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Date: October 28, 2010
Refer To: ENV-ES: 10-211

Mr. George Rael
Assistant Manager for Environmental Operations
National Nuclear Security Administration
Los Alamos Site Office, MS A316

SUBJECT: 2008 SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT MITIGATION ACTION PLAN ANNUAL REPORT FOR FISCAL YEAR 2010

Dear Mr. ~~Rael~~ George,

Enclosed for your review and acceptance the 2010 Mitigation Action Plan Annual Report (MAPAR) for the 2008 Site-Wide Environmental Impact Statement (SWEIS). This fulfills the 2010 annual reporting requirements for the MAP (Prime Contract No. DE-AC52-06-NA25396).

The Los Alamos National Security, LLC (LANS) SWEIS Project Office has compiled data from across the institution. This is the second MAPAR for the 2008 SWEIS and provides information regarding **Fiscal Year (FY) 2010** progress on mitigation action commitments. The MAPAR is organized in a manner consistent with the monthly MAP status reports and reflects progress towards completion of mitigation action commitments associated with LANL operations selected in the September 2008 and July 2009 Records of Decision.

Please do not hesitate to call me at 667-7912 or John Isaacson (667-2276) with any questions.

Sincerely,

Jennifer E. Nisengard, Ph.D, R.P.A.
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Enclosure A

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LA-UR-10-07245

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Title:	FY 2010 2008 Site Wide Environmental Impact Statement Mitigation Action Plan Annual Report
Author(s):	Jennifer E. Nisengard John S. Isaacson
Intended for:	Transmittal to the Department of Energy/National Nuclear Security Administration Los Alamos Site Office

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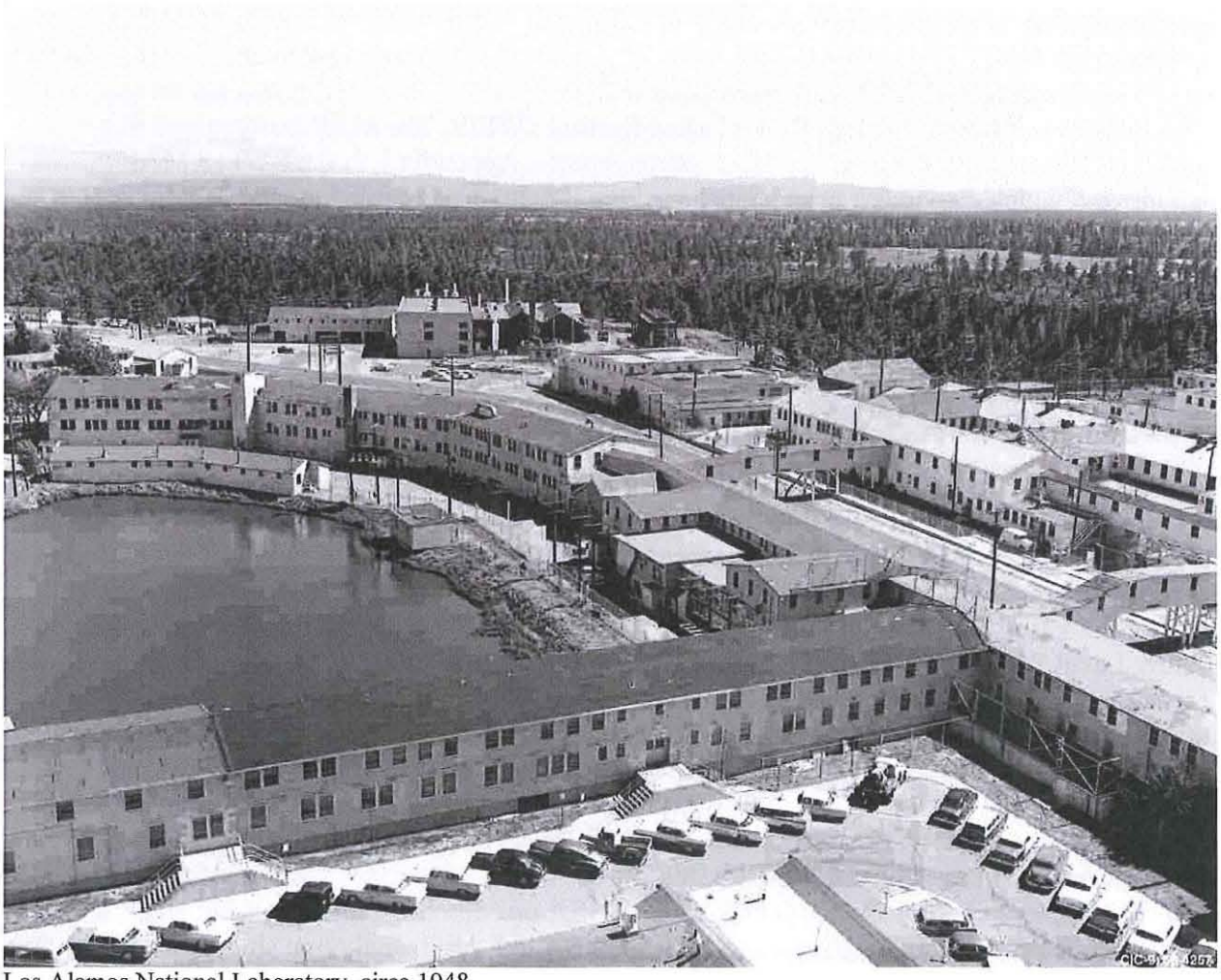
Title: **2008 SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT MITIGATION ACTION PLAN ANNUAL REPORT FISCAL YEAR 2010 OCTOBER 29, 2010**

Preparers: SWEIS Project Office
Jennifer E. Nisengard, ENV-ES
John S. Isaacson, ENV-DO



Los Alamos National Laboratory, circa 1948

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1.0 EXECUTIVE SUMMARY:

The first Record of Decision (ROD) for the *2008 Site Wide Environmental Impact Statement (SWEIS) for Continued Operation of Los Alamos National Laboratory* (DOE/EIS-0380) was published in September 2008. In January 2009, the Mitigation Action Plan (MAP) for the SWEIS was finalized. The MAP includes outstanding 1999 SWEIS MAP commitments, all continuing mitigations from NEPA decisions made since the 1999 SWEIS, and those made in the September 2008 and June 2009 SWEIS RODs. After the second SWEIS ROD was published in the Federal Register on June 26, 2009, the Department of Energy/National Nuclear Security Administration (DOE/NNSA) Los Alamos Site Office (LASO) issued a MAP Addendum. The Addendum, issued in August 2009, includes decisions contained in the second ROD.

This is the second MAP Annual Report (MAPAR) for the 2008 SWEIS and provides information regarding **Fiscal Year (FY) 2010** progress on mitigation action commitments specified and detailed in the MAP. The MAPAR fulfills the 2010 annual reporting requirements for the MAP and is a summary of FY 2010 work associated with mitigation action commitments for projects and programs selected in the two RODs issued for this SWEIS. The MAP is organized in a manner consistent with the monthly MAP status reports. Appendix I, is the SWEIS MAP tracking log, which provides a brief snapshot of the FY 2010 accomplishments, Appendix II is the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT) MAPAR initially distributed in May 2010 (LA-UR-10-3303), Appendix III is the 2010 Trails MAPAR, Appendix IV is the FY 2010 Special Environmental Analysis (SEA) MAPAR for Historic Buildings, Appendix V is the FY 2010 is the SEA MAPAR for archaeological resources, and Appendix VI is the FY 2010 Compliance Assurance project report (LA-UR-10-07064).

Supplement Analyses (SAs) (Nisengard, June 2010)

During FY 2010, the LANL SWEIS Project Office and the NEPA Team prepared several supplement analyses (SAs) in accordance with the provisions of the DOE NEPA Implementing Procedures, 10 CFR Part 1021. A SA is prepared when it is unclear whether or not the changes to the proposal are significant or whether the impacts from the changes are within the binding thresholds analyzed in the original EIS. Three SAs analyzed SWEIS coverage for transportation of Low-Level Waste (LLW) from LANL to Energy*Solutions* in Clive, Utah using a combination of truck and rail transportation (DOE/EIS-0380-SA-01, 02, XX). These SAs analyzed the radiological and non-radiological risks associated with the proposed action. LASO determined that the proposed action in SA-01 was bounded by the 2008 SWEIS and it was signed in December 2009 (DOE/EIS-0380-SA-01). A decision regarding the proposed action in DOE/EIS-0380-SA-02, which analyzed additional truck and rail waste shipments, has not been made. No decision was made regarding DOE/EIS-0380-SA-03, for the expanded footprint of the proposed Science Complex; the project was cancelled by NNSA on March 24, 2010. In May 2010, the SWEIS office prepared and distributed a draft final SA to LASO, analyzing shipment of 1.13 million cubic yards of Low Specific Activity and LLW shipments from LANL to Clive, Utah using a combination of truck and rail. The draft was edited to address LASO comments in June 2010. The SA considered possible transload facilities within a 130 mile (210 kilometer) radius of LANL. To date, no decision has been made.

2.0 MITIGATION ACTION COMMITMENTS:

2.1 Dual Axis Radiographic Hydrodynamic Test Facility (DARHT) MAP: (Fresquez 2010) Appendix II

The 2009 DARHT MAPAR was transmitted to LASO on May 27, 2010. All sample media (soil, sediments, vegetation, small mammals, bees and birds) from within and around the DARHT facility were collected, analyzed, tabulated and reported in the DARHT MAPAR.

2.2 Trails MAP: (Pava 2010), Appendix III.

Trails use at LANL has been considered one of the benefits of working and living in Los Alamos. In accordance with the 2003 *Final Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program* and FONSI (DOE/EA-1431), LANL implements the Mitigation Action Plan through the Trails Management Program. In FY 2010, Phase two of the Mortandad Cave Kiva Assessment, which included LIDAR and an archaeological assessment of features associated with the site, was completed. The Trails Working Group met monthly during FY 2010 and conducted two volunteer trails maintenance work parties at the Duran Trail with the Volunteer Task Force (October 2009 and May 2010). Work focused on repairing a major erosion channel near the top of the trail, clearing trees and scrub oak in the trail, repairing eroded wall segments, and bracing of the large eroded hole near the top of the trail with cut logs. In May 2010, the National Park Service (NPS) patrol contract with NNSA was renewed for five years. Attorneys for NPS and NNSA are revising some of LANL's sign language to allow NPS to cite violators. In August 2010, 27 trailhead signs were manufactured; sign language was reviewed by LANL legal staff and SMEs. The signs will be posted in October at ten LANL trails where the public has access; including the Anniversary, Ancho Springs, Hidden Canyon, Water and Potrillo Canyon, Devaney/Longmire, Deadman's Crossing, and the Wellness Trails.

2.3 Special Environmental Assessment MAP: (Fresquez, McGehee, Masse, and Hansen 2009), Attachments II, IV, and V.

2.3.1 Waste and Environmental Services: FY 2009 results have been reported in the 2009 Environmental Surveillance Report ESR (October 2010). FY 2010 sampling of native vegetation and deer mice in the areas upgradient of the Los Alamos Canyon Weir and the Pajarito Canyon Flood Retention Structure was completed in July 2010. Native understory vegetation is monitored because it is the primary food source of field deer mice, which have the smallest home range and indicates local contamination.

2.3.2 Cultural Resources: SEA-MAP surveys of archaeological sites were conducted in August; results of these surveys are reported in Appendices IV and V.

2.4 Flood Retention Structure (FSR): (Erickson 2010)

The annual inspection was completed June 18, 2010. No corrective actions were recommended.

2.5 Radioactive Liquid Waste Treatment Facility/Outfall Reduction Initiative: (Pava 2010)

This mitigation stems from the 2008 SWEIS commitment related to outfall reduction. The Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) for the Sanitary Effluent Reclamation Facility (SERF) expansion, which also addressed impacts to Sandia Canyon was issued in August 2010.

2.6 Los Alamos Science and Engineering Complex: (Pava 2010)

DOE/EIS-0380-SA-03, for the proposed Los Alamos Science and Engineering Complex, was transmitted to LASO in January 2010. In March 2010, NNSA terminated the project, but assigned James McConnell to develop a plan regarding LANL's continuing need for office and laboratory space.

2.7 Off-site Source Recovery Project (OSRP): (Pearson 2010)

The LANL OSRP has no plans to accept cobalt, iridium or cesium sealed sources on site. If this changes in the future, mitigations to reduce the risk of accidents will be implemented. Currently, none of these sources come to LANL. **This mitigation is on-hold until conditions change and these sealed sources are processed at LANL.**

2.8 Air Emissions: (Fuehne 2010)

LANL's radioactive stack emissions monitoring program continued in FY 2010. The Laboratory conducts continuous monitoring programs at 27 stacks and tracks operations from over 50 other minor stacks. Air monitoring activities along the fenceline of Materials Disposal Area B were tracked to evaluate LANL's emissions compliance status as cleanup activities at that waste disposal site continue. The 2009 annual report was sent to the Environmental Protection Agency in July 2010.

2.9 Wildland Fire Management Plan: (L'Esperance 2010)

The 2010 Wildland Fire Plan was accepted and implemented. Tree thinning and creation of defensible space across the Laboratory continues. To reduce the risk of wildland fire, the Laboratory sent its final high activity legacy transuranic waste shipment to the Waste Isolation Pilot Plant (WIPP). This activity also closed the commitment to the Defense Nuclear Facilities Safety Board and disposal of the highest-risk transuranic (TRU) waste stored at Area G. this sentence is awkward. Two-hundred and eighty-two high activity drums were shipped to WIPP. Shipments of legacy waste to WIPP were on-going in FY 2010, as is D&D of the TA-54 domes. Fire road/fire break maintenance activities are scheduled to resume in FY 2011 when the cultural resources assessment of the impacts of these activities is complete and recommended mitigation measures are implemented.

2.10 SWEIS Biological Assessment: (Hansen 2010)

As part of the Consent Order, installation of the grade control structures in Pueblo and DP Canyons by Environmental Programs to slow the movement of sediments and stormwater and to improve riparian/wetland habitat in these canyons was completed in FY 2010. Crews also installed gauging stations, revegetated, and completed clean up in the area. A report to New Mexico Environment Department (NMED) regarding the installation of the grade control structures and the associated gauging stations was submitted in June 2010. The structures were NMED prerequisites to conveyance of the tracts to Los Alamos County. NMED sent approval notifications for the two structures in August as well as concurrence for the conveyance of the Pueblo Canyon Tract.

2.11 Biological Resources Management Plan (BRMP): (Hansen August 2010)

- The report documenting the 2008 and 2009 results for the riparian area inventory, which also addresses the current site-wide status of the riparian inventory is complete.

- LANL biologists implemented physical road closures of protected threatened and endangered species habitats on LANL property in 2010.
- LANL biologist, Charles Hathcock and personnel from the New Mexico Department of Game and Fish conducted a field assessment of potential New Mexico Meadow Jumping Mouse habitat on LANL lands in FY 2010.
- LANL biologists worked on SERF facility and Sandia Canyon remediation actions and completed a floodplain assessment for those actions. The southwestern willow flycatcher survey was conducted in May.

2.12 Cultural Resources Management Plan (CRMP): (Nisengard, McGehee 2010)

- LANL archaeologists completed the FY 2010 annual requirement for Tribal tour of Nake'muu in October 2009.
- LANL's historic buildings SME evaluated the eligibility of the Mattie Brook trail to the Historic Register of Historic Places.
- As part of the CRMP, Phase I of the Gun Site Restoration Project was completed in FY 2010. Construction drawings for the Phase 2 Gun Site structural stabilization project were also completed. The project is scheduled with a tentative award date in the Fall 2010.

2.13 Energy Conservation: (Witt, Erickson, Nisengard 2010)

Policy Document 910 and the FY 2010 Executable Energy Management Plan, implementing DOE Order 430.2B, are being executed. The Draft Final FY 2011 Energy Management Plan was submitted to LASO in August 2010. A draft Site Sustainability Plan for CY 2011 is being reviewed by LANL's Energy Management Council and LASO for submission to DOE Headquarters in December 2010.

2.13.1 Electrical:

- The FY 2010 meter installation is complete. Meters are installed as necessary to quantify and evaluate electrical consumption (all metering to be complete by 2012).
- The powerline from the Norton substation to STA is on-hold.
- LANL purchased 14,000 MWhr of Renewable Energy Credits for FY 2010 meeting the requirement under DOE Order 430.2B that five to seven percent (5-7%) of the Laboratory's energy must be renewable
- AD Business Services is working to provide accurate reporting for the purchase and/or lease of *Energy Star* electronics, which has become the industry standard.
- The CMRR RULOB, LANL's first Leadership in Energy and Environmental Design (LEED) certified building received a DOE EStar Award.
- LANL has issued an institutional procedure requiring that facilities with Building Automation Systems utilize the night setback feature to reduce energy consumption.
- Efforts underway or in planning include continued development and scheduling for the current Energy-Saving Performance Contract (ESPC) effort, sponsoring Federal

Energy Management Program (FEMP) provided energy audit training for facility engineers and managers, and energy-reduction synergies expected from High Performance Sustainable Buildings (HPSB) and metering efforts.

2.13.2 Purchasing:

The green procurement web page, which provides information regarding green purchasing, which products are green, and why affirmative procurement is important, became active in August 2010: http://asm.lanl.gov/green/default.shtml. Development of a web page to provide quick access to green resources also continues. Procedure P842, which includes a section on (Designated Purchase Requestor) DPR compliance with Affirmative Procurement requirements, has been published. ASM also continued promoting green purchasing, via Affirmative Procurement clauses in three primary Blanket Order Agreements (BOAs) for computers, related hardware, peripherals and construction project contracts. The BOAs have contract clauses that state that EnergyStar and Electronic Products Environmental Assessment Tool (EPEAT) electronics will be purchased. Much of the Laboratory's procurement activity is initiated by the 1100 authorized Deployed Purchasing Representatives (DPRs) from across the Laboratory. The DPRs create purchase requisitions for processing by ASM and make purchases directly through iProcurement or with an approved P-Card. DPR annual training is mandatory and includes instruction on affirmative procurement topics. In April 2010, ASM hosted an in-house trade show to highlight green products as part of Earth Day. The primary method for procuring goods is through the Oracle iProcurement BOAs. BOAs are pre-established agreements for goods and services available for direct use by Laboratory employees. BOAs are accessed through supplier maintained websites where employees create and fill electronic shopping carts selecting from a catalog of pre-priced items. There are three primary BOAs for computers, related hardware, and peripherals; they include the following contractual requirement:

> *Affirmative Procurement: LANS, LLC is required to subcontract with firms that can assist the Laboratory in reducing environmental hazards, conserve environmental resources, minimize life-cycle costs and liability of DOE programs, and maximize operational capability through procurement of environmentally preferable products. As a component of its computer acquisition strategy, the Laboratory must report its compliance with Electronic Product Environmental Assessment Tool (EPEAT) and Energy Star procurement activity. As a component of the annual subcontractor performance review, the Subcontractor shall provide annual certification to LANS regarding the total dollar value of Laboratory purchases spent on the EPEAT and Energy Star designated products.*

LANS established a BOA with Performance Maintenance, Inc. (PMI) to supply industrial products, primarily cleaning supplies. The agreement has the following contractual language:

> *LANS is required to subcontract with firms that can assist the Laboratory in reducing environmental hazards, conserve environmental resources, minimize life-cycle costs and liability of DOE programs, and maximize operational capability through procurement of environmentally preferable products. Cleaning products shall meet the environmental attributes listed on the EPA website to the greatest extent practicable, unless otherwise noted in this Statement of Work. As a component of the annual subcontractor performance review, the Subcontractor shall provide annual certification to LANS regarding the total dollar value spent on the EPA designated products and the total dollar value spent on non-EPA designated products when EPA designated were available.*

2.13.3 Natural Gas:

The FY 2010 metering plan has been developed and meters are being installed as necessary to quantify and evaluate natural gas consumption at LANL.

