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Final Supplemental Environmental Impact Statement for the Nuclear Facility Portion of the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico

Summary

Conceptual Drawing CMRR Facility

AVAILABILITY OF THE
FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE NUCLEAR FACILITY PORTION OF THE CHEMISTRY AND METALLURGY RESEARCH BUILDING REPLACEMENT PROJECT AT LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO (CMRR-NF SEIS)

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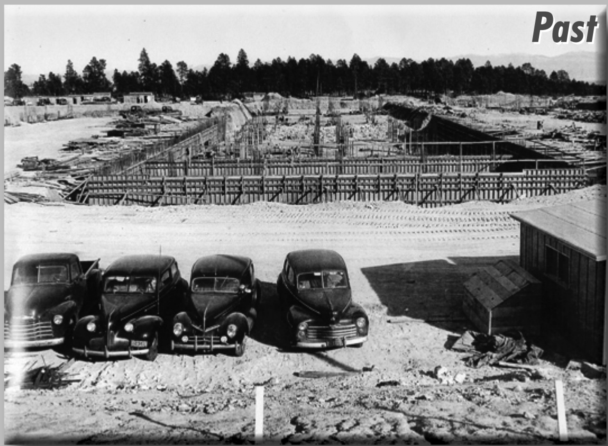

Final Supplemental Environmental Impact Statement for the Nuclear Facility Portion of the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico

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COVER SHEET

Responsible Agency: U.S. Department of Energy (DOE)
National Nuclear Security Administration (NNSA)

Title: *Final Supplemental Environmental Impact Statement for the Nuclear Facility Portion of the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico (CMRR-NF SEIS)* (DOE/EIS-0350-S1)

Location: Los Alamos, New Mexico

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***Abstract*:** NNSA, a semiautonomous agency within DOE, proposes to complete the Chemistry and Metallurgy Research Building Replacement (CMRR) Project at Los Alamos National Laboratory (LANL) by constructing the nuclear facility portion (CMRR-NF) of the CMRR Project to provide the analytical chemistry and materials characterization capabilities currently or previously performed in the existing Chemistry and Metallurgy Research (CMR) Building. This *CMRR-NF SEIS* examines the potential environmental impacts associated with NNSA's proposed action.

The existing CMR Building, most of which was constructed in the early 1950s, has housed most of the analytical chemistry and materials characterization capabilities at LANL. Other capabilities at the CMR Building include actinide processing and waste characterization that support a variety of NNSA and DOE nuclear materials management programs. In 1992, DOE initiated planning and implementation of CMR Building upgrades to address specific safety, reliability, consolidation, and security and safeguards issues. Later, in 1997 and 1998, a series of operational, safety, and seismic issues surfaced regarding the long-term viability of the CMR Building. Because of these issues, DOE determined at that time that the extensive upgrades originally planned would be time-consuming and of only marginal effectiveness. As a result, DOE decided to perform only the upgrades necessary to ensure the continued safe and reliable short-term operation of the CMR Building and to seek an alternative path for long-term reliability. Operational, safety, and seismic issues at the CMR Building also prompted NNSA to cease performing certain activities and to reduce the amounts of special nuclear material allowed in the CMR Building.

NNSA completed the *Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico (CMRR EIS)* in 2003. In 2004, NNSA issued a Record of Decision (ROD) to construct a two-building replacement facility in LANL Technical Area 55 (TA-55), with one building providing administrative space and

support functions and the other building providing secure laboratory space for nuclear research and analytical support activities (a nuclear facility). The first building, the Radiological Laboratory/Utility/Office Building (RLUOB), has been constructed and is being outfitted with equipment and furniture. Enhanced safety requirements and updated seismic information have caused NNSA to re-evaluate the design concept of the second building, the CMRR-NF. The proposed Modified CMRR-NF design concept would result in a more structurally sound building.

The proposed action is to complete the CMRR Project by constructing the CMRR-NF to provide the needed nuclear facility capabilities. The Preferred Alternative is to construct a new CMRR-NF in TA-55, in accordance with the Modified CMRR-NF design concept. Construction options for the Modified CMRR-NF Alternative include a Deep Excavation Option, in which a geologic layer of poorly welded tuff would be removed and replaced with low-slump concrete, and a Shallow Excavation Option, in which the foundation would be constructed in a geologic layer above the poorly welded tuff layer. As envisioned in the 2003 *CMRR EIS*, tunnels would be constructed to connect the CMRR-NF to the TA-55 Plutonium Facility and RLUOB. The No Action Alternative would be to construct the new CMRR-NF as envisioned in the 2004 ROD. Another alternative would be to continue using the existing CMR Building, implementing necessary maintenance and component replacements to ensure its continued safe operation. This *CMRR-NF SEIS* evaluates the potential direct, indirect, and cumulative environmental impacts associated with the alternatives analyzed. This *CMRR-NF SEIS* also presents an analysis of the impacts associated with disposition of all or portions of the existing CMR Building and a new CMRR-NF at the end of their useful lives.

