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 Albuquerque Operations Office  
 Los Alamos Area Office  
 Los Alamos, New Mexico 87544

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NM ENVIRONMENT DEPARTMENT  
 OFFICE OF THE SECRETARY

Dr. Ed Kelley, Director  
 Water and Waste Management  
 Division  
 New Mexico Environment Department  
 1190 St. Francis Drive  
 P. O. Box 26110  
 Santa Fe, New Mexico 87502

Dear Dr. Kelley:

Enclosed is a copy of the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility Mitigation Action Plan (MAP) Annual Report for 1997. As part of the Record of Decision (ROD) by the Department of Energy on the Final DARHT Environmental Impact Statement, a MAP was designated as a method of implementing and tracking mitigation actions, and to prevent adverse environmental effects from the project. The DARHT project has been under development at Los Alamos National Laboratory (LANL) since issuance of the ROD. This MAP Annual Report (MAPAR) was compiled to report the status of the DARHT schedule and action taken on the identified mitigation measures for calendar year 1997.

We thank you for your interest in our National Environmental Policy Act (NEPA) review process. If you have any questions, please contact me at (505) 667-8690, or by facsimile at (505) 665-4872. I can also be reached at the mailing address provided with this letter.

Sincerely,

Elizabeth R. Withers  
 NEPA Compliance Officer  
 Office of Environment

LAAME:2DT-228

Enclosure

cc w/enclosure:  
 Gedi Cibas, Ph.D.  
 New Mexico Environment Department  
 1190 St. Francis Drive  
 P. O. Box 26110  
 Santa Fe, NM 87502

Steve Yanicak, Point of Contact  
 Oversight Bureau  
 New Mexico Environment Department  
 LANL, MS-J993



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General

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*Title:* Dual Axis Radiographic Hydrodynamic Test Facility  
Mitigation Action Plan  
Annual Report for 1997

*Author(s):* Todd Haagenstad  
  
Technical Staff Member  
Ecology Group  
Los Alamos National Laboratory  
Los Alamos, NM 87545

*Submitted to:* US Department of Energy  
January 15, 1998



**Los Alamos**  
NATIONAL LABORATORY

Los Alamos, New Mexico 87545

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General 1/26/98

*Dual Axis Radiographic Hydrodynamic Test Facility*

*Mitigation Action Plan*

*Annual Report for 1997*

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Los Alamos National Laboratory

Los Alamos, New Mexico

Date Prepared: January 15, 1998  
Prepared by: Department of Energy  
Los Alamos Area Office

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## **1.0 INTRODUCTION**

This Mitigation Action Plan Annual Report (MAPAR) has been prepared by the U.S. Department of Energy (DOE) as part of implementing the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT) Mitigation Action Plan (MAP). This MAPAR provides a status on specific DARHT facility design- and construction-related mitigation actions that have been initiated in order to fulfill DOE's commitments under the DARHT MAP.

Activities associated with the MAP were to be reported in a 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 completion of decontamination and decommissioning of DARHT (DOE 1996). DARHT facility construction resumed on September 30, 1996 following full authorization from DOE and LANL. Therefore, a decision was made to change the reporting cycle for the MAPAR to a fiscal year cycle beginning with this report. The first official DARHT MAPAR was originally due on March 1, 1998 for fiscal year (FY) 1997; however, in order to coordinate the DARHT MAP activity and reporting cycle, the DOE Los Alamos Area Office (LAAO) has shifted the MAPAR reporting cycle to January 15.

A MAPAR-type document was provided to the public in May of 1997 in order to provide stakeholders with an opportunity to comment on the document format, content, and scope. All stakeholder input has been considered by DOE LAAO in the following MAPAR. The scope of this MAPAR reports on the full scope of actions that were implemented during FY 1997 (October 1, 1996 through September 30, 1997). Future MAPAR format, content, and scope will be revised as deemed necessary through stakeholder input and DOE LAAO determinations.

### **1.1 Background**

In August 1995, the DOE published a Final Environmental Impact Statement (EIS) on the DARHT facility at LANL, DOE/EIS-0228. This EIS was prepared according to National Environmental Policy Act (NEPA) regulations established by the Council on Environmental Quality (42 U.S.C. 4321 et seq. of 1969; 40 CFR Part 1500-1508). DOE published a Record of Decision (ROD) on this Final EIS in the Federal Register (60 FR 53588) on October 16, 1995. The DARHT 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 (DOE 1995). The ROD further states that DOE developed several mitigation measures to protect workers, soils, water, and biotic and cultural resources in and around the DARHT facility. In January 1996, DOE published a DARHT MAP, which identified potential impacts associated with the course of action selected in the ROD. The MAP also documents commitments and action plans DOE considers necessary to mitigate these potential impacts. DOE has committed to reporting the status on MAP activities and commitments to the public through the DARHT MAPAR (DOE 1996).

The DARHT MAP is being implemented consistent with DOE regulations under the National Environmental Policy Act (NEPA). The DOE's Final Rule and Notice for implementing NEPA [10 CFR 1021, section 331(a)], revised July 9, 1996, states:

“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 mitigation commitment.”

The ROD on the DARHT Final EIS 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 will developed several mitigation measures to protect soils, water, biotic and cultural resources potentially affected by the DARHT facility construction and operation (DOE 1995). In addition, 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 has committed to taking special precautions to protect the Mexican spotted owl (*Strix occidentalis lucida*), and has begun preparing a laboratory-wide Habitat Management Plan for all threatened and endangered species occurring throughout LANL, through the implementation of the mitigation measures discussed in section 5.11, Volume 1 of the DARHT Final EIS. The DARHT MAP elaborates upon those commitments (DOE 1996).

In December 1995, LANL completed a Biological and Floodplain/Wetland Assessment (BA) for the DARHT facility as required under the Threatened or Endangered Species Act of 1973 (Keller 1995). The BA includes mitigation measures expected to prevent any likely adverse affect to any threatened or endangered species, or modification to critical habitat. The mitigation measures identified in the BA have been used as the basis for establishing mitigation actions for potential impacts to threatened or endangered species and critical habitat as identified in the DARHT MAP. These BA mitigation measures, through implementation of the DARHT MAP, have established some of the guidelines under which the DARHT facility will be constructed and operated in order to mitigate the identified potential impacts.

In March 1996, the DOE and LANL initiated a LANL-wide Threatened or Endangered Species (TES) Habitat Management Plan (HMP). As referenced in Section VIII, C. 1. (a) of the DARHT MAP, the TES HMP is being prepared for all threatened or endangered species occurring throughout LANL. The plan includes the following critical elements or tasks:

- a complete list of threatened or endangered species occurring in and around LANL;
- a Geographic Information System (GIS) data base and operating system;
- a GIS Land Cover Map and Classification System;
- an ongoing Literature Review task;
- a on-going LANL Mission Requirements, Projects, and Activities review task;
- an Ecological Risk Evaluation element;
- a TES HMP LANL Integration task;
- and, multiple threatened or endangered species survey tasks.

These TES HMP elements and tasks are designed to ensure that plan implementation will be effective for the next several years. The TES HMP 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 throughout LANL. For the purposes of the DARHT MAPAR, the TES HMP is considered a separate, but related, LANL activity. The MAPAR identifies and discusses MAP activities that are being addressed by the TES HMP. The TES HMP is on schedule and in the third and final year of development. Implementation of the TES HMP is scheduled for October 1998 (Foxx 1996).

Finally, DOE has determined that the scope of activities implemented under the DARHT MAP through 2004 are within a scope of actions that are categorically excluded from the requirement to prepare an environmental assessment or an EIS. If the scope of mitigation actions require modification, the scope modification will be reviewed and the categorical exclusion will be amended as necessary.

## 1.2 MAP Function and Organization

The functions of the DARHT 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 (DOE 1996).

The DARHT MAP is divided into eight sections; the first five sections (I through V) provide background information regarding the NEPA review of the DARHT project and an introduction to the associated MAP. Section VI references the Mitigation Action Summary Table which summarizes the potential impacts and mitigation measures; indicates whether the mitigation is design-, construction-, or operational-related; the organization responsible for the mitigation measure; and the projected or actual completion date for each mitigation measure. Sections VII and VIII discuss the Mitigation Action Plan Annual Report and Tracking System commitment and the Potential Impacts, Commitments, and Action Plans respectively.