2.13.4 Water: (Pava and Witt 2010)

LANL received CD1 approval and expects to receive funds in FY 2011 for SERF expansion, with the intent of completely avoiding the use of potable water for computer center cooling tower makeup. The Environmental Assessment and Finding of No Significant Impact for the SERF and the Sandia canyon wetland was issued in August 2010. A landscape management plan to remove all non-native water intensive grass areas across the Laboratory to reduce maintenance costs and potable water consumption is underway.

2.14 Pollution Prevention: (Gallagher 2010)

Deputy Secretary of the Department of Energy, Daniel Poneman presented the eight FY 2009 NNSA awards, including five Environmental Stewardship awards and three Best in Class awards to several LANL teams in November 2009. In April 2010, LANL held its 15th annual pollution prevention awards as part of the Earth Day Week celebration. Fifty-six awards were given to over 250 individuals. An extremely conservative cost avoidance estimate of seven million dollars was realized through the implementation of these projects. LANL funded 21 pollution prevention projects using the Generator Set Aside Fund for implementation in FY 2010.

Progress continues in implementing the OREX alternative Personal P Equipment project. OREX is used exclusively at TA 53, is being piloted at TA 55. Procurement options to make OREX available through the iProcurement system are underway. Other prevention activities include ongoing improvements at the LANL paint shop, gas plant, and use of refillable canisters for lubricants for use in crafts. LANL approved a suite of Green Seal-certified janitorial supplies for use by the custodial contractors. A six-sigma project addressing issues associated with environmentally preferable purchasing awareness and procurement tracking for compliance reporting was completed in April 2010. A decrease in overall purchases resulted from an aggressive awareness campaign. The Environmental Steering Committee approved the FY 2011 EMS objectives for compliance improvement, pollution prevention, energy, fuel and water conservation, materials disposition, outfall reduction, and long-term sustainability planning. NNSA honored LANL with two Best in Class and two Environmental Stewardship Awards as part of their annual awards program in FY 2010.

2.15 Clean Fill: (Nisengard, Carr, English 2010)

A lean six-sigma project to develop a clean-fill management system, championed by Jim Jones, was conducted in FY 2010. Participants prepared solutions and secured FY 2011 funding to implement solutions.

2.16 Traffic: (Nisengard 2010)

In response to the EMP and the EMS's Traffic and Commuting survey, the Council published the results from the survey on the LANL website. LANL's parking policy was revisited in June 2010 to accommodate overnight parking for commuters. Alternative transportation was encouraged in FY 2010 through posters, LANL website announcements, and the Earth Day Week April Atomic

City Transit contest. LANL continued to implement recommendations from a multi-directorate Performance Improvement Project regarding fuel conservation and the use of alternative fuels.

2.17 Integrated Land Management Planning: (Isaacson, Bare 2010)

In April 2009, the Integrated Land Management Planning (ILMP) project was established to prepare a comprehensive analysis of development constraints and opportunities across the Laboratory. This effort is an expanded follow-on to a smaller study conducted in 2006, which focused on potential land transfers. The project was chartered jointly between the Associate Director for Environment, Safety, Health and Quality (ADESHQ) and the Associate Director for Project Management and Site Services (ADPMSS) with the following objectives to be completed over a three-year period (FY 2009-FY 2011):

- Establish criteria for developmental opportunities and constraints.
- Develop weighting and ranking protocols for analyzing criteria; socialize with LANL programs and management.
- Identify opportunities and constraints for future Laboratory growth and development, Environmental stewardship, potential transfer and improving economic opportunities with neighbors (e.g., Los Alamos County, San Ildefonso Pueblo).
- Prepare a comprehensive and integrated GIS analysis to be reviewed annually and revised as necessary, providing a comprehensive analytical method for site/project planning. The tool would become part of the Project Review and Requirements System, integrate with and support the Laboratory's Long Range Development Plan, and improve the evaluation process in support 10 CFR 770 requirements.
- Train LANL staff in the use of the integrated analysis method.

In 2010, the ILMP project analyzed the Laboratory for opportunities and constraints to three land use scenarios: mission development, environmental stewardship, and potential land transfer for economic development. The ultimate goal of the project is to assist project managers make informed land use decisions, streamline environmental compliance, and increase the probability for favorable land use outcomes, while meeting the Laboratory's environmental stewardship responsibilities. The method employed in the analysis provides an objective, semi-quantitative approach for evaluating constraints and opportunities for mission development and for addressing stewardship responsibilities early in the project planning process.

The analysis of opportunities and constraints is accessible through a web-based application that allows individuals involved in the siting process to compare opportunities and constraints for a number of potential siting options. The web-based application uses the laboratory standard GIS software and employs easy to use navigation tools to access the more than 50 land use variables that form the basis of the ILMP models. The web-based application has been demonstrated to a wide range of potential users and is being readied for a beta release in the first quarter FY 2011. A report and users manual will be completed by the second quarter FY 2011.

2.18 Compliance Assurance (Wright and Noll 2010) – Appendix VI LA-UR-10-07064

In FY 2010, the compliance assurance team met with project personnel associated with six Permits and Requirements Identification (PR-IDs). Feedback from the Environmental Division's subject matter experts and the PR-ID process included suggested process improvements. Two

field visits were conducted in FY 2010. In addition to the interviews conducted with the project personnel, a representative from Acquisition Services Management Division was interviewed. In September, the team compiled a report documenting the FY 2010 work as the FY 2010 deliverable. The Compliance Assurance Subtask identified possible process improvements and acknowledged that overall the PR-ID system identifies all environmental requirements. The most consistent recommendations were for improvements to the siting process and the PR-ID map tool, recommendations for a PR-ID closeout process, and integration of the PR-ID system with Procurement system. In general, environmental compliance assurance is improving at LANL; however, there are few mechanisms to ensure compliance. FY 2010 recommendations will be implemented in FY 2011 (LA-UR-10-07064).

Integrated Environmental Review (IER) Program is the primary LANL customer interface for environmental issues, all new and modified activities & projects are subject to environmental reviews using the Excavation Permitting (Ex-ID) and PR-ID tool. FY 2010 ENV reviewed more than 600 Ex-IDs and almost 140 PR-IDs.

2.19 Commitments to Santa Clara: (DOE/LASO)

DOE/NNSA LASO continues consultations with Santa Clara Pueblo to develop a mutually acceptable plan to address specific environmental justice and human health concerns and issues identified by the Santa Clara Pueblo during the SWEIS process. The plan will include specific tasks and timelines, and will identify the necessary resources to help ensure implementation of the plan.

Appendix I
2008 Site-Wide Environmental Impact Statement (SWEIS) Mitigation Action Plan (MAP)
FY 2010 MAP Tracking Log

2008 SWEIS MAPAR Tracking FY 2010 (Green items are complete; yellow is an on-going action; red is a closed or on-hold mitigation).

Topic	Action	Mitigation Completed	Annual Requirement Completed	Responsible Party
Transition of previous LANL NEPA mitigation commitments into the 2008 SWEIS MAP				
Dual Axis Radiographic Hydrodynamic Test Facility MAP	Conduct annual Tribal tours of Nake'muu and maintenance visits.	On-going	Complete October 2010	ENV-ES
	Reduce annual surveillance sampling schedule to soils and one additional medium.	Complete 2008/2009	N/A	WES
	Emissions data from contained experiments and comparisons with results from previous operations, from 2001, will be in the 2009 SWEIS Yearbook.	Completed 2010	N/A	DAHRT, HX, ENV
Trails MAP	Complete eligibility evaluations for historic trails under National Historic Preservation Act and identify additional environmental issues on trails use.	On-going	Completed July 2010	ENV-ES
	Evaluate and manage trails to determine appropriate closures and/or restrictions.	On-going	Mortandad Cavate Complex assessment report completed September 2010	ENV-ES
	Prepare cultural resources management plans for trails in TA-70 and TA-71.	On-going	Completed August 2010, site mitigations in TAs 70 and 71	ENV-ES
	Support the use of volunteers for selected trails maintenance projects at LANL.	On-going	Trails maintenance work parties October 2009, May 2010	ENV-ES
Special Environmental Assessment MAP	Complete rehabilitation of cultural resources impacted by the Cerro Grande Fire	On-going	Annual site monitoring completed in July 2009	ENV-ES
	Monitor sediment contamination behind the Los Alamos Canyon Weir and the Pajarito Canyon FRS and report results in the ESR.	On-going	May 2010	WES
	Periodically remove sediment from the Los Alamos Canyon Weir based on sedimentation rate and contamination accumulation rate.	On-going	June 2010 Sediment removed and recontouring completed	EP-CAP/LWSP
Flood Retention Structure	Annually monitor the FRS for structural integrity and safe operations until removed.	On-going	June 2010	IFCS
	Remove portions of the FRS in accordance with DOE/EA-1408.	N/A	N/A	ADNHHO
	Recycle demolition spoils from FRS DD&D as appropriate.	Clean Fill PIP completed FY 2010: recommendations to use demolition spoils	N/A	ADNHHO
	Consider leaving an aboveground portion of the FRS equivalent to the dimensions of a low-head weir to retain potentially contaminated sediments on Laboratory land.	N/A	N/A	ADNHHO
	Remove aboveground portions of the steel diversion wall of FRS.	N/A	N/A	ADNHHO
	Recontour and reseed disturbed areas to protect surface water quality in Pajarito Canyon after the FRS is removed.	N/A	N/A	ADNHHO
Project-Specific Mitigation Measures Analyzed in the SWEIS: Institutional Resource Management Responsibilities				
Radioactive Liquid Waste Treatment Facility/Outfall Reduction	All further actions affecting water flow volumes in Mortandad and Sandia canyons will be assessed for positive and negative impacts.	EA and FONSI August 2010; MAP will be modified in FY 2011	N/A	ENV

2008 SWEIS MAPAR Tracking FY 2010 (Green items are complete; yellow is an on-going action, red is a closed or on-hold mitigation).

Topic	Action	Mitigation Completed	Annual Requirement Completed	Responsible Party
Off-site Sealed Source Recovery Project	Institute adequate controls on the quantities and methods of storing sealed sources containing cobalt-60, iridium-192, or cesium-137 to mitigate the effects of potential accidents.	Mitigation on-hold 1/2009	N/A	N Division
Air Emissions	Continue air monitoring program to comply with the Clean Air Act.	On-going	Monitoring of 27 stacks FY2010	ENV
	Use existing PR-ID System to assess potential air quality impacts from new or modified projects and provide BMPs to control emissions.	On-going	More than 140 PR-ID reviews in FY 2010	Projects
	Removal of contamination from MDAs and other PRSs would be conducted in a manner that protects the environment, the public, and worker health and safety.	On-going	Monitoring at MDA B in FY 2010	EP/Projects
Wildland Fire Management Plan	Implement WFMP with adequately funded on-going program.	On-going	FY 2010 WFMP implemented	EO-EM
	Reduce wildfire risks by shipping legacy transuranic waste, currently stored in the TA-54 domes, to WIPP.	On-going	Ongoing	EP
SWEIS Biological Assessment	Develop and implement a wetlands/floodplains management plan.	On-going	Wetland/Floodplain assessments FY 2010.	ENV
	Evaluate ecological risks to watershed-specific T&E species and update site-wide modeling of ecological risk.	Complete	N/A	ENV
	Consider span bridges instead of land bridges in areas that cross canyons in T&E species habitats to reduce environmental impacts.	On-going	N/A	Projects
	Implement reasonable and prudent measures in the SWEIS BA through the institutional project review process and implementation of the HMP.	On-going	Multiple FY 2010 accomplishments	Projects
Biological Resources Management Plan	Implement Biological Resources Management Plan.	On-going	Multiple FY 2010 accomplishments	ENV
Cultural Resources Management Plan	Implement Cultural Resources Management Plan.	On-going	Multiple FY 2010 accomplishments	ENV
Energy Conservation: Electrical	Upgrade electrical infrastructure in buildings to reduce electrical usage.	On-going		FODs, HSR, PM
	Install gas-fired combustion turbine generator and upgrade existing steam turbines.	Complete	N/A	ADNHHO
	Meter major energy user facilities and sub-meter all other facilities to quantify and evaluate electrical consumption.	On-going	2010 metering plan goals complete	ADNHHO
	Construct the portion of power line from the Norton substation to STA.	On-hold	N/A	ADNHHO
	Construct Pajarito Corridor Electric Substation at TA-50.	On-going	N/A	ADNHHO
	Implement Energy Savings Performance Contract third-party financed retrofit projects to improve building efficiencies Lab-wide.	On-going	N/A	Institutional/ADNHHO
	Purchase additional renewable wind energy.	On-going	Purchase of 14,000 MWhrs of RECs	ADNHHO
	Purchase and/or lease "Energy Star" electronics.	On-going		ASM/DPRs
	Improve new building efficiencies by integrating Leadership in Energy and Environmental Design (LEED)/Sustainable Design on line-item contracts.	On-going	HPBS working group	PM/Engineering

2008 SWEIS MAPAR Tracking FY 2010 (Green items are complete; yellow is an on-going action; red is a closed or on-hold mitigation).

Topic	Action	Mitigation Completed	Annual Requirement Completed	Responsible Party
Institutional Resource Management Responsibilities continued				
Energy Conservation: Electrical	Upgrade electrical infrastructure in buildings to reduce electrical usage.	On-going	Draft Site Sustainability Plan	FODs, HSR, PM
	Install gas-fired combustion turbine generator and upgrade existing steam turbines.	Complete	2008/2009-turbine installed	ADNHHO
	Meter major energy user facilities and sub-meter all other facilities to quantify and evaluate electrical consumption.	On-going	2009 metering plan goals complete	ADNHHO
	Construct the portion of power line from the Norton substation to STA.	On-hold	N/A	ADNHHO
	Construct Pajarito Corridor Electric Substation at TA-50.	On-going	N/A	ADNHHO
	Implement Energy Savings Performance Contract third-party financed retrofit projects to improve building efficiencies Lab-wide.	On-going	N/A	Institutional/ADNHHO
	Purchase additional renewable wind energy.	On-going	Purchased 14,000 MWhrs of RECs	ADNHHO
	Purchase and/or lease "Energy Star" electronics.	On-going	Industry standard	ASM/DPRs
	Improve new building efficiencies by integrating Leadership in Energy and Environmental Design (LEED)/Sustainable Design on line-item contracts.	On-going	RULOB will be LEED, HPBS working group	PM/Engineering
Energy Conservation: Natural Gas	Meter major energy user facilities and sub-meter other facilities to quantify and evaluate natural gas consumption.	On-going (2012 deadline)	2010 metering plan goals complete	ADNHHO/ENV
	Install more efficient gas-fired combustion turbine generators and upgrade existing steam turbines to conserve power and energy.	On-going: 2009-turbine installed	N/A	ADNHHO
Energy Conservation: Water	Expand the SERF to increase the amount of recycled water usage and reduce water consumption.	EA and FONSI for SERF and Sandia Wetlands complete FY 2010	N/A	EP/ADNHHO
Pollution Prevention (P^2)	Annually report waste reduction performance against EMS waste reduction goals.	On-going	Complete FY 2010	ENV
	Continue to integrate waste reduction activities into the EMS.	On-going	Complete FY 2010	ENV
Clean Fill	Use excavation and demolition spoils locally to minimize purchase or new excavations of clean fill when possible.	On-going	Clean Fill PIP completed FY 2010	Projects
	Report annually on reuse of clean fill materials from excavations and DD&D.	On-going	Reported by UI and P2	ENV
Traffic Mitigations	Identify possible solutions to minimize traffic issues related to DD&D, remediation, and construction projects.	On-going	N/A	Projects
	Encourage alternative transportation, including walking, car-pooling, bicycling, and public transportation.	On-going	FY 2010 Atomic City Transit contest	ENV/IP
	Improve overall Lab-wide fleet fuel efficiency.	On-going	PIP complete 2008; being implemented	ASM
	Consider plans for an alternative route off DP Mesa.	No alt. route required	N/A	TA-21 DD&D Project

2008 SWEIS MAPAR Tracking FY 2009 (Green items are complete; yellow is an on-going action, red is a closed or on-hold mitigation).

Topic	Action	Mitigation Completed	Annual Requirement Completed	Responsible Party
Enhancement of Existing Programs				
Site Planning	Enhance the decision support tool that offers an objective and semi-quantitative method for integrating opportunities and constraints for project planning and compliance.	On-going	FY 2010 ILMP development	IP/ENV
	Use Project Review and Requirements System in concert with the decision support tool and project site selection process to better identify potential site planning constraints early in project development.	On-going	N/A	IP/ENV
	Use the decision support tool to comply with Land Transfer Regulations (10CFR770).	On-going	N/A	ENV
Compliance Assurance	Assign a functional manager for the PR-ID process and supporting tool, ensure supporting authority and funding for effective use in project development, compliance, and site planning.	On-going	N/A	ADESHQ, ADE, ADPMSS
	Implement compliance assurance process on a sample of PR-ID projects.	On-going	LA-UR-10-07064	ENV
	Develop metrics and track results.	On-going	LA-UR-10-07064	ENV
	Implement process improvement measures as appropriate.	On-going	LA-UR-10-07064	ENV
Commitments to Santa Clara				
Consultations with Santa Clara Pueblo	No later than January 30, 2009, DOE/NNSA LASO shall develop, jointly with Santa Clara Pueblo, a plan to address environmental justice and human health concerns and issues identified by the Santa Clara Pueblo during the SWEIS process. The plan will include specific tasks and timelines, and identify the necessary NNSA and Pueblo resources to help ensure implementation of the plan. In consultation with Santa Clara Pueblo, LASO will update the MAP to incorporate these actions.	LASO	LASO	DOE/NNSA LASO

Appendix II

Dual Axis Radiographic Hydrodynamic Test Facility (DARHT)
Mitigation Action Plan Annual Report Fiscal Year 2010 (LA-UR-10-3303)

Prepared by Philip R. Fresquez
Waste and Environmental Services Environmental Data and Analysis (WES-EDA)

LA-UR-10-3303

Dual-Axis Radiographic Hydrodynamic Test Facility

Mitigation Action Plan

Annual Report Covering FY 2009

Prepared by:
Department of Energy Los Alamos Site Office
National Nuclear Security Administration

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ACRONYMS

BA	Biological and Floodplain/Wetland Assessment
BSRL	baseline statistical reference level
CRT	Cultural Resources Team
DARHT	Dual-Axis Radiographic Hydrodynamic Test (facility)
DOE	US Department of Energy
EIS	Environmental Impact Statement
ENV-EAQ	Ecology and Air Quality (group)
ENV-RCRA	Water Quality and RCRA [Resource Conservation and Recovery Act] (group)
ENV-RRO	Risk Reduction Office
ESL	ecological screening level
ESR	Environmental Surveillance Report
FY	fiscal year
HAZMAT	Hazardous Materials Response Team
HMP	habitat management plan
IMP	Implementation Procedure
ISM	Integrated Safety Management (System)
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
MAP	Mitigation Action Plan
MAPAR	Mitigation Action Plan Annual Report
NEPA	National Environmental Policy Act of 1969
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
PHERMEX	Pulsed High-Energy Radiographic Machine Emitting X-Rays (facility)
ROD	Record of Decision
RSRL	regional statistical reference level
SEA	Special Environmental Analysis
SHPO	State Historic Preservation Officer
SL	screening level
SWEIS	Site-Wide Environmental Impact Statement
SWPP	Storm Water Pollution Prevention (Plan)
TA	Technical Area
TAL	target analyte list
TCPs	traditional cultural properties
VPB	Vessel Preparation Building
WES-EDA	Waste and Environmental Services, Environmental Data and Analysis (group)
WFO-FOD	Weapons Facilities Operations, Facilities Operations Directorate
WPA	Work Package Agreement

1.0 INTRODUCTION

This Mitigation Action Plan Annual Report (MAPAR) has been prepared by the US 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 operations-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 and the 2008 Site-Wide EIS (SWEIS) MAP (Note: The 2008 SWEIS MAP includes all National Environmental Policy Act of 1969 [NEPA] mitigation commitments subsequent to the 1999 SWEIS MAP and includes new mitigation actions related to the September 2008 and July 2009 SWEIS RODs. Although no new commitments were identified for DARHT, some of the earlier commitments were completed; for example, the need to continue the archeological monitoring of Nake'muu, and the DARHT MAP has now been rolled into the 2008 SWEIS MAP.

