is design-, construction-, or operational- related; the organization

responsible for each mitigation measure; and the projected or actual completion date for each mitigation measure.

VII. Mitigation Action Plan Annual Report and Tracking System

Activities associated with the MAP will be reported in a DOE Mitigation Action Plan Annual Report (MAPAR) to be published by March 1 for the preceding calendar year, beginning one year after resumption of construction of the DARHT facility and continuing annually thereafter, until the completion of decontamination and decommissioning of DARHT. The MAPAR will reflect new information or changed circumstances. If major changes to mitigations or the MAP are necessary, these changes will be noted in the MAPAR. Data collected may also be published in the Annual LANL Environmental Surveillance reports. The MAPAR will be placed in the Los Alamos and Albuquerque DOE Public Reading Rooms.

A DOE Mitigation Tracking System (MTS) will be developed to document the progress of fulfilling commitments described in the MAP. Monitoring will be employed to determine if the mitigation commitment achieved the objective as defined in the MAP. Monitoring could include trend analysis to establish if mitigation commitments were met over time. An additional method that may be employed is the identification of an administrative control that will be used to ensure implementation of the mitigation action. Administrative controls include the establishment of preventative maintenance schedules, inspection schedules and systems, or facility operating procedures. Results of the MTS will be reported in the MAPAR. The MTS will continue until all mitigation commitments are approved and verified and are considered closed. A Completion Report will be published by the DOE at the time of completion of all mitigations. DOE will approve and verify progress or closure on mitigation measures and evaluate the success of the various mitigation measures over time. These efforts will be reported, as appropriate, in the MAPAR.

VIII. Potential Impacts, Commitments, and Action Plans

A. Impacts Affecting the General Environment

1. Contamination of the environment surrounding the DARHT facility with radioactive or toxic material. This could occur due to the structural failure of containment vessels or during open-air firings.

Commitment/Action Plan- During the construction phase of the DARHT facility:

(a) the Ecological Studies Team (EST), a part of the LANL Environmental, Safety & Health, Group 20 (ESH-20), will collect baseline data on any contaminants present at the facility and in the surrounding areas, as well as at a control site away from the DARHT facility, from soils, invertebrates, plants, mammals, birds, and roadkill.

During operation of the facility, expected to begin 38 months after construction resumes, mitigation measures would include the following:

(b) EST will monitor contaminants by sampling soils, plants, mammals, birds, and roadkills at the locations mentioned above, once per year.

(c) Other site monitoring and evaluation will consist of periodic soil, water, and other environmental analyses for solid, hazardous, mixed, and radioactive wastes.

(d) A double-walled steel containment vessel will be used at the firing site facilities to contain emissions and debris from selected dynamic experiments, particularly those involving plutonium. Single-walled containment vessels will be used in certain other circumstances.

(e) Vessels used in hydrodynamic tests would be decontaminated.

DARHT EIS - Mitigation Action Plan

Time frame- during the construction and operational phase of the DARHT facility.

Verification: for (a): MAPAR documentation of data collected during DARHT construction phase; for (b) and (c): MAPAR documentation of data collected at least annually during DARHT operational phase; for (d) and (e): MAPAR documentation of relevant activities and mitigation developments. In addition, the MAPAR will report actual containment levels achieved as well as containment goals in order to demonstrate the level of success of those containment goals.

Responsible agency/organization- for (a)-(c): LANL ESH-20; for (d)-(e): LANL DX with CST-17 support.

2. Contamination of the environment with various types of waste as a result of cleaning out the containment vessels.

Commitment/Action Plan- The cleaning operation will recycle materials as much as reasonably possible and use appropriate operational processes to limit discharges of waste to the environment. Waste minimization techniques will be applied to those materials that cannot be recycled and they will be disposed of in permitted disposal facilities.

Time frame- during operational life of the facility.

Verification- annual documentation in MAPAR.

Responsible agency/organization- LANL DX division.

3. Contamination of the environment with various types of hazardous materials as a result of spills within the DARHT facility.

