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2008 Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EIS-0380) Mitigation Action Plan

US Department of Energy

December 2008,

Addendum September 2009,

1st Revision November 2010,

2nd Revision June 2014,

3rd Revision September 2016

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ACRONYMS AND TERMS

ADEM	Associate Directorate Environmental Management
DARHT	Dual-Axis Radiographic Hydrodynamic Test (Facility)
DOE	(US) Department of Energy
Field Office	DOE/NNSA Los Alamos Field Office
EM-LA	(DOE) Office of Environmental Management Los Alamos
FONSI	finding of no significant impact
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LTSESS	Long-Term Strategy for Environmental Stewardship and Sustainability
MAP	mitigation action plan
MAPAR	MAP Annual Report
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
ROD	record of decision
SWEIS	Site-Wide Environmental Impact Statement
US	United States

EXECUTIVE SUMMARY

The United States Department of Energy's National Environmental Policy Act Implementing Procedures (Title 10 Code of Federal Regulations 1021.331) require that a mitigation action plan be completed following each environmental impact statement and record of decision. The mitigation action plan addresses mitigation commitments addressed in the associated record of decision. The Department of Energy/National Nuclear Security Administration issued the *Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico* (2008 SWEIS [DOE/EIS-0380]) in May 2008. Two records of decision and an amended record of decision have been issued for the 2008 SWEIS. The 2008 SWEIS mitigation action plan has been revised twice, in 2010 and 2014. This mitigation action plan (revision 3) incorporates the 2015 *Chromium Plume Control Interim Measure and Plume-Center Characterization, Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EA-2005) Mitigation Action Plan* and formally closes out additional 2008 SWEIS mitigations that were completed or integrated into established programs at Los Alamos National Laboratory.

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1.0 INTRODUCTION

The United States (US) Department of Energy's (DOE) National Environmental Policy Act (NEPA) Implementing Procedures (Title 10 Code of Federal Regulations 1021.331) require that a mitigation action plan (MAP) be completed following each environmental impact statement and associated record of decision (ROD) to address mitigation commitments established in the ROD(s). The DOE/National Nuclear Security Administration (NNSA) issued the *Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico* (2008 SWEIS; DOE 2008a) in May 2008 and issued a ROD on September 19, 2008 (2008 SWEIS ROD or ROD; DOE 2008b); the ROD was published in the Federal Register (FR26SE08N) on September 26, 2008. In the ROD, DOE/NNSA decided to implement the No Action Alternative and certain elements of the Expanded Operations Alternative. DOE published another SWEIS ROD (DOE 2009) in the Federal Register on June 29, 2009, and again, selected the No Action Alternative with additional projects from the Expanded Operations Alternative. In 2011, DOE issued an amended ROD (DOE 2011a) to include transport of high-activity sealed sources through the global commons via commercial cargo aircraft in support of the ongoing Off-Site Sealed Source Recovery Program. DOE/NNSA may issue other RODs for the continued operation of Los Alamos National Laboratory (LANL) based on the 2008 SWEIS. Mitigations described in future RODs will be incorporated into the 2008 SWEIS MAP.

In December 2008, DOE issued a SWEIS MAP (DOE 2008c) that included commitments made in the September 2008 and June 2009 SWEIS RODs. The SWEIS MAP is implemented by Los Alamos National Security, LLC (LANS) as the LANL Management and Operations Contractor for DOE.

DOE issued a MAP Addendum in September 2009 that included decisions contained in the second ROD. The MAP was updated and revised in 2010 to incorporate the mitigations in the *2010 Final Environmental Assessment for the Expansion of the Sanitary Effluent Reclamation Facility and Environmental Restoration of Reach S-2 of Sandia Canyon at Los Alamos National Laboratory Los Alamos, New Mexico* (DOE 2010a) and mitigated finding of no significant impact (FONSI; DOE 2010b). The 2008 SWEIS MAP was again updated and revised in 2014 to incorporate mitigations associated with the *Mitigation Action Plan for the Nuclear Facility Portion of the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2011b). In 2014, DOE cancelled the nuclear facility portion of the Chemistry and Metallurgy Research Building Replacement Project. In the 2014 revision (DOE 2014), DOE also formally closed out 2008 SWEIS mitigation action commitments that had been cancelled, completed, or integrated into established LANL programs.

This 2008 SWEIS MAP (revision 3) incorporates the 2015 *Chromium Plume Control Interim Measure and Plume-Center Characterization, Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EA-2005) Mitigation Action Plan* (DOE 2015a) and formally closes out additional 2008 SWEIS mitigations that were cancelled, completed, or integrated into established LANL programs.

The 2008 SWEIS MAP may be revised to incorporate additional requirements associated with future RODs, NEPA decisions, or to meet the objectives set out in the 2008 SWEIS. This MAP is available on the DOE website (http://www.energy.gov/nepa/office-nepa-policy-and-compliance) and in the appropriate DOE/NNSA public reading room(s) or other locations for a minimum of 60 days. Copies of this MAP are available upon written request to the DOE/NNSA Los Alamos Field Office Manager.

1.1 Purpose and Organization of the MAP

The 2008 SWEIS MAP describes the mitigation measures that will be implemented from the 2008 SWEIS and explains how the mitigation measures will be planned and implemented for those actions selected in the two RODs and in other NEPA documents included in Section 3. There are several types of mitigation measures included in the SWEIS MAP that are outlined in Section 3.0. Planning and implementation of the mitigation measures and reporting requirements are included in Sections 1.2 and 2.0. Additionally, both 2008 SWEIS RODs included commitments to Santa Clara Pueblo as part of ongoing government-to-government relations. These commitments are outlined in Section 4.0.

1.2 MAP Monitoring and Reporting

1.2.1 SWEIS Yearbook

To measure the accuracy of the 1999 *Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory* (1999 SWEIS; DOE 1999a) impact analysis, DOE implemented a program to compare actual operational data with the environmental impacts identified in the 1999 SWEIS. These comparisons are published in annual reports. The Yearbooks provide data that can be used to identify trends and develop an impact analysis for future LANL environmental impact statements. This MAP requires continuation of the SWEIS Yearbooks for implementation of the 2008 SWEIS and the associated RODs. The SWEIS Yearbooks provide data to facilitate the production of a Supplement Analysis or a new SWEIS if deemed necessary. The SWEIS Yearbooks are prepared by LANS for DOE/NNSA Los Alamos Field Office (Field Office) review through the NEPA Compliance Officer and are available to the public on the LANL electronic public reading room webpage (http://eprr.lanl.gov/oppie/service) (LANL 2009, 2010a, 2011a, 2012a, 2013a, 2013b, 2015a, 2016).