Public Comments: In preparing this *Final CMRR-NF SEIS*, NNSA considered comments received during the scoping period (October 1 through November 16, 2010) and during the public comment period on the *Draft CMRR-NF SEIS* (April 29 through June 28, 2011) and late comments received after the close of the public comment period on the *Draft CMRR-NF SEIS*. Public hearings on the *Draft CMRR-NF SEIS* were held in Albuquerque, Los Alamos, Española, and Santa Fe, New Mexico. Comments on the *Draft CMRR-NF SEIS* were requested during a period of 60 days following publication of the U.S. Environmental Protection Agency's (EPA's) Notice of Availability in the *Federal Register*. NNSA considered every comment received at the public hearings or by U.S. mail, e-mail, or by toll-free phone or fax lines. All comments, including late comments received through July 31, 2011, were considered during preparation of this *Final CMRR-NF SEIS*.

This *Final CMRR-NF SEIS* contains revisions and new information based in part on comments received on the draft. Vertical change bars in the margins indicate the locations of these revisions and new information. Volume 2 contains the comments received on the *Draft CMRR-NF SEIS* and NNSA's responses to the comments. NNSA will use the analysis presented in this *Final CMRR-NF SEIS*, as well as other information, in preparing a ROD regarding the construction of the CMRR-NF. NNSA will issue the ROD no sooner than 30 days after EPA publishes a Notice of Availability of this *Final CMRR-NF SEIS* in the *Federal Register*.

OVERVIEW

The National Nuclear Security Administration (NNSA) is a semiautonomous agency within the U.S. Department of Energy (DOE). NNSA is responsible for the management and security of the Nation's nuclear weapons, nuclear nonproliferation programs, and naval reactor programs. NNSA is also responsible for administration of Los Alamos National Laboratory (LANL).

Since the early 1950s, DOE has conducted analytical chemistry and materials characterization work in the Chemistry and Metallurgy Research (CMR) Building at LANL. The CMR Building supports various national security missions, including nuclear nonproliferation programs; the manufacturing, development, and surveillance of pits (the fissile core of a nuclear warhead); life extension programs; dismantlement efforts; waste management; material recycle and recovery; and research. The CMR Building is a Hazard Category 2 nuclear facility with significant nuclear material and nuclear operations and has a potential for significant consequences.

The CMR Building is almost 60 years old and near the end of its useful life. Many of its utility systems and structural components are aged, outmoded, and deteriorated. In the 1990s, geological studies identified a seismic fault trace located beneath two of the wings of the CMR Building, which raised concerns about the structural integrity of the facility. Over the long term, NNSA cannot continue to operate the mission-critical CMR support capabilities in the existing CMR Building at an acceptable level of risk to worker safety and health. NNSA has already taken steps to minimize the risks associated with continued operations at the CMR Building. To ensure that NNSA can fulfill its national security mission for the next 50 years in a safe, secure, and environmentally sound manner, NNSA proposed in 2002 to construct a CMR replacement facility, known as the Chemistry and Metallurgy Research Building Replacement (CMRR).

NNSA has undertaken extensive environmental review of the CMRR Project; after thoroughly analyzing its potential environmental impacts and considering public comments, NNSA issued a final environmental impact statement (EIS) in November 2003 and a Record of Decision (ROD) in February 2004. The ROD announced that the CMRR would consist of two buildings: a single, aboveground, consolidated, special-nuclear-material-capable, Hazard Category 2 laboratory building (the CMRR-NF), as well as a separate but adjacent administrative office and support building, the Radiological Laboratory/Utility/Office Building (RLUOB). Construction of RLUOB is complete, and radiological operations are scheduled to begin in 2013.

Since issuance of the 2004 ROD, new developments have arisen indicating that changes to the CMRR are appropriate. Specifically, a new site-wide analysis of the geophysical structures that underlie the LANL area was prepared. In light of this new geologic information regarding seismic conditions at the site, NNSA has proposed changes to the design of the CMRR-NF. NNSA has also developed more-detailed information on the various support functions and infrastructure needed for construction, such as concrete batch plants and laydown areas. Even with these changes, the scope of operations remains the same as before (the 2004 ROD), as does the quantity of special nuclear material that can be handled and stored in the CMRR-NF.