Commitment/Action Plan- Spill containment (physical barriers or sills) within the DARHT facility has been provided by engineered design to contain all hazardous material spills that could occur. Additionally, a Spills Prevention Control and Countermeasures Plan will be required before facility operation begins and will be maintained for the life of the facility. Also, a spill response/emergency response team and/or equipment would be available and could be deployed in the event of an accident.

Time frame- during operational life of the facility.

Verification- annual documentation in MAPAR.

Responsible agency/organization- LANL DX.

4. Contamination of the environment with hazardous levels of various substances as a result of discharges of contaminated water from the DARHT facility.

Commitment/Action Plan- Water flow from the DARHT facility will be monitored to ensure compliance with outfall permits as stated in the National Pollutant Discharge Elimination System (NPDES) permit for the DARHT site. Should discharge levels exceed permit limits, ESH-18 will act to bring the facility into compliance.

Time frame- during operational life of the facility.

Verification- analytical results included in the MAPAR.

Responsible agency/organization- ESH-18.

B. Impacts Affecting Soils

1. Loss of soil and vegetation could occur during construction and operation of the DARHT facility as a result of severe storms and consequent severe storm water runoff.

Commitment/Action Plan- storm water pollution prevention best management practices will continue to be implemented during all phases of construction and during operation of the DARHT facility.

These include:

- (a) Adherence to all soil erosion mitigation measures in accordance with NPDES permit Storm Water Pollution Prevention Plan (SWPPP) to ensure that erosion and sedimentation are minimized and that drainage facilities are in place to control runoff. These include measures for temporary and permanent erosion control, sedimentation control, surface restoration and revegetation, storm water attenuation in paved and unpaved areas, routine inspection, and a Best Management Plan, which includes minimization of fuel and oil spills, good housekeeping practices, and control of stored materials and soil stockpiles.
- (b) Modification of the SWPPP if control measures are ineffective or construction sequences change.
- (c) Establishment and continuance of erosion/sediment control Best Management Practices (BMPs). The BMPs required by the SWPPP and the construction plans shall be continually monitored and maintained.

Time frame- during construction phase and operational life of the facility.

Verification- Annual documentation in MAPAR.

Responsible agency/organization- LANL ESH-18.

2. Soil erosion and damage to plants caused by additional construction and operational activities, especially off-road and ground-breaking activities. Additional construction at the DARHT site would further disturb about 2.0 ac (0.8 ha) of mixed pinon-juniper/ponderosa pine habitat.

Commitment/Action Plan- Erosion control measures to prevent slope disturbance during construction, and revegetation of areas disturbed during construction would be implemented and completed. These would include:

- (a) Workers must avoid off-road activities and stay within approved rights-of-ways.
- (b) Any proposed activities requiring the disturbance of mature trees and shrubs must first be approved by EST to avoid disturbance to threatened and endangered species and other wildlife species.
- (c) ESH-20 must be notified prior to any new ground-breaking activities. The EST will review all new sites and evaluate any potential impacts associated with the action. The EST will also provide mitigation measures to minimize potential impacts, including revegetation as addressed in the SWPPP.
- (d) The size of a vegetation buffer zone between the facilities and the edge of the mesa tops will be determined by EST based on topographic aspects and vegetation composition.
- (e) Indigenous trees and/or other indigenous vegetation will be planted, as appropriate, for erosion control, landscaping, and additional wildlife habitat.

Time frame- during construction phase and operational life of the facility.

Verification- LANL-wide Threatened and Endangered Species Habitat Management Plan detailing the status of threatened and endangered species on LANL lands and annual MAPAR report.

Responsible agency/organization- (a), (b), (c), and (e): DX with ESH-20 support; (d): ESH-20

C. Impacts Affecting Biotic Resources

1. DARHT construction and operation could impact threatened and endangered species as a result of impacts from firings and other operations and activities at the firing sites.

Commitment/Action Plan

(a) DOE, in consultation with the U.S. Fish and Wildlife Service (USFWS), will develop a LANL-wide Threatened and Endangered Species Habitat Management Plan for all threatened and endangered species occurring throughout LANL. This plan will be used to determine the combined effects of the

many LANL projects on these species, provide long-range planning information for all future projects, and develop long-range mitigation actions to protect the habitats for these species. This management plan will be completed within three years from the date of the ROD.