1.2.2 MAP Annual Report

Section 5.d(12)(f) of DOE Order 451.1B, *NEPA Compliance Program*, requires the Field Office to prepare an annual report documenting actions taken in accordance with an issued MAP. The first MAP Annual Report (MAPAR) for the 2008 SWEIS was published in fiscal year 2010 (LANL 2010b). Since that time, six additional MAPARs have been published (LANL 2011b, 2012b, 2013c, 2014a, 2015b). The MAPARs report actions taken to address the mitigations identified in the 2008 SWEIS MAP and other MAPs issued between 2008 and 2015. A draft MAPAR summarizing the work conducted in the previous fiscal year is submitted to the Field Office in October of each year for review. The Field Office finalizes and publishes the MAPAR.

2.0 IMPLEMENTATION

The MAP implementation process involves the Field Office, DOE Office of Environmental Management Los Alamos (EM-LA), and several LANS organizations. The implementation process includes mitigation action management, task scoping and funding allocation, tracking, technical implementation, annual reporting, and mitigation action commitment closure.

2.1 Roles and Responsibilities

The Field Office is responsible for implementing and tracking MAP mitigations. Daily coordination and management of MAP activities is delegated by the Field Office to LANS in accordance with their Management and Operations contract (Contract #DE-AC52-06NA25396). The LANL Environmental Stewardship Group is responsible for daily implementation of the MAP. LANS Environmental Specialists coordinate technical issues regarding the scope and schedule of individual mitigation measures of the MAP with other organizations within LANS. These projects and activities are assigned to organizations that have primary institutional responsibility for operations that the mitigation actions address.

2.2 Mitigation Tracking

LANS maintains a log to track the scope, schedule, interim milestones, deliverables, and closure of mitigation action commitments outlined in this MAP. A copy of the tracking log is transmitted quarterly to the NEPA Compliance Officer. Any issues in meeting the commitments are identified when LANS transmits the log.

2.3 MAP Review and Revision

The 2008 SWEIS MAP is reviewed annually as part of the MAPAR preparation to determine if the mitigation measures remain effective and if mitigation measures have

been completed and need to be formally closed. The MAP is revised to address significant changes, new mitigations, or deficiencies.

Additionally, the MAP is reviewed after each new ROD or NEPA decision is issued to determine if new mitigation measures are required or if mitigation measures previously identified need to be revised.

2.4 MAP Duration and Mitigation Closure

The duration for specific mitigation action commitments is identified in the MAP tracking log prepared by LANS. As currently scheduled, the implementation of the MAP and all associated mitigation actions is anticipated to be completed at the end of calendar year 2018, or until directed by the Field Office. As individual projects and activities that address specific mitigation measures are completed, LANS will provide formal documentation and rationale for recommending mitigation action closure in quarterly/annual reports. The Field Office reviews the documentation and either authorizes closure or requests additional information. Final closure of mitigation actions authorized by the Field Office is reported in the MAPAR and in MAP revisions.

3.0 MITIGATIONS

This section outlines the mitigation measures required to implement the 2008 SWEIS and is based on the mitigations associated with projects, programs, and operations analyzed in the SWEIS. In addition, mitigations from other NEPA decisions are incorporated into this MAP. There are four types of remaining mitigation measures addressed in this MAP:

1. On-going mitigation commitments established by the earlier 1999 SWEIS MAP and mitigation commitments that reflect NEPA decisions that have occurred since the issuance of the 1999 SWEIS ROD and prior to issuance of the 2008 SWEIS RODS (DOE 1999b) (Section 3.1).
2. Detailed mitigation action commitments for specific projects analyzed in the 2008 SWEIS and included in a ROD intended to minimize identified environmental impacts (Section 3.2).
3. Institutional resource management responsibilities, including LANL-wide mitigation commitments (Section 3.3).
4. Mitigation commitments that reflect NEPA decisions that have occurred since the issuance of the 2009 SWEIS ROD (Section 3.4).

Current mitigations are listed below. Mitigations that have been completed, closed, or incorporated into an institutional program are listed in Section 5.0.

3.1 Transition of Previous LANL NEPA Mitigation Commitments into the 2008 SWEIS MAP

This section provides an overview of continuing mitigation commitments from the 1999 SWEIS MAP and mitigation commitments resulting from projects initiated after the issuance of the 1999 SWEIS ROD and prior to issuance of the 2008 SWEIS RODs.

3.1.1 Dual-Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement

Objective

Update the Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility MAP (DOE 1996) requirements to reflect current transition to fully-contained experiments and close mitigation actions that have been completed.

NEPA and Other Drivers

DOE issued the final environmental impact statement on the DARHT Facility (DOE 1995a) in August 1995 and issued a ROD on October 16, 1995 (DOE 1995b). The DARHT ROD states that DOE decided to complete and operate the DARHT Facility 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). The DARHT MAP elaborates upon those commitments (DOE 1996).

Mitigation Action Commitments

- Monitor contaminants by sampling soils, plants, mammals, birds, and road kills at the facility and surrounding areas and at a control site away from the DARHT Facility.
- Conduct site monitoring and evaluation of soil, water, and other environmental analyses for solid, hazardous, mixed, and radioactive wastes.
- Conduct Tribal tours of Nake'muu Pueblo and annual maintenance visits.

2016 Update

The mitigation action commitment has been changed from *Conduct annual Tribal tours of Nake'muu Pueblo and annual maintenance visits* to *Conduct Tribal tours of Nake'muu Pueblo and annual maintenance visits*.

3.1.2 MAP for the LANL Trails Management Program

Objective

Implement the Trails Management Program and integrate future mitigation actions into the SWEIS MAPAR to decrease risks associated with recreational trails use on DOE/LANL lands.

NEPA Drivers

In 2003, DOE/NNSA directed LANS to establish a Trails Management Program. DOE/NNSA published the *Final Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program* (DOE 2003a) and FONSI (DOE 2003b) on September 2, 2003. DOE/NNSA issued a MAP (DOE 2003c) for this environmental assessment on the same date. The public offered more than 125 comments on the draft environmental assessment and representatives from the Pueblo de San Ildefonso and Santa Clara Pueblo participated, explaining their concerns and perspectives. The National Park Service and Los Alamos County also participated.

Mitigation Action Commitments

- Implement a management plan for trails at LANL.

2016 Update

The Trails Management Plan was finalized in 2015 (LANL 2015c). All outstanding mitigation action commitments were integrated into that plan. The mitigation action commitment is now to implement the Trails Management Plan.

3.1.3 MAP for the Special Environmental Analysis

Objective

Continue to implement ongoing requirements of the *Special Environmental Analysis for Actions Taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory* MAP (DOE 2000a).

