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National Nuclear Security Administration

Dual-Axis Radiographic Hydrodynamic Test Facility

Mitigation Action Plan

Annual Report for 2002

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Contents

ACRONYMS iv

1.0 INTRODUCTION 1
1.1 Background 1
1.2 MAP Function and Organization 2
1.3 MAP Duration and Close-out 2
1.4 DARHT Facility Schedule and Status 3

2.0 MAP IMPLEMENTATION 3

3.0 DARHT MAP SCOPE, SCHEDULE, AND STATUS 4
3.1 Mitigation Actions for the General Environment 5
3.2 Mitigation Actions for Soil 10
3.3 Mitigation Actions for Biotic Resources 12
3.4 Mitigation Actions for Cultural/Paleontological Resources 13
3.5 Mitigation Actions for Human Health and Safety 15

4.0 FY 2003 MAP IMPLEMENTATION 16

REFERENCES 17

TABLE

Table 3-1: Summary of Potential Impacts and Commitments Addressed in this MAPAR 4

ACRONYMS

BA	Biological and Floodplain/Wetland Assessment
BRSL	Baseline Statistical Reference Level
DARHT	Dual-Axis Radiographic Hydrodynamic Test (facility)
DOE	U.S. Department of Energy
DX	Dynamic Experimentation (Division)
EIS	Environmental Impact Statement
FY	fiscal year
HAZMAT	Hazardous Materials Response Team
HMP	habitat management plan
ISM	Integrated Safety Management (system)
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
LIR	Laboratory Implementation Requirement
MAPAR	Mitigation Action Plan Annual Report
MAP	Mitigation Action Plan
NCB	NEPA, Cultural Resources, and Biological Resources (LIR)
NCO	NEPA Compliance Officer
NEPA	National Environmental Policy Act of 1969
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
ROD	Record of Decision
RRES-ECO	Ecology Group
RRES-WQH	Water Quality and Hydrology Group
RSRL	Regional Statistical Reference Level
SHPO	State Historic Preservation Officer
SOPs	standard operating procedures
SWPP	Storm Water Pollution Prevention (Plan)
TA	Technical Area
TCPs	traditional cultural properties
USFWS	U.S. Fish and Wildlife Service
VPF	Vessel Preparation Facility
WPA	Work Package Agreement

1.0 INTRODUCTION

This Mitigation Action Plan Annual Report (MAPAR) has been prepared by the U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) as part of implementing the Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility Mitigation Action Plan (MAP; DOE 1996). This MAPAR provides status on specific DARHT facility design- and operation-related mitigation actions that have been implemented to fulfill DOE commitments under the DARHT Environmental Impact Statement (EIS) Record of Decision (ROD; DOE 1995) and MAP.

The NNSA Los Alamos Site Office (LASO; formerly the Los Alamos Area Operations Office) represents the DOE entity responsible for implementing the DARHT MAP. On February 15, 2002, DOE provided stakeholders with a complete MAPAR that reported on the full scope of commitments and action plans implemented under the DARHT MAP during fiscal year (FY) 2001. DOE LASO did not receive stakeholder comments on the FY 2001 MAPAR. This MAPAR reports on the full scope of actions that were implemented during FY 2002 (October 1, 2001 through September 30, 2002) and represents the third year of DARHT facility operations-related mitigation measures and action plans. All construction-related mitigation measures and action plans were completed in FY 1999 (LANL 1999).

1.1 Background

The DOE issued the Final EIS on the DARHT Facility (DOE/EIS-0228) at Los Alamos National Laboratory (LANL) in August 1995 and published the ROD in the Federal Register (60 FR 53588) on October 16, 1995. The DARHT MAP is being implemented consistent with DOE regulations under the National Environmental Policy Act (NEPA) as stated in DOE's Final Rule and Notice for Implementing NEPA [10 CFR 1021, section 331(a), revised July 9, 1996].

The ROD on the DARHT Final EIS states that 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[1]). The ROD further states that DOE will develop and implement several mitigation measures to protect soils, water, and biotic and cultural resources potentially affected by the DARHT facility construction and operation (DOE 1995). In addition, DOE 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. As discussed in Section 5.11, Volume 1 of the DARHT Final EIS, DOE also committed to taking special precautions to protect the Mexican spotted owl (*Strix occidentalis lucida*) by preparing and implementing a Laboratory-wide habitat management plan (HMP) for all threatened and endangered species occurring throughout LANL. The DARHT MAP elaborates upon those commitments (DOE 1996).