(b) All recognized LANL nesting threatened and endangered species habitat will be evaluated, managed, and monitored to perpetuate the species.

(c) Planning, design, construction, and associated operation of new facilities or modifications to existing facilities will be coordinated with ESH-20 to insure threatened and endangered species are not adversely affected. Any proposed action that may affect a listed or proposed threatened or endangered species or designated or proposed critical habitat would be coordinated with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act.

(d) In the event of an emergency, such as fire, flood, or storm, DOE would contact USFWS as soon as reasonably possible after action is taken immediately to control or contain the emergency. In these cases, DOE would not need to formally consult with USFWS before responding to the incidents, but would comply with the Section 7 Emergency Consultation process provided for under the Endangered Species Act.

Time frame- for (a): habitat management plan will be completed within three years from the date of the ROD; for (b)-(d): during operational life of the facility.

Verification- for (a) and (b): evaluation criteria will be contained within the LANL-Wide Threatened and Endangered Species Habitat Management Plan detailing the status of threatened and endangered species and nesting habitats on LANL property; for (c)-(d): annual MAPAR report.

Responsible agency/organization- DOE/LAAO.

2. DARHT construction and operation could impact the Mexican spotted owl (*Strix occidentalis lucida*) as a result of noise from firings and other operations, as well as other activities at the firing sites.

Commitment/Action Plan

(a) The LANL-wide Threatened and Endangered Species Habitat Management Plan will include long-term monitoring by EST of Mexican spotted owl habitat in Potrillo, Valle, and Fish-ladder canyons. According to this plan, monitoring will include periodic sample collection (e.g., sound levels, soil, plants, small mammals, and owl pellets) for possible contamination of the ecosystem with hazardous and toxic materials.

(b) The LANL-Wide Threatened and Endangered Species Habitat Management Plan will also provide for long-term monitoring of Mexican spotted owl reproduction.

Other mitigation actions during construction include:

(c) Contacting ESH-20 prior to any new removal of mature trees (live or snag) to determine impact to the nesting of the Mexican spotted owl. If no impact is determined the tree removal will be allowed. If impacts are thought likely to occur the proposed tree removal must be postponed until after the breeding season (March 1- August 31).

(d) Not disturbing any additional habitat within 0.25 mi (400 m) of known Mexican spotted owl nesting habitat.

(e) Arranging construction lights so that light is not directed toward the canyons, or is shielded, during the breeding season.

(f) Restricting as much as possible all nighttime construction noise associated with the DARHT facility.

(g) Keeping noise from construction equipment, such as electrical generators, as quiet as possible so as not to disturb normal Mexican spotted owl activities and keeping it directed away from the canyons as much as possible.

(h) Keeping all equipment associated with construction at least 25 ft (8 m) from the surrounding canyon edges during the breeding season.

(i) Not allowing any construction personnel beyond the canyon edges.

- (j) Constructing flow-checks to slow the rate of the released water in the canyons originating from the facility and planting native vegetation to prevent erosion associated with this water release, as appropriate.
- (k) Planting native trees along roads, disturbed canyon edges, and the edges of parking lots, as appropriate.
- (l) Placing the warning siren on the mesa side of the DARHT facility.
- (m) Keeping all construction equipment as well-maintained and as quiet as reasonably possible.

Other mitigation actions during operation include:

- (n) Conducting a yearly Mexican spotted owl survey to determine any owl nesting activity in the area. Once a known nest location is determined this information would be used to evaluate any proposed night time shot activity at the proposed facility during the breeding season. If the nest is located more than 0.25 mi (400 m) from the proposed facility, a limit of one night shot per month would then be permitted during the breeding season. If an owl nest is discovered within 0.25 mi (400 m) of the facility, or if more than one night shot per month during the owl breeding season is proposed, DOE will reinitiate consultation with USFWS under Section 7 of the Endangered Species Act.
- (o) Keeping operational and set-up noise from equipment such as air conditioners, cooling fans, and electrical generators at a minimum at night, and directed away or shielded from the canyons as much as possible so as not to disturb normal Mexican spotted owl activities.
- (p) Keeping all equipment associated with operation at least 25 ft (8 m) from the surrounding canyon edge.
- (q) Restricting all operation personnel to the mesa top and not allowing them beyond the canyon edges, except as approved by ESH-20 for specific fragment removal operations.
- (r) Maintaining flow-checks to slow the rate of released water in the canyons originating from the facility.
- (s) Monitoring all water flow from the facility to ensure compliance with outfall permits.
- (t) Utilizing glass plates or other shield material during large uncontained shots to dissipate energy, break up fragments, buffer noise, and limit contaminant release to the Mexican spotted owl habitat.
- (u) Keeping all operational equipment well maintained and as quiet as reasonably possible.
- (v) Notifying ESH-20, prior to conducting any activities such as fragment removal in or on the slopes of Potrillo, Valle, or Water Canyons, so that a survey may be conducted. If no nesting Mexican spotted owls are found the activity will be allowed; if a nest is found the activity will not be allowed until after the breeding season.
- (w) Contacting ESH-20 prior to any new removal of mature trees (live or snag) to determine possible impacts to any nesting Mexican spotted owls. If no impact is determined the tree removal will be allowed. If impacts are thought likely to occur the proposed tree removal must be postponed until after the breeding season.
- (x) Lights used during shot setup will be directed away or shielded from the canyon.

Time frame- during construction phase and operational life of the facility.

Verification- For (a) and (b): LANL-Wide Threatened and Endangered Species Habitat Management Plan; for (c)-(x): annual MAPAR report.

Responsible agency/organization- (a) and (b): DOE/LAO with ESH-20 support; (c), (n), (v), and (w): DX with ESH-20 support; (s): ESH-18; all others: DX.

3. DARHT construction and operation could impact the peregrine falcon (*Falco peregrinus*) if present as a result of noise from firings and other operations, as well as other activities at the firing sites.

Commitment/Action Plan

(a) Contacting ESH-20 prior to any new removal of trees (live or snagged) to determine impact to peregrine falcon foraging habitat. If no peregrine falcon is found the activity will be allowed; if a

peregrine falcon is found the activity will not be allowed until after the species' breeding season (March - September) unless Section 7 Consultation under the Endangered Species Act is initiated with the USFWS and it is determined through that process that activities may proceed during that time period.
(b) Notifying ESH-20, so that a survey may be conducted, prior to conducting any activities that could disturb potential habitat along the canyon slopes of Potrillo, Valle, or Water Canyons. If no peregrine falcon is found the activity will be allowed; if a peregrine falcon is found the activity will not be allowed until after the breeding season (March - September) unless Section 7 Consultation under the Endangered Species Act is initiated with the USFWS and it is determined through that process that activities may proceed during that time period.

Time frame- during construction phase and operational life of the facility.

Verification- LANL-wide Threatened and Endangered Species Habitat Management Plan, and annual MAPAR.

Responsible agency/organization- **(a):** DX with ESH-20 support; **(b):** DX with ESH-20 support. If Section 7 consultation is required, DOE/LAAO will be the responsible agency.

4. DARHT construction and operation could impact the northern goshawk (Accipiter gentilis) if present as a result of noise from firings and other operations, as well as other activities at the firing sites.

Commitment/Action Plan- The following actions will be taken to preserve northern goshawk habitat:

(a) ESH-20 will be contacted prior to any new removal of trees (live or snag) to determine potential impact to the nesting and foraging habitat of the northern goshawk.

(b) Long-term monitoring of potential northern goshawk habitat in Potrillo and Valle canyons will be carried out by EST.

(c) The vegetation in Potrillo and Valle canyons and on the mesa top surrounding the facilities will be preserved.

Time frame- during construction phase and operational life of the facility.

Verification- LANL-wide Threatened and Endangered Species Habitat Management Plan and annual MAPAR report.

Responsible agency/organization- **(a):** DX with ESH-20 support; **(b):** ESH-20; **(c):**DX. If Section 7 consultation is required, DOE/LAAO will be the responsible agency.

5. DARHT construction and operation could impact the spotted bat (Euderma maculatum) if present as a result of noise from firings and other operations, as well as other activities at the firing sites.