NEPA Drivers

DOE/NNSA prepared and issued the *Special Environmental Analysis for Actions Taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory* in September 2000 (DOE 2000b). This report describes and analyzes actions taken in response to the Cerro Grande fire and identifies various mitigation measures that must be implemented under the Special Environmental Analysis MAP as an extension of the fire suppression, erosion, and flood control actions.

Mitigation Action Commitments

- Monitor biota and sediment contamination behind the Los Alamos Canyon weir and the Pajarito Canyon flood retention structure until it is removed and report results in the LANL Annual Site Environmental Report (see Section 3.1.4 for additional information on the flood retention structure).
- Periodically remove sediment from the Los Alamos Canyon weir based on sedimentation rate and contamination accumulation rate.

2016 Update

No revisions made.

3.1.3.1MAP for the Flood and Sediment Retention Structure

Objective

Annually monitor the Technical Area 18 flood retention structure for safe operation until it is removed, and comply with NEPA commitments in the 2002 environmental assessment.

NEPA Drivers

DOE prepared and issued the 2002 environmental assessment *Proposed Future Disposition of Certain Cerro Grande Fire Flood and Sediment Retention Structures at Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2002) and the 2008 SWEIS ROD (DOE 2008b). In 2001, DOE constructed the flood retention structure to control flooding that resulted from post-Cerro Grande fire hydrologic conditions. Compliance with the environmental assessment requires the eventual removal of the flood retention structure in Pajarito Canyon.

Mitigation Action Commitments

- Annually monitor the flood retention structure for structural integrity and safe operations until removed.
- Remove portions of the flood retention structure in accordance with DOE/EA-1408 (DOE 2002).
- Recycle demolition spoils from flood retention structure decontamination, demolition, and decommissioning as appropriate.
- Leave an aboveground portion of the flood retention structure equivalent to the dimensions of a low-head weir to retain potentially contaminated sediments on LANL land.

- Remove aboveground portions of the steel diversion wall below the flood retention structure.
- Recontour and reseed disturbed areas to protect surface water quality in Pajarito Canyon after the flood retention structure is removed.

2016 Update

No revisions made, all mitigations remain on hold until the flood retention structure is removed.

3.2 Project-Specific Mitigation Measures Analyzed in the 2008 SWEIS

3.2.1 Expanded Operations of the Off-Site Sealed Source Recovery Project

Objective

Ensure adequate controls on the quantities and storage of recovered sealed sources.

NEPA and Other Drivers

The Low-Level Radioactive Waste Policy Amendments Act (Public Law 99-240) of 1985 assigned DOE the responsibility for management of greater than Class C waste. DOE's response to Congress stated that management of greater than Class C wastes was not feasible due to the lack of disposal facilities in the US. As a solution, a management approach was initiated that included DOE's commitment to the collection and storage of greater than Class C waste pending development of disposal facilities. In 1999, the DOE Waste Management Department and DOE's Albuquerque office consolidated three existing projects related to source recovery and management into the Off-Site Sealed Source Recovery Project and designated LANL as the DOE facility to operate the project.

The 2011 Amended ROD (DOE 2011a) states: Consistent with the decisions announced in the amended ROD issued in 2011, NNSA will continue implementing the Global Threat Reduction Initiative Off-Site Source Recovery Project, including the recovery, storage and disposition of high-activity beta/gamma sealed sources. This program includes the recovery of sealed sources from foreign countries, and NNSA has decided that transport of high-activity sealed sources through the global commons via commercial cargo aircraft may be utilized as part of the ongoing Off-Site Source Recovery Project.

Mitigation Action Commitments

- Institute 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.

- NNSA will use all practicable means to avoid or minimize environmental harm when implementing the actions described in the ROD. NNSA operates pursuant to a number of Federal laws including environmental laws and DOE orders, and Federal, State, and local controls and agreements. In addition, the commercial storage and transportation activities associated with the recovery of high-activity sealed sources are regulated by the Nuclear Regulatory Commission (and states granted certain authorities by the Commission) and the Department of Transportation. Many of these requirements mandate actions that may serve to mitigate potential adverse environmental impacts.

2016 Update

No revisions made, all mitigations remain on hold until sealed sources containing cobalt-60, iridium-192, or cesium-137 are accepted at LANL. .

3.3 Institutional Resource Management Responsibilities

3.3.1 Wildland Fire Management

Objective

Reduce the risk of a wildfire that may adversely impact the public, workers, facilities, operations, and the environment.

NEPA and Other Drivers

Three FONSIs (DOE 2000c, 2001, 2004) have been issued for the *Environmental Assessment for the Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2000d). However, several specific mitigation measures are included in the 2008 SWEIS alternatives including direction that LANS will continue its wildfire management activities and further reduce risks by shipping legacy transuranic waste, currently stored in domes at Technical Area 54, to the Waste Isolation Pilot Plant. The DOE/NNSA Wildfire Management Policy (DOE 2003d) states that DOE sites are required to have wildland fire management plans in place that are consistent with DOE Order 450.1, *2001 Federal Wildland Fire Management Policy and Implementing Actions*. To fulfill the requirements of DOE Order 450.1, and address the findings of the Office of the Inspector General audit, a wildland fire management plan (LANL 2007a) was developed in November 2007 and has been implemented. The plan is a detailed course of action to carry out wildland fire management site policies and help achieve fire protection objectives.

Mitigation Action Commitments

- Continue to further reduce wildfire risks by shipping legacy transuranic waste, currently stored in the Technical Area 54 domes, to the Waste Isolation Pilot Plant.

2016 Update

Mitigation for a wildland fire management plan and an adequately funded program is complete, both have been established.

3.3.2 Managing Biological and Cultural Resources, Implementation of Management Plans

Objective

Establish and implement proactive and cost-effective ways to meet biological and cultural resource management goals.

NEPA and Other Drivers

NEPA, while not mandating any specific standard of protection, requires consideration of biological, natural, and cultural resources in an institution's decision-making process.

Federal laws associated with biological and cultural resources protection include the Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, the National Historic Preservation Act, and the Native American Graves Protection and Repatriation Act. There are also state laws, executive orders, DOE orders, and institutional policies for biological and cultural resource protection. Some resource management actions that do not have Federal legal drivers constitute best management practices for mitigating risks. Lack of such consideration can be grounds for legal action against the institution.

Mitigation Action Commitments

- Revise and implement the Cultural Resources Management Plan (LANL 2006a).
- Implement the Biological Resources Management Plan (LANL 2007b).

2016 Update

No revisions made.