The DOE NNSA Los Alamos Site Office (LASO) is responsible for implementing the DARHT MAP, which is now included in the 2008 SWEIS MAP. In June 2004, DOE provided stakeholders with the first MAPAR, complete with the full scope of commitments and action plans implemented under the DARHT MAP during fiscal year (FY) 2003. This MAPAR reports on the full scope of actions that were implemented during FY 2009 (October 1, 2008, through September 30, 2009) and represents the tenth 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

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 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 10 years (the Phased Containment Option of the Enhanced Containment Alternative[1]). In general, open-air detonations occurred from 2000–2006 and detonations within a foam medium occurred from 2002–2006. A containment vessel qualification shot was conducted at the Technical Area (TA) 36-06 firing point in 2006, and shots within steel containment vessels at DARHT were implemented in May of 2007. Overall, three hydrodynamic test shots within steel containment vessels at DARHT were conducted in FY 2007, two were conducted in FY2008, and none in FY2009.

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

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

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; LANL 1998) for all threatened and endangered species occurring throughout LANL. 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 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 US Fish and Wildlife Service 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 DARHT 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 operations-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 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 archaeological 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 will 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 operations. This information generally refers to when an individual action will 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 facility 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 first axis.

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 archaeological site. In the late fall of 2000, the first major hydrotest using the DARHT first axis was performed, fragment mitigation measures were in place, and post-shot cleanup was conducted to minimize the release of contaminants to the environment.

In the summer of 2001, one major system checkout experiment and three major hydrotests were performed. Fragment mitigation measures were in place and post-shot cleanup was conducted to minimize the release of contaminants to the environment. 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. Fragment mitigation measures were in place and post-shot cleanup operations were conducted. An aqueous foam containment method of particulate containment and blast mitigation was tested at another firing site for implementation at DARHT. Also, during 2002 the DARHT Project continued the major installation of the injector and accelerator components of the second axis. Two major DARHT second axis commissioning milestones were achieved in 2002. On July 2, 2002, the second axis injector achieved conceptual design-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 conceptual design-4d with e-beam parameters of >1.0 kA at >12.0 MeV for longer than 400 nanoseconds.

In 2003, the construction of the Vessel Preparation Building (VPB) was completed. One hydrotest was fired in the fall of 2003 and again returned state-of-the-art quantitative radiographic information of a mock-up of a stockpile system. This experiment was the initial implementation of aqueous foam mitigation for a hydrotest experiment at DARHT. The aqueous foam mitigation method achieved at least a 5% reduction in material released to the open air as prescribed for Phase I of the Phased Containment Option. Steel plates and concrete replaced surface gravel at the firing pad to enhance cleanup activities following experiments.

In FY 2004, two major hydrotests were conducted. Aqueous foam particulate mitigation was implemented during these experiments to mitigate blast effects. One of these experiments was

the first foam-mitigated experiment to use the new fabric tent configuration for containing the foam.

In FY 2005, hydrotesting continued with three major hydrotest experiments. Fragment mitigation was implemented during these experiments to mitigate blast effects. Aqueous foam particulate mitigation using a fabric tent configuration for containing the foam was implemented during these experiments to mitigate blast effects.

In FY 2006, hydrotesting continued with three major hydrotest experiments. Aqueous foam particulate mitigation using a fabric tent configuration for containing the foam was again implemented during these experiments to mitigate blast effects. The VPB underwent a Phase II readiness review in FY 2006 and was approved to begin operations including the staging, preparation, and decontamination of containment vessels.

In FY 2007, hydrotesting continued with three major hydrotest experiments. Single-walled steel containment vessels were used for these hydrotest experiments to mitigate the fragments and particulate emissions associated with the experiment. These steel containment vessels achieved at least a 40% reduction in material released to the open air as prescribed for Phase II of the Phased Containment Option. The steel vessels were decontaminated on the DARHT firing point and transported to the VPB where they were prepared for the next experiment. A major DARHT second axis commissioning milestone was achieved in FY 2007. The DARHT Axis II team successfully kicked four pulses through to the target on the scaled accelerator. Each of the four pulses were 35 nanoseconds in duration and uniformly spaced 400 nanoseconds apart. The kicker and downstream transport system performed extremely well.

In FY 2008, hydrotesting continued with two major hydrotest experiments. Single-walled steel containment vessels were used for these hydrotest experiments to mitigate the fragments and particulate emissions associated with the experiment.

In FY 2009, no hydrotest experiments were conducted.

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. On an annual basis, critical information and data gathered during the mitigation actions are analyzed and summarized; these results are published in the MAPAR.

The DOE/NNSA LASO NEPA Compliance Officer is ultimately responsible for implementing the DARHT MAP and has delegated MAP management and tracking to the Risk Reduction Office (ENV-RRO). This responsibility formerly resided with the Ecology and Air Quality (ENV-EAQ) group; it now currently resides with the Waste and Environmental Services, Environmental Data and Analysis (WES-EDA) group. Using the annual WPA, WES-EDA coordinates with the appropriate LANL organizations to ensure mitigation action implementation 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 in mitigation actions or to 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 main sections: introduction and background; MAP implementation; MAP scope, schedule, and status and results on potential impacts; and conclusions and recommendations including future MAP implementation.

3.0 DARHT MAP SCOPE, SCHEDULE, AND STATUS

This MAPAR documents the scope and results of mitigation action tasks that were implemented throughout FY 2009. The scope of tasks completed in FY 2009 represents the tenth 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	MAPAR section
A. General Environment		
1. Contamination of the environment surrounding DARHT facility with radioactive or hazardous material: commitments (b–e).	operations	3.1
2. Contamination of the environment with various types of wastes as a result of cleaning out the containment vessels.	operations	3.1
3. Contamination of the environment with various types of hazardous materials as a result of spills within the DARHT facility.	operations	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	3.1
B. Soil		
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	3.2
2. Soil erosion and damage to plants caused by additional construction and operations activities, especially off-road and groundbreaking activities: commitments (a–e).	operations	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	3.3
2. DARHT facility construction and operation could impact the Mexican spotted owl (*Strix occidentalis lucida*) as a result of noise from firings and other operations, as well as other activities at the firing sites: commitments (n–x).	operations	3.3
3. DARHT facility construction and operation could impact the American peregrine falcon (*Falco peregrinus anatum*) as a result of noise from firings and other operations, as well as other activities at the firing sites: commitments (a, b).	operations	3.3

C. Biotic Resources (cont.)		
4. DARHT facility construction and operation could impact the northern goshawk (*Accipiter gentilis*) as a result of noise from firings and other operations, as well as other activities at the firing sites: commitments (a–c).	operations	3.3
5. DARHT facility construction and operation could impact the spotted bat (*Euderma maculatum*) as a result of noise from firings and other operations, as well as other activities at the firing sites.	operations	3.3
6. DARHT facility construction and operation could impact the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) as a result of noise from firings and other operations, as well as other activities at the firing sites.	operations	3.3
7. DARHT facility construction and operation could impact the Jemez Mountains salamander (*Plethodon neomexicanus*) as a result of noise from firings and other operations, as well as other activities at the firing sites: commitments (a, b).	operations	3.3
8. DARHT facility construction and operation could impact the bald eagle (*Haliaeetus leucocephalus*) as a result of noise from firings and other operations, as well as other activities at the firing sites: commitments (a, b).	operations	3.3
9. DARHT facility construction and operation could impact the Townsend's pale big-eared bat (*Corynorhinus townsendii*) as a result of noise from firings and other operations, as well as other activities at the firing sites: commitments (a, b).	operations	3.3
10. DARHT facility construction and operation could impact the wood lily (*Lilium philadelphicum* var. *andinum*) as a result of firings and other operations, as well as other activities at the firing sites: commitments (a, b).	operations	3.3
D. Cultural/Paleontological Resources		
1. Blast effects, such as shock waves and flying debris, from shots using high explosive charges could affect nearby archaeological sites, especially Nake'muu, and the immediately surrounding environment: commitments (b, e–g).	operations	3.4
2. 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: commitments (a, b).	construction/ operations	3.4
E. Human Health and Safety		
1. Adverse health effects on workers and the general public from high noise levels associated with the DARHT facility, especially construction and test firings: commitment (a).	construction/ operations	3.5
2. Adverse health effects on workers from radiation from DARHT facility operations: commitments (a–c).	operations	3.5

3.1 Mitigation Actions for the General Environment

Summary of Potential Impacts

MAP Section VIII.A.1(b–e)

The DARHT MAP identifies the potential for hazardous and radioactive materials to be released to the general environment surrounding the DARHT facility. Hazardous 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

The operational mitigation actions associated with this potential impact are as follows:

b) WES-EDA and ENV-EAQ will monitor contaminants by sampling soil, plants, mammals, birds, and bees at baseline locations and, following the start of operations, within the potential impact area of DARHT, once per year.

c) Other site monitoring and evaluation will consist of periodic soil, water, and other environmental analyses for solid, hazardous, mixed, and radioactive wastes should spills or other unplanned events occur.

d) Double- and single-walled steel containment vessels will be used appropriately.

e) Vessels will be decontaminated.

Status

MAP Section VIII.A.1(b)

Since 1996, soil, sediment, vegetation, honey bee, and small mammal tissue samples have been collected from around the DARHT facility and analyzed during the construction phase (1996–1999) for baseline conditions. The results of four years of analysis of DARHT samples are summarized in a composite report (Nyhan et al. 2001) and were used to calculate baseline statistical reference levels (BSRLs); these are the concentrations of radionuclides and nonradionuclides (mean plus three standard deviations = 99% confidence level) around the DARHT facility before the start up of operations, as per the DARHT MAP (DOE 1996). Baselines for potential contaminants, populations, and species diversity in birds were developed at a later date (Fresquez et al. 2007).

In FY 2000, operations-phase environmental monitoring was initiated by collecting a suite of samples similar to those collected during the construction phase. Monitoring environmental media in the years to come will continue to assess cumulative impact by documenting accumulations of contaminants in the environmental media.

This section of the MAPAR summarizes the results of analyses of soil, sediment, vegetation, field mice, birds, and bees collected around the perimeter of DARHT during FY 2009 (Figure 1). All of the raw data can be found in the annual Environmental Surveillance Report (ESR) (LANL, in preparation).

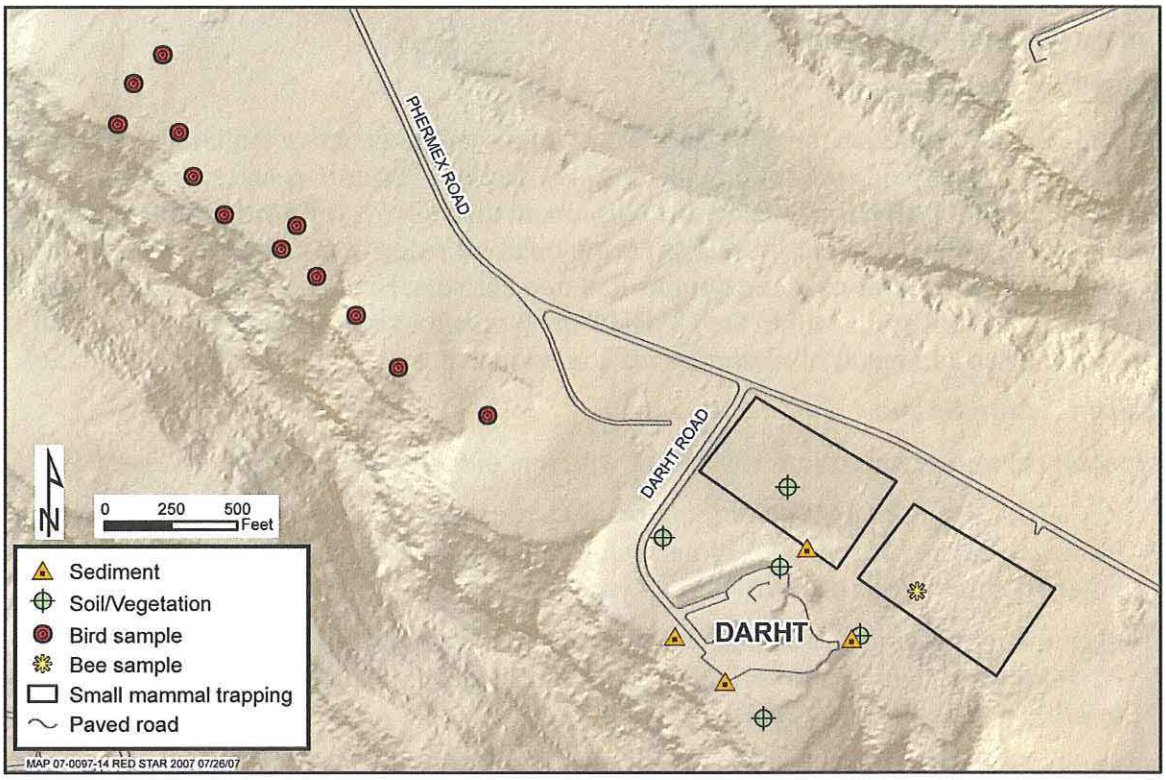

Figure 1. Sample locations for soil, sediment, vegetation, field mice, birds, and bees around DARHT.

Soil and Sediment Monitoring. Soil samples were collected near the firing point and around the perimeter of the DARHT facility on the north, east, south, and west sides (see Figure 1). In addition, sediment samples were collected on the north, east, south, and southwest sides. All samples were submitted to Paragon Analytics, Inc., under chain-of-custody procedures for the analysis of tritium; plutonium-238; plutonium-239/240; strontium-90; americium-241; cesium-137; uranium-234; uranium-235; uranium-238; and 23 target analyte list (TAL) chemicals.

We compared the radionuclide and TAL element results in soil and sediment from the DARHT sampling to both BSRLs and regional statistical reference levels (RSRLs). RSRLs are the upper-level background concentration (mean plus three standard deviations = 99% confidence level) derived from soil collected from regional areas away from the influence of the Laboratory over at least the last five sampling periods. RSRLs represent natural and fallout sources, are calculated as data become available, and can be found in the ESR.

The use of both reference levels is employed because the BSRLs for some radionuclides and chemicals may be biased as a result of changes in (pre- and post-) sampling locations and the change in analytical techniques.

Most radionuclides, with the exception of uranium isotopes, in soil and sediment collected from within and around the perimeter of the DARHT facility were either not detected or below the statistical reference levels. A non-detected value is one in which the result is lower than three times the counting uncertainty and is not significantly different ($\alpha = 0.01$, or 99% confidence level) from zero (Keith 1991, Corely et al. 1981) or less than the minimum detectable activity.

Uranium isotopes, but mostly uranium-238, were detected above the BSRL in over 50% of the soil samples collected from within and around the perimeter of the DARHT facility. The highest amount of uranium-238 was detected in the soil sample collected from within the area of the firing point (5.7 pCi/g dry); however, this amount was dramatically lower than the three previous year's, particularly in 2008 (55 pCi/g dry), and far below the residential screening level (SL) (Figure 2). SLs for radionuclides are set below the DOE single-pathway dose limit of 25 mrem/yr (DOE 1993, DOE 1999a) so that potential concerns may be identified in advance, i.e., a "yellow flag." If a radionuclide exceeds the SL, we investigate the basis for the exceedance. LANL developed SLs to identify radionuclides of potential concern on the basis of a 15-mrem/yr protective dose limit for several scenarios (LANL 2005a) using the residual radioactive (RESRAD) computer model (Yu et al. 1995). To evaluate these constituents in the most conservative manner, the values are compared to SLs based on a residential scenario

The general decrease in concentration of uranium-238 in soil collected around the perimeter since 2006 and the significant decrease within the firing point since 2008 may reflect the change in the contaminant mitigation procedures at the DARHT facility in the past years as well as the number of detonations. The changes in contaminant mitigation at DARHT in the past years have included open and/or foam mitigation (2000–2006) to closed steel containment (vessel) mitigation starting in 2007. Also, there has been a decrease in the number of detonations in the latter years: three in 2007, two in 2008, and none in 2009 (Martha Zumbro, personal communication, May 11, 2010). See MAP Section VIII.A.1(d) for more information and results concerning the use of steel containment vessels.

Most of the TAL elements, with the exception of sodium, in soil and sediment samples collected within and around the DARHT facility were below both the statistical reference levels. There are not SLs for sodium. SLs for chemicals are derived from the New Mexico Environment Department that are set at a 10^{-5} risk level for carcinogens and a hazard quotient of 1 for non-carcinogens (NMED 2006).

Beryllium, listed as a chemical of concern before the start up of operations at DARHT (DOE 1995), was not detected in any of the soil or sediment samples above reference levels. Also, beryllium concentrations in soil over the 10-year operations period has been mostly below the BSRL and stable over time (Figure 3).

Other chemicals analyzed around the perimeter of the DARHT facility were high explosive compounds and there were no high explosives detected in any of the soil or sediment samples. Although not analytically surveyed for in 2009, polychlorinated biphenyls and semivolatile organic compounds in soil and sediment samples collected around the perimeter of the DARHT facility in 2007 showed no detections in any of the constituents above the reporting limits.