[1] In addition to containment with vessels, additional mitigation measures for use at DARHT are being evaluated. These include aqueous foam dust mitigation that is aimed at reducing release of materials from test shots.

In December 1995, LANL completed a Biological and Floodplain/Wetland Assessment (BA) for the DARHT facility as required under the Endangered Species Act of 1973 (Keller and Risberg 1995). The BA includes mitigation expected to prevent any likely adverse effect to any threatened or endangered species or modification to critical habitat. The mitigation measures identified in the BA were the basis for U.S. Fish and Wildlife Service (USFWS) concurrence with a finding of "may affect, but not likely to adversely affect," and have been used as the basis for establishing mitigation commitments and action plans 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 was constructed and will be operated to mitigate the identified potential impacts.

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: Sections I through V provide background information regarding the NEPA review of the DARHT facility 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; summarizes the organization responsible for the mitigation measure; and summarizes the projected or actual completion date for each mitigation measure. Sections VII and VIII discuss the MAPAR and tracking system commitment and the potential impacts, commitments, and action plans.

Under Section VIII, potential impacts are categorized into the following 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 category includes a brief statement of the nature of the impact and its potential cause(s). The commitment made to mitigate the potential impact is identified. 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 (about 30 years) of the DARHT facility (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 that identifies the projected/actual period of mitigation action completion. Each mitigation action time frame correlates with one or more of the following DARHT facility project stages: design, construction, and operation. This information generally refers to when an individual action is planned to be initiated and completed. All construction-related mitigation measures were completed in FY 1999 (LANL 1999).

1.4 DARHT Facility Schedule and Status

The court-ordered injunction on DARHT facility construction was lifted on April 16, 1996, and DOE authorized resumption of construction activities on April 26, 1996. The DARHT construction contractor was fully mobilized on August 23, 1996, and full-scale construction was authorized and began on September 30, 1996. In July 1999, with the appropriate DOE authorization, the DARHT Project Office initiated DARHT facility operations on the DARHT 1st axis. In the late fall of 2000 the first major hydrotest using the DARHT 1st axis was performed. Also, during the late summer of 2000 two very simple high explosive shots using 16 lb of TNT were performed. The purpose of these two experiments was to acquire accelerometer data on the building at the Nake'muu archeological site.

In the summer of 2001 one major system checkout experiment and three major hydrotests were performed. Each of the four experiments returned state-of-the-art quantitative radiographic information. The final three hydrotests illuminated the complex hydrodynamics of mock-ups of stockpiled systems.

In the fall of 2002 hydrotesting continued with two major experiments that again returned state-of-the-art quantitative radiographic information of mock-ups of stockpiled systems. Also, during 2002 the DARHT Project continued the major installation of the injector and accelerator components of the 2nd axis that is approximately 99% complete. Two major DARHT 2nd axis commissioning milestones were achieved in 2002. On July 2, 2002, the 2nd axis injector achieved CD-4a early with e-beam parameters of >250 Amps at >2.0 MeV. On December 21, 2002, the full accelerator achieved the technical criteria of CD-4d with e-beam parameters of >1.0 kA at >12.0 MeV for longer than 400 nanoseconds. Finally, the construction of the Vessel Preparation Facility (VPF) was almost complete by the end of 2002.

2.0 MAP IMPLEMENTATION

The DARHT MAP is implemented on an annual basis in coordination with the federal FY funding cycle. At the beginning of each FY, 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.

The NNSA LASO NEPA Compliance Officer (NCO) is ultimately responsible for implementing the DARHT MAP. The NCO has delegated MAP management and tracking to the Ecology

Group (RRES-ECO, formerly ESH-20). Using an annual WPA, RRES-ECO coordinates with the appropriate LANL organizations to ensure mitigation action implementation, to maintain the tracking system, and to prepare the annual report.

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. The MAPAR reflects new information or changed project and environmental circumstances and should report changes to mitigation or the MAP. In order to ensure the public has full access to this information, the MAPAR is 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 future MAPAR implementation.