4.0 COMMITMENTS TO SANTA CLARA PUEBLO

NNSA recognizes that the operation of LANL over the last 65 years has affected the people of neighboring communities in northern New Mexico, including Tribal communities. These effects, which vary in nature across communities, include alterations of lifestyles, community, and individual practices. While the analysis conducted by DOE/NNSA found no disproportionately high and adverse impacts to minority or low-income populations, based on comments from the Santa Clara Pueblo, the 2008 SWEIS ROD stated that:

> "…NNSA will undertake implementation of the decisions announced in this ROD in conjunction with a MAP. The MAP will be updated as the need arises to identify actions that would address specific concerns and issues raised by the Santa Clara Pueblo as well as those of other tribal entities in the area of LANL."

The SWEIS ROD also stated that:

> "…with respect to the concerns raised by the Santa Clara Pueblo, the NNSA will continue its efforts to support the Pueblo and other tribal entities in matters of human health, and will participate in various intergovernmental cooperative efforts to protect indigenous practices and locations of concerns. NNSA will conduct government-to-government consultation with the Pueblo and other tribal entities to incorporate these matters into the MAP."

To this end, the Field Office consulted with Santa Clara Pueblo and agreed to provide one-time funding to the 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 NNSA and Pueblo resources to help ensure implementation of the plan. In consultation with Santa Clara Pueblo, the Field Office shall then update the MAP to incorporate these actions.

2016 Update

DOE/NNSA has concurred with Santa Clara Pueblo's Human Health Risk Assessment work plan, addressing environmental justice and human health concerns and issues identified by Santa Clara Pueblo during the SWEIS process and is seeking funding.

5.0 TRANSITION OF LANL NEPA MITIGATION COMMITMENTS SINCE THE ISSUANCE OF THE 2008 SWEIS

This section includes additional mitigation commitments associated with the 2015 *Final Environmental Assessment for Chromium Plume Control Interim Measure and Plume-Center Characterization, Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2015b).

In 2016, DOE EM-LA requested that the MAP for the *Chromium Plume Control Interim Measure and Plume-Center Characterization, Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2015a) be integrated into a revision of the 2008 LANL SWEIS MAP (DOE 2008a). This integration eliminates duplication of tracking the documents separately and enhances transparency of reporting to the public regarding the implementation and effectiveness of mitigations applied. Table 5.1 summarizes the mitigations associated with this project.

Objective

Mitigate adverse environmental effects, including direct, indirect, and cumulative impacts associated with implementation of the Chromium Plume Control Interim Measure and Plume Center Characterization Project in Mortandad Canyon (Technical Area 05).

NEPA Driver

The mitigations in the 2015 *Chromium Plume Control Interim Measure and Plume-Center Characterization, Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EA-2005) Mitigation Action Plan* (DOE 2015a) are being incorporated into this 2008 SWEIS MAP, Revision 3 for reporting and tracking purposes.

Mitigation Action Commitments

- Mitigate potential noise and light impacts to the Mexican Spotted Owl during construction, drilling, and pumping activities by planning activities outside the breeding season, preferentially selecting equipment with lower noise levels, and using noise barriers where appropriate.
- Direct all lighting away from the canyon or habitat areas.
- Paint infrastructure so it blends in with the landscape to minimize potential visual impacts.
- Comply with the LANL Cultural Resources Management Plan (LANL 2006a).
    - ❖ Plan and site project activities to avoid impacts to cultural resources.
    - ❖ Cultural resources staff will monitor vegetation removal and construction activities and cultural resources will be marked for avoidance.
    - ❖ Implement erosion control measures at archaeological sites near proposed well pads or pipelines to manage changes in erosional patterns resulting from vegetation clearing and/or construction.
    - ❖ Coordinate actions associated with perceived impacts to the Pueblo de San Ildefonso by continuing to engage in proactive government-to-government consultations with the Pueblo and aligning proposed work with the established protocols between the Pueblo and DOE.
    - ❖ Do not spray land applied treated water within the boundaries of archaeological sites, including those sites bisected by existing roads.

- ❖ Limit road maintenance within the boundaries of cultural resources and have cultural resources staff monitoring all work.
- ❖ To the extent possible, schedule drilling work and other construction activities along the boundary with the Pueblo de San Ildefonso to avoid elk and deer hunting, breeding, and calving seasons to avoid conflicts with hunts on the adjacent Pueblo de San Ildefonso Sacred Area property.
- ❖ To the extent possible, schedule activities to avoid ceremonial activities on the adjacent Pueblo de San Ildefonso Sacred Area property.

- Comply with the Endangered Species Act by adhering to restrictions outlined in the LANL Threatened and Endangered Species Habitat Management Plan (LANL 2015e).
  - ❖ Comply with the annual noise and tree cutting restrictions imposed by the Habitat Management Plan and the Environmental Assessment for Wildfire Reduction and Forest Health Improvement (DOE 2000d).
  - ❖ Support the multi-year study recording avian abundance and diversity in the Sandia wetlands habitat areas.
  - ❖ Support the Sandia wetlands and Mortandad Canyon bird-banding study scheduled to continue until 2024.
- Implement required best management practices detailed in the *Floodplain Assessment of the Chromium Plume Control Interim Measure and Plume-Center Characterization in Mortandad Canyon* (LANL 2015d) to minimize short-term negative impacts.
  - ❖ Do not install support structures (e.g., personnel trailers, storage tanks, or permanent laydown yards) within the floodplain.
  - ❖ Do not locate permanent equipment staging areas within the floodplain.
  - ❖ Refuel equipment at least 100 feet from any drainage, including dry arroyos.
  - ❖ Do not store hazardous materials, chemicals, fuels, and oils within the floodplain.
  - ❖ Revegetate areas following soil disturbances using an appropriate native perennial seed mix or plants.
  - ❖ Remove all trash and debris (e.g., construction material) from the floodplain after completion.

- ❖ Implement erosion and sediment control measures during construction.

- Limit well pad footprints to the smallest size necessary, to minimize land use impacts.
- Revegetate with native perennial vegetation to restore the area, as infrastructure is downsized or no longer needed.
- Implement Environmental Protection Agency regulated National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities requirements to minimize the discharge of potential pollutants to watercourses, including:
  - ❖ Implement storm water management and sediment and erosion controls specified in Storm Water Pollution Prevention Plans.
  - ❖ Conduct site inspections weekly and following storm events producing 0.25 inches of precipitation.
  - ❖ Properly manage construction materials, equipment, and waste.
  - ❖ Implement controls to manage runoff velocity and sediment yield from disturbed areas to pre-development values.
  - ❖ Stabilize disturbed areas with native perennial vegetation.
- Required best management practices that will minimize short-term negative impacts associated with the Discharge Permit 1793 include:
  - ❖ Land application sites cannot be located in a watercourse.
  - ❖ Land application cannot result in runoff to a watercourse.
  - ❖ Land application cannot create ponds or pools.
  - ❖ Land application must be conducted in a manner that maximizes infiltration and evaporation.
  - ❖ Land application is restricted to daylight hours and for a maximum of 10 hours per day.
  - ❖ Land application must be supervised at all times.
  - ❖ Land application is prohibited while precipitation is occurring.