Under Section VIII, 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, especially 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.

### **1.3 MAP Duration and Close-out**

The DARHT MAP is scheduled to be implemented for the operational life of the DARHT facility (30 years) (DOE 1996). Within the DARHT MAP, each DOE commitment and action plan specifies a time frame, verification strategy, and responsible agency/organization. The MAP also includes a summary of mitigation actions which provides a column that identifies the projected/actual period of mitigation action completion. Each mitigation action time frame correlates with one or more of the following DARHT project stages: design, construction, and operation. This information generally refers to when an individual action is planned to be initiated and completed.

FY 1997 has been the first full year of DARHT construction and MAP implementation. Specific mitigation actions have been selected and scheduled consistent with the scope of design- and construction-related commitments in the DARHT MAP. As mitigation actions proceed, the scope, schedule, and resulting data will be analyzed and summarized on an annual basis as part of the MAPAR. DOE will approve and verify progress or closure of mitigation measures and evaluate the success of various mitigation measures over time. These efforts will be reported, as appropriate, in the MAPAR.

### **1.4 DARHT Project Schedule and Status**

The court ordered injunction on DARHT facility construction was lifted on April 16, 1996, and DOE authorized resumption of activities on April 26, 1996. The DARHT construction contractor was fully mobilized on August 23, 1996, and full construction was authorized and began on September 30, 1996. The DARHT facility equipment installation has already begun and partial occupancy is anticipated to begin by March 1, 1998.

## **2.0 MAP IMPLEMENTATION**

The DARHT MAP is implemented on an annual basis in coordination with the federal fiscal year funding cycle. At the beginning of each fiscal year, the DARHT MAP mitigation actions are reviewed and formalized in a LANL Work Package Agreement (WPA). Following WPA authorization, the mitigation actions are initiated and tracked using a formal project management system. On an annual basis, critical information and data gathered during the implementation of mitigation actions are analyzed and summarized; these results are published in the MAPAR.

### **2.1 Mitigation Action Scoping**

A scope of mitigation actions which specifically addresses the potential impacts and commitments identified by DOE in the DARHT MAP has been identified. These mitigation actions have been selected using the DARHT MAP as a general guidance document. Individual actions (tasks and subtasks) have been selected according to the following general criteria:

- The scope of the action must specifically address potential impacts, commitments, and action plans as described in the DARHT MAP.
- The scope of action and any resulting data must be scientifically and legally defensible.
- The scope of action must be formally approved by all responsible LANL organizations.

In the mitigation action scoping process, the MAP is carefully reviewed and individual tasks and subtasks are selected to address the potential impacts, commitments, and mitigation actions. Individual tasks and subtasks are generally designed to be completed within a fiscal year but are repeated in subsequent fiscal year efforts.

## **2.2 Work Package Agreements**

As part of the DARHT MAP implementation process, LANL's Environmental Safety and Health Ecology Group (ESH-20) formally documents the selection and LANL authorization of mitigation action tasks in a WPA. The WPA is prepared by ESH-20 with concurrence from all involved LANL organizations and is submitted to the appropriate LANL funding organization for authorization. The WPA is prepared annually according to the federal fiscal year funding cycle and serves as a tracking system by documenting the task scope, cost, milestones and deliverables, and schedule. The cover page of the WPA provides a work package summary and all of the appropriate LANL authorization signatures. If the scope of specific mitigation action task requires modification within a given fiscal year, changes are documented in a revised and re-authorized WPA.

## **2.3 Mitigation Action Management and Tracking**

Once a WPA is established, ESH-20 manages and tracks individual mitigation actions on behalf of other responsible organizations within LANL. Mitigation action management and tracking is coordinated by the DARHT MAP Project Leader using a formal project management system. The project management system includes LANL-authorized project management software integrated with LANL's Financial Management Information System (FMIS). The project management system provides monthly schedule and cost status information as needed. DOE maintains a separate Mitigation Tracking System (MTS) that documents the overall progress on fulfilling the commitments described in the MAP.

Selected mitigation action tasks are assigned to individual task leaders within appropriate LANL organizations. The task leaders are responsible for implementing individual actions and tracking progress, cost, issues, and results as identified in the WPA. Task leaders coordinate with the DARHT MAP Project Leader to resolve scope changes and other issues involving mitigation action management and tracking. The status and results of mitigation actions are thoroughly reviewed by all appropriate LANL organizations and the information is ultimately reported in the DARHT MAPAR.

## 2.4 MAPAR Function and Organization

The function of the MAPAR is to fulfill DOE's commitment to the stakeholders to report the general status and critical information regarding activities associated with implementation of the DARHT MAP. Additionally, the MAPAR should reflect new information or changed circumstances and should report changes to mitigations or the MAP. In order to ensure the public has full access to this information, the MAPAR will be placed in the Los Alamos and Albuquerque DOE Public Reading Rooms.

The organization of the MAPAR is intended to provide the reader with a clear understanding of the scope and status of mitigation actions implemented annually under the DARHT MAP. The MAPAR consists of the following four main sections: introduction and background; MAP implementation; MAP scope, schedule, and status; and MAPAR changes and summary table.

## 3.0 DARHT MAP SCOPE, SCHEDULE, AND STATUS

In April 1996, DOE and LANL began implementing the DARHT MAP. The LANL DARHT Project Office and ESH-20 agreed that the DARHT Project Office would fund ESH-20 managed actions, and track general DARHT MAP activities identified for groups within the following LANL organizations: Dynamic Experimentation Division (DX), Facilities Safeguards and Security Division (FSS), Chemical Science Technology Waste Services Group (CST-17), and Environment, Safety, and Health Industrial Hygiene Group (ESH-4). The DARHT Project Office is responsible for providing the annual status for mitigation actions implemented by these organizations. ESH-20 was selected to track activities identified for ESH-20 and LANL's Environmental Safety and Health Water Quality and Hydrology Group (ESH-18).

The scope of this MAPAR represents mitigation action tasks that were implemented in through FY 1997. The scope of mitigation action tasks identified, initiated, or completed in FY 1997, represent the first full year of DARHT MAP implementation. The mitigation actions for FY 1997 address commitments specific to design- and construction-related DARHT activities. A summary of the scope of potential impacts and commitments addressed in this MAPAR is provided in Table 2-1.

**Table 2-1: Summary of Potential Impacts and Commitments Addressed**

Potential Impacts Commitment Addressed	DARHT phase	MAP page reference	MAPAR section
<b>A. General Environment</b>			
1. Radioactive and toxic material contamination: commitments (a, d, e)	construction (a) design (d, e)	5, 14	3.1.2
1. Radioactive and toxic material contamination: commitments (b, c) specific to operations – not addressed in this MAPAR	operations	N/A	N/A
2. Waste contamination from vessel cleanup: commitment specific to operations – not addressed in this MAPAR	operations	N/A	N/A
3. Waste contamination from spills: commitment specific to operations – not addressed in this MAPAR	operations	N/A	N/A
4. Contamination from water discharges: commitment specific to operations – not addressed in this MAPAR	operations	N/A	N/A
<b>B. Soils</b>			
1. Loss of soil due to severe storm runoff: commitments (a, b, c)	construction	6-7, 14	3.1.3
2. Loss of soil due to off-road activities and ground- breaking: commitments (a, b, c, d, e)	construction	7, 14-15	3.1.3
<b>C. Biotic Resources</b>			
1. General impact to TES: commitments (a, b, c, d) specific to operations – not addressed in this MAPAR	operations	N/A	N/A
2. Noise and other impacts to the Mexican spotted owl: commitments (a, b) specific to operations – not addressed in this MAPAR	operations	N/A	N/A
2. Noise and other impacts to the Mexican spotted owl: commitments (c, d, e, f, g, h, i, j, k, l, m)	construction	8-9, 15-16	3.1.4
2. Noise and other impacts to the Mexican spotted owl: commitments (n, m, o, p, q, r, s, t, u, v, w, x) specific to operations – not addressed in this MAPAR	operations	N/A	N/A
3. Noise and other impacts to the peregrine falcon: commitments (a, b)	construction	9-10, 17	3.1.4
4. Noise and other impacts to northern goshawk: commitments (a, b, c)	construction	10, 17	3.1.4
5. Noise and other impacts to spotted bat: commitment (a)	construction	10, 17	3.1.4
6. Noise and other impacts to meadow jumping mouse: (a)	construction	11, 17	3.1.4
7. Noise and other impacts to Jemez Mountains salamander: commitments (a, b)	construction	11, 17	3.1.4