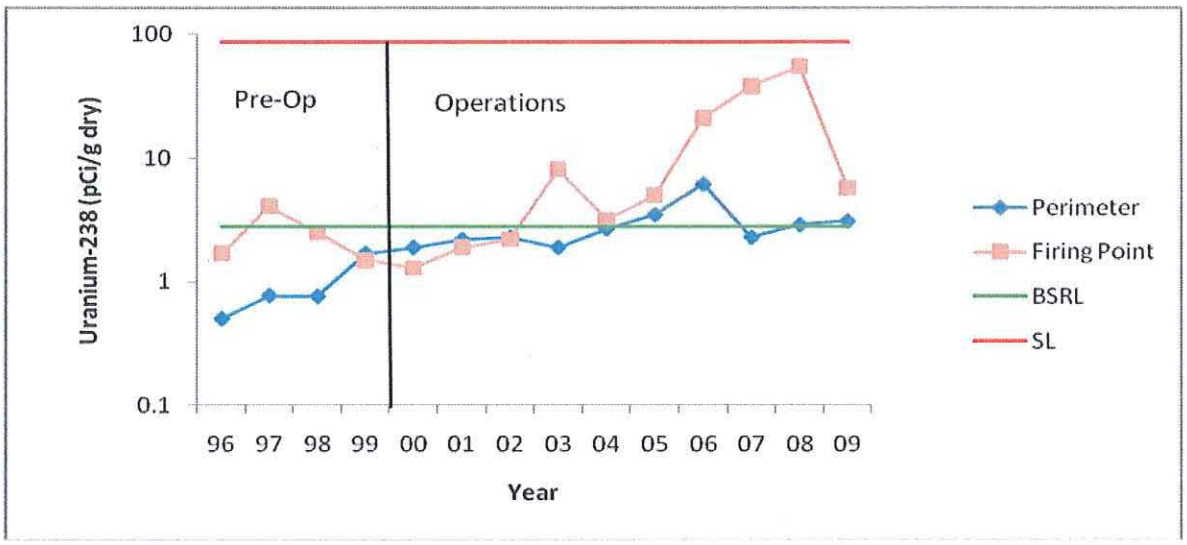

Figure 2. **Uranium-238 concentrations in soil collected within (near the firing point) and around (north-, east-, south-, and west-side average) the DARHT facility at TA-15 from 1996–1999 (pre-operations) to 2000–2009 (during operations) as compared with the baseline statistical reference level (BSRL) and the residential screening level (SL). Note the logarithmic scale on the vertical axis.**

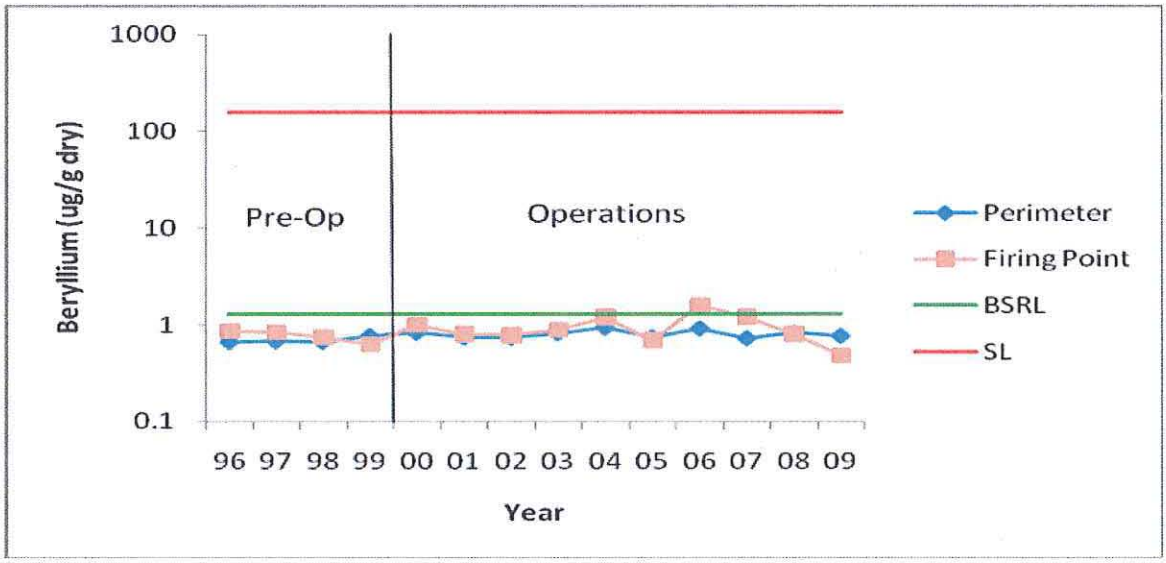

Figure 3. **Beryllium concentrations in soil collected within (near the firing point) and around the DARHT perimeter (north, west, south, and east side average) at TA-15 from 1996–1999 (pre-operations) to 2000–2009 (during operations) as compared with the baseline statistical reference level (BSRL) and the residential screening level (SL). Note the logarithmic scale on the vertical axis.**

Vegetation Monitoring. Overstory (tree needles and branch) vegetation samples were collected on the north, south, west, and east sides of the DARHT complex and submitted to Paragon Analytics, Inc., for the analyses of the same radionuclides and TAL chemicals as the soil.

Most radionuclides in overstory vegetation collected from around the perimeter of the DARHT facility were either not detected or below the BSRLs (or RSRLs). The only radionuclides in vegetation that were above the statistical levels at DARHT were plutonium-239/240 in one sample collected from the west side and uranium-238 in two samples collected from the north and east sides. All radionuclides, however, were orders of magnitude below the SLs and the amounts of uranium-238 over time show a decrease to BSRLs after the change in contaminant mitigation procedures from open and/or foam mitigation (2000–2006) to closed steel containment (vessel) mitigation starting in 2007 (Figure 4). Also, there were no detonations in FY 2009. SLs for biota were set at 10% of the standard by the dose assessment team at the Laboratory to identify the potential contaminants of concern (McNaughton 2006).

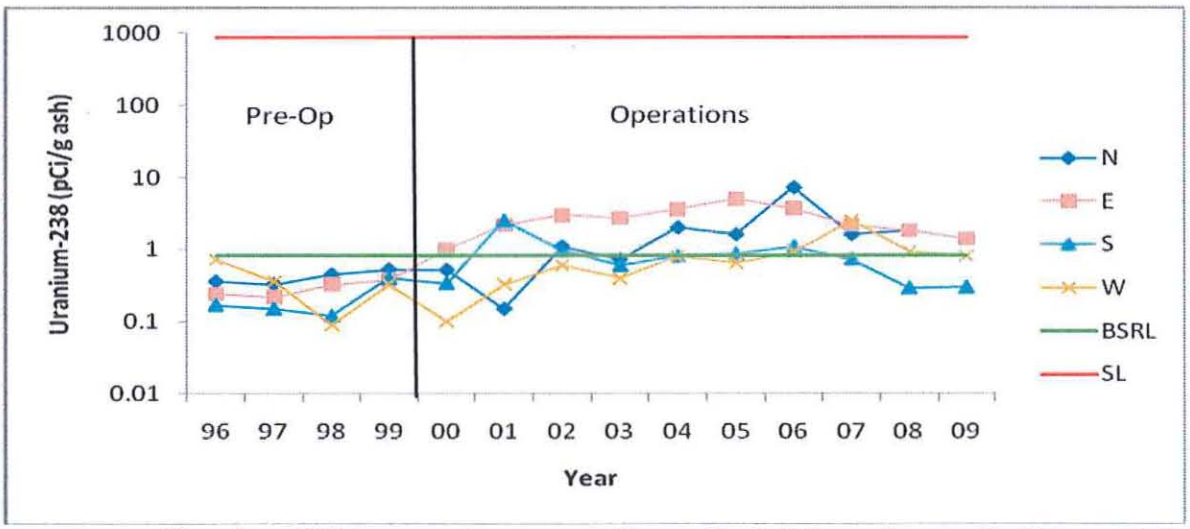

Figure 4. Uranium-238 in overstory vegetation collected from the north (N), east (E), south (S), and west (W) side of the DARHT facility at TA-15 from 1996–1999 (pre-operations) through 2000–2009 (during operations) compared with the baseline statistical reference level (BSRL) and the screening level (SL). Note the logarithmic scale on the vertical axis.

The results for the 23 TAL elements, including heavy metals like beryllium and mercury, in overstory vegetation collected from around the DARHT facility show that all of the elements were either below the detection limits or detected below the BSRLs (or below the RSRLs when BSRL data were not available).

Small Mammal Monitoring. Small mammals, mostly deer mice (*Peromyscus* spp.), are collected using snap traps from two sample grids located on the north and northeast side of the DARHT facility. Samples of composite whole body mice (>five field mice per sample) were submitted to Paragon Analytics, Inc., for analyses of the same radionuclides and TAL chemicals as the other biota.

Most radionuclides were either not detected or below the BSRLs in a composite field mouse sample (five mice per sample) collected from the north and northeast side of the DARHT facility. Uranium-234 and uranium-235 concentrations were just slightly above the BSRLs but the amounts were orders of magnitude below the SL.

The isotopic distribution of uranium-234 to uranium-238 in the field mouse sample collected from the north-northeast side of DARHT was comprised of depleted uranium.

Using uranium-238 concentrations to model trends over time, the amounts, as seen with vegetation, exhibit an increase to 2007 and then decrease thereafter to the BSRL; this is concurrent with the change in detonation mitigation practices from open and/or foam-mitigated detonations during the 2000–2006 period to closed vessel containment after 2007 (Figure 5). Also, there were no detonations in FY 2009.

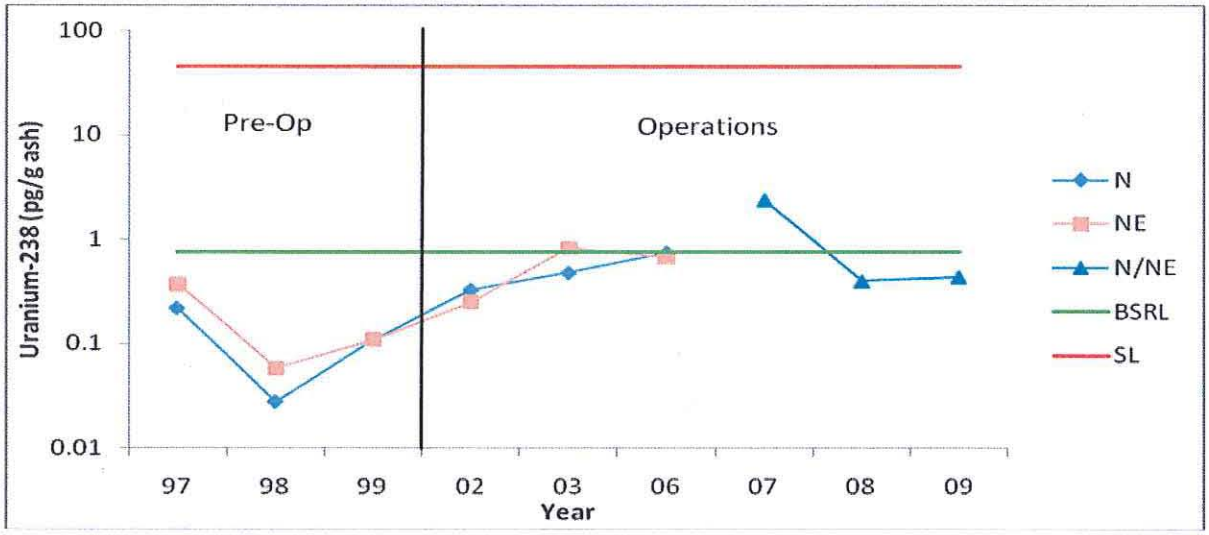

Figure 5. **Uranium-238 concentrations in (whole body) mice collected from the north (N) and northeast (NE) side of the DARHT facility at TA-15 from 1997–1999 (pre-operations) through 2002–2009 (during operations) compared with the baseline statistical reference level (BSRL) and the screening level (SL). Note the logarithmic scale on the vertical axis.**

With respect to TAL elements in field mice, only one element, barium, was higher than the RSRL. However, using the highest barium concentration in soil around the DARHT facility, the levels would not exceed the ecological screening level (ESL) for the field mouse (LANL 2005b). ESLs are based on the chemical concentrations in the soil because there are no direct SLs based on biota tissue concentrations.

Bee Monitoring. Honey bee samples from three hives located just northeast of the DARHT facility were collected and submitted to Paragon Analytics, Inc., for analyses of the same radionuclides and TAL chemicals as the other biota.

Most concentrations of radionuclides, with the exception of tritium, in bee samples collected from the two hives located northeast of the DARHT facility were either not detected or detected below the BSRLs.

Tritium increased in concentration from an average of 0.11 pCi/mL in 2008 to 12 pCi/mL in 2009. The reason for the increase in tritium concentrations in bees near DARHT is not completely known because the amounts of tritium in the soil, vegetation, and field mice samples collected directly around the perimeter of the DARHT facility were not elevated. Nevertheless, the amounts of tritium in bee samples collected on the northeast side of the DARHT facility in 2009 are still far below the SL of 3.5E05 and are not expected to pose a potentially unacceptable dose to the bees.

The isotopic distribution of uranium-234 to uranium-238 in one of the two bee samples indicate that the uranium is in a depleted form.

A comparison of uranium-238 in bee samples over the pre- and operational period at DARHT reveals the same general trend observed with the other biotic media; that there is an increase in activity to around 2006 and then a sharp decrease concurrent with the change in detonation mitigation practices from open/foam (2000–2006) to closed vessel containment starting in 2007 (Figure 6). Also, there were no detonations in FY 2009.

The TAL elements in bee samples from hives northeast of the DARHT facility show that barium and copper exceeded the BSRL and agree with past results. There are no ESLs listed for barium and copper in soil for bees, but the highest levels of barium and copper in soil around the grounds at DARHT are far below ESLs for other indicator biota receptors.

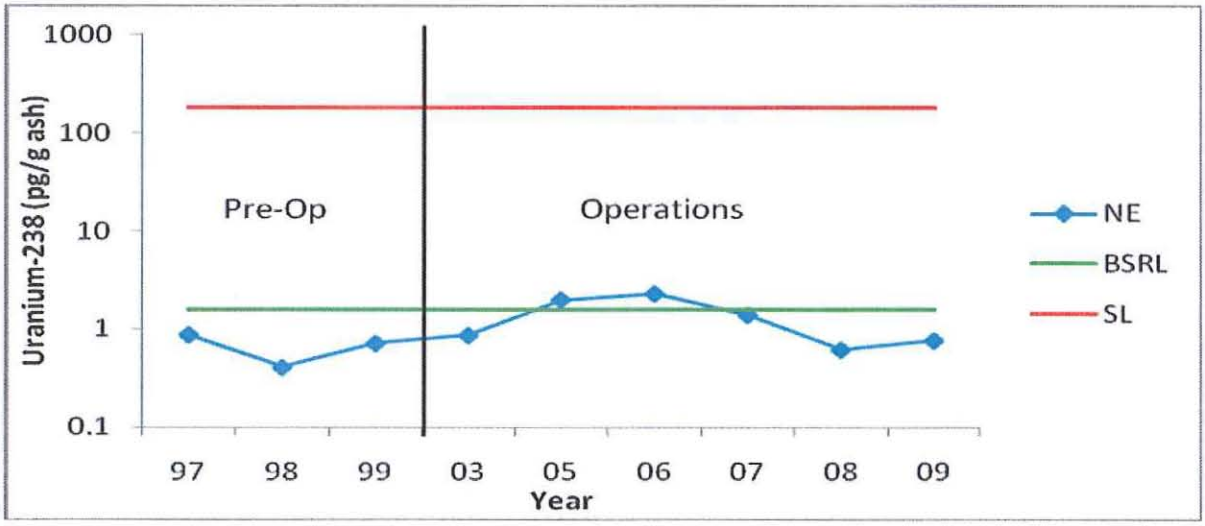

Figure 6. Uranium-238 concentrations in bees collected from the northeast (NE) side of the DARHT facility at TA-15 from 1997–1999 (pre-operations) through 2003–2009 (during operations) compared with the baseline statistical reference level (BSRL) and the screening level (SL). Note the logarithmic scale on the vertical axis.

Bird Monitoring. Birds were collected for population and diversity estimates using 12 mist capture net traps spaced about 200 ft to 1,600 ft outward from the west side of the DARHT facility. The objective of the bird monitoring project is to determine the general (ecological)

stress levels around the vicinity of DARHT caused by facility operations (e.g., noise, disturbance, traffic, etc.).

The number of birds, number of bird species, diversity, and evenness (distribution) collected in 2009 are generally higher than the same collected before the start-up of operations at DARHT in 1999 (Figure 7). The most common bird species collected regardless of time periods were the broad-tailed hummingbird (*Selasphorus platycercus*), chipping sparrow (*Spizella passerina*), Virginia's warbler (*Vermivora virginiae*), and western bluebird (*Sialia mexicana*).

Three birds collected from the northwestern side of the DARHT facility were submitted for TAL element analysis. Most TAL elements in bird samples were below the RSRLs. The few TAL elements in two or more birds that were above the RSRLs were barium, antimony, and silver; however, the slightly higher elements in these birds are probably from sources along their migratory routes rather than from DARHT operations because these elements are not elevated in soil or sediment around the facility.

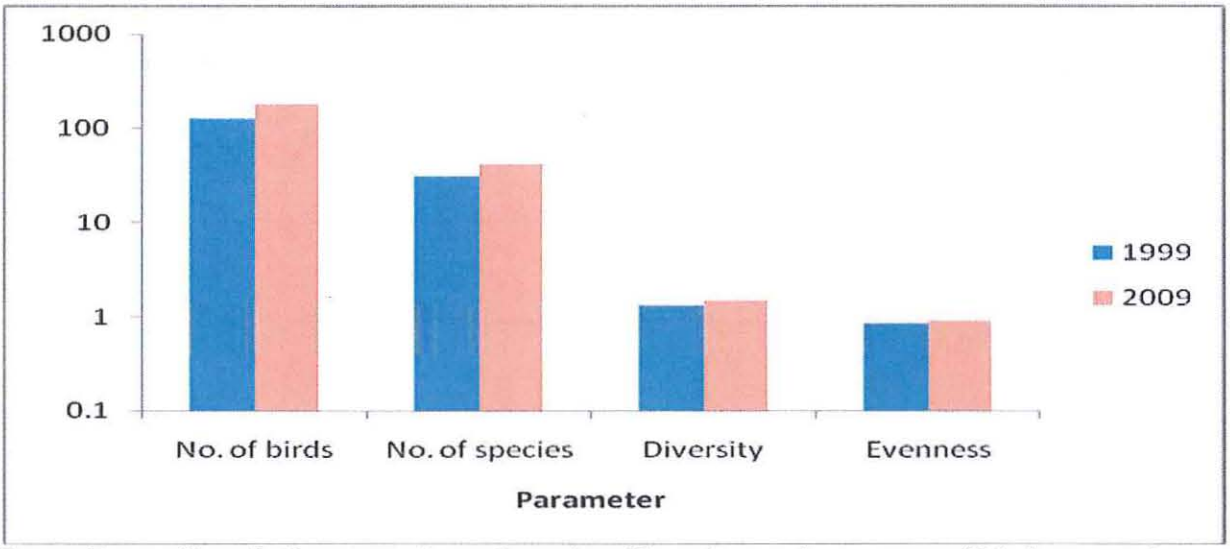

Figure 7. Populations, number of species, diversity, and evenness of birds occurring before (1999) and during (2009) operations at DARHT. Note the logarithmic scale on the vertical axis.

MAP Section VIII.A.1(c)

For routine DARHT facility operations, the sampling and analysis methodology used in the environmental baseline monitoring conducted under Section VIII.A.1(b) (see above) was designed to include environmental monitoring requirements under this mitigation action. Should the DARHT facility experience a substantial accidental spill or release of hazardous or radioactive materials, additional environmental monitoring would be conducted under this mitigation action as necessary. On January 18, 2005, approximately 385 gallons of mineral oil were released from an aboveground storage tank into the secondary containment system during an oil transfer—this released material did not reach the environment.