2016 Update

Mitigations are incorporated into this Revision 3 of the 2008 SWEIS MAP.

Table 5.1 Mitigations Associated with the Chromium Plume Control Interim Measure and Plume-Center Characterization Project

Affected Environment	Mitigation Actions	Purpose	Responsible Party	Status
Threatened and Endangered Species Habitat	All requirements in the LANL Habitat Management Plan will be implemented for all aspects of the project. These requirements may include timing restrictions on noise producing activities during the Mexican Spotted Owl breeding season, tree removal restrictions, and lighting requirements. Surveys for the Mexican Spotted Owl in Mortandad and surrounding canyons will be implemented annually.	The Federal law, the Endangered Species Act, prohibits disturbance of Federally listed species and their habitats. This mitigation and on-going Mexican Spotted Owl surveys are required by the LANL Habitat Management Plan (LANL 2015e).	LANS (Associate Directorate Environmental Management [ADEM]), DOE EM-LA	Open
Migratory Birds	Site-specific requirements for migratory bird protections will be detailed in the LANS Integrated Review Tool. On-going migratory bird research in Sandia Canyon will be continued under the MAP to continue monitoring for changes in bird diversity	The Migratory Bird Treaty Act prohibits killing migratory birds and their nestlings and eggs. This mitigation will minimize impacts to migratory birds and continued research will monitor for impacts to migratory birds from LANL operations.	LANS (ADEM), DOE EM-LA	Open
Game Animals and other Wildlife	Implement actions to improve habitat for large game and other wildlife. Such habitat improvements may include planting native vegetation to supplement food resources and installation of supplemental water sources. To the extent possible, schedule drilling work and other construction activities along the boundary so as not to occur during elk and deer hunting seasons. After soil-disturbing activities have been completed, disturbed sites will be restored with re-contouring and planted with a native seed mix or native vegetation plantings.	Re-establish habitat suitable for large game and other wildlife quickly to minimize disturbance to migration and use patterns.	LANS, DOE EM-LA	Open

Affected Environment	Mitigation Actions	Purpose	Responsible Party	Status
Game Animals and other Wildlife (continued)	Native seed stock should include species identified in the *Pollinator-Friendly Best Management Practices for Federal Lands* (USDA 2015) document as directed by the Secretary of Energy on October 19, 2015, regarding the Presidential Initiative on Pollinator Health.			
Surface Water Quality	Develop and use best management practices and comply with the requirements of the National Pollutant Discharge Elimination System Construction General Permit to prevent or minimize the transport of sediment or other potential pollutants from disturbed areas during construction and implementation of the project.	Minimize environmental impacts associated with stormwater runoff or runon and comply with the National Pollutant Discharge Elimination System (Clean Water Act) Construction General Permit for Stormwater Discharge.	LANS, DOE EM-LA	Open
Cultural Resources, Native American Graves Protection and Repatriation Act, and Traditional Cultural Properties	LANL Cultural Resources Management Plan provisions will be followed and may be augmented to address specific site issues as the project is implemented. If buried archeological resources, remains, or items of cultural significance are encountered during construction, site activities will cease until items are evaluated by LANS and DOE EM-LA cultural resources staff and appropriate actions are taken. If traditional cultural properties are identified during construction, site activities will cease until appropriate mitigation measures are determined through consultation with the State Historic Preservation Officer and the involved Tribal government.	Comply with the National Historic Preservation Act, which requires Federal agencies to take into account the effects Federally funded activities have on cultural and archaeological resources and traditional cultural properties and practices.	LANS, DOE EM-LA (consultation with Tribal governments and the State Historic Preservation Officer)	Open
Visual	Use directional lighting whenever possible. Infrastructure may be painted so that it blends in with the landscape more effectively.	Minimize potential visual impacts	LANS, DOE EM-LA	Open
Noise	Noise diminishing equipment will be used whenever possible.	Minimize potential noise impacts	LANS, DOE EM-LA	Open

Affected Environment	Mitigation Actions	Purpose	Responsible Party	Status
Environmental Justice	Consult with the Pueblo de San Ildefonso to schedule drilling work and other construction activities to avoid hunting and calving seasons and conflicts with ceremonial observances on Pueblo de San Ildefonso property.	Minimize impacts to activities conducted by members of the Pueblo de San Ildefonso in the Sacred Area	DOE EM-LA consultation with Pueblo de San Ildefonso	Open
Land Use LANS (ADEM), DOE EM-LA	Remove all trash and debris after construction, well pad footprints will be limited to what is necessary to minimize the visual impact from the proposed action. As infrastructure is downsized or no longer needed, revegetate with native grasses and trees to contribute to restoration of the area.	Minimize permanent project footprint	LANS, DOE EM-LA	Open
Air Quality	Actively control air emissions that result from operations, construction, demolition, and remediation activities.	Comply with the Clean Air Act Title V site-wide permit by meeting the Environmental Protection Agency's National Ambient Air Quality.	LANS, DOE EM-LA	Open
Water	Water use is an important issue in northern New Mexico. For this project, injection (described as an aspect of the preferred alternative) could offset extraction by increasing the return rate of water back to the aquifer.	Maximize expedient return of water to the aquifer.	LANS, DOE EM-LA, New Mexico Environment Department	Open

6.0 CLOSED, NEW, AND/OR, REVISED MITIGATION COMMITMENTS

Many of the mitigations listed in the original 2008 SWEIS MAP and its subsequent revisions are complete or the actions are now integrated into well-established LANL programs. These commitments are no longer tracked as mitigations. As the MAP is reviewed and updated, DOE revises or creates new mitigations to be tracked annually. Table 6.1 provides a summary of all mitigations from the LANL SWEIS MAP that have been completed or are being implemented through other programs and new and/or revised mitigations. More detailed information about the closure, revision, or the addition of a mitigation can be found in the relevant MAPARs.