Commitment/Action Plan- Notifying ESH-20, so that a survey may be conducted, prior to conducting any activities that could disturb potential habitat along the slopes of Potrillo, Valle, or Water Canyons. If no spotted bats are found the activity will be allowed; if a spotted bat is found the activity will not be allowed until after the spotted bat breeding season unless Section 7 Consultation under the Endangered Species Act is initiated with the USFWS and it is determined through that process that activities may proceed during that time period.

Time frame- during construction phase and operational life of the facility.

Verification- LANL-wide Threatened and Endangered Species Habitat Management Plan, and annual MAPAR.

Responsible agency/organization- DX with ESH-20 support. If Section 7 consultation is required, DOE/LAAO will be the responsible agency.

6. DARHT construction and operation could impact the meadow jumping mouse (Zapus hudsonius luteus) if present as a result of noise from firings and other operations, as well as other activities at the firing sites.

Commitment/Action Plan- Notifying ESH-20, so that a survey may be conducted, prior to conducting any activities that could disturb potential habitat along the canyon bottoms of Potrillo, Valle, or Water Canyons. If no meadow jumping mouse are found the activity will be allowed; if a meadow jumping mouse is found the activity will not be allowed until after the time of their highest activity (June - July) unless Section 7 Consultation under the Endangered Species Act is initiated with the USFWS and it is determined through that process that activities may proceed during that time period.

Time frame- during construction phase and operational life of the facility.

Verification- LANL-wide Threatened and Endangered Species Habitat Management Plan and annual MAPAR report.

Responsible agency/organization- DX with ESH-20 support. If Section 7 consultation is required, DOE/LAAO will be the responsible agency.

7. DARHT construction and operation could impact the Jemez mountain salamander (Plethodon neomexicanus) if present as a result of noise from firings and other operations, as well as other activities at the firing sites.

Commitment/Action Plan

(a) Notifying ESH-20, so that a survey may be conducted, prior to conducting any activities that could disturb potential habitat along the canyon slopes of Potrillo, Valle, or Water Canyons. If no Jemez mountain salamanders are found the activity will be allowed; if a Jemez mountain salamander is found the activity will not be allowed until after the time of their highest activity (June - September) unless Section 7 Consultation under the Endangered Species Act is initiated with the USFWS and it is determined through that process that activities may proceed during that time period.

(b) Contacting ESH-20 prior to any new removal of trees (live, snagged, or downed log) to determine impact to Jemez mountain salamander habitat. If no Jemez mountain salamander habitat is found the activity will be allowed; if Jemez mountain salamander habitat is found the activity will not be allowed until after the time of this species' highest activity (June - September) unless Section 7 Consultation under the Endangered Species Act is initiated with the USFWS and it is determined through that process that activities may proceed during that time period.

Time frame- during construction phase and operational life of the facility.

Verification- LANL-wide Threatened and Endangered Species Habitat Management Plan and annual MAPAR report.

Responsible agency/organization- DX with ESH-20 support. If Section 7 consultation is required, DOE/LAAO will be the responsible agency.

8. Movements of large mammal and predator species could be affected by permanent fence installation.

Commitment/Action Plan

(a) Project managers must consult with ESH-20 to minimize effects on large mammal and predator species movements. Consultation with the New Mexico Department of Game and Fish will be conducted as needed.

(b) ESH-20 will provide site-specific measures regarding the construction of fences and other barriers to facilitate the movement of wildlife, as appropriate.

(c) Facility personnel would avoid cutting any standing tree, live or snag, unless ESH-20 has given prior approval. Trees would not be removed while occupied by any mammal or bird. Appropriate steps for mammal/bird removal would be undertaken.

Time frame- during construction phase and operational life of the facility.

Verification- MAPAR documentation of relevant activities.

Responsible agency/organization- (a): DX with ESH-20 support. If Section 7 consultation is required, DOE/LAAO will be the responsible agency; (b): ESH-20; (c): DX with ESH-20 support.

D. Impacts Affecting Cultural/Paleontological Resources

1. Blast effects, such as shock waves and flying debris, from shots using high-explosive charges could affect nearby archeological sites, especially Nake'muu, and the immediately surrounding environment.