MAP Section VIII.A.1(d)

In accordance with the ROD for the DARHT Final EIS, DOE was operating the DARHT facility while implementing a program to conduct tests inside single-walled steel containment vessels with containment (Note: current DARHT nomenclature is confinement) to be phased in over 10 years (the Phased Containment Option of the Enhanced Containment Alternative) (DOE 1995). In general, open-air detonations occurred from 2000–2006 and detonations within a foam medium occurred from 2002–2006. A containment vessel qualification shot was conducted at the TA-36-06 firing point in 2006 and shots within single-walled steel containment vessels at DARHT were implemented in May of 2007. Three hydrodynamic test shots within single-walled steel containment vessels at DARHT were conducted in 2007. Two hydrodynamic test shots were conducted within single-walled steel containment vessels at DARHT in 2008. These steel containment vessels achieved at least a 40% reduction in material released to the open air as prescribed for Phase II of the Phased Containment Option.

Measurements using a variety of sampling methodologies (e.g., air particulates, adhesive films, surface swipes, and video analysis) at the firing point and sites downwind (mostly) of the firing point at various distances (50, 135, and 200 m) during open-air and foam detonations showed that use of foam reduced the size of a plume generated from a hydrodynamic test and the dispersal of contaminants by an average of 80% (Duran 2008); this is far above the 5% reduction prescribed for Phase I of the Phased Containment Option.

Similarly, comparisons of potential contaminant releases during foam mitigation and the use of steel containment vessels using surface swipes, particulate air sampling, and monitoring of detonation gases at the vessel and around the immediate work area were made. The use of steel containment vessels shows an additional 20% reduction over foam mitigation in potential emissions of uranium and beryllium as a result of a shot. In other words, the use of steel containment vessels reduced the amount of potential contamination by 99.9% and was far above the 40% reduction in material released to the open air as prescribed for Phase II of the Phased Containment Option.

MAP Section VIII.A.1(e)

The VPB located at TA-15 near the DARHT facility underwent a Phase II readiness review in FY 2006 and the facility is approved to begin operations including the staging, preparation, and decontamination of containment vessels. The containment vessel qualification shot conducted in 2006 provided baseline data/characterization of vessel debris resulting from hydrodynamic testing and analysis of the generated gas byproducts to aid in the disposal of future material, to provide data for personnel safety, and to aid in the development of future cleanout procedures for the containment vessels.

Containment vessel decontamination operations began in FY 2007, during FY 2008 containment vessels continued to be decontaminated on the DARHT firing point. Following decontamination, the vessels were transported to the VPB and prepared for the next experiment.

Summary of Potential Impact

MAP Section VIII.A.2

The DARHT MAP identifies the potential for contamination of the environment with various types of waste as a result of cleaning out the containment vessels.

Mitigation Action Scope

The cleaning operations will recycle materials as much as reasonably possible and use appropriate operation processes to limit discharges of waste to the environment. Waste minimization techniques will be applied to those materials that cannot be recycled and they will be disposed of in permitted disposal facilities. Typically, non-recyclable materials are placed into 55 gallon drums, fixed with cement, and disposed of at TA-54, Area G (Martha Zumbro, personal communication, May 10, 2010).

Status

MAP Section VIII.A.2

LANL has completed construction of a permanent VPB to be operated at TA-15 near the DARHT facility. This facility is approved to stage, prepare, and decontaminate, as appropriate, the vessels used in the DARHT hydrodynamic experiments. LANL has developed containment vessel cleanout processes in support of the commitment to decontaminate vessels used in experiments.

Process equipment for managing debris from vessel shots has been installed in the VPB. Procedures for vessel cleanout, decontamination, and stabilization of debris from vessel shots have been prepared to support containment vessel experiments. Waste minimization techniques are applied during the vessel cleanout and decontamination process.

Summary of Potential Impact

MAP Section VIII.A.3

The DARHT MAP identifies the potential for contamination of the environment with various types of hazardous material as a result of spills within the DARHT facility.

Mitigation Action Scope

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

Status

MAP Section VIII.A.3

Spill containment (physical barriers or sills) within the DARHT facility is in place and is maintained to contain all hazardous material spills that could occur. A Spill Prevention Control and Countermeasures Plan was completed and approved before beginning DARHT facility operations. This plan will be maintained for the life of the facility consistent with the requirements under the LANL Integrated Safety Management (ISM) System and Environmental Protection Agency Oil Pollution Prevention Regulation, 40 CFR Part 112. The DARHT facility has not had a substantial accidental spill of hazardous materials. Should an accidental spill occur in the DARHT facility, appropriate emergency actions will be taken in accordance with existing operational procedures. These emergency actions would include deployment of the LANL Hazardous Materials Response Team (HAZMAT). The HAZMAT is on call full time to respond to all emergency spills within the LANL site and, as needed, the LANL region. The mineral oil

release was not considered a spill because it did not reach the environment and did not require HAZMAT deployment.

Summary of Potential Impact

MAP Section VIII.A.4

The DARHT MAP identifies the potential for contamination of the environment with hazardous levels of various substances as a result of discharges of industrial water from the DARHT facility cooling tower.

Mitigation Action Scope

Water discharged from the DARHT facility cooling tower will be monitored to ensure compliance with outfall permits as stated in the National Pollutant Discharge Elimination System (NPDES) permit for the DARHT facility site. Should discharge levels exceed permit limits, LANL's Water Quality and RCRA (ENV-RCRA) group will act to bring the facility into compliance.

Status

MAP Section VIII.A.4

Water flow from the DARHT facility cooling tower is routinely monitored by ENV-RCRA to ensure compliance with the NPDES permit. There was an NPDES chlorine exceedance at the DARHT cooling tower (Outfall 03A185) in FY 2006. The compliance sample result of >2.2 mg/l exceeded the daily maximum permit requirement of 500 ug/l (0.5 mg/l). Corrective actions were taken to get the discharge back into compliance. There were no recorded NPDES permit exceedances at the DARHT cooling tower (Outfall 03A185) in FY 2009. ENV-RCRA continues to support DARHT facility representatives through monitoring and implementation of the requirements of the NPDES outfall permit.

3.2 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 groundbreaking activities caused by additional construction and operational activities may result in further soil erosion and damage to plants.

Mitigation Action Scope

MAP Section VIII.B.1(a–c)

The operational mitigation actions associated with these potential impacts are as follows:

a) Adherence to all soil erosion mitigation measures in accordance with the operational Storm Water Pollution Prevention (SWPP) Plan to ensure that erosion and sedimentation are minimized and that drainage facilities are in place to control runoff. These measures include temporary and permanent erosion control, sedimentation control, surface restoration and revegetation, storm water attenuation in paved and unpaved areas, routine inspection, and best management practices, which include minimization of fuel and oil spills, good housekeeping practices, and control of stored material and soil stockpiles.

b) Modification of SWPP Plan if control measures are ineffective.

c) Establishment and continuance of erosion/sediment control best management practices. The best management practices required by the SWPP Plan shall be continually monitored and maintained.

Status

MAP Section VIII.B.1(a)

The DARHT facility operations are conducted in full compliance with an existing SWPP Plan. The SWPP Plan has been implemented to ensure that erosion and sedimentation are minimized and measures are in place to control runoff. The plan includes required measures for temporary and permanent erosion control, sedimentation control, surface restoration and revegetation, storm water attenuation in paved and unpaved areas, routine inspection, and a best management practices plan, which includes minimization of fuel and oil spills, good housekeeping practices, and control of stored material and soil stockpiles. The scope, implementation, and modification of the operational SWPP Plan are routinely reviewed by Weapons Facilities Operations, Facilities Operations Directorate (WFO-FOD) environmental personnel and ENV-RCRA.

MAP Section VIII.B.1(b)

If control measures prescribed in the SWPP Plan are determined to be ineffective, the scope and implementation of the operational SWPP Plan will be modified, as necessary, by WFO-FOD environmental personnel and ENV-RCRA.

MAP Section VIII.B.1(c)

Best management practices prescribed in the SWPP Plan are continually monitored and maintained by DARHT facility representatives and WFO-FOD environmental personnel. Current control measures have proven appropriate and effective. If control measures are determined to be ineffective, the scope and implementation of the SWPP Plan are modified, as necessary, by the WFO-FOD environmental personnel and ENV-RCRA.

Mitigation Action Scope

MAP Section VIII.B.2(a–e)

The operations 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 ENV-EAQ to avoid disturbance to threatened and endangered species and other wildlife species.

c) ENV-EAQ must be notified before any new groundbreaking activities. ENV-EAQ will review all new sites and evaluate any potential impacts associated with the action. ENV-EAQ 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 ENV-EAQ 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 procedures that, in part, restrict facility workers to designated areas. Access to undesignated areas of the DARHT facility site is managed according to procedures 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 operations activities must comply with the institutional process established under LANL Implementation Procedure (IMP) 405.0—also known as the NEPA, Cultural, and Biological (NCB) Review. [Note: These activities previously were governed by Laboratory Implementation Requirement 404-30.02.0.] This IMP establishes the institutional requirements that are implemented to ensure that contractual work smart standards for NEPA, cultural resources, and biological resources are consistently met. In addition to requiring full compliance with applicable NEPA, cultural resources, and biological resources federal regulations, IMP 405.0 requires full and effective implementation of the LANL HMP (LANL 1998). These standards are measured by performance criteria contained in the Laboratory Performance Requirement 404-00-00 Appendix 3 (Environmental Protection—Ecological and Cultural Resources). ENV-RRO is the Office of Institutional Coordination for IMP 405.0 and is responsible for developing, revising, and maintaining the document, as well as technically assisting the institution in full and effective implementation.

Under the institutional Wildland Fire Management Plan (LANL 2007) and wildfire risk reduction program, some of the forested areas surrounding the DARHT facility site have been thinned. The forest thinning was determined to be necessary to minimize the immediate risk of a wildfire starting in the overgrown forest that originally surrounded the DARHT facility site. The specific location and amount of thinning was planned and implemented in full compliance with IMP 405.0. Additional thinning was conducted along the exclusion fence to eliminate dead hazard trees that might damage the fence. The DARHT facility site forest thinning activities were conducted in consultation with the Ecology Group (now ENV-EAQ) to ensure appropriate protection (such as vegetation buffer zones and erosion control) of Mexican spotted owl and other wildlife habitat in the area. All applicable NEPA, biological resources, and cultural resources regulatory requirements—including MAP Section VIII.B.2(b–e)—for DARHT facility operations and other facility management activities around the DARHT facility site are fully addressed through the ongoing implementation of IMP 405.0.

3.3 Mitigation Actions for Biotic Resources

Summary of Potential Impacts

MAP Section VIII.C.1(b–d); 2(n–x); 3(a, b); 4(a–c); 5(a); 6(a); 7(a, b); 8(a, b); 9(a, b); and 10(a, b)

According to the DARHT MAP, DARHT facility construction and operation could impact federally protected threatened and endangered species such as the Mexican spotted owl. DARHT

facility construction and operation could impact the Mexican spotted owl because of noise from firings and other operations, as well as other activities at the firing site. These activities could impact other endangered species potentially occurring in the project area as well. If present, the following species could be affected: American peregrine falcon, northern goshawk, bald eagle, spotted bat, Townsend's pale big-eared bat, New Mexico meadow jumping mouse, Jemez Mountains salamander, and the wood lily.

Mitigation Action Scope

MAP Section VIII.C.1(b–d); 2(n–x); 3(a, b); 4(a–c); 5(a); 6(a); 7(a, b); 8(a, b); 9(a, b); and 10(a, b)

These sections of the DARHT MAP commit DOE and LANL to implementing mitigation measures selected to protect threatened, endangered, and sensitive species in the DARHT facility area. These mitigation measures collectively require DARHT facility representatives to continue to coordinate with ENV-EAQ on all DARHT facility site threatened and endangered species issues through the ongoing implementation of the LANL HMP. LANL conducts the necessary species monitoring and habitat protection measures required for the DARHT facility site through the HMP (LANL 1998).

Status

MAP Section VIII.C.1(b–d); 2(n–x); 3(a, b); 4(a–c); 5(a); 6(a); 7(a, b); 8(a, b); 9(a, b); and 10(a, b)

Since January 1999, LANL has fully implemented the HMP. During FY 2000, site-wide implementation of the HMP was included as part of the institutional requirements in IMP 405.0. All applicable NEPA, biological resources, and cultural resources regulatory requirements (including MAP Section VIII.C.1 [b–d]; 2 [n–x]; 3 [a, b]; 4 [a–c]; 5 [a]; 6 [a]; and 7 [a, b]) for DARHT facility operations are addressed through the ongoing implementation of IMP 405.0.

3.4 Mitigation Actions for Cultural 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 archaeological sites, especially Nake'muu, and the immediate surrounding environment.

Mitigation Action Scope

MAP Section VIII.D.1(b, e–g)

The operations mitigation actions associated with this potential impact are as follows:

b) For large, high explosive charge experiments, a temporary expendable fragment mitigation, 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 cultural site 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 DARHT facility operator 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 general, open-air detonations occurred from 2000–2006 and detonations within a foam medium and steel containment vessels occurred from 2002–2006 and from 2007–2008, respectively. None of the large explosive shots in 2002 or 2003 (two shots each year) required fragment mitigation for blast effects and the employment of foam and steel containment vessels in the latter years significantly reduced the size of a plume and the dispersal of materials (Duran 2008).

Thus, with regard to fragment mitigation measures, all future shots will be evaluated on a case-by-case basis to determine the need for additional fragment protection; however, the current use of steel containment vessels basically minimizes this mitigation concern.

MAP Section VIII.D.1(e)

Based on the results of the annual nine-year-long (1998–2006) physical conditions assessment of Nake'muu, it was concluded that the natural environment, in particular the amount of yearly snowfall and elk moving through the site, is responsible for the deterioration of the standing wall architecture, not the operations at DARHT (Vierra and Schmidt 2006). As a result of this statistically quantitative study, it was determined that additional annual monitoring at Nake'muu under the DARHT MAP is not required and was suspended in FY 2007. In order to formally close out this specific monitoring requirement, a consultation between the LASO Cultural Resources Program Manager, Environmental Protection Division (including the Cultural Resources Team [CRT]), the Pueblo of San Ildefonso, and the Facility Operations Director of Weapons Facilities Operations is recommended. This meeting has not yet been scheduled.

It is noted that yearly qualitative assessments of Nake'muu have also been performed as part of the MAP for the Special Environmental Analysis (SEA) associated with the Cerro Grande fire (DOE 2000a). During the period of FY 2006–2009 this LANL CRT field check of Nake'muu was directly tied into the annual visit by the Pueblo of San Ildefonso required by the DARHT MAP. The field check provides a brief condition assessment of the standing walls to discuss with Pueblo of San Ildefonso visitors during the DARHT tour visit, as well as to check the condition of the fire road and fire break into Nake'muu.

In September 2003, a team from the Pueblo of San Ildefonso conducted rehabilitation activities at Nake'muu including cutting and slashing of snags, reduction of scrub oak, and using slash for erosion control. No unusual episodes of wall fall were noticed during a brief condition assessment conducted on July 28, 2006. However, the assessment conducted of Nake'muu on October 23, 2007, discovered at least eight small wall sections had fallen since the July 2006

inspection, presumably as a result of moderate to heavy snowfall during the winter of 2006/2007 and wildlife activity within the site. On September 22, 2008, and again on September 28, 2009, members of the LANL CRT visited Nake'muu and conducted detailed photography of all standing walls to use as a baseline for future comparison. They documented the collapse of a partial wall in one room.

MAP Section VIII.D.1(f)

In September 2004, DOE and LANL conducted site tours for tribal representatives to discuss Nake'muu monitoring and Cerro Grande fire rehabilitation projects. A tour of Nake'muu was conducted on May 18, 2005, with approximately 12 members of the Pueblo of San Ildefonso. In September 2006, a tour of Nake'muu was conducted with members of the Pueblo of Santa Clara.

Although the DARHT MAP physical assessment of Nake'muu was completed in 2006, it was determined that visits by the Pueblos would continue into the indefinite future. In FY 2007, the LANL CRT began coordination efforts with the LANL Tribal Relations Office to plan for these tours, which resumed in FY 2008. On September 26, 2008, four members of the Environmental Program at the Pueblo of San Ildefonso visited Nake'muu. They were joined by the ENV-EAQ Group Leader, Dianne Wilburn, and Environmental Protection Division Leader, Victoria George. In FY 2009, the Cultural Resources Team attempted to schedule a Nake'muu tour for members of San Ildefonso Pueblo during September 2009, in accordance with site access restrictions and past practices. However, the interested San Ildefonso Pueblo members were unable to participate in a tour of Nake'muu until October 2009 (in FY 2010). To prevent site access restrictions and scheduling conflict issues, future tours will be conducted during the first quarter of each fiscal year (October–December), rather than in September.

MAP Section VIII.D.1(g)

Fragment mitigation measures are implemented from experiments that have the potential to generate fragments. Steel containment vessels were implemented in FY 2007 for the mitigation of material releases to the environment. Aqueous foam has been implemented as an alternative for the mitigation of material releases to the environment. The post-shot operations for the experiments were conducted according to experiment-specific Integrated Work Documents and the following established standard procedures:

- WFO-OS-ES-050 General Safety for Firing Site Areas
- WFO-OS-ES-030 General Firing Operations
- HX-DARHT-TP-1039 DARHT Firing Operations
- HX-DARHT-TP-1040 General Explosive Operations at DARHT
- DX-PRO-012 Division Waste Management Procedure
- WFO-OS-HS-025 Radiological Controls

These procedures 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 procedures appropriately address DARHT MAP commitments that are designed to minimize the short- and long-term release of contaminants (radioactive and hazardous 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 the Ecology Group 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 1999b). In addition, as part of the LANL SWEIS MAP, in FY 2000 LANL completed the *Comprehensive Plan for the Consideration of Traditional Cultural Properties and Sacred Sites at Los Alamos National Laboratory* (DOE 2000b). This DOE plan was approved in August 2000 and provides the institutional framework for identifying and documenting two specific types of cultural resources: traditional cultural properties (TCPs) and sacred sites (DOE 2000b). As part of DARHT facility operations, DOE and LANL will continue to consult with the four Accord Pueblos through annual tours, as necessary, to minimize 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. Cultural resource surveys conducted as part of the Cerro Grande Rehabilitation Project did not identify any new archaeological sites in the vicinity of the DARHT facility. No new TCP or sacred site issues were identified during FY 2007 through 2009. Any future TCP and sacred site issues will be addressed as part of the institutional process established under the *Comprehensive Plan for the Consideration of Traditional Cultural Properties and Sacred Sites at Los Alamos National Laboratory.*

To assist in the formal closure of DAHRT MAP mitigation actions for cultural resources, we recommend that, beginning in FY 2010 or FY 2011, the annual visit of the Pueblo of San Ildefonso to Nake'muu and the associated rehabilitation monitoring and site condition assessment under the SEA MAP become part of the annual implementation of the Laboratory Cultural Resources Management Plan (LANL 2006) by the LANL CRT.

3.5 Mitigation Actions for Human Health and Safety

Summary of Potential Impact

MAP Section VIII.E.1(a)

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

Mitigation Action Scope

MAP Section VIII.E.1(a)

Under this section of the DARHT MAP there is a commitment to provide noise protection to workers in the form of ear muffs or ear plugs, depending on the expected noise levels, per Occupational Safety and Health Administration Act of 1972 requirements.

Status

MAP Section VIII.E.1(a)

Under the institutional implementation of the ISM System, DARHT facility operations are managed according to specific procedures that collectively address a wide range of potential impacts to worker safety and health. These procedures fully address potential adverse health effects on workers from high noise levels associated with the DARHT facility during test firing by requiring the use of appropriate personal protective equipment.