Though the changes would affect the structural aspects of the building and not its purpose, NNSA decided to prepare a supplemental EIS (SEIS) to address the ways in which the potential environmental effects of the proposed CMRR-NF have changed since the project was analyzed in the 2003 EIS. Development of an SEIS includes a scoping process, public meetings, and a comment period on a draft SEIS to ensure that the public has a full opportunity to participate in this review. Because NNSA decided in the 2004 ROD to build the CMRR—as a necessary step in maintaining critical analytical chemistry and materials characterization capabilities at LANL—this SEIS is not intended to revisit that decision. Instead, this SEIS supplements the previous analysis by examining the potential environmental impacts related to the proposed change in the CMRR design. So, in addition to the No Action Alternative (to proceed with the CMRR-NF as announced in the 2004 ROD), this SEIS considers two action alternatives: (1) construct a new Modified CMRR-NF that would result in a more structurally sound building (construction options include shallow and deep excavation); and (2) continue using the CMR Building, with minor upgrades and repairs to ensure safety, together with RLUOB.

On March 11, 2011, as the draft SEIS was in its final stages of preparation, the Fukushima Daiichi Nuclear Power Plant in Japan was damaged by a tsunami generated as a result of a magnitude 9.0 earthquake. A number of comments received by NNSA on the draft SEIS expressed concerns regarding the nuclear consequences of a seismic event affecting LANL. In response to these concerns, NNSA revised the final SEIS to include additional information about the seismic environment of the LANL sites being considered in the alternatives analyzed, the potential seismically initiated accidents that might occur at the CMR Building or a CMRR-NF facility, and the critical differences between a nuclear power plant and a nuclear materials research laboratory. NNSA remains committed to improving our understanding of the events affecting the Fukushima Daiichi Nuclear Power Plant and learning from Japan’s experience.

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ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

AC	analytical chemistry
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CMR	Chemistry and Metallurgy Research Building
CMRR	Chemistry and Metallurgy Research Building Replacement
CMRR EIS	*Final Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico*
CMRR-NF	Chemistry and Metallurgy Research Building Replacement Nuclear Facility
CMRR-NF SEIS	*Supplemental Environmental Impact Statement for the Nuclear Facility Portion of the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico*
CRD	Comment Response Document
Complex Transformation SPEIS	*Complex Transformation Supplemental Programmatic Environmental Impact Statement*
DD&D	decontamination, decommissioning and demolition
DOE	U.S. Department of Energy
EIS	environmental impact statement
g	gravitational acceleration
GTCC	greater-than-Class C
LANL	Los Alamos National Laboratory
LANL SWEIS	*Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico*
LCF	latent cancer fatality
LEED	Leadership in Energy and Environmental Design®
MC	materials characterization
MEI	maximally exposed individual
NEPA	National Environmental Policy Act
NMSSUP	Nuclear Materials Safeguards and Security Upgrades Project
NNSA	National Nuclear Security Administration
NRHP	National Register of Historic Places
PC	Performance Category
PIDADS	perimeter intrusion, detection, assessment, and delay system
ROD	Record of Decision
RLUOB	Radiological Laboratory/Utility/Office Building
RLWTF	Radioactive Liquid Waste Treatment Facility
SEIS	supplemental environmental impact statement
SNM	special nuclear material
SWEIS	site-wide environmental impact statement
TA	technical area
TRU	transuranic
U.S.C.	*United States Code*
USFWS	U.S. Fish and Wildlife Service