Commitment/Action Plan

(a) To protect Nake'muu from flying debris during most shots, one wing of the DARHT building was aligned between the blast area and Nake'muu so that most debris on a trajectory towards Nake'muu would be deflected away from that site.

(b) For large, high-explosive charge experiments, a temporary expendable blast shield, consisting of glass plates (to dissipate energy), a sand bag revetment, or other shielding material, would be constructed as necessary on a case-by-case basis to mitigate blast effects.

(c) Protection for archeological site LA 71410 was provided by covering it with the earthen radiation shielding berm. At the request of San Ildefonso Pueblo and with the concurrence of the NM SHPO, LA 71410 was recorded and subsequently buried.

(d) Two cultural resource sites were protected by routing the access road away from them and fencing them to protect them from disturbance during construction.

(e) Design and implementation of a long-term monitoring procedure at Nake'muu, using photographs or other means of recording, will be developed, in conjunction with the State Historic Preservation Officer, the National Park Service, or local Tribal governments, to determine if activities at TA-15 are causing any structural changes to the ruin over time.

(f) DOE will periodically (at least once a year) arrange for Tribal officials to visit cultural resource sites within TA-15 that are of particular interest to the Tribes.

(g) DX will periodically pick up metal fragments in the areas where fragments land, and will invite local tribes to participate (at least once a year) so that Tribal representatives can observe whether there has been damage to any cultural resource sites. DOE would evaluate procedures/measures for mitigation periodically. If damage is discovered, needed changes will be implemented and reported in the MAPAR. This will be done in consultation with the four Accord tribes (Cochiti, Jemez, Santa Clara, and San Ildefonso).

Time frame- during construction and operational life of the facility.

Verification- annual documentation in MAPAR.

Responsible agency/organization- (a): completed; (b): DX; (c): and (d): completed; (e): ESH-20 Cultural Resources Management Team and DOE/LAAO with support of DX; (f): DOE/LAAO; (g): DX with DOE/LAAO support.

2. Structural or other damage to as-yet unknown Native American cultural resources within the area of potential effects for the DARHT site. This could occur as a result of DOE's lack of knowledge of these resources in the DARHT area.

Commitment/Action Plan

(a) Consultations with the four Accord tribes will continue in order to identify and protect any such cultural resources throughout the life of activities at DARHT.

(b) Evaluation of cultural resources in the vicinity of TA-15 will also be coordinated with the New Mexico State Historic Preservation Officer, as appropriate, for concurrence of eligibility determinations and potential effects.

Time frame- during construction phase and operational life of the facility.

Verification- annual documentation in MAPAR.

Responsible agency/organization- DOE and ESH-20 Cultural Resources Management Team.

E. Impacts Affecting Human Health and Safety

1. Adverse health effects on workers and the general public from high noise levels associated with the DARHT facility, especially construction and test firings.

Commitment/Action Plan

(a) Noise protection would be provided to workers in the form of ear muffs or ear plugs, depending on the expected noise levels, per OSHA requirements.

(b) Construction noise would be minimized as much as possible by proper maintenance of equipment.

Time frame- during construction phase and operational life of the facility.

Verification- Site Worker Safety Plan.

Responsible agency/organization- LANL DX with FSS support.

2. Adverse health effects on workers from radiation from DARHT operations.

Commitment/Action Plan

(a) Radiation shielding will be provided around the accelerators to limit radiation exposure to workers in the facilities.

(b) An earthen berm has been constructed to limit radiation exposure beyond the firing site.

(c) DARHT workers will complete DOE-certified core radiological training (minimum Rad-Worker I level) and be enrolled in the LANL dosimetry program.

Time frame- during operational life of the facilities.

Verification- site worker safety reports, radiation monitoring reports.

Responsible agency/organization- (a) and (b): LANL DX; (c): LANL DX with ESH-4 support.