Summary of Potential Impact

MAP Section VIII.E.2(a–c)

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

Mitigation Action Scope

MAP Section VIII.E.2(a–c)

The operations mitigation actions associated with this potential impact are as follows:

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

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

c) Engineered controls were installed as visual indicators to notify workers when the accelerators are operating.

Status

MAP Section VIII.E.2(a–c)

Under the institutional implementation of the ISM System, DARHT facility operations are managed according to specific procedures that collectively address a wide range of potential impacts to worker safety and health. DARHT facility accelerator operations are conducted in accordance with the DARHT Operations Standard HX-DARHT-AP-014. This procedure

requires appropriate training, radiation dosimetry program participation, and acceleration operations that collectively protect workers from exposure to unacceptable levels of radiation.

4.0 CONCLUSIONS

In FY 2009 there were no significant impacts from contaminants based on measurements of soil, sediment, vegetation, field mice, and bees from DARHT operations. Also, the comparison of bird species diversity and composition, a qualitative measurement, before and during DARHT operations, showed no significant impacts to the bird populations.

Although 2009 contaminant levels were not at concentrations detrimental to human health or to the environment, there were still measurable amounts of depleted uranium in all media and the levels were increasing over time to at least 2006. Concentrations of depleted uranium in most media decreased in 2007 and may correspond to the success of employing steel containment vessels and/or to a reduction of detonations. However, since increases of uranium in all media were noted to at least 2006 and uranium may linger in soils for some time, the monitoring of all or part of these media should be continued to a point where the concentrations are similar to BSRLs.

Foam mitigation significantly reduced the amount of potential contaminants released into the environment as compared to open-air detonations, and the use of steel containment vessels further reduced those amounts over foam mitigation.

Regarding potential impacts from DARHT operations on Nake'muu, the natural environment is having a greater effect on the deterioration of the standing wall architecture than the operations at DARHT.

4.1 2009 MAP Implementation

In July 1999, all construction-related DARHT MAP mitigation commitments and action plans were completed. The FY 2009 DARHT MAP activities represent the tenth year of operation implementation. The DARHT MAP activities implemented during FY 2009 were a continuation of DARHT facility operations-phase MAP tracking and annual reporting. Should the scope of the DARHT facility project change during the operations stage, as part of the appropriate NEPA review, the scope of the DARHT MAP could be changed by NNSA as necessary and as directed by DOE LASO.

4.2 Recommendations

- Future (2010) DARHT operations are anticipated to incorporate more contained tests. As a result, impacts from a given year of DARHT operations on the environment are expected to eventually decrease and this should be considered in future monitoring; however, uranium-238 appears to have accumulated in soils and sediments, particularly near the firing point, and may impact biotic resources over a period of years. These potential cumulative impacts should continue to be monitored, especially for contaminants such as uranium-238 that are above BSRLs, and/or are on an increasing trend.
- Re-evaluate the environmental monitoring strategy for DARHT considering issues such as (1) budget, (2) movement to contained shots in 2007, (3) trend in contaminant concentrations and comparison with the benchmark thresholds of BSRLs (RSRLs) and SLs, and (4) the results of the 2005 special study on the effects of discontinuity in sample data.

- The DARHT MAPAR will continue to be issued annually until the issuance of the new LANL SWEIS ROD and MAP. Upon the issuance of the new LANL SWEIS ROD and MAP, the DARHT MAPAR will be incorporated into a consolidated annual MAP report that will include all ongoing NEPA mitigation actions and any mitigation commitments associated with the new SWEIS ROD, scheduled to be issued in FY 2008. As has been done in the past, detailed analysis and the data of DARHT monitoring results are published in the annual ESR.
- Annual monitoring at Nake'muu has been discontinued, but site visits every two to three years for vegetation removal, etc., and annual tribal visits should continue. Future TCP and sacred site issues should be addressed as part of the institutional process established under the *Comprehensive Plan for the Consideration of Traditional Cultural Properties and Sacred Sites at LANL* (DOE 2000b).
- Under the institutional implementation of the ISM System, continue to manage DARHT facility operations according to specific procedures that collectively address a wide range of potential impacts to worker safety and health including, but not limited to, noise and radiation hazards.

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Appendix III

Trails Management Program Mitigation Action Plan Annual Report Fiscal Year 2010

Prepared by Daniel S. Pava
Environmental Stewardship Resources Management Team (ENV-ES)

INTRODUCTION AND BACKGROUND

This is Mitigation Action Plan Annual Report (MAPAR) has been prepared for the National Nuclear Security Administration (NNSA) as part of implementing the Los Alamos National Laboratory Trails Management Program Mitigation Action Plan (MAP), which is now a part of the 2008 LANL SWEIS MAP. The objective of the MAP is to continue to implement the Trails Management Program and integrate future mitigation actions with the SWEIS MAPAR to decrease risks associated with trails use on DOE/LANL lands. This MAPAR covers LANL Trails Management Program activities and actions that happened during the past fiscal year: the period from October 2009 through September 2010. The first MAPAR was submitted to NNSA in January 2006, and the second MAPAR was submitted in March 2007. The third MAPAR was submitted in March 2008 but only covered a portion of FY 2008, because the DOE issuance of the 2008 LANL SWEIS and Record of Decision was imminent. The fourth MAPAR was submitted in October 2009.

TRAILS AT LANL

Trails use at LANL has been considered one of the benefits of working and living in Los Alamos. However, there was never an explicit DOE or LANL policy or mechanism to balance recreational trails use with environmental, cultural, safety, security, and operational concerns. In 2003, DOE directed LANL to look at establishing such a program. DOE/NNSA published the *Final Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program* and FONSI (DOE/EA-1431) on September 2, 2003. The NNSA issued a MAP for this EA on the same date. The most pertinent trails issues identified during the scoping of the EA were:

- DOE, NNSA does not have a public recreational mission established by Congress.
- Public gets conflicting messages because signs, access controls, and enforcement at LANL vary.
- Trespassing occurs from LANL onto adjacent lands where trail use is not permitted.
- Trail use poses threats to some cultural and natural resources.
- Trail use in certain LANL areas increases the risks of human exposure at Potential Release Sites, and other operational and natural hazards. Some of the natural hazards have been magnified by the Cerro Grande Fire, and
- Security concerns are posed by the use of certain LANL trails.

The MAP for the LANL Trails Management Program established that the Trails Management Program would be implemented through individual projects, including measures for planning, repair and construction, environmental protection, safety, security, and post-repair and construction end-state conditions assessments. A standing Trails Working Group (TWG), which includes representatives from LANL and other agency's stakeholders (e.g., the National Park Service, San Ildefonso Pueblo, Santa Clara Pueblo, Los Alamos County, and the public) was formed to carry out this program.

The goals of the trails management program are:

Reduce the risk of damage and injury to property, human life, and health, and sensitive natural and cultural resources from social trail use at LANL

Facilitate the establishment of a safe, viable network of linked trails across the Pajarito Plateau that traverse land holdings of various private and government entities for recreational use and for alternate transportation purposes without posing a threat to DOE and NNSA mission support work at LANL or disrupting LANL operations.

Maintain the security of LANL operations.

Respect the wishes of local Pueblos to maintain access to traditional cultural properties (TCPs) by Pueblo members while also preventing unauthorized public access to adjacent Pueblo lands and other lands identified as both religious and culturally sensitive areas to Native American communities.

Adapt trail use at LANL to changing conditions and situations in a responsive manner.

Maintain the recreational functionality of the DOE lands so that the land owned by the DOE remains open to all members of the public for non-motorized recreation, in compliance with federal laws and LANL operational constraints.

TRAILS MANAGEMENT PLAN MAP IMPLEMENTATION

LANL Trails Management Program Accomplishments during FY 2010 included the following:

Meetings

The Trails Working Group met nine times in FY 2010 (October 2009 to September 2010. The Working Group held its 60th meeting in September 2010. Typically, attendees include LANL subject-matter experts along with representatives from Los Alamos County, nearby Pueblos, Bandelier National Monument law enforcement, and interested local residents. Agendas are distributed prior to each meeting and include in-depth and continuing discussion and resolution of trails mitigation actions. What follows are the highlights of the 2010 Trails Management Plan implementation at LANL.

Trails Maintenance

Three volunteer work parties were coordinated in FY 2010. Two focused on the Duran Road/Trail during the fall and spring while another was conducted at TA-50 near a recreational trail. Work on the Duran Road/Trail included repairing eroded trail wall segments , clearing trees and scrub, bracing of a large eroded area, and repairing the major erosion channel near the top of the trail (Figure 1). The trail is now in overall good shape and runoff from the streets and parking lots no longer appears to be an issue. LANL archaeologists conducted trails maintenance, primarily erosion control, at six sites situated in Technical Area (TA) 70. Mitigations were recommended as part of two assessments, which documented impacts to cultural resources from recreational trails use.

Figure 1. Duran Trail Work Party volunteers.

New trail head signs

New metal trail head signs were developed and approved by the Trails Working Group (Figure 2). Care was taken to make the signs informative and accurate. The 27 signs were manufactured during the summer and posting them at a variety of LANL trail heads is pending.

Figure 2. Sample trailhead sign.

Public Information

A new LANL trails map was prepared and approved by the Trails Working Group. The poster-sized map is available to members of the working group and is approved for unlimited distribution. The Working Group also reviewed and provided comments on the new LANL Policy (P104) Pets, Dogs and Other Animals on LANL Property. Trails Management Program also coordinated with LANL Outreach to inform public of trails closures due to environmental remediation, threatened and endangered species surveys and programmatic conflicts.

Cultural Resources Protection

The Trails Management Program provided funding for the successful completion of cultural resource protection tasks including LIDAR studies at the Mortandad Cavate Complex, a baseline condition assessment at the Mortandad Cavate Complex, Trails assessments for the New Mexico State Historic Preservation Office, and erosion control to protect cultural resources in TA 70.

Security and Safety

The Trails Management Program coordinated with Bandelier National Monument law enforcement on patrols and trespassing issues, with LANL security on proper posting of unexploded ordnance signs and unauthorized trails use, and with the Los Alamos County Open Space program manager on issues that affect the county and LANL.

NEXT STEPS

The Trails Working Group will continue to implement the Trails Management Program addressing the Trails Mitigation Action Plan in FY 2011. Results of the Mortandad baseline study and LIDAR study will be presented to the Trails Working Group and other interested parties. Mitigation recommendations for sites in TAs 70 and 71 will be implemented.

Appendix IV

FY 2010 SEA MAP Annual Reporting for Historic Cultural Resource Sites

Prepared by Ellen McGehee and Steven Hoagland
Environmental Stewardship, Resources Management Team (ENV-ES)

HOMESTEAD AND DEPRESSION ERA SITES (CIRCA 1887–1942)

FY 2009 SEA MAP annual reporting recommended continued monitoring of conditions at six Homestead-era sites and one Depression-era Civilian Conservation Corps (CCC) site impacted by the Cerro Grande Fire. These sites include the Montoya Homestead (LA 21334), the Grant Homestead (LA 16807), the Gomez Homestead (LA 86643), the Fermin Vigil Homestead (LA 30638), the Montoya Brothers Homestead (LA 30640), Anchor Ranch (LA 16808), and the CCC camp (LA 21369B). FY 2009 recommendations also included repair of erosion control mitigations at the Montoya Homestead, removing downed trees from historic features at the CCC camp, and submission of site form updates and revised eligibility determinations for three historic trash scatters where in-field analysis was conducted as part of FY 2009 SEA MAP fieldwork. Fieldwork was conducted at these sites because of continued deterioration of diagnostic artifact attributes resulting burning during the Cerro Grande Fire.

FY 2010 SEA MAP Fieldwork Summary (Homestead and Depression Era Sites)

In FY 2010, members of the LANL Resources Management Team revisited the CCC camp and five of the six Homestead-era sites identified in the FY 2009 recommendations. The sites were photographed and any changes in condition were noted, such as continuing erosion or impacts from downed fire-burned trees. The Gomez Homestead was not revisited this year because the *horno*, rock buildings, and other features at the site have not had any fire-related issues in the last several years of reporting. Erosion control measures put in place at the Montoya Homestead during past SEA MAP field seasons are continuing to cause increased gulleying at the site (Figures 1 and 2). In addition, several fire-killed trees have fallen on historic features associated with both the CCC camp and Anchor Ranch (Figures 3 and 4). Tree removal and erosion repairs to historic sites were not completed in FY 2010 and these tasks are recommended for FY 2011.

For FY 2011 and beyond, annual monitoring of the Homestead-era sites and the CCC camp should be discontinued because the sites are stable and are no longer at risk for data loss due to fire-related impacts. Furthermore, additional in-field analysis is not recommended for the artifact scatters within the boundaries of the Montoya, Grant, and Gomez Homesteads because artifact deterioration has also stabilized.

Figure 1. Detail of erosion channel, FY 2009, Montoya Homestead (LA 21334).

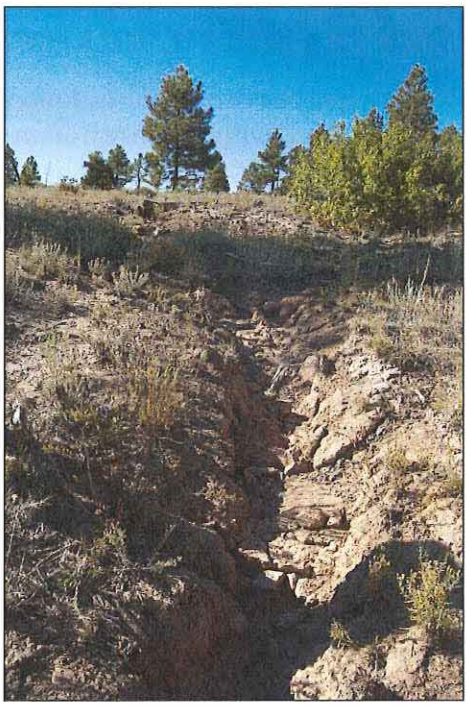

Figure 2. Detail of same erosion channel, FY 2010.

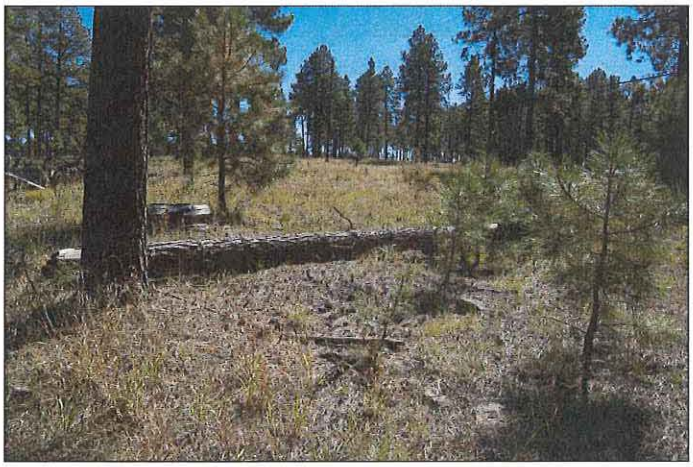

Figure 3. Downed fire-killed tree on CCC camp foundation

Figure 4. Downed fire-killed trees in one of the Anchor Ranch reservoirs.

Updated site forms and revised eligibility determinations for three Homestead-era sites were finalized as part of FY 2010 SEA MAP activities. Historic artifact scatters (LAs 89769, 89831, and 131236) were identified as candidates for in-field analysis because diagnostic artifacts were exhibiting increased surface degradation and other post-fire effects. In 2009, in-field artifact analysis was completed at the three sites. One hundred percent of the artifacts observed at LA 89769 and LA 131236 and approximately 50% of artifacts at LA 89831 were documented. New Mexico Cultural Resource Information System (NMCRIS) site record forms were updated in conjunction with the in-field artifact assessment.

The three artifact scatters were also reassessed for National Register of Historic Places (Register) eligibility. With 100% in-field artifact analysis and no potential for intact subsurface remains, LA 89769 and LA 101236 were determined ineligible for the Register because they lack additional information potential. With approximately 50% of the artifacts yet to be analyzed, LA 89831 retains the potential to yield information important for establishing regional and site-specific research themes concerning New Mexico's Homestead era. The updated NMCRIS site record forms will be submitted to the New Mexico State Historic Preservation Office (SHPO) in FY 2011 with a request to concur with the revised eligibility determinations.

Manhattan Project and Cold War Era Historic Buildings and Structures (1942–1963)

FY 2009, SEA MAP annual reporting recommended continued monitoring at V-Site. Other recommendations included developing stabilization plans and rehabilitating areas impacted by the fire. LANL Resources Management Team staff visited V-Site (TA-16-516 and TA-16-517) many times during FY 2010, conducting tours and checking on site conditions. Site work carried out in FY 2010 included removing vegetation (including scrub oak growth) and repainting deteriorated wooden building elements. In FY 2010, detailed task descriptions and drawings were developed for FY 2011 stabilization and rehabilitation work. This work will involve repairs to the earthen berms, the burned concrete pad areas located east of buildings TA-16-516 and TA-16-517, and the broken sump cover at the site of TA-16-515 (burned during the fire).

SUMMARY OF RECOMMENDATIONS

Annual monitoring should be discontinued at the Homestead-era and Depression-era sites impacted by the fire because the sites have stabilized and are no longer experiencing fire-related impacts. Updated site forms and revised eligibility recommendations should be submitted to the

SHPO during FY 2011 for the three historic artifact scatters where in-field analysis was conducted during FY 2009 (LA 89769, LA 89831, and LA 131236). FY 2011 rehabilitation associated with Homestead-era sites should include the removal of downed trees at the CCC camp and Anchor Ranch and the repair of erosion control measures at the Montoya Homestead. FY 2011 rehabilitation work at V-Site should focus on repairs to the earthen berms, the burned concrete pads, and the sump area at TA-16-515. Furthermore, LANL Resources Management Team personnel should make recommendations regarding the appropriate disposition and/or interpretation of burned artifacts currently located at V-Site.

Table 1. Recommendations for FY 2011 SEA MAP activities (Historic Sites)

Historic Property Name	TA	Recommendations for FY 2011 SEA MAP Actions
Homestead and Depression Era Sites		
Montoya Homestead, LA 21334	TA-6	Repair existing erosion control measures.
Anchor Ranch, LA 16808	TA-8	Remove downed trees located on historic features.
CCC Camp (Depression era), LA 21369B	TA-16	Remove downed trees located on historic features.
Manhattan Project and Cold War Buildings and Structures		
TA-16, V-Site	TA-16	Repair berms and burned concrete pads, repair sump area at TA-16-515, and assess future disposition of burned artifacts.

Appendix V

Special Environmental Assessment Mitigation Action Plan (SEA MAP) Fiscal Year (FY) 2010 Report for Prehistoric (Ancestral Pueblo) Sites

Prepared by W. Bruce Masse
Environmental Stewardship, Resources Management Team (ENV-ES)

INTRODUCTION/MITIGATION ACTION COMMITMENT

The Special Environmental Assessment Mitigation Action Plan (SEA-MAP) states that review, evaluation, and stabilization of prehistoric cultural resource sites within areas impacted by the 2000 Cerro Grande Fire and areas prone to flooding or soil erosion would continue until post-fire storm event water flow regimes approximate pre-fire hydrological conditions. Pre-fire hydrologic conditions have occurred, however site stabilization and protection measures are still being performed as part of this effort, as is consultation with the State Historic Preservation Officer (SHPO) and local Pueblos and tribes.