**Table 2-1: Summary of Potential Impacts and Commitments Addressed (continued)**

<b>C. Biotic Resources (continued)</b>			
8. Large mammal/predator movement disturbance: commitments (a, b, c)	construction	11-12, 17	3.1.4
<b>D. Cultural/Paleontological Resources</b>			
1. Site disturbance from blast effects: commitment (a) specific to design – completed during design (see MAP)	design	N/A	N/A
1. Site disturbance from blast effects: commitment (b) specific to operations – not addressed in this MAPAR	operations	N/A	N/A
1. Site disturbance from blast effects: commitment (c) specific to design – completed during design (see MAP)	design	N/A	N/A
1. Site disturbance from blast effects: commitment (d) specific to design – completed during design (see MAP)	design	N/A	N/A
1. Site disturbance from blast effects: commitment (e)	pre-operations	12, 18	3.1.5
<b>E. Human Health and Safety</b>			
1. Health effects from high noise levels: commitment (a) specific to operations – not addressed in this MAPAR	operations	N/A	N/A
1. Health effects from high noise levels: commitment (b)	construction	13, 18	3.1.6
2. Health effects form high radiation levels: commitments (a, b)	construction	13, 18	3.1.6
2. Health effects form high radiation levels: commitment (c) specific to operations – not addressed in this MAPAR	operations	N/A	N/A

### 3.1 Potential Impacts, Commitments and Mitigation Actions

#### 3.1.1 Mitigation Action Plan Annual Report and Tracking System

ESH-20 is currently managing and tracking mitigation actions on behalf of other responsible organizations within LANL. Mitigation action management and tracking is coordinated by the DARHT MAP Project Leader, in coordination with the DARHT Project Leader, using a formal project management system. The project management system includes LANL-authorized project management software integrated with LANL's FMIS process. The project management system provides monthly schedule and cost status information as needed. DOE is tracking overall fulfillment of commitments described in the MAP.

Selected mitigation actions have been assigned to individual task leaders within appropriate LANL organizations. The task leaders are responsible for implementing individual actions and tracking progress, cost, issues, and results as identified in the WPA. Task leaders coordinate with the DARHT MAP Project Leader to resolve scope changes and other issues involving mitigation action management and tracking. The status and results of mitigation actions are reviewed by all appropriate LANL organizations and DOE LAAO, and the critical information is prepared for reporting in the DARHT MAPAR.

#### 3.1.2 Mitigation Actions for the General Environment

***NOTE: MAP Section VIII. A. 1 (b, c) relates to commitments applicable to facility operations and will be addressed in a future MAPAR.***

**Summary of Potential Impacts**

**MAP Section VIII. A. 1 (a, d, e)**

The DARHT MAP identifies the potential for toxic and radioactive materials to be released to the general environment surrounding the DARHT facility. Toxic and radioactive materials could be released to the general environment through the following mechanisms: a structural failure of containment vessels or during open air firing operations; release of various types of waste as a result of cleaning out the containment vessels; release of various hazardous materials as a result of spills within the DARHT facility; and release of hazardous levels of various substances as a result of discharges of contaminated water from the DARHT facility.

**Mitigation Action Scope and Status**

MAP Section VIII. A. 1 (a): 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.

In FY 1997, ESH-20 collected baseline data at the DARHT facility, the areas immediately adjacent to the facility site, and the appropriate control sites. Baseline chemical (radionuclides and heavy metals) data were collected for soils, vegetation, and sediments. Analytical results for FY 1996 sampling generally indicate chemical concentrations are consistent with concentrations reported in the Final EIS. The exception, a single sediment sample, contained concentrations of strontium-90 (<sup>90</sup>Sr) higher than previously reported. The concentration of <sup>90</sup>Sr in the sediment sample is below the LANL screening action limits and is considered, at this time, to be an outlier. Consistent with Standard Operating Procedures, the same location will be sampled in FY 1998. ESH-20 is in the process of preparing a LANL Manuscript Publication on the results soil, vegetation, and sediment sampling conducted in support of the DARHT MAP during FY 1997.

During FY 1997, multiple studies designed to collect similar data for invertebrates, mammals, birds, and surface water, have been initiated. These mitigation actions include short-term field studies designed to identify the presence or absence, density, and movement of organisms as a function of establishing baseline chemical data in addition to other environmental baseline information. Baseline data is being established following the appropriate sampling and analysis protocols consistent with DOE Order 5400.1. All baseline study field activities are being coordinated with LANL's DARHT Project Office, Dynamic Experimentation Division Office (DX-DO) Facility Manager, and DX Division's Field Operations and Experiment Support Group (DX-4) Access Control Office per ESH-20 General Field Work Standard Operating Procedures. These data are being collected through the implementation of the following mitigation action subtasks:

Subtask 1: This is a continuation of FY 1996 mitigation actions. FY 1997 activities include collecting soil, sediment, vegetation, and roadkill (or equivalent) samples for chemical analyses in order to continue gather data critical to establishing the baseline for the DARHT facility prior to initiating the operational phase of the project.

Subtask 2: Under this subtask, baseline data is being gathered on the concentrations of chemicals (radionuclides and heavy metals) found in an arthropod species (honey bees) as an organism representative of the invertebrates inhabiting the DARHT project area. Honeybees are currently collected throughout LANL as a cost-effective means of collecting chemical data on invertebrates. This small-scale study is being conducted consistent with existing methodology used in honeybee studies that have been conducted throughout LANL. ESH-20 has established a control site and a permanent apiary with two beehives from which bee samples have been collected. Honeybee tissue samples have been submitted to LANL for a suite of chemical analyses that complement the analyses being conducted under Subtask 1.

Subtask 3: Under this subtask, baseline chemical data and supplemental information is being collected on birds that occur within the DARHT project area. This short-term study is being conducted to establish baseline data prior to initiating the operational phase of the DARHT project. Under US Fish and Wildlife Service/New Mexico State Game and Fish licensing and protocol, netting stations have been established in order to gather information concerning the presence and movement of birds species in the DARHT project area and an appropriate control site. This information is being used to validate data acquired from the chemical analysis of bird tissues collected for the baseline studies. Due to above average rainfall during the FY 97 field season, only one sample was collected. All bird tissue samples will be submitted to LANL during FY 98 for a suite of chemical analyses that complement the analyses being conducted under Subtask 1.

Subtask 4: Under this subtask, baseline data and supplemental information is being collected on small mammal species (specifically rodents) that occur within the DARHT project area. This short-term study is being conducted to establish baseline data prior to initiating the operational phase of the DARHT project. Using existing methodology for small mammal (rodent) studies currently being conducted throughout LANL, information concerning small mammal species composition in the DARHT project area, and an appropriate control site, has been collected. This information will be used to validate data acquired from the chemical analysis of tissues from small mammal species collected for the baseline studies. Small mammal tissue samples have been submitted to LANL for a suite of chemical analyses that complement the chemical analyses being conducted under Subtask 1.

Subtask 5: Under this subtask, baseline water quality data is being collected by LANL's Water Quality and Hydrology Group (ESH-18) to determine current surface water quality and quantity, and to determine if any migration of potential pollutants is occurring from the DARHT project area during construction. Automated storm water runoff monitoring stations have been purchased. The sampling protocol has been established in accordance with 40 CFR 136. The final siting and operation of the monitoring stations is currently under evaluation. Surface water samples will be submitted to LANL for a suite of chemical analyses that complement the analyses being conducted under Subtask 1. These data will be used to compare current water quality data with samples collected during facility operation.