TABLE I-SUMMARY OF MITIGATION ACTIONS

Potential Impact	Mitigation Measure	Design-Related	Construction-Related	Operational-Related	Responsible-Organization	Projected/Actual Period of Completion
A. GENERAL ENVIRONMENT						
1. Radioactive and toxic material contamination	(a) Collect baseline data on contaminants		X		ESH-20	end of construction
	(b) Monitor contaminants once per year			X	ESH-20	end of operational phase
	(c) Periodic environmental analyses			X	ESH-20	end of operational phase
	(d) Single-walled and double-walled steel containment vessels	X		X	DX, CST-17	end of operational phase
	(e) Decontamination of vessels	X		X	DX, CST-17	end of operational phase
2. Waste contamination from vessel cleanup	Recycling materials, appropriate operational processes			X	DX	end of operational phase
3. Waste contamination from spills	Spill containment barriers, SPCC Plan, response team	X		X	DX	end of operational phase
4. Contamination from water discharges	Adherence to/monitoring of NPDES limits of permitted outfalls			X	ESH-18	end of operational phase
B. SOILS						
1. Loss of soil due to severe storm runoff	(a) Adherence to SWPPP measures		X	X	ESH-18	end of operational phase
	(b) Modification of SWPPP if necessary		X	X	ESH-18	end of operational phase
	(c) Continuance of Best Management Practices		X	X	ESH-18	end of operational phase
2. Loss of soil due to off-road activities and ground-breaking	(a) Avoidance of off-road activities		X	X	DX, ESH-20	end of operational phase
	(b) Approval for disturbance of vegetation		X	X	DX, ESH-20	end of operational phase

TABLE 1-SUMMARY OF MITIGATION ACTIONS (CONT'D)

Potential Impact	Mitigation Measure	Design-Related	Construction-Related	Operational-Related	Responsible-Organization	Projected/Actual Period of Completion
	(c) Notification of ESH-20 prior to groundbreaking		X	X	DX, ESH-20	end of operational phase
	(d) Determination of vegetation buffer zone		X	X	ESH-20	end of operational phase
	(e) Revegetation with indigenous vegetation		X	X	DX, ESH-20	end of operational phase
	C. BIOTIC RESOURCES					
1. General impacts to TES	(a) Implementation of LANL-wide habitat management plan for all TES			X	DOE/LAAO	end of operational phase
	(b) Maintenance/management of recognized nesting habitats			X	DOE/LAAO	end of operational phase
	(c) Coordination with USFWS, ESH-20 for construction activities			X	DOE/LAAO	end of operational phase
	(d) Notification of USFWS after dealing with emergency			X	DOE/LAAO	end of operational phase
2. Noise and other impacts to the Mexican spotted owl	(a) Long-term Mexican spotted owl habitat monitoring			X	DOE/LAAO, ESH-20	end of operational phase
	(b) Long-term monitoring of Mexican spotted owl reproduction			X	DOE/LAAO, ESH-20	end of operational phase
Mitigation measures during construction:	(c) ESH-20 approval of tree removal		X		DX, ESH-20	end of construction
	(d) Maintenance of owl habitat within 0.25 mi of nesting habitat		X		DX	end of construction
	(e) Reorientation/shielding of lights during breeding season		X		DX	end of construction
	(f) Restricting nighttime construction noise		X		DX	end of construction
	(g) Keeping construction noise quiet/away from canyons		X		DX	end of construction
	(h) Keeping equipment > 25 ft from canyon edges during breeding season		X		DX	end of construction

TABLE 1-SUMMARY OF MITIGATION ACTIONS (CONT'D)

Potential Impact	Mitigation Measure	Design-Related	Construction-Related	Operational-Related	Responsible-Organization	Projected/Actual Period of Completion
	(i) Restricting personnel from canyons		X		DX	end of construction
	(j) Constructing flow-checks to prevent erosion		X		DX	end of construction
	(k) Planting native trees, as appropriate		X		DX	end of construction
	(l) Placing warning siren on mesa side of facility		X		DX	end of construction
	(m) Maintaining construction equipment as quiet as possible		X		DX	end of construction
Mitigation measures during operation:	(n) Restricting night shots if owl nest is near site			X	DX, ESH-20	end of operational phase
	(o) Keeping operational/setup noise quiet/away from canyons			X	DX	end of operational phase
	(p) Keeping operational equipment > 25 ft from canyon edges			X	DX	end of operational phase
	(q) Restricting personnel from canyons except as needed			X	DX	end of operational phase
	(r) Maintaining flow-checks during operational phase			X	DX	end of operational phase
	(s) Ensuring compliance with water outfall permits			X	ESH-18	end of operational phase
	(t) Using shield material for fragment breakup, noise buffering, and contaminant release minimization			X	DX	end of operational phase
	(u) Keeping operational equipment as quiet as possible			X	DX	end of operational phase
	(v) ESH-20 approval for fragment removal during nesting season			X	DX, ESH-20	end of operational phase
	(w) ESH-20 approval for tree/snag removal during nesting season			X	DX, ESH-20	end of operational phase
	(x) Reorientation/shielding of lights away from canyon			X	DX	end of operational phase