CONVERSIONS

METRIC TO ENGLISH			ENGLISH TO METRIC		
Multiply	**by**	**To get**	**Multiply**	**by**	**To get**
Area					
Square meters	10.764	Square feet	Square feet	0.092903	Square meters
Square kilometers	247.1	Acres	Acres	0.0040469	Square kilometers
Square kilometers	0.3861	Square miles	Square miles	2.59	Square kilometers
Hectares	2.471	Acres	Acres	0.40469	Hectares
Concentration					
Kilograms/square meter	0.16667	Tons/acre	Tons/acre	0.5999	Kilograms/square meter
Milligrams/liter	1 [a]	Parts per million	Parts per million	1 [a]	Milligrams/liter
Micrograms/liter	1 [a]	Parts per billion	Parts per billion	1 [a]	Micrograms/liter
Micrograms/cubic meter	1 [a]	Parts per trillion	Parts per trillion	1 [a]	Micrograms/cubic meter
Density					
Grams/cubic centimeter	62.428	Pounds/cubic feet	Pounds/cubic feet	0.016018	Grams/cubic centimeter
Grams/cubic meter	0.0000624	Pounds/cubic feet	Pounds/cubic feet	16,025.6	Grams/cubic meter
Length					
Centimeters	0.3937	Inches	Inches	2.54	Centimeters
Meters	3.2808	Feet	Feet	0.3048	Meters
Kilometers	0.62137	Miles	Miles	1.6093	Kilometers
Temperature					
Absolute					
Degrees Celsius + 17.78	1.8	Degrees Fahrenheit	Degrees Fahrenheit - 32	0.55556	Degrees Celsius
Relative					
Degrees Celsius	1.8	Degrees Fahrenheit	Degrees Fahrenheit	0.55556	Degrees Celsius
Velocity/Rate					
Cubic meters/second	2118.9	Cubic feet/minute	Cubic feet/minute	0.00047195	Cubic meters/second
Grams/second	7.9366	Pounds/hour	Pounds/hour	0.126	Grams/second
Meters/second	2.237	Miles/hour	Miles/hour	0.44704	Meters/second
Volume					
Liters	0.26418	Gallons	Gallons	3.78533	Liters
Liters	0.035316	Cubic feet	Cubic feet	28.316	Liters
Liters	0.001308	Cubic yards	Cubic yards	764.54	Liters
Cubic meters	264.17	Gallons	Gallons	0.0037854	Cubic meters
Cubic meters	35.315	Cubic feet	Cubic feet	0.028317	Cubic meters
Cubic meters	1.3079	Cubic yards	Cubic yards	0.76456	Cubic meters
Cubic meters	0.0008107	Acre-feet	Acre-feet	1233.49	Cubic meters
Weight/Mass					
Grams	0.035274	Ounces	Ounces	28.35	Grams
Kilograms	2.2046	Pounds	Pounds	0.45359	Kilograms
Kilograms	0.0011023	Tons (short)	Tons (short)	907.18	Kilograms
Metric tons	1.1023	Tons (short)	Tons (short)	0.90718	Metric tons
ENGLISH TO ENGLISH					
Acre-feet	325,850.7	Gallons	Gallons	0.000003046	Acre-feet
Acres	43,560	Square feet	Square feet	0.000022957	Acres
Square miles	640	Acres	Acres	0.0015625	Square miles

[a] **This conversion is only valid for concentrations of contaminants (or other materials) in water.**

METRIC PREFIXES

Prefix	Symbol	Multiplication factor
exa-	E	1,000,000,000,000,000,000 = 10^{18}
peta-	P	1,000,000,000,000,000 = 10^{15}
tera-	T	1,000,000,000,000 = 10^{12}
giga-	G	1,000,000,000 = 10^{9}
mega-	M	1,000,000 = 10^{6}
kilo-	k	1,000 = 10^{3}
deca-	D	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001 = 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001 = 10^{-18}

SUMMARY

This document summarizes the U.S. Department of Energy (DOE) National Nuclear Security Administration's[1] (NNSA's) *Supplemental Environmental Impact Statement for the Nuclear Facility Portion of the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico (CMRR-NF SEIS)* (DOE/EIS-0350-S1). It describes the background, purpose, and need for the proposed action; results of the public involvement process; alternatives considered; and results of the analysis of environmental consequences. It also provides a comparison of the potential environmental impacts among the alternatives.

S.1 Introduction

The *CMRR-NF SEIS* (DOE/EIS-0350-S1) has been prepared in accordance with the National Environmental Policy Act (NEPA), as amended (42 *United States Code* [U.S.C.] 4321 et seq.), as well as Council on Environmental Quality (CEQ) regulations and DOE NEPA implementing procedures codified in Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508 and 10 CFR Part 1021, respectively. CEQ and DOE NEPA regulations and implementing procedures require preparation of a supplemental environmental impact statement (SEIS) if there are substantial changes in the proposed action that are relevant to environmental concerns or there are significant new circumstances or information relevant to environmental concerns that bear on the proposed action or its impacts. An SEIS may also be prepared to further the purposes of NEPA. The following paragraphs summarize the NEPA analyses applicable to the Chemistry and Metallurgy Research Building Replacement Nuclear Facility (CMRR-NF) that the NNSA has completed over the last 7 years, as well as the changes to the CMRR-NF proposal that are the subject of the *CMRR-NF SEIS*.