3.0 DARHT MAP SCOPE, SCHEDULE, AND STATUS

The MAPAR documents the scope of mitigation action tasks that were implemented throughout FY 2002. The scope of tasks completed in FY 2001 represents the third year of operations-related mitigation. A summary of the scope of potential impacts and commitments addressed in this MAPAR is provided in Table 3-1.

Table 3-1: Summary of Potential Impacts and Commitments Addressed in this MAPAR

DARHT MAP Potential Impacts/Commitments	DARHT phase	MAP page reference	MAPAR section
A. General Environment			
1. Contamination of the environment surrounding DARHT facility with radioactive or toxic material: commitments (b–e).	operations	5–6	3.1
2. Contamination of the environment with various types of wastes as a result of cleaning out the containment vessels.	operations	6	3.1
3. Contamination of the environment with various types of hazardous materials as a result of spills within the DARHT facility.	operations	6	3.1
4. Contamination of the environment with hazardous levels of various substances as a result of discharges of contaminated water from the DARHT facility.	operations	6	3.1
B. Soils			
1. Loss of soil and vegetation could occur during construction and operation of the DARHT facility as a result of severe storm water runoff: commitments (a–c).	operations	6–7	3.2
2. Soil erosion and damage to plants caused by additional construction and operational activities, especially off-road and ground-breaking activities: commitments (a–e).	operations	7	3.2
C. Biotic Resources			
1. DARHT facility construction and operations could impact threatened and endangered species as a result of impacts from firings and other operations and activities at the firing sites: commitments (b–d).	operations	7–8	3.3

MAP Section VIII.B.1(c): The SWPP Plan Best Management Practices are continually monitored and maintained by DARHT facility representatives and RRES-WQH. If control measures are determined to be ineffective, the scope and implementation of the operational SWPP Plan will be modified as necessary by the DARHT facility representatives and RRES-WQH.

Mitigation Action Scope

MAP Section VIII.B.2(a–e): The operational mitigation actions associated with these potential impacts are as follows:

a) Workers must avoid off-road activities and stay within approved rights-of-way.

b) Any proposed activities requiring the disturbance of mature trees and shrubs must first be approved by RRES-ECO to avoid disturbance to threatened and endangered species and other wildlife species.

c) RRES-ECO must be notified prior to any new ground-breaking activities. RRES-ECO will review all new sites and evaluate any potential impacts associated with the action. RRES-ECO will also provide mitigation to minimize potential impacts, including revegetation as addressed in the SWPP Plan.

d) The size of a vegetation buffer zone between the facilities and the edge of the mesa tops will be determined by RRES-ECO 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.

Status

MAP Section VIII.B.2(a): DARHT facility operations are conducted according to SOPs that, in part, restrict facility workers to designated areas. Access to undesignated areas of the DARHT facility site is managed according to SOPs that restrict access to authorized personnel on special work assignments such as post-shot material recovery or fire suppression operations. All other workers avoid off-road activities and stay within approved rights-of-way.

MAP Section VIII.B.2(b–e): Under the ISM System at LANL, all planning, construction, and operational activities must comply with the institutional process established under Laboratory Implementation Requirement (LIR) 404-30-02.0–also known as the NEPA, Cultural Resources, and Biological Resources (NCB) LIR. The NCB LIR establishes the institutional requirements that are implemented to ensure that contractual work smart standards for NEPA, cultural resources, and biological resources are consistently met (LANL 2000). In addition to requiring full compliance with applicable NEPA, cultural resources, and biological resources federal regulations, the NCB LIR requires full and effective implementation of the LANL HMP. These standards are measured by performance criteria contained in the Laboratory Performance Requirement 404-00-00 Appendix 3 (Environmental Protection – Ecological and Cultural Resources). RRES-ECO is the Office of Institutional Coordination for the NCB LIR and is responsible for developing, revising, and maintaining the document, as well as technically assisting the institution in full and effective implementation.

3.4 Mitigation Actions for Cultural/Paleontological Resources

Summary of Potential Impacts

MAP SECTION VIII, D.1(B, E–G)

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 Nake'muu, and the immediate surrounding environment.