TABLE I-SUMMARY OF MITIGATION ACTIONS (CONT'D)

Potential Impact	Mitigation Measure	Design-Related	Construction-Related	Operational-Related	Responsible-Organization	Projected/Actual Period of Completion
3. Noise and other impacts to peregrine falcon	(a) ESH-20 approval of tree/snag removal		X	X	DX, ESH-20	end of operational phase
	(b) EST falcon survey prior to canyon disturbance		X	X	DX, ESH-20 DOE/LAAO	end of operational phase
4. Noise and other impacts to northern goshawk	(a) ESH-20 approval of tree/snag removal		X	X	DX, ESH-20	end of operational phase
	(b) EST long-term monitoring of goshawk habitat		X	X	ESH-20	end of operational phase
	(c) Preservation of canyon and mesa-top vegetation		X	X	DX, DOE/LAAO	end of operational phase
5. Noise and other impacts to spotted bat	EST bat survey prior to canyon slope disturbance		X	X	DX, ESH-20, DOE/LAAO	end of operational phase
6. Noise and other impacts to meadow jumping mouse	EST mouse survey prior to canyon bottom disturbance		X	X	DX, ESH-20, DOE/LAAO	end of operational phase
7. Noise and other impacts to Jemez mountain salamander	(a) EST salamander survey prior to canyon slope disturbance		X	X	DX, ESH-20, DOE/LAAO	end of operational phase
	(b) ESH-20 approval of tree/snag removal		X	X	DX, ESH-20, DOE/LAAO	end of operational phase
8. Large mammal/predator movement disturbance	(a) ESH-20 consultation to avoid disturbance to movements of large mammals and predators		X	X	DX, ESH-20, DOE/LAAO	end of operational phase
	(b) ESH-20 provision of site-specific measures for fencing		X	X	ESH-20	end of operational phase
	(c) ESH-20 approval for tree/snag removal		X	X	DX, ESH-20	end of operational phase
D. CULTURAL/PALEONTOLOGICAL RESOURCES						
1. Site disturbance from blast effects	(a) DARHT facility alignment	X			DX, ESH-20	completed
	(b) Use of temporary, expendable blast shield			X	DX	end of operational phase

TABLE 1-SUMMARY OF MITIGATION ACTIONS (CONT'D)

Potential Impact	Mitigation Measure	Design-Related	Construction-Related	Operational-Related	Responsible-Organization	Projected/Actual Period of Completion
	(c) Construction of an earth berm		X		DX, ESH-20	completed
	(d) Rerouting of access road		X		DX, ESH-20	completed
	(e) Long-term monitoring at Nake'muu			X	ESH-20, DX, DOE/LAAO	end of operational phase
	(f) Periodic Tribal inspection of sites			X	DOE/LAAO	end of operational phase
	(g) Periodic removal of metal fragments			X	DX, DOE/LAAO	end of operational phase
2. Disturbance of unknown sites in TA-15	(a) Consultation with four Accord Tribes			X	DOE, ESH-20	end of operational phase
	(b) Evaluation of cultural resources in TA-15			X	DOE, ESH-20	end of operational phase
E. HUMAN HEALTH AND SAFETY						
1. Health effects from high noise levels	(a) Noise protection for workers			X	DX, FSS	end of operational phase
	(b) Minimization of construction noise		X		DX, FSS	end of construction
2. Health effects from high radiation levels	(a) Radiation shielding around accelerators	X	X		DX	end of construction
	(b) Construction of earthen berm		X		DX	completed
	(c) Enrollment of DARHT workers in training and dosimetry program			X	DX, ESH-4	end of operational phase