In November 2003, NNSA issued the *Final Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico (CMRR EIS)* (DOE/EIS-0350) (DOE 2003), which was followed by the issuance of a Record of Decision (ROD) in February 2004 (69 *Federal Register* [FR] 6967). In that 2004 ROD, NNSA stated its decision to implement the preferred alternative, Alternative 1, the construction and operation of a new Chemistry and Metallurgy Research Building Replacement (CMRR) Facility within Technical Area 55 (TA-55) at Los Alamos National Laboratory (LANL). The new CMRR Facility would include two buildings: one for administrative and support functions and one for Hazard Category 2 special nuclear material[2] (SNM) laboratory operations. Both buildings would be constructed in aboveground locations (under *CMRR EIS* Construction Option 3). The existing Chemistry and Metallurgy Research (CMR) Building located within TA-3 at LANL would undergo decontamination, decommissioning, and demolition (DD&D) in its entirety (under *CMRR EIS* Disposition Option 3). The preferred alternative included the construction of the new CMRR Facility and the movement of operations from the existing CMR Building into the new CMRR Facility, with operations to continue in the new facility over the next 50 years.

As described in the *CMRR EIS*, the laboratory areas in the administrative and support building would be allowed to contain only very small amounts of nuclear materials such that it would be designated a radiological facility.[3] All nuclear analytical chemistry (AC) and materials characterization (MC) operations would be housed in one Hazard Category 2 nuclear laboratory building. The Hazard Category 2 building would be constructed with one floor below ground, containing the Hazard Category 2

[1] For more information on NNSA, a semiautonomous agency within DOE, see the 1999 National Nuclear Security Administration Act (Title 32 of the Defense Authorization Act for Fiscal Year 2000 [Public Law 106-65]).
[2] Special nuclear material includes plutonium, uranium enriched in the isotope 233 or the isotope 235, and any other material that the U.S. Nuclear Regulatory Commission determines to be special nuclear material.
[3] Facilities that handle less than Hazard Category 3 threshold quantities, but require identification of "radiological areas" are designated radiological facilities.

operations, and one floor above ground, containing Hazard Category 3 operations. An underground tunnel would link the buildings. In addition, another underground tunnel would be constructed to connect the existing TA-55 Plutonium Facility with the Hazard Category 2 building; this tunnel would also contain a vault spur for the CMRR Facility long-term SNM storage requirements. NNSA would operate both the CMR Building and the CMRR Facility for an overlapping 2 to 4-year period because most AC and MC operations require transitioning from the old CMR Building to the new CMRR Facility. The CMR Building would also continue operations during construction of any new CMRR-NF.

> **Nuclear Facilities Hazards Classification (U.S. Department of Energy [DOE] Standard 1027)**
>
> Hazard Category 1: Hazard analysis shows the potential for significant offsite consequences.
>
> Hazard Category 2: Hazard analysis shows the potential for significant onsite consequences.
>
> Hazard Category 3: Hazard analysis shows the potential for only significant localized consequences.
>
> **Special Nuclear Material (SNM) Safeguards and Security (DOE Order 474.1-1A)**
>
> DOE uses a cost-effective, graded approach to providing SNM safeguards and security. Quantities of SNM stored at each DOE site are categorized as Security Category I, II, III, or IV, with the greatest quantities included under Security Category I and lesser quantities included in descending order under Security Categories II through IV. Types and compositions of SNM are further categorized by their "attractiveness" using an alphabetical system. Materials that are most attractive for conversion into nuclear explosive devices are identified by the letter "A." Less-attractive materials are designated progressively by the letters "B" through "E."

Since 2004, project personnel have engaged in an iterative planning process for all CMRR Project activities and materials needed to implement construction of the two-building CMRR Facility at TA-55. The administrative and support building, now known as the Radiological Laboratory/Utility/Office Building (RLUOB), was fully planned and constructed over the past 6 years, from 2004 through 2010. Occupancy of RLUOB is currently estimated to begin in 2011, with radiological laboratory operations commencing in about 2013.

Project planning and design for the CMRR-NF was initiated in 2004, but has progressed along a slower timeline than projected in the *CMRR EIS*. In early 2005, NNSA initiated a site-wide environmental impact statement (SWEIS) for the continued operation of LANL, the *Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico (LANL SWEIS)* (DOE/EIS-0380) (DOE 2008a); a year later, in October 2006, NNSA initiated preparation of the *Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS)* (DOE 2008b) to consider the potential environmental impacts of alternatives for transforming the nuclear weapons complex into a smaller, more-efficient enterprise that could respond to changing national security challenges and ensure the long-term safety, security, and reliability of the nuclear weapons stockpile (DOE/EIS-0236-S4). While these two environmental impact statements (EISs) were being prepared, CMRR-NF planning was deliberately limited to preliminary planning and design work, and NNSA deferred implementing its decision to construct the CMRR-NF at LANL.