MAP Section VIII. A. 1 (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.

DX and CST-17 have reported that the design and the final drawings for the single-wall vessel have been completed. The Safety Analysis Report for the double-walled vessel design has been initiated and is in process. Some of the auxiliary systems still need to be designed. The Request for Quotation for the vessel material has been issued.

MAP Section VIII. A. 1 (e): Containment vessels used in selected dynamic experiments would be decontaminated.

LANL has developed containment vessel cleanout processes in support of the commitment to decontaminate vessels used in selected dynamic experiments. The physical and chemical processes for containment vessels have been optimized using surrogate debris materials. The parameters for process optimization include process performance, chemical usage, waste volume reduction, hazard mitigation and recyclability of reagents. Based on data from these tests, full process flow sheets and draft instrumentation and piping diagrams for the process have been prepared and reviewed by the necessary LANL organizations. This information has been used to evaluate the location for the cleanout activities and to assess and address the facility-specific environmental, safety, and health requirements.

LANL has initiated the design process for a permanent vessel preparation facility to be constructed and operated at TA-15 near the DARHT facility. This facility will be used to decontaminate and stage the vessels used in the dynamic experiments. As an interim action, LANL will utilize an existing facility at TA-50 to decontaminate vessel materials until the vessel preparation facility is operational. All appropriate NEPA documentation for these actions has been completed.

***NOTE: MAP Section VIII. A. 2-4 relates to commitments applicable to facility operations and will be addressed in a future MAPAR.***

### **3.1.3. Mitigation Actions for Soil**

#### **Summary of Potential Impacts: MAP Section VIII. B. 1 (a-c), 2 (a-e)**

According to the DARHT MAP, 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. In addition, off-road and ground-breaking activities caused by additional construction and operational activities may result in further soil erosion and damage to plants. Additional construction at the DARHT site would further disturb about 2.0 ac (0.8 ha) of mixed piñon-juniper/ponderosa pine habitat.

**Mitigation Action Scope and Status**

MAP Section VIII. B. 1 (a): The DARHT Project Office, ESH-18, and the general construction contractor, have developed a Storm Water Pollution Prevention (SWPP) Plan that identifies appropriate Best Management Practices (BMPs) for the construction-related activities for the DARHT facility. Storm water best management practices are continually implemented during all construction activities. All soil erosion mitigation measures are followed in accordance with National Pollutant Discharge Elimination System (NPDES) SWPP Plan 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 Best Management Plan, which includes minimization of fuel and oil spills, good housekeeping practices, and control of stored materials and soil stockpiles.

Under the FY 1997 implementation of the DARHT MAP, ESH-18 provided support and oversight of the DARHT construction SWPP Plan. ESH-18 conducted routine inspections of construction activities by coordinating with the DARHT Project Office, Construction Project Manager, and the general construction contractor.

MAP Section VIII. B. 1 (b): The SWPP Plan will be modified if control measures are ineffective or construction sequences change.

As a means of responding to this commitment, ESH-18 is provided support and oversight of the DARHT construction SWPP Plan; necessary changes will be implemented should the control measures be found ineffective or the construction sequences change.

MAP Section VIII. B. 1 (c): Establishment and continuance of erosion/sediment control BMPs. The BMPs required by the SWPP Plan shall be continually monitored and maintained.

The BMPs required by the SWPP Plan and the construction plans are continually monitored and maintained. In support of this commitment, ESH-18 conducts routine inspections of erosion/sediment control BMPs for construction activities by coordinating with the DARHT Project Office, Construction Project Manager, and the general construction contractor.

MAP Section VIII. B. 2 (a): Workers must avoid off-road activities and stay within approved right-of-ways.

As part of the scope of the DARHT BA, ESH-20 coordinated with DOE, DX, and the U.S. Fish and Wildlife Service (USFWS) to established the appropriate site right-of-ways. Based on the scope of the DARHT BA and BMPs implemented by DX and ESH-18, contractual requirements have been established for the general contractor; these requirements specify proper right-of-way access and restrictions regarding off-road activities. Off-road activities are conducted as described in the DARHT BA; no additional off-road activities have occurred since approval of the BA.

MAP Section VIII. B. 2 (b): Any proposed activities requiring the disturbance of mature trees and shrubs must first be approved by ESH-20 to avoid disturbance to threatened or endangered species and other wildlife species.

As part of the scope of the DARHT BA, ESH-20 coordinated with DOE, DX, and the USFWS to establish the appropriate disturbance of vegetation surrounding the DARHT facility. Based on the scope of the DARHT BA, contractual requirements have been established for the general contractor; these requirements identify the current vegetation removal procedures that specify approval of vegetation removal through ESH-20. Additional vegetation removal activities would be conducted as described in the DARHT BA; no additional DARHT-related vegetation removal activities have occurred since approval of the BA.

MAP Section VIII. B. 2 (c): ESH-20 must be notified prior to any new ground-breaking activities. ESH-20 will review all new sites and evaluate any potential impacts associated with the action. ESH-20 will also provide mitigation measures to minimize potential impacts, including revegetation as addressed in the SWPP Plan.

As part of the scope of the DARHT BA, ESH-20 coordinated with DOE, DX, and the USFWS to establish the appropriate requirements for ground-breaking activities around the DARHT facility. Based on the scope of the DARHT BA, contractual requirements have been established for the general contractor; these requirements identify the current ground-breaking procedures, which specify approval through ESH-20 and coordination with ESH-18 under the SWPP Plan. Additional ground-breaking activities would be conducted as described in the DARHT BA; no new DARHT-related ground-breaking activities have occurred since approval of the BA.

MAP Section VIII. B. 2 (d): The size of a vegetation buffer zone between the facilities and the edge of the mesa tops will be determined by ESH-20 based on topographic aspects and vegetation composition.

As part of the scope of the DARHT BA, ESH-20 coordinated with DOE, DX, and the USFWS to established the appropriate size of vegetation buffer zone between the facilities and the edge of the mesa tops based on topographic aspects and vegetation composition. As needed, ESH-20 will continue to evaluate the site-specific conditions to assess the appropriate size of vegetation buffer zones; no additional site changes have occurred since approval of the BA.

MAP Section VIII. B. 2 (e): Indigenous trees and/or other indigenous vegetation will be planted, as appropriate, for erosion control, landscaping, and additional wildlife habitat.

Under LANL's best management practices, revegetation activities are conducted based on recommendations from ESH-20. When the construction activities are completed for the DARHT facility site, ESH-20 will assist DX in reestablishing indigenous trees and/or other indigenous vegetation, as appropriate, for erosion control, landscaping, and additional

wildlife habitat. Revegetation activities are not appropriate at this time given the DARHT site is still under construction.

### 3.1.4. Mitigation Actions for Biotic Resources

**NOTE:** MAP Section VIII. C. 1 (a-d); C. 2 (a-b); and C. 2 (n-x) relates to commitments applicable to facility operations and will be addressed in a future MAPAR.

#### **Summary of Potential Impacts:**

MAP Section VIII. C. 2 (c-m); 3 (a-b); 4 (a-c); 5 (a); 6 (a); 7 (a-b)

DARHT construction and operation could impact the Mexican spotted owl (*Strix occidentalis lucida*) because of noise from firings and other operations, as well as other activities at the firing site. These activities could impact other Threatened or Endangered Species potentially occurring in the project area. If present, the following species could be affected: peregrine falcon (*Falco peregrinus*); northern goshawk (*Accipiter gentilis*); spotted bat (*Euderma maculatum*); meadow jumping mouse (*Zapus hudsonius*); and Jemez Mountains salamander (*Plethodon neomexicanus*)

#### **Mitigation Action Scope and Status**

MAP Section VIII. C. 2 (c): ESH-20 will be contacted prior to new removal of mature trees (live or snags) to determine impacts 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 through August 31).

No additional DARHT-related tree removal has occurred since USFWS concurrence with the DARHT BA. If additional tree removal becomes necessary, ESH-20 will be contacted, and the tree removal activities will be implemented as stated above.