History and Background

Cultural resource managers of the Environmental Stewardship Resources Management Team (ENV-ES RMT) are responsible for carrying out the SEA MAP site monitoring commitment as part of the 2008 Site Wide Environmental Impact Statement (SWEIS) MAP. Between 2000 and 2002, LANL archaeologists surveyed areas impacted by a range of impacts from the fire. In 2002, LANL report these data to the Los Alamos Site Office (LASO) (Nisengard et al. 2002). One hundred and seven archaeological sites were subject to rehabilitation measures in 2003 by a team from the Pueblo of San Ildefonso. Rehabilitation consisted of removal of burned snags, thinning and slashing of some unburned or partially burned trees, the placement of straw wattles, filling stump holes, and revegetation using the seeds of native grasses and shrubs. In addition, three-strand smooth wire fences were erected along and around 87 sites situated on fire roads or potentially vulnerable to fire suppression activities. Single sites and site clusters were fenced.

In 2005, 96 of the rehabilitated sites were reassessed (Nisengard et al. 2005). Seven sites were excavated as part of the Land Conveyance and Transfer Project (LA-UR-07-6205) and no longer have cultural significance under the National Historic Preservation Act. Four other sites could not be revisited due to logistical considerations with respect to LANL mission activities. The purpose of the monitoring effort was to evaluate the 2003 mitigation program and assess the need for continued monitoring and/or additional mitigation actions. In 2006, 32 Ancestral Pueblo period sites and the Rendija Canyon Traditional Cultural Property (TCP) district were subject to SEA MAP field checks. These sites are situated in Technical Areas (TAs) 5, 15, 16, 37, 49, 60, 67 and Rendija Canyon and were identified in the 2005 SEA MAP cultural resources report as requiring mitigations (Nisengard et al. 2005). These sites were re-visited in 2007 and 2008. In 2008, because of the recovery of the area to pre-fire conditions, archaeologists determined that seven sites had been adequately rehabilitated and no longer needed annual monitoring. The Rendija Canyon TCP perimeter fences were repaired in FY 2008. In 2009, archaeologists conducted field checks of the remaining 25 sites and Rendija Canyon TCP district. Twenty-eight locations were monitored and assessed during FY 2009. An inspection of the Rendija Canyon perimeter fences was conducted in FY 2009 and the district was removed from the SEA MAP monitoring schedule. In FY 2010, eight sites were recommended for removal from SEA monitoring schedule. Eighteen sites were monitored and assessed in FY 2010.

FY 2010 Mitigation Status and Observations

FY 2010, SEA MAP monitoring was conducted by LANL archaeologists in July and August. Many of the erosion, fence, and snag issues identified in FY 2009 persist in FY 2010. Several sites continue to experience erosion problems due to inadequate vegetation (Figure 1). A similar situation is present at LA 136825, where the soil has developed a hard crust making it difficult for grass seeds to fix themselves and grow (Figures 2, 3). Even with abundant slash on the

ground surface, soil buildup, and growth is lacking, despite adequate rainfall. These sites are recommended for hydroseeding in FY 2011 or 2012.

Figure 1. Tuff masonry blocks eroding from rubble mound. Wattle installed in FY 2003.

Figure 2. Erosion at LA 136825 at center left (2009).

Figure 3. Erosion at LA 136825 fieldhouse structure in the scrub oak (2010).

A different type of erosion is present at sites in which fire road or firebreak cut banks containing intact cultural deposits are increasingly incised by small erosion channels. This situation is exemplified at LA 4601-B (Figure 4). In this case, the cultural deposits include the midden area east of a rubble mound and possibly a portion of the rubblemound. Because the walls of the cut banks are nearly vertical, they would not respond well to hydroseeding and the use of wattles in the roadbed is not practical. Field consultation with Water Quality stormwater subject matter experts (SMEs) is recommended.

Figure 4. Eroded cut, roomblock mound is behind the center fence section (view west).

Snags and the rapid growth of scrub oak due to the past two years of average or greater than average annual rainfall, continue to be persistent issues at some sites. Although Nake'muu (LA 12655) no longer exhibits issues with standing snags or with erosion, scrub oak that was trimmed during the Cerro Grande Rehabilitation Project in FY 2003, is beginning to encroach upon the standing walls (Figure 5). This situation would have occurred sooner if not for several years of drought. Standing snags that resulted from the Cerro Grande Fire and the subsequent drought and bark beetle blight are less of an issue because they have been cut or have fallen over the past ten years. Nevertheless, standing snags impact at the roomblock mound at LA 15855 (Figure 6). In this case, the recommended removal of the pinyon snags should also be accompanied with the trimming of the surrounding scrub oak.

Figure 5. Southeastern corner of the eastern roomblock at Nake'muu (view southeast). Scrub oak is beginning to impact standing walls.

Figure 6. View of the Mound C roomblock at LA 15855 (view east). Scrub oak growing on and around the masonry walls of the roomblock.

An unusual issue with a snag has occurred at the LA 126547 petroglyph shrine associated with and south of LA 15855 (Figure 7). Initially when the tree fell several years ago, it seemed possible that as the fallen snag began to decompose and its branches broke off, that it would roll over the cliff and the stump hole could damage the petroglyphs and/or the masonry shrine at the base of the cliff. However, because of the angle of the fallen snag with respect to the cliff face and that the upper half of the tree is on the cliff slope, the lower half is securely fixed on the slope below the cliff so the fallen snag is relatively stable and unlikely to impact the site.

Figure 7. Fallen and uprooted ponderosa snag above LA 126647 (view northeast).

Remnants of tuff block masonry walls were identified within graded fire breaks at LA 4697 in TA-49 in FY 2009 (Figures 8, 9). This discovery was facilitated by moisture retention in the tuff blocks after a rain storm, the conditions were similar during the FY 2010 monitoring field visit and several wall remnants representing 5-6 rooms were visible in the fire break in an area about 20 m long by 4-5 wide. Pin flag probes of the area indicated that 10-15 cm of intact archaeological deposits are present above bedrock in and around the wall remnants. Some areas of significant erosion are present near the exposed roomblock (Figure 9). LA 4697 was examined as part of a fire roads and fire breaks damage assessment completed in FY 2010. Recommendations regarding the exposed roomblock will be addressed in a FY 2011 report.

Figure 8. The pencil marks the alignment of the surface of a tuff block masonry wall that extends across Firebreak 5 at LA 4697 (view west).

Figure 9. L. Maestas stands in the vicinity of the roomblock exposed in Firebreak 5 at LA 4697, erosion in the foreground is within a few meters of the roomblock (view east).

FY 2010 SITE REHABILITATION

Two of the 18 SEA MAP monitoring sites were recommended for rehabilitation measures during FY 2010. These included LA 89779, a fieldhouse structure, and LA 137749, a small structure or shrine, both of which are located in TA-60. These were rehabilitated by a work crew from LANL Maintenance and Site Services (MSS), under the supervision of a CRM staff member.

LA 89779 exhibited two rehabilitation issues that required correction. First was the cutting and slashing of a large pinyon snag growing within the southwestern corner of the masonry fieldhouse structure (Figure 10). The trunk of this unusually large pinyon snag had split within the past two years, and further splitting and toppling of the heavy trunk and branch sections threatened to uproot and displace the masonry wall stones (Figure 11). The tree was cut and sections of the trunk were placed in a semicircle along the western side of the masonry structure to provide potential slopewash erosion protection.

Figure 10. Large pinon snag at LA 89779 (2009 prior to treatment, view east).

The second rehabilitation measure at LA 89779 was that of placing wattles and slash from the pinyon tree in eroded areas south, east, and north of the masonry structures (Figure 12). A total of two 25-foot wattles and four 10-foot wattles were placed in the most heavily eroded areas. A more recent examination of the wattle placement by a stormwater SME on the Water Quality Team, suggests that the wattles can be made potentially more effective by slight shifts in position and by better anchoring them to the ground surface. Such adjustments, if necessary, will be made during FY 2011 SEA MAP monitoring fieldwork.

Figure 11. FY 2010 treatment of the large pinyon snag at LA 89779 (view northeast).

Figure 12. FY 2010 treatment (wattles and slash) at LA 89779 (view southwest).

RECOMMENDATIONS FOR FY 2011 ACTIVITIES

Table 1 summarizes the findings and recommendations from the FY 2010 SEA MAP field season for the 18 sites recommended in FY 2009 for continued monitoring and mitigation. Three sites are recommended for removal from the SEA MAP monitoring program as they have recovered (i.e., LA 137749 and LA 30642 in TA-60, and LA 129492 in TA 15). LA 137749 was rehabilitated in FY 2010. Rehabilitation included cutting of snags that had fallen onto the site fence and associated fence repair. Rehabilitation is now complete and there is no need for future monitoring under the SEA MAP. LA 30642 is a fieldhouse recommended for fence repairs in FY 2009 (Figure 13). However, because the condition of the fence has not worsened over four years, and because the fence provides satisfactory protection for the site from vehicular traffic, no further mitigations are necessary. Monitoring of the remaining 15 sites is planned for FY 2011.

Figure 13. Sagging fence wire at LA 30642 (view southwest).

LA 129492 is a fieldhouse in TA-15 monitored for erosion issues. During the Cerro Grande Rehabilitation Project, snags at the site were cut and placed around and upslope of the rubble mound for erosion control. The major impact to the site was the general absence of stabilizing vegetation on and immediately around the rubble mound. Vegetation growth in 2009 and 2010 has recovered and the site has been rehabilitated no future monitoring is required (Figure 14).

Figure 14. Fieldhouse rubblemound at LA 129492 (view north).

References

LANL 2002 Nisengard, J.E., B.C. Harmon, K.M. Schmidt, A.L. Madsen, W.B. Masse, E.D. McGehee, K.L.M. Garcia, J. Isaacson, and J.S. Dean *Cerro Grande Fire Assessment Project: An Assessment of the Impact of the Cerro Grande Fire on Cultural Resources at Los Alamos National Laboratory, New Mexico* LA-UR-02-5713. Los Alamos National Laboratory, Los Alamos, NM.

LANL 2005 Nisengard, J.E., K.M. Schmidt, B.C. Harmon, and W.B. Masse *Archaeological Site Monitoring for the 2005 Special Environmental Analysis-Mitigation Action Plan (SEA MAP) Los Alamos National Laboratory, New Mexico.* Cultural Resources Report No. 259, Survey 1006. Los Alamos National Laboratory report LA-CP-05-1080, Los Alamos, NM.

Table 1. SEA MAP sites (FY 2009-2010). Green indicates ongoing monitoring and recommendations, pink indicates completed.

Site Number	TA or Canyon	FY 2009 Recommendations	FY 2010 Recommendations
LA 4601B	TA-5	Repair fence north of road damaged by snag, and sections and t-post damaged by vehicle. Remove snags and repair eastern end of south fence. Cut and slash snags along south fence. Fire road blading and erosion has exposed possibly masonry wall stone and wall segments within roadbed. Erosion of road berms threatens intact deposits.	Reassess and prioritize fence repairs. Damage is not as extensive as reported in FY09. Reassess the wall segments/stones reported in FY09 in roadbed, which could not be identified in FY10. Significant erosion on road side berms with intact cultural deposits, needs erosion control. Recommend consultation with Water Quality stormwater SME.
LA 4602A	TA-5	Revisited as part of monitoring for the nearby site of LA 4602B. Erosion still a problem on LA4602A rubblemound and along old road. Slash and spread snags, and re-seed the old road (ca. 1/8 acre).	Erosion still a problem on the LA4602A rubblemound and along the old road bed. Slash and spread fallen snags, and re-seed old road (ca. 1/8 acre). Recommend consultation with Water Quality stormwater SME.
LA 4602B	TA-5	Place 1-2 wattles along east side of rubblemound, adjacent to and above the eroded area. Slash and scatter fallen snags. Reseed rubblemound and lightly eroded area nearby (ca. 1/8 acre).	Erosion still a problem, but wattles may damage the site. Recommend hydroseeding the rubblemound and a lightly eroded area (ca. 1/8 acre) and consult with Water Quality stormwater SME.
LA 89727	TA-15	Repair 10 sections (150-160 ft) of fence. Cut and slash six fallen snags and scatter slash. Monitor for erosion control one more year.	Repair of 10 fence sections (150-160 ft) damaged by fallen snags. Cut and slash six fallen snags and scatter slash.
LA 89803	TA-15	Two broken fence sections to repair. Tighten three fence sections. Cut and slash two fallen snags. One large snag remains, 75 ft SW of SW corner.	Repair two fence sections and tighten three sections. Cut and slash two fallen snags. The large snag at SW corner will not damage the fence if it falls.
LA 129492	TA-15	No treatment needed. Erosion very low and nearly stable. Monitor vegetation for erosion control for one more year.	Erosion no longer an issue. Vegetation has adequately stabilized the site. Remove from list of monitored sites.
LA 15855	TA-16	Cut and slash snag and trim scrub oak in Feature C. Check fall snags by cliff face and their relationship to all petroglyphs on the cliff face at this location.	Cut and slash snag and trim scrub oak in Feature C. The fallen snag at the cliff face does not appear to be a threat and is unlikely to damage the petroglyph shrine area at the base of the small cliff.
LA 86651	TA-16	Slash nearby fallen snags, and use for erosion control on south and southwest side of mound. Reseeding not necessary.	Additional vegetation in the erosion area and the potential for erosion has decreased. Continue to monitor vegetation growth and erosion potential.

Site Number	TA or Canyon	FY 2009 Recommendations	FY 2010 Recommendations
LA 122031	TA-16	Erosion is no longer a problem and few snags in the site area. Install fence along the southwestern edge of the site next to road to prevent vehicles from driving over features (tire tracks inside site boundary).	Vegetation growth is good, erosion is not a problem. Install fence along the southwestern edge of the site next to road to prevent vehicles from driving over features (tire tracks inside site boundary).
LA 136825	TA-16	Cut nearby fallen snags and use slash for erosion control, especially upslope to the west of the structure, and to the south of the structure. Re-seed approximately ¼ acre to the south and west of structure.	Erosion continues to be a problem, no vegetation on hard pan soils upslope to the west and south of the structure. Existing slash not capturing soil. Recommend two wattles and hydroseeding (¼ acre).
LA 12655 (Nake'muu)	TA-37	No erosion or snag problems. Need to trim scrub oak in next year or two.	No erosion or snag problems. Scrub oak grew vigorously in 2009-2010 and is starting to contact standing walls. Recommend trimming in 2011.
LA 4697	TA-49	Masonry walls visible across the fire break, estimated depth of cultural fill 10-15 cm across a slight mounded area. Some erosion in nearby fire break and fire break berms. Reassess during FY10 fire roads and fire break damage and site condition assessment. Snags and erosion inside the fence is minor.	Site also assessed as part of the 2010 fire road and firebreak damage assessment project. No FY 10 blading of firebreaks, no additional damage to the site.
LA 89746	TA-49	The two snags have fallen but still may pose a modest threat to the masonry rubblemound. Carefully slash and scatter branches without disturbing rubblemound.	Same as FY09. Two fallen snags pose a modest threat to the masonry rubblemound. Carefully slash and scatter branches without disturbing the rubblemound.
LA 30642	TA-60	Well vegetated site area, with no erosion issues. Tighten western 6 sections of fence. Once this is accomplished, no other treatment should be necessary.	Well vegetated, no erosion issues. Western side of the fence is loose, but fully functional. The slack strands no worse than previous years. Remove from the list of monitored sites.
LA 89779	TA-60	High priority for treatment. Slash and scatter enough branches from the large splitting pinyon snag to reduce the weight load and prevent further damage to the masonry. Erosion control needed to the west, north, and east sides of the rubblemound. Recommend 4-5 wattles, slash, and re-seeding to north and east (0.25 acres).	**FY10 mitigation.** The snag was cut, slash scattered, and trunk sections placed in a circle around the structure for protection. Six wattles placed on the south, east, and north sides of the site for erosion control. A Water Quality stormwater SME indicates that some wattles can be reset for more effective erosion control. Monitor erosion and reset wattles as necessary.

Site Number	TA or Canyon	FY 2009 Recommendations	FY 2010 Recommendations
LA 137749	TA-60	Remove, cut, slash, and scatter slash from two fallen snags on northeast corner of fence. Repair 2 sections of northeast corner of fence. Monitor the health for 1-2 years of the lightning struck ponderosa pine in the southwestern corner of the fenced area.	Site selected for FY10 mitigation. Trees were cut and left in place. The fence at the northeast corner was repaired. No erosion issues and vegetation growth is good. Remove from the list of monitored sites.
LA 89714	TA-67	Repair 4 sections (ca. 50 ft) of eastern fence. Repair 1 section (ca. 16 ft) of western fence. Cut and slash 4 fallen snags; use slash for erosion control. Fill in 2 stump/root holes.	Same as FY09. Repair four sections (ca. 50 ft) of eastern fence and one section (ca. 16 ft) of western fence. Cut and slash fallen snags; use slash for erosion control. Fill stump/root holes.
LA 89790	TA-67	Cut and slash 7 fallen snags, and scatter slash for erosion control. Tighten 5-6 sections (70-80 ft) of fence bent by fallen snags, replacing fence strands as necessary.	Same as FY09. Cut and slash seven fallen snags and scatter slash for erosion control. Tighten 70-80 ft of fence bent by fallen snags, replace fence strands as necessary.

Appendix VI

Compliance Assurance Subtask Project
Final Report FY 2010

Prepared by
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Approved for public release; distribution is unlimited.

Title: **Compliance Assurance Subtask Pilot Project Final Report—FY 2010**

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Los Alamos
NATIONAL LABORATORY
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Cover photo: Vegetation growth after mastication thinning in Technical Area 8. Note the archaeological boundary in the background. Photo by Phil D. Noll.

Contents

List of Acronyms

ASM	Acquisition Services Management (Division)
BMPs	best management practices
D&D	decontamination and demolition
DOE	U.S. Department of Energy
ENV	Environmental Protection (Division)
EX-ID	Excavation Permits Identification
FTL	Field Team Leader
FY	fiscal year
LANL	Los Alamos National Laboratory
MAP	Mitigation Action Plan
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Agency
P2	Pollution Prevention
PPE	Personal Protective Equipment
PR-ID	Permits Requirements Identification
PRS	potential release site
ROD	Record of Decision
SMEs	subject matter experts
SOW	Statement of Work
STR	Subcontractor Technical Representative
SWEIS	Site-Wide Environmental Impact Statement
TA	Technical Area
WMC	Waste Management Coordinator

Background

The Department of Energy (DOE), National Nuclear Security Administration (NNSA) issued the *Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory* (DOE 2008a) in May 2008. Upon the issuance of the 2008 Site-Wide Environmental Impact Statement (SWEIS), the required Mitigation Action Plan (MAP) (DOE 2008b) was finalized in January 2009 to address mitigation commitments expressed in the Record of Decision (ROD).

In addition to the specific mitigation measures expressed in the first and second RODs, DOE/NNSA and Los Alamos National Security, LLC, agreed to institute policies, procedures, and programs applicable to work conducted at Los Alamos National Laboratory (LANL) to mitigate potentially adverse effects of operations and to enhance existing programs to improve operational efficiency and minimize future potential impacts from LANL operations.

In 2007, LANL published program description PD400, *Environmental Protection* (LANL 2008) as part of the Environmental Governing Policies. This program description was established to introduce a formal process that all LANL workers would follow to ensure that environmental requirements and issues were identified early in the planning process and communicated to the appropriate personnel to prevent impacts to the environment. PD400 states the following:

> All new and modified projects, planning activities, and work execution (excluding office, business, or administrative functions) must be reviewed to determine applicable environmental requirements, controls, and best management practices (BMPs).