Both the *LANL SWEIS* and the *Complex Transformation SPEIS* were issued in 2008. Among the various decisions announced in the *Complex Transformation SPEIS* ROD (73 FR 77644) was the programmatic decision to retain manufacturing and research and development capabilities involving plutonium at LANL and, in partial support of those activities, to construct and operate the CMRR-NF at LANL in accordance with the 2004 *CMRR EIS* ROD. Among the various decisions supported by the analysis contained in the 2008 *LANL SWEIS* were decisions regarding the programmatic level of operations at LANL facilities (including the CMRR Facility) for at least the next 5 years and project-specific decisions for individual projects at LANL. These decisions were issued in a September 2008 *LANL SWEIS* ROD (73 FR 55833) and a June 2009 *LANL SWEIS* ROD (74 FR 33232). Congressional funding has been appropriated to proceed with CMRR-NF planning and design (DOE 2011b).

Over the past 8 years, the CMRR-NF planning process has identified several design considerations that were not envisioned in 2003, when the *CMRR EIS* was prepared and issued. Several ancillary and support requirements have also been identified in addition to those identified and analyzed in the *CMRR EIS*. Two support actions—installation of an electric power substation in TA-50 and removal and transport of about 150,000 cubic yards (115,000 cubic meters) of geologic material per year during construction from the building site and other LANL construction projects to other LANL locations for storage—were identified early enough to be included in the 2008 *LANL SWEIS* environmental impact analyses and the associated September 2008 *LANL SWEIS* ROD. Both the 2008 and 2009 *LANL SWEIS* RODs identified NNSA's selection of the No Action Alternative for the baseline level of overall operations for the various LANL facilities, which included the implementation of actions selected in the 2004 *CMRR EIS* ROD. These actions included construction and operation of the two-building CMRR Facility at TA-55, transfer of operations from the old CMR Building and its ultimate demolition, and the two support actions mentioned above. The *CMRR-NF SEIS* addresses the CMRR-NF alternatives, as well as updated information on the ancillary and support activities, that have developed since the *CMRR EIS* and *LANL SWEIS* were published.

Chemistry and Metallurgy Research Building Replacement Project Terminology

Chemistry and Metallurgy Research Building (*CMR Building*) – refers to the existing building in Technical Area 3 (TA-3) that was built primarily in the 1950s.

Chemistry and Metallurgy Research Building Replacement Facility (*CMRR Facility*) – refers to the entire facility conceived to replace the CMR Building; it comprises a nuclear facility and a support facility (see below).

Radiological Laboratory/Utility/Office Building (*RLUOB*) – refers to the administration and support facility component of the CMRR Facility. RLUOB has been constructed in TA-55.

Chemistry and Metallurgy Research Building Replacement Nuclear Facility (*CMRR-NF*) – refers to nuclear facility component or portion of the CMRR Facility. Construction of the CMRR-NF in TA-55 adjacent to RLUOB is the subject of this supplemental environmental impact statement.

S.2 Background

LANL was originally established in 1943 as "Project Y" of the Manhattan Project in northern New Mexico, within what is now the Incorporated County of Los Alamos (see **Figure S–1**). Project Y had a single national defense mission—to build the world's first nuclear weapon. After World War II ended, Project Y was designated a permanent research and development laboratory, the Los Alamos Scientific Laboratory. It was renamed LANL in the 1980s, when its mission was expanded from defense and related research and development to incorporate a wide variety of new assignments in support of Federal Government and private sector programs. LANL is now a multidisciplinary, multipurpose institution primarily engaged in theoretical and experimental research and development.