MAP Section VIII. C. 2 (d): There will be no additional habitat disturbance of habitat within 0.25 miles (400 meters) of known Mexican spotted owl nesting habitat.

The status and location of Mexican spotted owl nesting habitat is closely monitored and recorded by ESH-20 under USFWS protocol according to the BMPs established in the BA. All required Mexican spotted owl nesting habitat buffer zones have been maintained. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (e): Construction lights must be arranged so that light is not directed toward the canyons, or is shielded, during the breeding season.

Under the conditions and best management practices established in the DARHT BA, construction lights have been arranged so that light is not directed toward the canyons, or is shielded, during the breeding season. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (f): Nighttime construction noise associated with the DARHT facility is restricted as much as possible.

Under the conditions and best management practices established in the DARHT BA, nighttime construction noise associated with the DARHT facility is restricted as much as possible. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (g): Noise from construction equipment, such as electrical generators, is kept as quiet as possible so as not to disturb normal Mexican spotted owl activities and is kept directed away from the canyons as much as possible.

Under the conditions and best management practices established in the DARHT BA, noise from construction equipment is kept as quiet as possible so as not to disturb normal Mexican spotted owl activities and is kept directed away from the canyons as much as possible. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (h): Equipment associated with construction is kept at least 25 feet (8 meters) away from the surrounding canyon edges during the breeding season.

Under the conditions and best management practices established in the DARHT BA, equipment associated with construction is kept at least 25 feet (8 meters) away from the surrounding canyon edges during the breeding season. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (i): Construction personnel are not allowed beyond the surrounding canyon edges.

Under the conditions and best management practices established in the DARHT BA, construction personnel are not allowed beyond the surrounding canyon edges. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (j): Flow-checks will be constructed to slow the rate of the release of water to the canyons originating from the facility, and native vegetation will be planted, as appropriate, to prevent erosion associated with this water release.

Under the conditions established in the DARHT BA and BMPs implemented as part of the SWPP Plan under site NPDES requirements, flow-checks have been constructed to slow the rate of the release of water to the canyons originating from the facility site. Native vegetation will be planted, when appropriate, to prevent long-term erosion associated with this water release.

MAP Section VIII. C. 2 (k): Native trees will be planted along roads, disturbed canyon edges, and the edges of parking lots, as appropriate.

ESH-20 will coordinate planting native trees along roads, disturbed canyon edges, and the edges of parking lots, when construction site activities have subsided enough such that it is appropriate to begin revegetating. The planting of native trees will be consistent with the conditions and best management practices established in the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (l): Warning sirens will be placed on the mesa side of the DARHT facility.

Warning sirens have not yet been installed on the DARHT facility. When the warning sirens are installed, installation will be consistent with the conditions and best management practices established in the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 2 (m): All construction equipment will be well-maintained and as quiet as possible.

The general contractor is responsible for maintaining all construction equipment; the equipment is maintained as quiet as possible consistent with the conditions and best management practices established in the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 3 (a): ESH-20 will be contacted prior to any new removal of trees (live or snag) 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.

ESH-20 is in the process of conduction surveys for the peregrine falcon under USFWS protocol as part of the TES HMP. Although surveys are still in process, the peregrine falcon has not been identified around the DARHT facility. No additional DARHT-related tree removal has occurred since USFWS concurrence with the DARHT BA. If additional DARHT-related tree removal becomes necessary, ESH-20 will be contacted, and the tree removal activities will be implemented as stated under Section VIII. C. 3 (a) of the DARHT MAP.

MAP Section VIII. C. 3 (b): ESH-20 will be contacted, 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.

ESH-20 is in the process of conducting surveys for the peregrine falcon under USFWS protocol as part of the TES HMP. Although surveys are still in process, the peregrine falcon has not been identified around the DARHT facility. No additional canyon slope habitat disturbance has occurred since USFWS concurrence with the DARHT BA. If additional disturbance of canyon slope habitat becomes necessary, ESH-20 will be contacted, and the activities will be implemented as stated under Section VIII. C. 3 (b) of the DARHT MAP.

MAP Section VIII. C. 4 (a): ESH-20 will be contacted prior to any new removal of trees (live or snag) to determine potential impact to nesting and foraging habitat of the northern goshawk.

Although no longer a federally listed species, the TES HMP recognizes the northern goshawk as a "Species of Concern" for the purposes of developing and implementing the plan. Potential habitat for the northern goshawk has been identified and mapped throughout LANL. No additional trees (live or snag) have been removed since USFWS concurrence with the DARHT BA. Should additional tree removal be required, ESH-20 will be contacted, and the activities will be implemented as stated under Section VIII. C. 4 (a) of the DARHT MAP.

MAP Section VIII. C. 4 (b): Long-term monitoring of potential northern goshawk habitat in Potrillo and Valle canyons will be carried out by ESH-20.

Although no longer a federally listed species, the TES HMP recognizes the northern goshawk as a "Species of Concern" for the purposes of developing and implementing the plan. Potential habitat for the northern goshawk has been identified, mapped, and will be continually monitored throughout LANL as part of the TES HMP.

MAP Section VIII. C. 4 (c): The vegetation in Potrillo and Valle canyons and on the mesa top surround the facility will be preserved.

Under the conditions and best management practices established in the DARHT BA, vegetation on the mesa top surrounding the DARHT facility has been preserved as much as possible. No additional vegetation removal has occurred in Potrillo and Valle canyons since USFWS concurrence with the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.

MAP Section VIII. C. 5.: ESH-20 will be notified so that a survey for spotted bat 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.

ESH-20 has conducted a LANL-wide survey for the spotted bat consistent with USFWS requirements as part of the development of TES HMP. The spotted bat has been netted and

positively identified at Bandelier National Monument. These TES HMP survey efforts have resulted in identifying the existence of spotted bat at LANL using echolocation survey techniques. No new DARHT activities have occurred along the slopes of Potrillo, Valle, or Water Canyons since USFWS concurrence with the DARHT BA.

MAP Section VIII. C. 6.: ESH-20 will be notified so that a survey for meadow jumping mouse may be conducted prior to conducting any activities that could disturb potential habitat along 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 through 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.

ESH-20 is in the process of addressing LANL-wide survey requirements for the meadow jumping mouse consistent with USFWS requirements through the development of a habitat model technique as part of the TES HMP. No new DARHT activities have occurred in the bottom of Potrillo, Valle, or Water Canyons since USFWS concurrence with the DARHT BA.

MAP Section VIII. C. 7 (a): ESH-20 will be notified so that a survey for the Jemez Mountains salamander 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 Mountains salamanders are found the activity will be allowed; if a Jemez Mountains salamander is found the activity will not be allowed until after the time of their highest activity (June through 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.

The Jemez Mountains salamander has historically been identified at LANL. ESH-20 is in the process of developing a Jemez Mountains salamander habitat modeling technique as part of the TES HMP during 1997. This technique will be validated by conducting LANL-wide potential habitat surveys using GIS landcover maps generated as part of the TES HMP. The intent of this modeling technique is to provide a valid survey technique as a replacement for the current labor intensive and intrusive survey technique. No new DARHT activities have occurred along the slopes of Potrillo, Valle, or Water Canyons since USFWS concurrence with the DARHT BA.

MAP Section VIII. C. 7 (b): ESH-20 will be notified prior to any new removal of trees (live, snagged, or downed log) to determine impact to Jemez Mountains salamander habitat. If no Jemez Mountains salamander habitat is found the activity will be allowed; if Jemez Mountains salamander is found the activity will not be allowed until after the time of the 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.

Under the conditions and best management practices established in the DARHT BA, ESH-20 will be notified prior to any new removal of trees (live, snagged, or downed log) to determine impact to Jemez Mountains salamander habitat. No additional DARHT-related tree removal (live, snagged, or downed log) has occurred since USFWS concurrence with the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.

**Summary of Potential Impacts:**  
**MAP Section VIII. C. 8 (a-c)**

The movement of large mammals and predator species could be affected by permanent fence installation associated with the end of the DARHT construction phase. The mesa tops around the DARHT facility serve as a large mammal migration and use corridor. The installation of permanent fences could affect daily and seasonal movement of large mammals and predator species in the area. The following large mammal and predator species could be affected: elk, black bear, and mountain lion. Furthermore, removal of standing trees could affect mammals and birds species that use the trees for habitat.

