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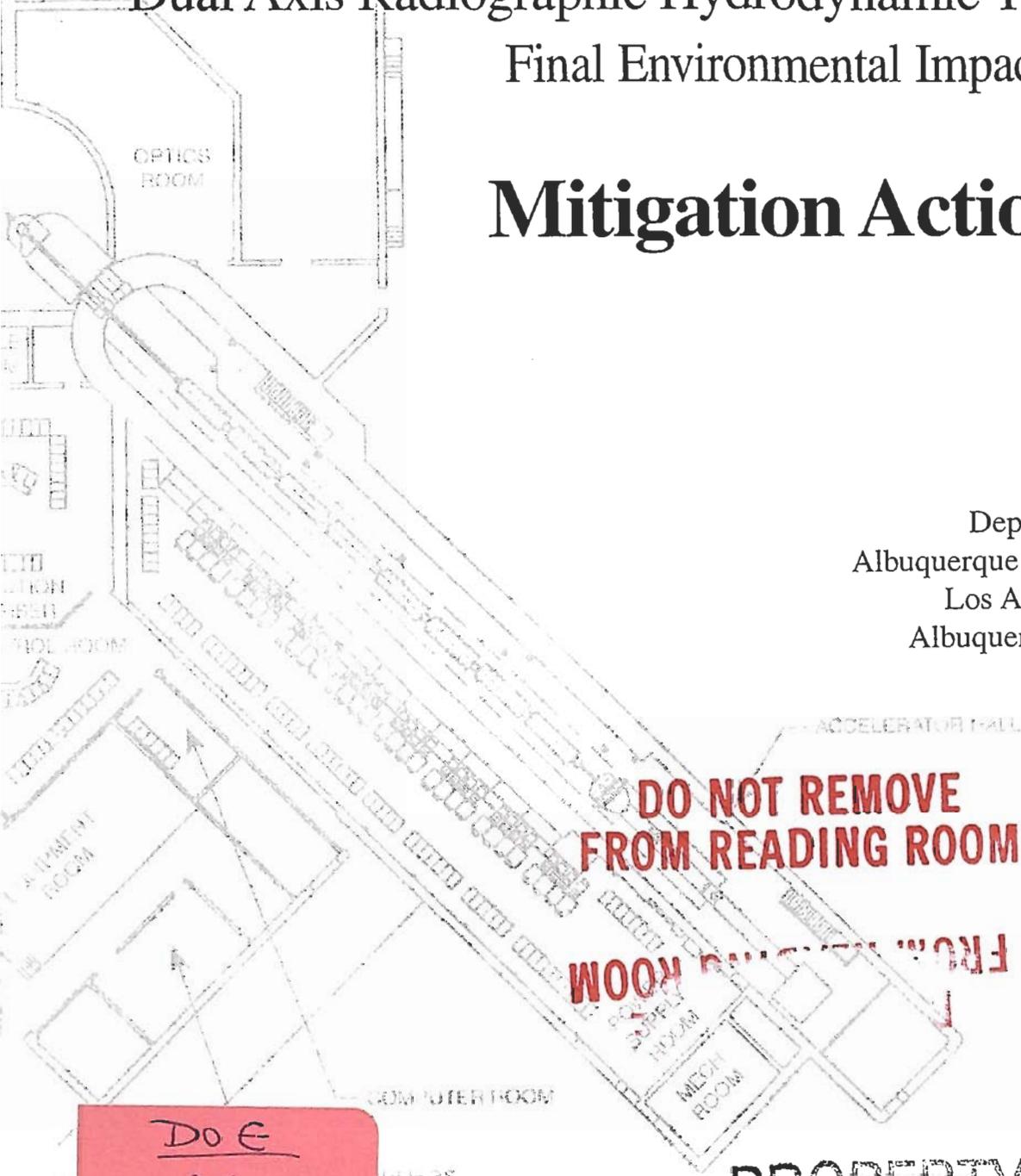