Since its creation in 2000, NNSA's congressionally assigned missions have been (1) to enhance U.S. national security through the military application of nuclear energy; (2) to maintain and enhance the safety, reliability, and performance of the U.S. nuclear weapons stockpile to meet national security requirements, including the ability to design, produce, and test; (3) to provide the U.S. Navy with safe, militarily effective nuclear propulsion plants and to ensure the safe and reliable operation of these plants; (4) to promote international nuclear safety and nonproliferation efforts; (5) to reduce the global danger from weapons of mass destruction; and (6) to support U.S. leadership in science and technology (50 U.S.C. 2401(b)). Congress identified LANL as one of three national security laboratories to be administered by NNSA for DOE. As NNSA's mission is a subset of DOE's original mission assignment, the work performed at LANL in support of NNSA has remained unchanged in character from that performed for DOE prior to NNSA's creation. Specific LANL assignments for the foreseeable future include (1) production of weapons components, (2) assessment and certification of the nuclear weapons stockpile, (3) surveillance of weapons components and weapon systems, (4) assurance of the safe and secure storage of strategic materials, and (5) management of excess plutonium inventories. NNSA mission objectives at LANL include providing a wide range of scientific and technological capabilities that support nuclear materials handling, processing, and fabrication; stockpile management; materials and manufacturing technologies; nonproliferation programs; and waste management activities.