The Permits Requirements Identification (PR-ID) system is an institutional tool that is used to identify environmental requirements and specifically addresses the following environmental subject areas:

- air quality
- biological resources
- cultural resources
- National Environmental Policy Act (NEPA)
- pollution prevention
- potential release sites (PRSs [contaminated sites])
- waste and materials management
- water quality

The SWEIS MAP identified the Compliance Assurance Subtask as a way to measure and monitor environmental requirements (as directed by PD400) and determine if BMPs and controls are being implemented by LANL projects. To implement process improvements, information collected during assessments would be summarized in a deliverable to the SWEIS Project Office and communicated to the PR-ID manager, subject matter experts (SMEs), and other interested parties.

1.0 Introduction

The Compliance Assurance Subtask was identified in the SWEIS MAP as part of Section 3.4, *Enhancement of Existing Facilities*. The purpose of the Compliance Assurance Subtask is to measure and improve the implementation of environmental compliance requirements as stated in

PD400 and recommend process improvement measures as appropriate. The requirements published in Section 3.4.2 of the MAP are detailed in Table 1. The Compliance Assurance Subtask was implemented in fiscal year (FY) 2009 as a pilot project. The Subtask Team worked from mid-May through September 2009 to conduct assessments and publish results.

Table 1. Section 3.4.2 from the 2009 SWEIS MAP

Compliance Assurance
Objective Measure and improve implementation of compliance requirements and BMPs identified for new and modified projects in the PR-ID system, reducing costs and delays.
Context Compliance assurance for the PR-ID system would entail selecting a 5 percent to 10 percent sample of PR-ID review documents and tracking the implementation of review requirements throughout the life of the construction/demolition project. Where necessary, the assurance process would include providing solutions to compliance requirements that prove difficult to implement. To address continuous improvement in the compliance process, metrics will be developed to track performance of the PR-ID system in reducing environmental impacts and assuring compliance with the myriad state and Federal environmental regulations that are associated with construction and demolition projects.
Background IPP 400.1, Rev. 3 (now PD400), requires all new and modified projects to complete the PR-ID process. PR-ID assures that projects consider compliance issues, requirements, and BMPs in the planning process. The objective of this system is to allow Project Managers the ability to reduce environmental impacts and their associated compliance requirements. However, no quality assurance system exists to see if the identified requirements are implemented during project execution. Identified requirements include the full spectrum of environmental concerns such as waste generation and disposal, archaeological sites, sediment control from storm water run-off, air quality, construction noise, and light impacts on sensitive threatened and endangered species. A proactive assurance program would have avoided costly environmental problems, for example, to DARHT [Dual-Axis Radiographic Hydrodynamic Test Facility], the Biosafety Level-3 facility, and the historic Manhattan Project Gun Site.
Mitigation Action Commitments • Implement compliance assurance process on a sample of PR-ID projects. • Develop metrics and track compliance results. • Formally assign a functional manager for the PR-ID process and support tool and ensure supporting authority and funding for effective use in project development, compliance, and site planning. • Implement process improvement measures as appropriate.

In September 2009, the final report for the Compliance Assurance Subtask Pilot Project was published (LANL 2009). The report summarized the interviews and a field visit conducted as part of the pilot project. Feedback generated by the project was disseminated to the SWEIS Project Managers, Environmental Protection Managers, the PR-ID Administrator, and Environmental Protection (ENV) Division SMEs. The SWEIS Project Office funded the Compliance Assurance Subtask for FY 2010 between June and September 2010 to conduct assessments and publish results as part of the FY 2010 SWEIS MAP Annual Report.

2.0 Methods

Project methodology was developed using the task description in the SWEIS MAP (Table 1) and discussions with the SWEIS Project Office and the Integrated Environmental Review Project Manager. PR-ID assessments would be conducted on PR-IDs that were in progress, outside, and included soil disturbance. Examples of soil disturbance projects included road improvements, decontamination and demolition (D&D), fuels reduction, construction of new facilities, and Potential Release Site characterization. Project personnel representing five to 10 percent of PR-IDs were formally interviewed face to face.

The Subtask Team for the project developed the following goals and objectives:

- Develop interview question guidelines regarding ENV Division requirements. Interview questions will vary based on specificity of individual PR-IDs.
- Meet with PR-ID initiator, Project Manager, and/or Subcontractor Technical Representatives (STRs) on 5 to 10 construction or ground-disturbing PR-IDs before the end of FY 2010.
- Document how well ENV Division requirements were implemented.
- Document what roadblocks or other problems the Project Managers encountered with respect to ENV Division requirements.
- Document feedback from the Project Manager on what process improvements they recommend for the PR-ID process or ENV Division requirements.
- Meet with Acquisition Services Management (ASM) Division representative regarding how PR-ID fits into the procurement process.
- Provide a final report at the end of FY 2010.

3.0 Results Summary

PR-IDs were chosen based on the criteria discussed in Section 2.0 (Table 2). Before the interviews, a list of questions, specific to individual PR-IDs, was developed. The Subtask Team found this more beneficial to the project goals than general questions. Several PR-ID initiators were contacted to schedule interviews between June and September 2010 and six project interviews were conducted with available Project Leaders.

PR-ID initiators and project personnel understood the environmental requirements for their projects and the process to implement the requirements; however, there is some uncertainty as to whether or not the requirements "flowed down" to the workers (i.e., subcontractors).

Overall, the PR-ID initiators felt that the ENV Division SMEs utilize the PR-ID tool most efficiently and communicated their requirements well compared to the other organizations who comment regularly in the PR-ID system. Most project delays were quickly mitigated and projects were able to move forward. The most consistent comment involved SMEs who use boilerplate comments. Project personnel stated that between 60 percent and 90 percent of the comments they received were boilerplate and it was possible that SMEs were not commenting on the specific PR-ID. Project personnel stated that they would prefer customized, tailored comments for each PR-ID. A second consistent comment involved the PR-ID mapping tool. Several Project Managers remarked that this tool was cumbersome and difficult to use.

The most common positive comment was that ENV Division SMEs were always helpful when they were contacted. Many of the ENV Division SMEs were very proactive and contacted the project before entering comments in the PR-ID system to clarify any questions. In addition, a

couple of project personnel felt that the Storm Water SMEs were very helpful in suggesting the proper BMPs for sites. A Project Manager commented that he likes to use the GIS tool found on the Environment page (not the mapping tool within the PR-ID system) at the start of a project to see what kind of environmental restrictions he may encounter at that location.

Table 2. PR-ID Project Titles

Technical Area (TA) 3-16 Ion Beam Facility D&D Phase I: Radiological Systems Removal
TA-21 Tritium System Test Assembly D&D
Material Disposal Area B Open Air Excavation FY 2010
Upper Sandia and Upper Cañada del Buey Aggregates Integrated Work Plan Implementation
Open Area (UI) Fuels Reduction
TA-48 Cleanroom Facility

3.1 Field Visits

A field visit was conducted at TA-46 in the Upper Cañada del Buey Aggregate Area. The Field Team Leader (FTL) from Terranear PMC led a tour of several borehole sampling locations. The subsurface samples were taken by hand auguring into asphalt to understand the extent and nature of the contamination from the Laboratory activities. All fill material not included in the samples was treated as waste and an asphalt patch or cold patch was applied to seal the location. (see photographs from field visits at the end of this document). Sampling locations were within the developed area around TA-46. No debris or unexpected waste was left onsite. In addition to the bore sampling locations, the site of a septic tank removal was visited. The septic tank was located directly east of building 58 at TA-46, adjacent to the Mortandad Canyon edge. This septic tank had some unexpected waste issues so the removal of the tank was delayed. Storm Water Permitting/Compliance SMEs inspected all BMPs that were put in place by the subcontractor. The septic tank had recently been removed from the site, but the FTL stated that the site would be re-seeded with the suggested seed mix.

Field visit to TA-8, TA-16, and TA-49 at the Open Area Fuels Reduction Sites were conducted. The FTL discussed environmental concerns with SMEs before information was entered into the PR-ID. In project areas with high densities of cultural resource sites, the FTL walks the project area with LANL archaeologists to ensure that sites are not adversely affected. The FTL showed us several tree thinning locations where thinning was accomplished by hand or by a tree masticator. PRSs are avoided completely by the tree thinning crews. Ground disturbance was minimal in all areas that were thinned. The FTL discussed the thinning method used by the subcontractor whereby the selective removal of trees is used to provide for species diversity and age diversity. Masticated material was left onsite to provide soil stability and erosion control. One site, however, was slightly rutted due to unexpected saturated ground. The project was stopped until the ground was dry. The FTL stated that all construction equipment was thoroughly inspected by the subcontractor and Laboratory STRs before the start of work for any potential fluid/fuel leaks. The subcontractor was responsible for any spill cleanup and waste generated.

In addition to the Open Area Fuels Reduction Sites, the FTL visited a fire road/fuel break area. Due to storm water issues and erosion control, the FTL stated that fire roads near canyon edges are not graded down to bare soil unless absolutely necessary. Field visits for some of the selected projects were not possible for various reasons. Two TA-21 projects were already completed and absorbed by other projects; the TA-48 Cleanroom Facility funding was delayed so the expected construction has not yet begun; and D&D of the Ion Beam Facility was in the equipment removal stage, so no ground breaking activities were in progress.

3.2 Procurement and the PR-ID Process

Currently, the PR-ID process is not the only mechanism used to identify environmental requirements for projects at LANL. Acquisition Services Management (ASM) staff routinely use an Internal Review Team and scan procurement documents (Purchase Requests and Statements of Work) looking for key environmental words and phrases that could indicate that a review of the documents is required by ENV Division staff before the procurement proceeds. Because of this, an ASM Division representative was interviewed as part of this Compliance Assurance Subtask to get another perspective on environmental compliance requirements.

ASM Division uses what is commonly referred to as "Form 410," which is an extensive list of key words for numerous issues (including environmental) for this purpose. Currently, Air Quality is the only environmental issue identified. Water Quality, Waste Management, Storage Tanks, D&D, New Construction, and other environmental issues need to be added to Form 410. Integration of the PR-ID system with the LANL Procurement system was discussed during this interview as well. For example, if a project has entered a PR-ID, then ASM Division should not have to scan the procurement documents for environmental issues. However, many ASM Division employees are unaware of the PR-ID system and integrating it with procurement systems would require cooperation with ASM, ENV, and Engineering Services Divisions.

ASM Division suggested that the PR-ID system be advertised more (perhaps on the LANL home page) so employees know about it and use it. PD400, *Environmental Protection*, requires a PR-ID for any new or modified project but, many people have not read PD400 and are unaware of the requirement. ASM Division suggested that the definition of "Project" in PD400 is too vague. Another suggestion was that there should be a cut-off criteria so that not every procurement would require a PR-ID, but small purchases can also lead to environmental noncompliance issues. Another issue with using procurement documents to screen for possible environmental issues is that many SOWs are extremely vague making it difficult to identify potential environmental issues form procurement documents.

The PR-ID system needs to be integrated with ASM Division's use of Form 410. The mechanism to do this could be a requirement for those who submit purchase requests to indicate if a PR-ID has been submitted and provide the PR-ID number). If a PR-ID has been submitted, no further environmental reviews are necessary. If not, they would either submit a PR-ID or have the procurement documents reviewed by ENV Division. Integration of the PR-ID system with the procurement systems would eliminate current duplicate reviews and be more efficient.

3.3 Process Improvements and Comments Compiled During the Interviews

3.3.1 PR-ID Application or General Comments

- PR-ID Administrator was very helpful when called. One initiator felt that the PR-ID Administrator is overloaded and not always as responsive.
- Most interviewees completed the PR-ID tutorial, but said it should be updated.
- Time to enter a PR-ID varied from 1.5 to 8 hours.
- Mapping tool needs improvement and was difficult to use.
- Siting process being triggered on every PR-ID. Siting process is too slow and some sitings are approved after the project has started or is completed.
- PR-IDs should have an expiration date. PR-IDs older than a year should be updated.
- If a PR-ID is revised, the system should show old and new comments.

- Some of the PR-ID questions are very specific, so sometimes PR-ID initiators have to answer "unknown" until project has started.
- PR-ID process is straight forward. Some PR-ID initiators used a previous PR-ID as a guide or relied on help from someone that had previously entered a PR-ID.
- Most interviewees commented that they did not know Deployed Environmental Professionals existed and had not used them.
- Some Project Managers/Leaders suggested that an Environmental Professional be dedicated to their projects so they have one person to interact with on environmental issues for the life of the project.
- Project Managers want to be informed of personnel changes, organizational changes, location changes, so they can contact the appropriate SMEs.
- In many cases, there were delays in obtaining EX-IDs. Integrate EX-ID and PR-ID.
- The PR-ID system needs to be advertised as a REQUIREMENT. Too many LANL personnel are unaware of the requirement.
- Employees need training on the PR-ID system and its use.
- The PR-ID is not a one-time, check-the-box process, it is a living document. Project Leaders need to address SME comments. PR-ID needs to be closed out at end of project.
- There needs to be a formal PR-ID close-out process. Automatically generated email reminders sent from the PR-ID system to Project Managers would be helpful.
- Boilerplate comments are generally of little value. SMEs need to read the PR-ID and tailor the comments to the specific project.
- Too much duplication of PR-ID comments and procurement documents (SOW). PR-ID needs to be integrated with the procurement process.
- Many times project walk-down comments are different from PR-ID comments on the same issues. Recommended that the people who do the walk-downs also provide the SME comments in the PR-ID system.

3.3.2 Cultural Resources

- D&D projects often require historic building documentation. Coordination with LANL cultural resource SMEs early in the project precludes delays.
- One potential environmental noncompliance surfaced from a PR-ID interview and field visit. Comments entered into the PR-ID system stated that an archaeological survey of the site was required and that the State Historic Preservation Office would have to be contacted. The Project Manager (who was also the PR-ID initiator) could not remember meeting with anyone regarding archaeological surveys. The FTL who led the site visit joined the project after it was already in progress and had no knowledge of meeting with anyone regarding archaeological surveys. This information was sent to the cultural resource SMEs to verify whether they conducted surveys or a site visit. The cultural resource SMEs stated that they had met with the LANL project people (not the subcontractor that entered the PR-ID) and determined that after the project areas were better defined, there were no cultural resource compliance issues.

3.3.3 Biological Resources

- Mexican spotted owl timing restrictions could have delayed one project; however, LANL biologists expedited the required surveys so the project was able to begin as scheduled.
- Noise, lighting, and tree removal comments did not apply to any of the projects except for the Open Area Fuels Reduction project.

- Three of the six projects has coverage under the SWEIS Biological Assessment (LANL 2006).

3.3.4 Water Quality

- Subcontractor designed drainage controls were inspected and approved by the Storm Water Permitting/Compliance Team.
- Some projects relied heavily on the Storm Water Permitting/Compliance Team for advice and assistance on appropriate BMP controls.

3.3.5 Waste Management

- One project was delayed due to issues with waste disposition because of changing requirements. Project Leader worked with a Waste Management Coordinator (WMC) to resolve issues.
- All projects that generated waste worked with a WMC for help submitting Waste Profile Forms and Waste Characterization Strategy Forms.
- The boilerplate comment issue was raised repeatedly regarding waste comments.

3.3.6 NEPA

- Five of the six projects were covered under the SWEIS. One was covered by an Environmental Assessment (DOE 2000).
- For one project, a SOW was sent to the NEPA Team in lieu of a D&D Plan as required in the SMEs comments, which was acceptable.

3.3.7 Pollution Prevention

- Several projects did not complete a Pollution Prevention (P^2) Checklist. Others completed waste minimization plans as required.
- One project worked with a P^2 SME on the use of dissolvable Personal Protective Equipment (PPE) and materials. However, the project manager interviewed was unsure if PPE was purchased because he left the project early. The P^2 SME verified that the project purchased dissolvable PPE and materials.

3.3.8 Air Quality

- The boilerplate comment issue was raised repeatedly regarding air quality comments; especially with respect to asphalt reporting.
- Project manager worked with the Rad-NESHAP Team to assure open air excavations were permitted.

4.0 Conclusions and Future Work

The Compliance Assurance Subtask identified several possible process improvements and acknowledged that overall the PR-ID system is identifying all environmental requirements related to Laboratory operations and keeping the Laboratory in environmental compliance. The most consistently cited areas for improvement:

- Siting process needs improvement
- PR-IDs should have an expiration date and a closeout process
- Integrate PR-ID system with Procurement system
- Mapping tool in PR-ID needs improvement

- Boilerplate comments by SMEs are not always useful
- Most project managers were unaware of Deployed Environmental Professionals.

Environmental compliance assurance has been improving at LANL; however, there are few mechanisms to ensure compliance. This project could be expanded in future years or the Deployed Environmental Professionals could take on the responsibility of reviewing PR-IDs and ensuring requirements are met (field visits). Additionally, the PR-ID system could be linked to LANL's Procurement system. Most environmental compliance requirements are identified in the PR-ID system but many procurement specialists are unaware that the system exists. Procurement specialists are reviewing procurement documentation for environmental requirements (currently only Air Quality requirements), which seems to be a duplication of effort.

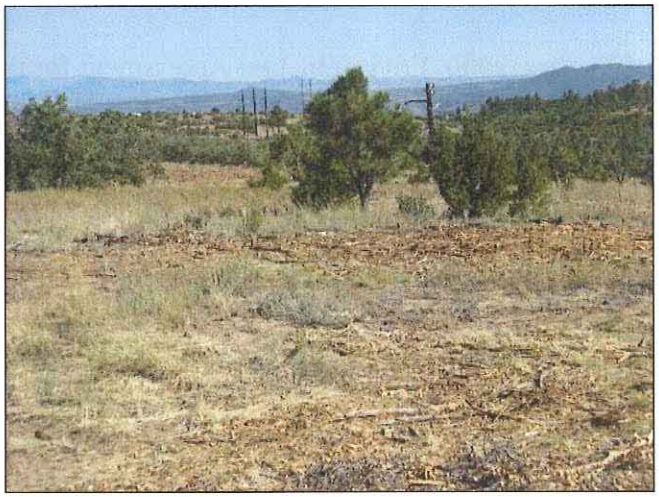
With the Laboratory's intent of integrating the Excavation Permit (EX-ID), PR-ID, and the siting process in the near future, the Compliance Assurance Project should be expanded to assess the EX-ID and siting processes. There are numerous examples of projects every year that are entered into the EX-ID system that should have been entered in the PR-ID system. The EX-ID system has an exclusion process whereas the PR-ID system does not and that could account for why some projects are not entered into the PR-ID. These systems must be complementary or integrated to reduce costs and avoid delays to mission-critical work.

Overall, the PR-ID initiators felt that the ENV Division SMEs utilize the PR-ID system efficiently and communicate their requirements well compared to the other organizations involved. Perhaps a project analogous to the Compliance Assurance Project could be used by all the organizations who comment regularly in the PR-ID system to evaluate the effectiveness of their contributions to project management activities.

Field visit photographs.

Repair of parking area at TA-46 after characterization sampling using a hand auger. Use of asphalt cold patch precluded necessity for reporting to Air Quality team.

Site of septic tank removal in TA-46, note BMPs installed as per PR-ID comments.



Tree mastication at TA-49, mastication results in little to no ground disturbance and material is left on site for erosion control.

Historic property avoided as per PR-ID comments (pink/orange flagging) in TA-08.

Tree thinned areas at TA-16, note defensible space and limited ground disturbance.

5.0 References

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