DOE/EIS-0228



# 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

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January 23, 1996

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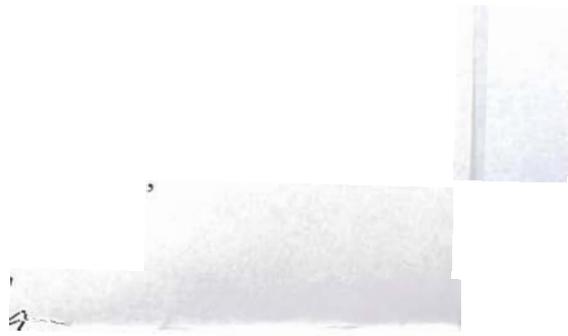
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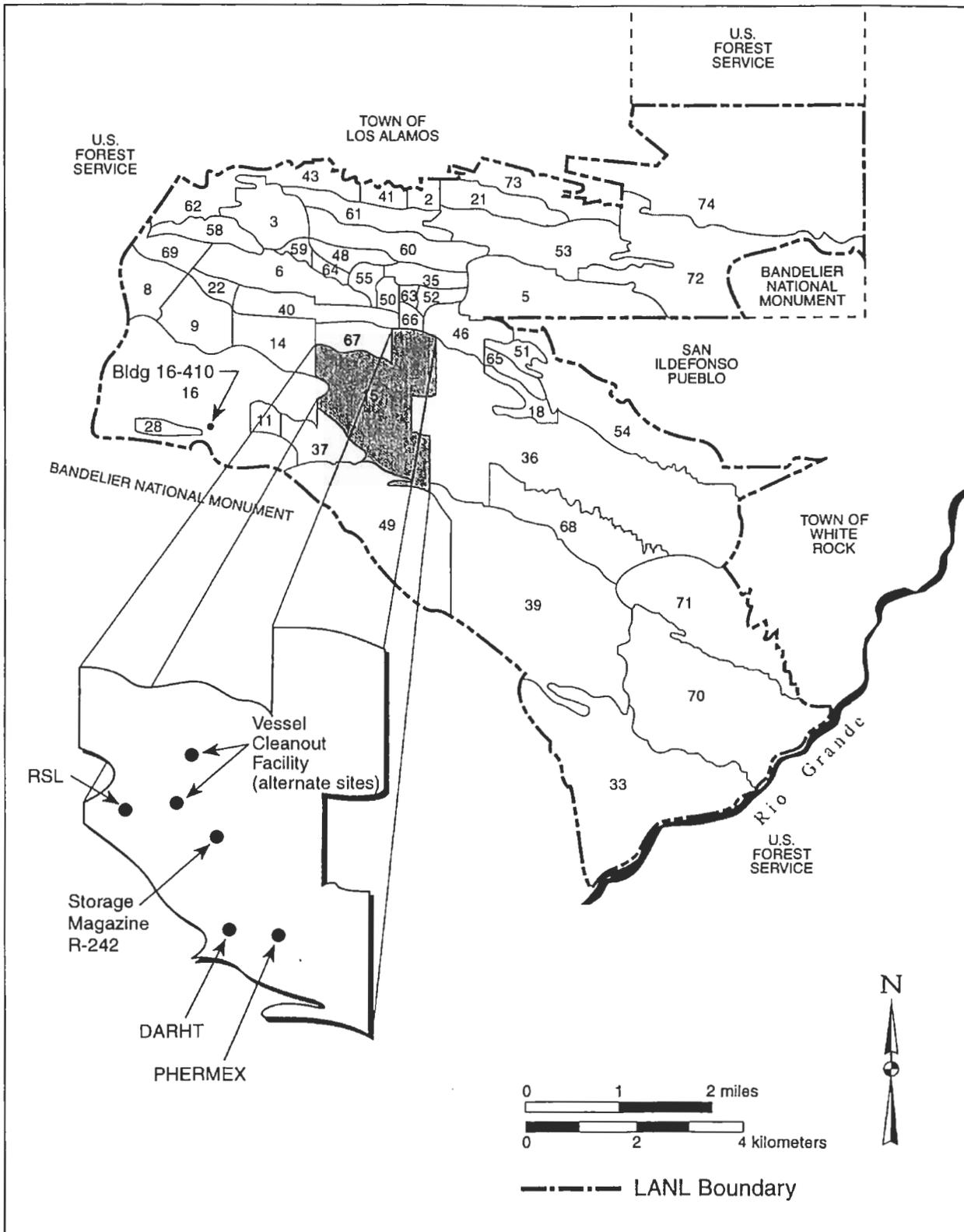


FIGURE 1.—The location of DARHT in relation to nearby facilities at LANL.

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 Nike'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.

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**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.



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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
<b>A. GENERAL ENVIRONMENT</b>						
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>B. SOILS</b>						
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
	(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
<b>D. CULTURAL/PALEONTOLOGICAL RESOURCES</b>						
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