Table 6.1 Closed, New, and/or Revised Mitigation Action Commitments

Topic	Mitigation Action Commitment	NEPA Driver	Status	Comment
DARHT MAP	Conduct Tribal tours of Nake'muu and annual maintenance visits.	DOE/EIS-0228 (October 1995).	Revised 2016	N/A
Trails MAP	Complete eligibility evaluations for historic trails under the National Historic Preservation Act when possible and identify potential environmental issues on trails use.	DOE/EA-1431 (Aug. 2003) and FONSI (Sept. 2003)	Complete 2014 SWEIS MAP Revision	Implemented as part of the Cultural Resources Management Plan (LANL 2006a)
	Evaluate and manage trails to determine appropriate closures and/or restrictions.		Complete	Trails Management Plan complete (LANL 2015c)
	Prepare management plans for trails at LANL.		Complete	Trails Management Plan complete (LANL 2015c)
	Support the use of volunteers for selected trails maintenance projects at LANL.		Complete	Trails Management Plan complete (LANL 2015c)
	Plan, maintain, repair, and construct trails.		Complete	Trails Management Plan complete (LANL 2015c)
	Implement the Trails Management Plan (LANL 2015c)		New 2016	Trails Management Plan complete (LANL 2015c)
Special Environmental Analysis MAP	Complete rehabilitation of cultural resources impacted by the Cerro Grande fire	DOE/SEA-03 (Sept. 2000)	Complete	Rehabilitation completed 2012.
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.	Biological Assessment for the 2008 SWEIS (LA-UR-06-6679; LANL 2006b); 2009 ROD for LANL SWEIS (July 2009)	Complete	Actions reviewed via the Integrated Review Tool.
	All further actions affecting water flow volumes in Mortandad and Sandia canyons will be assessed for positive and negative impacts.	Biological Assessment for the 2008 SWEIS (LA-UR-06-6679; LANL 2006b); 2009 ROD for LANL SWEIS (July 2009)	Complete	Actions reviewed via the Integrated Review Tool.

Topic	Mitigation Action Commitment	NEPA Driver	Status	Comment
Sanitary Effluent Reclamation Facility (SERF)	Implement the Sanitary Effluent Reclamation Facility MAP	MAP and FONSI for DOE/EA-1736 (Aug. 2010); 2008 ROD for LANL SWEIS (Sept. 2008)	Complete	Construction of Sanitary Effluent Reclamation Facility expansion and restoration activities in Sandia Canyon complete, MAP implemented (DOE 2010c).
Air Emissions	Continue air monitoring program to comply with the Clean Air Act, including monitoring radiological air emissions. Monitor and track Los Alamos Neutron Science Center emissions to maintain the annual dose to the public under the administrative limit.	LANL Clean Air Act Title V (42 U.S.C § 7661 et seq.) site-wide permit; 2008 SWEIS MAP (Dec. 2008)	Complete	Clean Air Act compliance implemented under the LANL Air Quality Program.
	Use existing projects requirements identification program and other tools to assess potential air quality impacts from new or modified projects and provide best management practices to control emissions (e.g., maintaining construction equipment and routine watering or eco-friendly chemical stabilization to control fugitive dust).		Complete	Clean Air Act compliance implemented under the LANL Air Quality Program.
	Removal of contamination from material disposal areas and other potential release sites would be conducted in a manner that protects the environment, the public, and worker health and safety.		Complete	Clean Air Act compliance implemented under the LANL Air Quality Program.
	Removal of waste from some large material disposal areas may require the use of temporary containment structures to limit possible releases of contaminated material to the environment to levels within applicable standards and as low as reasonably achievable.		Complete	Clean Air Act compliance implemented under the LANL Air Quality Program.

Topic	Mitigation Action Commitment	NEPA Driver	Status	Comment
Environmental Justice	Continue consultations and both formal and informal public meetings.	2008 ROD for the LANL SWEIS (Sept. 2008)	Complete	Consultations and public meetings implemented through the NEPA process.
	Improve upon and implement effective communication strategies to provide fair and equitable sharing of information about LANL operations to surrounding minority and low-income communities.		Complete	Consultations and public meetings implemented through the NEPA process.
Wildland Fire Management Plan	Implement the Wildland Fire Management Plan (LA-UR-07-6478) with adequately funded ongoing program. Note: this plan is now called the Wildland Fire Operations Plan	SWEIS MAPs (2008; 2014a)	Complete	Wildland Fire Operations Plan updated annually and implemented.
SWEIS Biological Assessment	Develop and implement a wetlands/floodplains management plan.	Biological Assessment for the 2008 SWEIS (LA-UR-06-6679; 2006)	Complete	Riparian inventory completed in fiscal year 2012.
	Evaluate ecological risks to watershed-specific threatened and endangered species and update site-wide modeling of ecological risk.		Complete	Integrated into the Decision Support Application tool.
	Evaluate the use of span bridges instead of land bridges in areas that cross canyons in threatened and endangered species habitats to reduce environmental impacts (under the Endangered Species Act, land bridge proposals require US Fish and Wildlife Service consultation).	LANL Threatened and Endangered Species Habitat Management Plan (LA-UR-11-02582) and SWEIS Biological Assessment (LA-UR-06-6679)	Complete	Implemented through the use of the Integrated Review Tool.
	Implement all reasonable and prudent measures in the biological assessment through the Integrated Review Tool process and implementation of the Threatened and Endangered Species Habitat Management Plan.		Complete	Implemented through the use of the Integrated Review Tool.

Topic	Mitigation Action Commitment	NEPA Driver	Status	Comment
Energy Conservation–Electrical	Upgrade electrical infrastructure in buildings to reduce electrical usage.	2008 ROD for the LANL SWEIS (Sept. 2008) LANL Site Sustainability Plan	Complete	Implemented through the Site Sustainability Plan.
	Install one gas-fired combustion turbine generator to support peak demand and upgrade existing steam turbines.		Complete	Rolls-Royce Combustion Gas Turbine Generator installed 2009.
	Meter major energy user facilities with high- end "Square-D" meters (as required), and sub-meter, when necessary. All other facilities to quantify and evaluate electrical consumption.		Complete	Implemented through the Site Sustainability Plan.
	Implement Energy Savings Performance Contract third-party financed retrofit projects to improve building efficiencies LANL-wide with individual satellite boilers to supply steam to Technical Area 03 buildings.		Complete	Implemented through the LANL Site Sustainability Plan.
	Purchase additional renewable energy and/or renewable energy credits.		Complete	Implemented through the LANL Site Sustainability Plan.
	Purchase and/or lease *Energy Star* electronics.		Complete	Implemented through the LANL Site Sustainability Plan.
	Improve new building efficiencies by integrating Leadership in Energy and Environmental Design/High Performance Sustainable Building design for new construction.		Complete	Implemented through the LANL Site Sustainability Plan.
Energy Conservation–Natural Gas	Meter major energy user facilities with high-end "Square-D" meters, and sub-meter other facilities when appropriate to quantify and evaluate natural gas consumption to enable future conservation efforts.	2008 ROD for the LANL SWEIS (July 2008) DOE/EA-1430 environmental assessment and FONSI (Dec. 2002)	Complete	Implemented through the LANL Site Sustainability Plan.
	Install more efficient gas-fired combustion turbine generators and upgrade existing steam turbines to conserve power and energy.		Complete	Rolls-Royce Combustion Gas Turbine Generator installed in 2009.