**Mitigation Action Scope and Status**

MAP Section VIII. C. 8 (a-b): 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. ESH-20 will provide site-specific measures regarding the construction of fences and other barriers to facility the movement of wildlife, as appropriate.

**Large mammals (elk)**

As part of the scope of the DARHT MAP, ESH-20 has established and initiated a field study designed to identify the movement of elk in and around the DARHT facility. The field study involves using existing LANL methodology for trapping elk and placing a collar with a Global Positioning System (GPS) unit attached around the elk's neck. The procedure has been approved by LANL's Institutional Animal Care and Use Committee in full compliance with animal care and use regulations implemented by the U.S. Department of Agriculture. Once the GPS collar is on an elk, ESH-20 remotely tracks the movement of the collared elk over an extended period of time, thus enabling ESH-20 to establish a scientifically-based conclusion regarding elk movement as a means of providing the appropriate guidance for permanent fence installation. Consultation with the New Mexico State Game and Fish has been conducted as needed.

During FY 97, one elk was collared and tracked as part of the DARHT MAP. The data collected from the collared elk has been analyzed with similar data from adjacent sites. Using these data, ESH-20 is developing a GIS-based model for predicting large mammal movements given a number of permanently fencing scenarios. This model will be used as the bases for addressing this commitment.

Large predators

Large predator species are less frequently observed than elk in and around the DARHT facility. However, permanent fencing may have a greater affect on large predator species given their noted sensitivity to industrial activities. ESH-20 has initiated a study to determine the presence or absence of larger predator species in and around the immediate DARHT facility site. This has been accomplished using standard wildlife study technique involving scent-marking posts surrounded by finely sifted soil. The scent marking post are designed to attract selected predators, and the sifted soil provides a means of recording the predator's use and therefor presence.

Data gather following the deployment of 10 scent marking posts has been analyzed using standard techniques. A total of 10 animal tracks were recorded during the FY 97 monitoring. The most notable predator evidence included tracks from bobcat, fox, and possibly mountain lion. ESH-20 may deploy GPS collars on large predator species such as mountain lions if this study indicates large predators exist in high enough densities to support a GPS collar monitoring effort.

MAP Section VIII. C. 8 (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 taken.

ESH-20 is routinely contacted during tree removal activities at LANL. If additional tree removal around the DARHT facility becomes necessary, ESH-20 would be contacted and removal activities would be conducted according to established BMPs.

**3.1.5. Mitigation Actions for Cultural/Paleontological Resources**

***NOTE: MAP Section VIII. D. 1 (a, c, d) relates to design phase commitments that were recorded as "complete" in the DARHT MAP. MAP Section VIII. D. 1 (b, f, g) and MAP Section VIII D. 2 (a-b) relate to commitments applicable to facility operations and will be addressed in a future MAPAR.***

**Summary of Potential Impacts:**  
**MAP Section VIII. D. 1 (e)**

The DARHT MAP identifies potential impacts from blast effects, such as shock waves and flying debris, from shots using high-explosive charges. These blast effects could affect nearby archeological sites, especially Nike'muu, and the immediately surrounding environment.

**Mitigation Action Scope and Status**

MAP Section VIII. D. 1 (e): Under this section of the DARHT MAP there is a commitment to design and implement a long-term monitoring procedure at Nike'muu, using photographs or other means of recording in conjunction with the State Historic Preservation Officer, the National Park Service (NPS), or local Tribal governments. This monitoring procedure will

be developed to determine if activities at Technical Area 15 are causing any structural changes to the ruin over time.

As part of the DARHT MAP, ESH-20 has implemented the following two subtasks as a means of fulfilling commitments made under MAP Section VIII. D. 1 (e):

Subtask D-1: ESH-20 is completing Phase II of an ongoing cultural resource assessment of cultural resources within a hazard radius zone which may be affected by fragments generated during the operational phase of the DARHT project. The purpose of this task is to comply with Section 106 of the National Historic Preservation Act (NHPA), the American Indian Religious Freedom Act (AIRFA), and Executive Order 13007. Activities have included collecting data for preparing a standard report that will be used in conducting consultation with the State Historic Preservation Officer (SHPO) and tribal governments.

Subtask D-2: Under this subtask, ESH-20 has established an interagency contract with the NPS to conduct an architectural analysis of LA 12655 (Nake'muu) and to conduct a subsequent site monitoring program. The purpose of this subtask is to establish the baseline condition of Nake'muu by photographing and documenting the condition of this site before the DARHT facility is operational. This effort will assist LANL and DOE in developing a monitoring procedure as a means of assessing the long-term blast effects from shock waves and flying debris on this archaeological site. The NPS has completed the first year of the monitoring program and has provided ESH-20 with a proposed monitoring plan and annual report. Subsequent yearly monitoring of Nake'muu and any consequent mitigation measures will be covered in a separate WPA for years beyond FY 1997. Work performed by NPS under the agreement will be reviewed and monitoring by ESH-20's Cultural Resources Team Leader.

The NPS has been selected as the appropriate entity to conduct the monitoring of Nake'muu because they are considered the experts in the field and are currently staffed and equipped for such tasks. Additionally, the NPS is considered an independent (non-biased) party. Pueblo officials will be involved in specific aspects of surveys of Nake'muu but will not be paid for their involvement. ESH-20 serves as a LANL representative for oversight of the NPS contract, coordinates with pueblo official with respect to their involvement, and reviews and manages any resulting official documentation. Any official documentation generated during the monitoring of Nake'muu will be managed as a controlled document in a manner identical to other LANL cultural resources reports.

### **3.1.6 Mitigation Actions for Human Health and Safety**

***NOTE: MAP Section VIII. E. 1 (a), and MAP Section VIII. E. 2 (c) relate to commitments applicable to facility operations and will be addressed in a future MAPAR.***

**Summary of Potential Impacts:**

**MAP Section VIII. E. 1 (b)**

The DARHT MAP identifies the potential for adverse health effects on workers and the public from high noise levels associated with the DARHT facility, especially during construction and test firing.

**Mitigation Action Scope and Status**

MAP Section VIII. E. 1 (b): Under this section of the DARHT MAP there is a commitment to minimize construction noise as much as possible by properly maintaining equipment.

Under contractual requirements that have been established for the general construction contractor, all construction equipment is properly maintained such that construction noise is minimized as much as possible. These requirements also apply to conditions implemented as part of the best management practices established in the DARHT BA.

**Summary of Potential Impacts:**

**MAP Section VIII. E. 2 (a)**

The DARHT MAP identifies the potential for adverse health effects on workers from radiation from DARHT operations.

**Mitigation Action Scope and Status**

MAP Section VIII. E. 2 (a): Under this section of the DARHT MAP there is a commitment provide the appropriate radiation shielding around the accelerators to limit radiation exposure to workers in the facilities.

The walls of the DARHT structure have been comprehensively designed to serve as the radiation shielding around the accelerators. During the design phase of DARHT project, LANL conducted extensive research and design regarding the radiation shielding required to limit the radiation exposure to workers in the facility. The design and construction of radiation shielding for the DARHT structure was implemented according to the DOE Radiological Control Manual consistent with the operating principles for maintaining personal radiation exposure As-Low-As-Reasonably-Achievable (ALARA). When DARHT becomes operational, all associated workers will be monitored under LANL's personnel radiation monitoring program.

## 4.0 MAPAR CHANGES AND SUMMARY TABLE

### 4.1 MAPAR changes for FY 1997

#### Scope of the MAP

Based on recommendations provided in each annual report or quarterly reports as appropriate, commitments and actions plans implemented as part of the DARHT MAP may be changed, added, or deleted. Modification to the scope of commitments and action plans would be directed by DOE/LAAO based on scientifically and legally defensible information generated during the implementation of the DARHT MAP. Should the scope of the DARHT project change during the construction or early operational stages, as part of the appropriate NEPA review, the scope of the DARHT MAP would be changed as necessary. DOE has determined that the current scope of mitigation actions for the DARHT MAP should be repeated for FY 98.