Mitigation Action Scope

MAP Section VIII.D.1 (b, e–g): The operational mitigation actions associated with this potential impact are as follows:

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.

e) Implementation of a long-term monitoring program at Nake'muu using photographs or other means of recording 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) The DX Division 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 Pueblos (Cochiti, Jemez, Santa Clara, and San Ildefonso).

Status

MAP Section VIII.D.1 (b): In FY 2001, hydrotesting continued with two major shots. None of the four shot events during FY 2001 were considered to be large shots; therefore, it was not necessary to construct and use blast shields for the purpose of mitigating blast effects to archaeological sites. Neither of the two shots in Fall 2002 required blast shields for mitigating blast effects. Future shots will be evaluated on a case-by-case basis in coordination with the ongoing Nake'muu monitoring program to determine the need for constructing and deploying blast shields.

MAP Section VIII.D.1 (e): During FY 2002 RRES-ECO continued to implement the Nake'muu monitoring project, including the annual physical assessment and photographic documentation of site conditions. The project database was updated and all official information managed in a manner identical to other LANL cultural resource reports.

MAP Section VIII.D.1 (f): During FY 2002, DOE and LANL conducted site tours for tribal representatives to discuss Nake'muu monitoring and Cerro Grande Fire rehabilitation projects.

MAP Section VIII.D.1 (g): In FY 2002 hydrotesting continued with two major shots. The post-shot operations for the simple experiments and hydrotest were conducted according to the following established standard SOPs:

- DX-4 SOP 3 General Safety
- DX-4 SOP 4 General Firing Operations
- DX-4 SOP 31 Firing Operations at TA-15-312 Firing Area
- DX-DO SOP 1 Waste Management
- DX-DO SOP 6 Radiological Controls

These SOPs have been determined appropriate by DOE and are implemented under the LANL ISM System as an integral part of DARHT facility operations and provide the operational basis and procedures for recovery of metal fragments dispersed during operational shots. In addition to the ISM System requirements, these SOPs appropriately address DARHT MAP commitments that are designed to minimize the short- and long-term release of contaminants (radioactive and toxic materials) to the DARHT facility site.

Summary of Potential Impact

MAP SECTION VIII.D.2 (A, B)

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

Mitigation Action Scope

MAP Section VIII.D.2 (a, b): The operational mitigation actions associated with this potential impact are as follows:

a): Consultation with the four Accord Pueblos will continue to identify and protect any such cultural resources throughout the life of activities at the DARHT facility.

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

Status

MAP Section VIII.D.2 (a, b): DOE and RRES-ECO completed the Phase II cultural resources assessment and cultural resources report for the DARHT facility project. On May 20, 1999, the SHPO officially concurred with a DOE and LANL finding that the construction and operation of the DARHT facility will have "no adverse effect" on cultural resources in the potentially affected area (DOE 1999). In addition, as part of the LANL Site-Wide EIS MAP, in FY 2000 LANL completed the *Comprehensive Plan for the Consideration of Traditional Cultural Properties and*

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

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

Status

MAP Section VIII.D.2 (a, c): Under the institutional implementation of the ISM System, DARHT facility operations are managed according to specific SOPs that collectively address a wide range of potential impacts to worker safety and health. DARHT facility accelerator operations are specifically addressed under the DARHT Axis I – SOP 210. This SOP requires appropriate training, radiation dosimetry program participation, and 1st axis acceleration operations that collectively protect workers for exposure to unacceptable levels of radiation.

4.0 FY 2003 MAP IMPLEMENTATION

Based on the scope and stage of the DARHT facility project, MAP commitments and action plans may be changed, added, or deleted as appropriate as a function of recommendations provided in each MAPAR. Modification to the scope of commitments and action plans are directed by DOE LASO based on scientifically and legally defensible information that is generated during the implementation of the DARHT MAP.

In July 1999, all construction-related DARHT MAP mitigation commitments and action plans were completed. The FY 2002 DARHT MAP activities represent the third year of operational implementation. The DARHT MAP activities implemented during FY 2003 will be a continuation of DARHT facility operational phase MAP tracking and annual reporting. Should the scope of the DARHT facility project change during the operational stage, as part of the appropriate NEPA review, the scope of the DARHT MAP would be changed by NNSA as necessary.