Topic	Mitigation Action Commitment	NEPA Driver	Status	Comment
Energy Conservation–Water	Expand the Sanitary Effluent Reclamation Facility and take advantage of additional opportunities to increase the amount of recycled water usage and reduce water consumption at LANL.	2008 ROD for the LANL SWEIS (Sept. 2008)	Complete	Expansion completed 2012.
	Promote water conservation projects and plans that contribute to compliance with DOE Order 430.2B.		Complete	LANL Site Sustainability Plan.
Pollution Prevention	Annually report waste reduction performance against Environmental Management System waste reduction goals.	DOE Order 450.1 (June 2008)	Complete	Performance reported annually and integrated into the Environment Management System and Site Sustainability Plan.
	Continue to integrate waste reduction activities into LANL's Environmental Management System.		Complete	Integrated into the Environmental Management System.
Clean Fill	Use excavation and demolition spoils locally to minimize purchase or new excavations of clean fill when feasible.	2008 ROD for the LANL SWEIS (Sept. 2008)	Complete	Clean Fill Database is part of the Integrated Review Tool, the institutional yard is operating.
	Report annually on reuse of clean fill materials from excavations and decontamination, demolition, and decommissioning.		Complete	Clean Fill data is tracked and reported in the LANL Site Sustainability Plan.
Traffic	Identify possible solutions to minimize traffic issues for Royal Crest Mobile Home Park and the Los Alamos town center related to decontamination, demolition, and decommissioning, remediation, and site closure projects.	MAP and 2008 ROD for the LANL SWEIS (Sept. 2008) DOE Order 430.2B (Feb. 2008)	Complete	No alternate route required.
	Encourage alternative transportation, including walking, carpooling, bicycling, and public transportation.		Complete	LANL Site Sustainability Plan.
	Consider plans for an alternative route off DP Mesa.		Complete	No alternate route required.

Topic	Mitigation Action Commitment	NEPA Driver	Status	Comment
Site Planning	Enhance the decision support tool to offer an objective and semi-quantitative method for integrating opportunities and constraints for project planning and compliance.	MAP and 2008 ROD for the LANL SWEIS (Sept. 2008)	Complete	Decision Support Application part of the Integrated Review Tool.
	Use Project Review and Requirements System in concert with the decision support application and project site selection process to better identify potential site planning constraints early in project development.		Complete	Decision Support Application part of the Integrated Review Tool.
	Use the decision support application to comply with Land Transfer Regulations (10 Code of Federal Regulations 770).		Complete	Decision Support Application
Compliance Assurance	Implement compliance assurance process on a sample of Integrated Review Tool projects requirements identification projects.	MAP and 2008 ROD for the LANL SWEIS (Sept. 2008)	Complete	*Compliance Assurance Subtask Pilot Project Final Report—FY 2009 and FY 2010* (LA-UR-09-06307 and LA-UR-10-07064)
	Develop metrics and track results.		Complete	N/A*
	Implement process improvement measures as appropriate.		Complete	Process improvements identified in 2009 and 2010 implemented.
	Formally assign a functional manager for the Integrated Review Tool projects requirements identification process and support tool and ensure supporting authority and funding for effective use in project development, compliance, and site planning.		Complete	N/A

* N/A = not applicable.

7.0 REFERENCES

DOE 1995a. US Department of Energy, 1995. Dual-Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement, DOE/EIS-0228, August 1995.

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

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

DOE 1999a. US Department of Energy, 1999. Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory, DOE/EIS-0238, Albuquerque Operations Office, Albuquerque, New Mexico, 1999.

DOE 1999b. US Department of Energy, 1999. Record of Decision for the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory, DOE/EIS-0238, Albuquerque, New Mexico, 1999.

DOE 2000a. US Department of Energy, 2000. Mitigation Action Plan for the Special Environmental Analysis for Actions Taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/SEA-03, 2000.

DOE 2000b. US Department of Energy, 2000. Special Environmental Analysis for Actions Taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/SEA-03, September 2000.

DOE 2000c. US Department of Energy, 2000. Finding of No Significant Impact for the Environmental Assessment for the Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-1329, August 2000.

DOE 2000d. US Department of Energy, 2000. Environmental Assessment for the Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-1329, August 2000.

DOE 2001. US Department of Energy, 2001. Finding of No Significant Impact for the Environmental Assessment for the Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-1329, May 2001.

DOE 2002. US Department of Energy, 2002. Proposed Future Disposition of Certain Cerro Grande Fire Flood and Sediment Retention Structures at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-1408, August 2002.

DOE 2003a. US Department of Energy, 2003. Final Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program, Los Alamos, New Mexico, DOE/EA-1431, September 2003.

DOE 2003b. US Department of Energy, 2003. Finding of No Significant Impact for the Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program, Los Alamos, New Mexico, DOE/EA-1431, September 2003.

DOE 2003c. US Department of Energy, 2003. Mitigation Action Plan for the Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program, Los Alamos, New Mexico, DOE/EA-1431, September 2003.

DOE 2003d. US Department of Energy, 2003. Memo from DOE Secretary to Undersecretary for Energy, Science, and Environment. Subject: *Department of Energy Wildland Fire Management Policy*, 2002-019296, February 2003.

DOE 2004. US Department of Energy, 2004. Finding of No Significant Impact for the Environmental Assessment for the Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-1329, October 2004.

DOE 2008a. US Department of Energy, 2008. Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EIS-0380, Los Alamos, New Mexico, May 2008.

DOE 2008b. US Department of Energy, 2008. Record of Decision: Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory; Federal Register Notice FR26SE08N, Volume 73, p. 55833. Washington DC, September 2008.

DOE 2008c. US Department of Energy, 2008. Mitigation Action Plan for the Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory, DOE/EIS-0380-MAP, December 2008.

DOE 2009. US Department of Energy, 2009. Record of Decision: Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory in the State of New Mexico, Federal Register, Volume 74, Issue 131, p. 33232–33235. Washington, DC, June 2009.

DOE 2010a. US Department of Energy, 2010. Final Environmental Assessment for the Expansion of the Sanitary Effluent Reclamation Facility and Environmental Restoration of Reach S-2 of Sandia Canyon at Los Alamos National Laboratory Los Alamos, New Mexico, DOE/EA-1736, August 2010.

DOE 2010b. US Department of Energy, 2010. Finding of No Significant Impact for the Proposed Expansion of the Sanitary Effluent Reclamation Facility and Environmental Restoration of Reach S-2 of Sandia Canyon at Los Alamos National Laboratory, Los Alamos, New Mexico DOE/EA-1736, EA-1736-FONSI-2010, August 2010.