#### 4.2 Status Summary of Mitigation Actions

Potential Impact	Mitigation Measure	Responsible-Organization	Mitigation Action Status
<b>MAP Section VIII. A. General Environment</b>			
1. Radioactive and toxic material contamination	(a) Collect baseline data on contaminants	ESH-20 ESH-18	FY 1996 soil, sediment, and vegetation sampling results indicate concentration of chemicals consistent with the results reported in the Final DARHT EIS with one notable exception. A single sediment sample indicates an elevated <sup>90</sup> Sr concentration; the concentration level is below LANL screening action limits and considered an outlier.  In FY 1997, similar chemistry baseline studies were initiated for invertebrates, birds, mammals, and surface water.
1. Radioactive and toxic material contamination	(b, c) [specific to operations]	N/A	Not addressed in this MAPAR.
	(d) Single-walled and double-walled steel containment vessels (design-related)	DX CST-17	The single-wall vessel design and final drawings are complete. The Safety Analysis Report for the double-walled vessel design has been initiated.
	(e) Decontamination of vessels (design-related)	DX CST-17	The physical and chemical processes for containment vessels have been optimized using surrogate debris material. Full process flow sheets and draft instrumentation and piping diagrams have been prepared and reviewed. The vessel preparation facility is being designed and LANL has identified a location for interim decontamination processes.
2. Waste contamination from vessel cleanup	[specific to operations]	N/A	Not addressed in this MAPAR.
3. Waste contamination from spills	[specific to operations]	N/A	Not addressed in this MAPAR.
4. Contamination from water discharges	[specific to operations]	N/A	Not addressed in this MAPAR.
<b>MAP Section VIII. B. Soils</b>			
1. Loss of soil due to severe storm runoff	(a) Adherence to SWPP Plan measures	DX ESH-18	A Storm Water Pollution Prevention (SWPP) Plan for construction has been completed in full compliance with the requirements of the National Pollutant Discharge Elimination System (NPDES). ESH-18 is providing support and oversight for SWPP Plan implementation through construction.
	(b) Modification of SWPP Plan if necessary	DX ESH-18	The existing SWPP Plan will be modified as necessary by DX, the general contractor and ESH-18.
	(c) Continuance of Best Management Practices	DX ESH-18	Best Management Plans (BMPs) under the existing SWPP Plan are implemented as required. ESH-18 conducts routine inspections of construction operations for consistency with SWPP Plan.

**Status Summary of Mitigation Actions (Cont.)**

2. Loss of soil due to off-road activities and ground-breaking	(a) Avoidance of off-road activities	DX ESH-20	Construction activities are conducted according to the BMPs established by DOE, LANL, and USFWS during the preparation and approval of the DARHT Biological Assessment (BA); no additional DARHT-related off-road activities have occurred since approval of the BA.
2. Loss of soil due to off-road activities and ground-breaking (cont.)	(b) Approval for disturbance of vegetation	DX ESH-20	Construction activities are conducted according to BMPs established by DOE, LANL, and USFWS during the preparation and approval of the DARHT BA; no additional DARHT-related vegetation disturbance has occurred since approval of the BA.
	(c) Notification of ESH-20 prior to ground-breaking	DX ESH-20	Construction activities are conducted according to BMPs established by DOE, LANL, and USFWS during the preparation and approval of the DARHT BA; no new DARHT-related ground-breaking has occurred since approval of the BA.
	(d) Determination of vegetation buffer zone	ESH-20	Appropriate vegetation buffer zones were established during the preparation and approval of the DARHT BA; no new DARHT-related site changes have occurred since approval of the BA.
	(e) Revegetation with indigenous vegetation	DX ESH-20	Revegetation activities have not occurred due to the continued construction activities. When construction is complete, ESH-20 will assist DX in re-establishing indigenous trees and/or other indigenous vegetation.
<b>MAP Section VIII. C. Biotic Resources</b>			
1. General impact to TES	(a, b, c, d) [specific to operations]	N/A	This commitment is addressed as part of the anticipated scope of the final Threatened or Endangered Species (TES) Habitat Management Plan (HMP).
<b>Potential Impact</b>	<b>Mitigation Measure</b>	<b>Responsible-Organization</b>	<b>Mitigation Action Status</b>
2. Noise and other impacts to the Mexican spotted owl	(a, b) [specific to operations]	N/A	This commitment is addressed as part of the anticipated scope of the final TES HMP.
2. Noise and other impacts to the Mexican spotted owl	(c) ESH-20 approval of tree removal	DX ESH-20	Construction activities will be conducted according to BMPs established by DOE, LANL, and USFWS during the preparation and approval of the DARHT BA; no additional DARHT-related tree removal has occurred since approval of the BA.
	(d) Maintenance of owl habitat within 0.25 mile of nesting habitat	DX	The status and location of Mexican spotted owl nesting habitat is closely monitored and recorded by ESH-20 under USFWS protocol according to the BMPs established in the BA. All required Mexican spotted owl nesting habitat buffer zones have been maintained. This commitment is maintained as part of the anticipated scope of the final TES HMP.
	(e) Reorientation/shielding of lights during breeding season	DX	Under the conditions and best management practices established in the DARHT BA, construction lights have been arranged so that light is not directed toward the canyons, or is shielded, during the breeding season. This commitment is maintained as part of the

**Status Summary of Mitigation Actions (Cont.)**

			anticipated scope of the final TES HMP.
	(f) Restricting nighttime construction noise	DX	Under the conditions and best management practices established in the DARHT BA, nighttime construction noise associated with the DARHT facility is restricted as much as possible. This commitment is maintained as part of the anticipated scope of the final TES HMP.
2. Noise and other impacts to the Mexican spotted owl (cont.)	(g) Keeping construction noise quiet/away from canyons	DX	Under the conditions and best management practices established in the DARHT BA, noise from construction equipment is kept as quiet as possible so as not to disturb normal Mexican spotted owl activities and is kept directed away from the canyons as much as possible. This commitment is maintained as part of the anticipated scope of the final TES HMP.
	(h) Keeping equipment > 25 ft from canyon edges during breeding season	DX	Under the conditions and best management practices established in the DARHT BA, equipment associated with construction is kept at least 25 feet (8 meters) away from the surrounding canyon edges during the breeding season. This commitment is maintained as part of the anticipated scope of the final TES HMP.
	(i) Restricting personnel from canyons	DX	Under the conditions and best management practices established in the DARHT BA, construction personnel are not allowed beyond the surrounding canyon edges. This commitment is maintained as part of the anticipated scope of the final TES HMP.
	(j) Construct flow-checks to prevent erosion	DX	Under the conditions established in the DARHT BA and BMPs implemented as part of the SWPP Plan under site NPDES requirements, flow-checks have been constructed to slow the rate of the release of water to the canyons originating from the facility. Native vegetation will be planted, when appropriate, to prevent erosion long-term erosion associated with this water release.
	(k) Planting native trees, as appropriate	DX	ESH-20 will coordinate planting native trees along roads, disturbed canyon edges, and the edges of parking lots, when construction site activities have subsided enough such that it is appropriate to begin revegetating. The planting of native trees will be consistent with the conditions and best management practices established in the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.
	(l) Placing warning siren on mesa side of facility	DX	Warning sirens have not yet been installed on the DARHT facility. When the warning sirens are installed, installation will be consistent with the conditions and best management practices established in the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.
	(m) Maintaining construction equipment as quiet as possible	DX	The general contractor is responsible for maintaining all construction equipment; construction equipment is maintained as quiet as possible consistent with the conditions established in the DARHT BA and the DARHT MAP.