DOE 2010c. US Department of Energy, 2010. Mitigation Action Plan for the Expansion of the Sanitary Effluent Reclamation Facility and Environmental Restoration of Reach S-2 of Sandia Canyon at Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-1736, August 2010.

DOE 2011a. US Department of Energy, 2011. Amended Record of Decision: Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory, Los Alamos, NM, Federal Register, Volume 76, p 40352. Washington, DC. July 2011.

DOE 2011b. US Department of Energy, 2011. Mitigation Action Plan for the Nuclear Facility Portion of the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico. DOE/EIS-0350-S1, Los Alamos Site Office, Los Alamos, New Mexico, November 2011.

DOE 2014. US Department of Energy, 2014. 2008 Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory (DOE/EIS-0380) Mitigation Action Plan, 2nd Revision, March 2014.

DOE 2015a. US Department of Energy, 2015. Mitigation Action Plan for Chromium Plume Control Interim Measure and Plume-Center Characterization, Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-2005, December 2015.

DOE 2015b. US Department of Energy, 2015. Final Environmental Assessment for Chromium Plume Control Interim Measure and Plume-Center Characterization, Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EA-2005, December 2015.

LANL 2006a. Los Alamos National Laboratory, 2006. A Plan for the Management of the Cultural Heritage at Los Alamos National Laboratory, New Mexico. Los Alamos National Laboratory report LA-UR-04-8964, March 2006.

LANL 2006b. Los Alamos National Laboratory, 2006. Biological Assessment of the Continued Operation of Los Alamos National Laboratory on Federally Listed Threatened and Endangered Species. Los Alamos National Laboratory report LA-UR-06-6679, 2006.

LANL 2007a. Los Alamos National Laboratory, 2007. Los Alamos National Laboratory Wildland Fire Management Plan. Los Alamos National Laboratory report LA-UR-07-6478, September 24, 2007.

LANL 2007b. Los Alamos National Laboratory, 2007. Biological Resources Management Plan for Los Alamos National Laboratory. Los Alamos National Laboratory report LA-UR-07-2595, 2007.

LANL 2009. Los Alamos National Laboratory, 2009. SWEIS Yearbook–2008 Comparison of 2007 Data to Projections of the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory LA-UR-09-01653, March 2009.

LANL 2010a. Los Alamos National Laboratory, 2010. SWEIS Yearbook–2008 Comparison of 2008 Data to Projections of the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory LA-UR-10-03439, June 2010.

LANL 2010b. Los Alamos National Laboratory, 2010. 2008 Site-Wide Environmental Impact Statement Mitigation Action Plan Annual Report for Fiscal Year 2010, Los Alamos National Laboratory report LA-UR-10-07245, Los Alamos, New Mexico, October 2010.

LANL 2011a. Los Alamos National Laboratory, 2011. SWEIS Yearbook–2009 Comparison of 2009 Data to Projections of the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory LA-UR-11-02392, May 2011.

LANL 2011b. Los Alamos National Laboratory, 2011. 2008 Site-Wide Environmental Impact Statement Mitigation Action Plan Annual Report for Fiscal Year 2011, Los Alamos National Laboratory report LA-UR-11-06159, Los Alamos, New Mexico, October 2010.

LANL 2011c. Los Alamos National Laboratory, 2011. Threatened and Endangered Species Habitat Management Plan for Los Alamos National Laboratory, Los Alamos National Laboratory report LA-UR-11-02582, Los Alamos, New Mexico, April 2011.

LANL 2012a. Los Alamos National Laboratory, 2012. SWEIS Yearbook–2010 Comparison of 2010 Data to Projections of the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory LA-UR-12-01648, April 2012.

LANL 2012b. Los Alamos National Laboratory, 2012. 2008 Site-Wide Environmental Impact Statement Mitigation Action Plan Annual Report for Fiscal Year 2012, Los Alamos National Laboratory report LA-UR-12-26410, Los Alamos, New Mexico, November 2012.

LANL 2013a. Los Alamos National Laboratory, 2013. SWEIS Yearbook–2011 Comparison of 2011 Data to Projections of the 2008 Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory LA-UR-13-20455, January 2013.

LANL 2013b. Los Alamos National Laboratory, 2013. SWEIS Yearbook–2012 Comparison of 2012 Data to Projections of the 2008 Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory LA-UR-13-29469, January 2014.

LANL 2013c. Los Alamos National Laboratory, 2013. Fiscal Year 2013 Mitigation Action Plan Annual Report for the 2008 Site-Wide Environmental Impact Statement for continued Operation of Los Alamos National Laboratory, Los Alamos National Laboratory report LA-UR-13-28416, Los Alamos, New Mexico, December 2013.

LANL 2014a. Los Alamos National Laboratory, 2014. 2008 Site-Wide Environmental Impact Statement Mitigation Action Plan Annual Report for Fiscal Year 2014, Los Alamos National Laboratory report LA-UR-14-28384, Los Alamos, New Mexico, October 2014.

LANL 2014b. Los Alamos National Laboratory, 2014. Los Alamos National Laboratory Forest Management Plan LA-UR-14-27513.

LANL 2015a. Los Alamos National Laboratory, 2015. SWEIS Yearbook–2013 Comparison of 2013 Data to Projections of the 2008 Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory LA-UR-15-22755, April 2015.

LANL 2015b. Los Alamos National Laboratory, 2015. 2008 Site-Wide Environmental Impact Statement Mitigation Action Plan Annual Report for Fiscal Year 2015, Los Alamos National Laboratory report LA-UR-15-28336, Los Alamos, New Mexico, October 2015.

LANL 2015c. Los Alamos National Laboratory, 2015. Trails Management Plan 2015, Los Alamos National Laboratory report LA-UR-15-20807, Los Alamos, New Mexico, November 2015.

LANL 2015d. Los Alamos National Laboratory, 2015. Floodplain Assessment of the Chromium Plume Control Interim Measure and Plume-Center Characterization in Mortandad Canyon, Los Alamos National Laboratory report LA-UR-15-28814, C. Hathcock and D. Keller (authors), November 2015.

LANL 2015e. Los Alamos National Laboratory, 2015. Threatened and Endangered Species Habitat Management Plan for Los Alamos National Laboratory, Los Alamos National Laboratory report LA-UR-15-28610, Los Alamos, New Mexico, October 2015.

LANL 2016. Los Alamos National Laboratory, 2016. SWEIS Yearbook–2014 Comparison of 2014 Data to Projections of the 2008 Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory LA-UR-16-24711, August 2016.

USDA 2015. United States Department of Agriculture, 2015. Pollinator-Friendly Best Management Practices for Federal Lands, accessed at http://www.fs.fed.us/wildflowers/pollinators/BMPs/.