**Status Summary of Mitigation Actions (Cont.)**

<b>Potential Impact</b>	<b>Mitigation Measure</b>	<b>Responsible-Organization</b>	<b>Mitigation Action Status</b>
2. Noise and other impacts to the Mexican spotted owl	(n, o, p, q, r, s, t, u, v, w, x) [specific to operations]	N/A	Not addressed in this MAPAR.
3. Noise and other impacts to the peregrine falcon	(a) ESH-20 approval of tree/snag removal	DX ESH-20	This commitment is addressed as part of the anticipated scope of the final TES HMP. The TES HMP tracks and manages all threatened or endangered species issues consistent with the conditions established in the DARHT BA and the DARHT MAP. The peregrine falcon has not been identified around the DARHT facility and no additional DARHT-related tree removal has occurred since approval of the BA.
	(b) ESH-20 falcon survey prior to canyon disturbance	DX ESH-20 DOE/LAAO	This commitment is addressed as part of the anticipated scope of the final TES HMP. The TES HMP tracks and manages all threatened or endangered species issues consistent with the conditions established in the DARHT BA and the DARHT MAP; no additional disturbance of habitat has occurred since approval of the BA.
4. Noise and other impacts to northern goshawk	(a) ESH-20 approval of tree/snag removal	DX ESH-20	This commitment is addressed as part of the anticipated scope of the final TES HMP. Although the northern goshawk is no longer a federally listed species, the TES HMP considers the northern goshawk a "Species of Concern". The TES HMP tracks and manages all threatened or endangered species (and species of concern) issues consistent with the conditions established in the DARHT BA and the DARHT MAP; no additional DARHT-related tree removal has occurred since approval of the BA.
	(b) ESH-20 long-term monitoring of goshawk habitat	ESH-20	Although no longer a federally listed species, the TES HMP recognizes the northern goshawk as a "Species of Concern" for the purposes of developing and implementing the plan. Potential habitat for the northern goshawk has been identified, mapped, and will be continually monitored throughout LANL as part of the TES HMP.
	(c) Preservation of canyon and mesa-top vegetation	DX DOE/LAAO	Under the conditions and best management practices established in the DARHT BA, vegetation on the mesa top surrounding the DARHT facility has been preserved as much as possible. No additional vegetation removal has occurred in Potrillo and Valle canyons since USFWS concurrence with the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.
5. Noise and other impacts to spotted bat	(a) ESH-20 spotted bat survey prior to canyon slope disturbance	DX ESH-20 DOE/LAAO	ESH-20 has conducted a LANL-wide survey for the spotted bat consistent with USFWS requirements as part of the TES HMP. The spotted bat has been netted and positively identified at Bandelier National Monument. TES HMP survey efforts at LANL have identified the existence of spotted bat at LANL using echolocation survey techniques. No new DARHT activities have occurred along the slopes of Potrillo, Valle, or Water Canyons since USFWS concurrence with the DARHT BA.
6. Noise and other impacts to meadow jumping mouse	(a) ESH-20 mouse survey prior to canyon bottom disturbance	DX ESH-20 DOE/LAAO	ESH-20 is preparing to address LANL-wide survey requirements for the meadow jumping mouse through the development of a habitat modeling technique consistent with USFWS requirements as part of the TES HMP. No new DARHT activities have

**Status Summary of Mitigation Actions (Cont.)**

<b>Potential Impact</b>	<b>Mitigation Measure</b>	<b>Responsible-Organization</b>	<b>Mitigation Action Status</b>
			occurred in the bottom of Potrillo, Valle, or Water Canyons since USFWS concurrence with the DARHT BA.
7. Noise and other impacts to Jemez Mountains salamander	(a) ESH-20 salamander survey prior to canyon slope disturbance	DX ESH-20 DOE/LAAO	The Jemez Mountains salamander has historically been identified at LANL. ESH-20 is in the process of developing a Jemez Mountains salamander habitat modeling technique as part of the TES HMP. This technique will be validated by conducting LANL-wide potential habitat surveys using GIS landcover maps generated as part of the TES HMP. The intent of this modeling technique is to provide a valid survey technique as a replacement for the current labor intensive and intrusive survey technique. No new DARHT activities have occurred along the slopes of Potrillo, Valle, or Water Canyons since USFWS concurrence with the DARHT BA.
	(b) ESH-20 approval of tree/snag removal	DX ESH-20 DOE/LAAO	Under the conditions and best management practices established in the DARHT BA, ESH-20 will be notified prior to any new removal of trees (live, snagged, or downed log) to determine impact to Jemez Mountains salamander habitat. No additional tree removal (live, snagged, or downed log) has occurred since USFWS concurrence with the DARHT BA. This commitment is maintained as part of the anticipated scope of the final TES HMP.
<b>Potential Impact</b>	<b>Mitigation Measure</b>	<b>Responsible-Organization</b>	<b>Mitigation Action Status</b>
8. Large mammal/predator movement disturbance	(a) ESH-20 consulted to avoid disturbance to movements of large mammals and predators	DX ESH-20 DOE/LAAO	ESH-20 has initiated a study to determine the movement of elk by using GPS collars. Scent post stations are being deployed to determine the presence of large predators. If deemed appropriate, GPS collars will be used to determine movement of large predators. A GIS-based model is currently under development to provide appropriate recommendations regarding permanent fencing.
	(b) ESH-20 provisions of site-specific measures for fencing	ESH-20	ESH-20 has initiated a study to determine the movement of elk by using GPS collars. Scent post stations are being deployed to determine the presence of large predators. If deemed appropriate, GPS collars will be used to determine movement of large predators. A GIS-based model is currently under development to provide appropriate recommendations regarding permanent fencing.
	(c) ESH-20 approval for tree/snag removal	DX ESH-20	Construction activities will be conducted according to BMPs established by DOE, LANL, and USFWS during the preparation and approval of the DARHT BA; no additional DARHT-related tree removal has occurred since approval of the BA.
<b>MAP Section VIII. D. Cultural/Paleontological Resources</b>			
1. Site disturbance from blast effects	(a) [design-related]	N/A	Not addressed in this MAPAR – completed during design (see MAP).

**Status Summary of Mitigation Actions (Cont.)**

<b>Potential Impact</b>	<b>Mitigation Measure</b>	<b>Responsible-Organization</b>	<b>Mitigation Action Status</b>
1. Site disturbance from blast effects	(b) [specific to operations]	N/A	Not addressed in this MAPAR.
1. Site disturbance from blast effects	(c) [design-related]	N/A	Not addressed in this MAPAR – completed during design (see MAP).
1. Site disturbance from blast effects	(d) [design-related]	N/A	Not addressed in this MAPAR – completed during design (see MAP).
1. Site disturbance from blast effects (cont.)	(e) Long-term monitoring of Nake'muu	DX ESH-20 DOE/LAAO	ESH-20 is completing the Phase II assessment of an on-going cultural resources assessment for DARHT.  ESH-20 has established an interagency contract with the National Park Service (NPS) to provide and implement a long-term monitoring plan for Nake'muu. The NPS has completed the first year of monitoring and has provided an annual report and a proposed long-term monitoring plan.
<b>MAP Section VIII. E. Human Health and Safety</b>			
1. Health effects from high noise levels	(a) [specific to operations]	N/A	Not addressed in this MAPAR.
1. Health effects from high noise levels	(b) Minimization of construction noise	DX	General contract requirements have been established for the general contractor that ensures that construction equipment noise is minimized as much as possible.
2. Health effects form high radiation levels	(a) Radiation shielding around accelerators	DX FSS	The walls of the DARHT structure are designed to provide the required radiation shielding following a thorough LANL review and according to the operating principles of ALARA. The shielding design is complete and construction is in process.
2. Health effects form high radiation levels	(b) Construction of earthen berm	N/A	Not addressed in this MAPAR – already completed (see MAP).
2. Health effects form high radiation levels	(c) [specific to operations]	N/A	Not addressed in this MAPAR.

**CITATIONS:**

DOE 1995, *Dual Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement Record of Decision*, DOE/EIS-0228, October 1995.

DOE 1996, *Dual-Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement Mitigation Action Plan*, DOE/EIS-0228, January 1996.

Foxx, T., *Threatened and Endangered Species Habitat Management Plan Annual Review*, Los Alamos National Laboratory, October 16, 1996.

Keller, D. C., and D. Risberg, *Biological and Floodplain/Wetland Assessment for the Dual Axis Radiographic Hydrodynamics Test Facility (DARHT)*, Los Alamos National Laboratory, LAUR-95-647, December 1995.