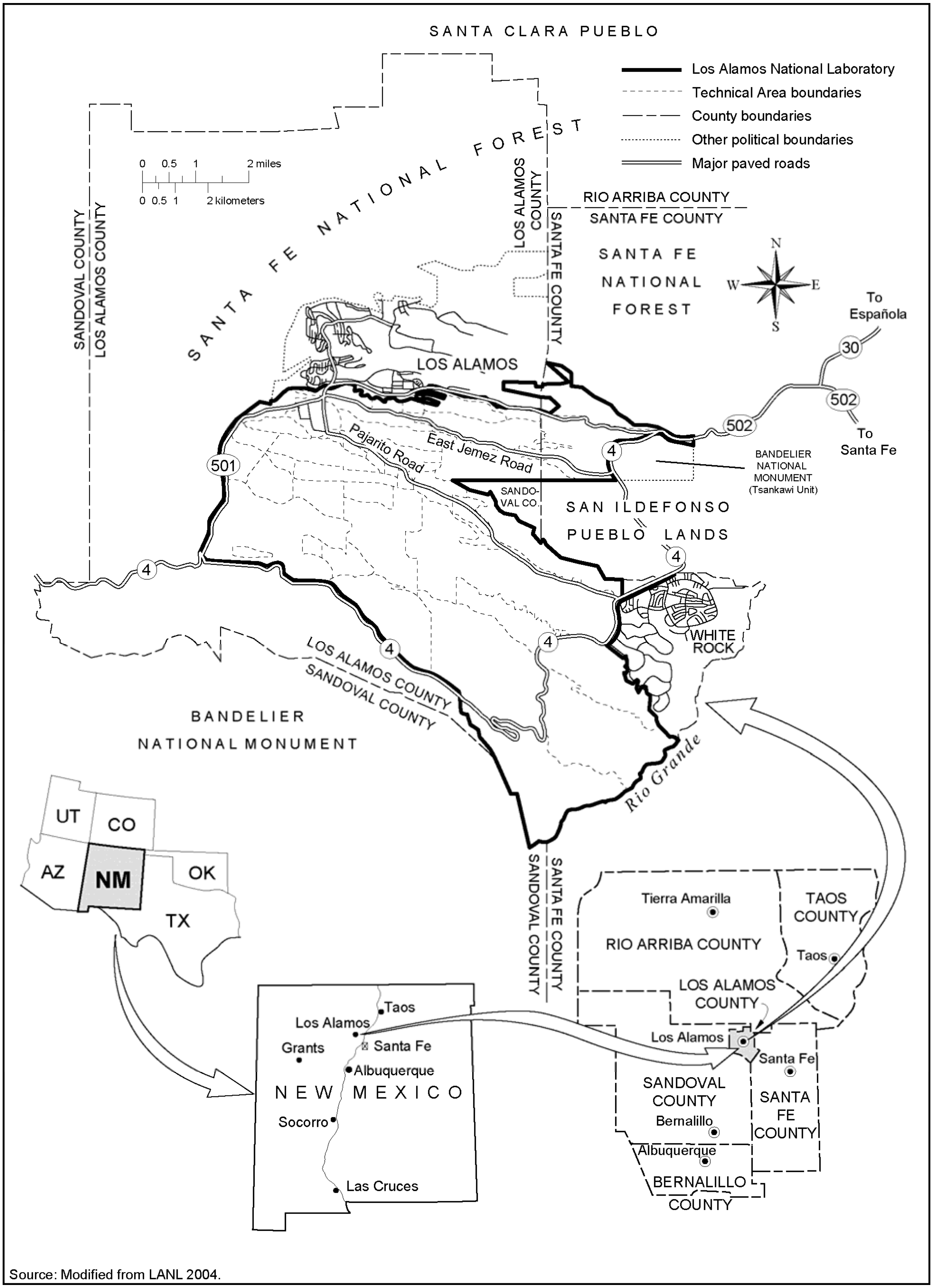

Figure S–1 Location of Los Alamos National Laboratory

In the mid-1990s, DOE, in response to direction from the President and Congress, developed the Stockpile Stewardship and Management Program (now the Stockpile Stewardship Program) to provide a single, highly integrated technical program for maintaining the continued safety and reliability of the nuclear weapons stockpile. Stockpile stewardship comprises activities associated with nuclear weapons research, design, and development; maintaining the knowledge base and capabilities to support nuclear weapons testing; and the assessment and certification of nuclear weapons safety and reliability. Stockpile management includes operations associated with producing, maintaining, refurbishing, surveilling, and dismantling the nuclear weapons stockpile. Mission-essential work conducted at LANL provides science, research and development, and production support to these NNSA missions, with a special focus on national security.

A particularly important facility at LANL is the nearly 60-year-old CMR Building, located in TA-3 (see **Figures S–2** and **S–3**), which has unique capabilities for performing AC, MC, and actinide[4] research and development related to SNM. Actinide science-related mission work at LANL ranges from the plutonium-238 heat source program conducted for the National Aeronautics and Space Administration to arms control technology development. CMR Building operations provide AC and MC in support of manufacturing, development, and surveillance of nuclear weapons pits;[5] nuclear nonproliferation programs; and programs with critical national security missions. Pit production mission support work was first assigned to LANL in 1996 in the ROD for the *Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (61 FR 68014). DOE later determined how and where it would conduct that mission support work through the 1999 *LANL SWEIS* (DOE 1999) and its associated ROD (64 FR 50797). Since 2000, pit production at LANL has been established within the Plutonium Facility Complex at TA-55 (see Figure S–3), and several certified pits[6] have been produced over the past 5 years in that facility. Pit production does not take place at the CMR Building and would not take place in any CMRR facility.

Construction of the CMR Building was initiated in 1949 and completed in 1952. The CMR Building is a three-story building composed of a central corridor and eight wings, with over 550,000 square feet (51,000 square meters) of working area, including laboratory spaces and administrative and utility areas. The CMR Building is currently designated as a Hazard Category 2, Security Category III nuclear facility. Its main function is to house research and development capabilities involving AC, MC, and metallurgic studies on actinides and other metals. AC and MC services support virtually all nuclear programs at LANL. These activities have been conducted almost continuously in the CMR Building since it became operational in 1952; however, with the closure of Wing 2, the broad spectrum of MC work once performed at the CMR Building has been relocated to other wings of the CMR Building or has been suspended.

The CMR Building was initially designed and constructed to comply with the building codes in effect during the late 1940s and early 1950s. In the intervening years, a series of upgrades has been performed to address changing building and safety requirements. In 1992, DOE initiated planning and implementation of additional CMR Building upgrades to address specific safety, reliability, consolidation, and safeguards and security issues with the intent to extend the useful life of the CMR Building for an additional 20 to 30 years. Many of the utility systems and structural components were recognized then as being aged, outmoded, and generally deteriorating. Beginning in about 1997 and continuing to the present, a series of operational, safety, and seismic issues have surfaced. A 1998 seismic study identified two small parallel faults beneath the northernmost portion of the CMR Building (LANL 1998). No other faults were detected. The presence of these faults gave rise to operational and safety concerns related to

[4] "Actinide" refers to any member of the group of elements with atomic numbers from 89 (actinium) to 103 (lawrencium), including uranium and plutonium. All members of this group are radioactive.
[5] A pit is the central core of a primary assembly in a nuclear weapon typically composed of plutonium-239 and/or highly enriched uranium and other materials.
[6] A certified pit meets the specifications for use in the U.S. nuclear stockpile.

the structural integrity of the building in the event of seismic activity along this portion of the Pajarito fault system. These issues have partially been addressed by administratively restricting the amount of material stored within the building and in use at any given time, completely removing operations from three wings of the building, and generally limiting operations in the other three laboratory wings that remain functional. Upgrades to the building that were necessary have since been undertaken to allow the building to continue functioning while ensuring safe and reliable operations. The planned closeout of nuclear laboratory operations within the CMR Building was previously estimated to occur in or around the year 2010; however, with the limited upgrades on selected facility systems and operational restrictions implemented, NNSA plans to continue to operate the nuclear laboratories in the building until the building can no longer operate safely, a replacement facility is available, or NNSA makes other operational decisions.

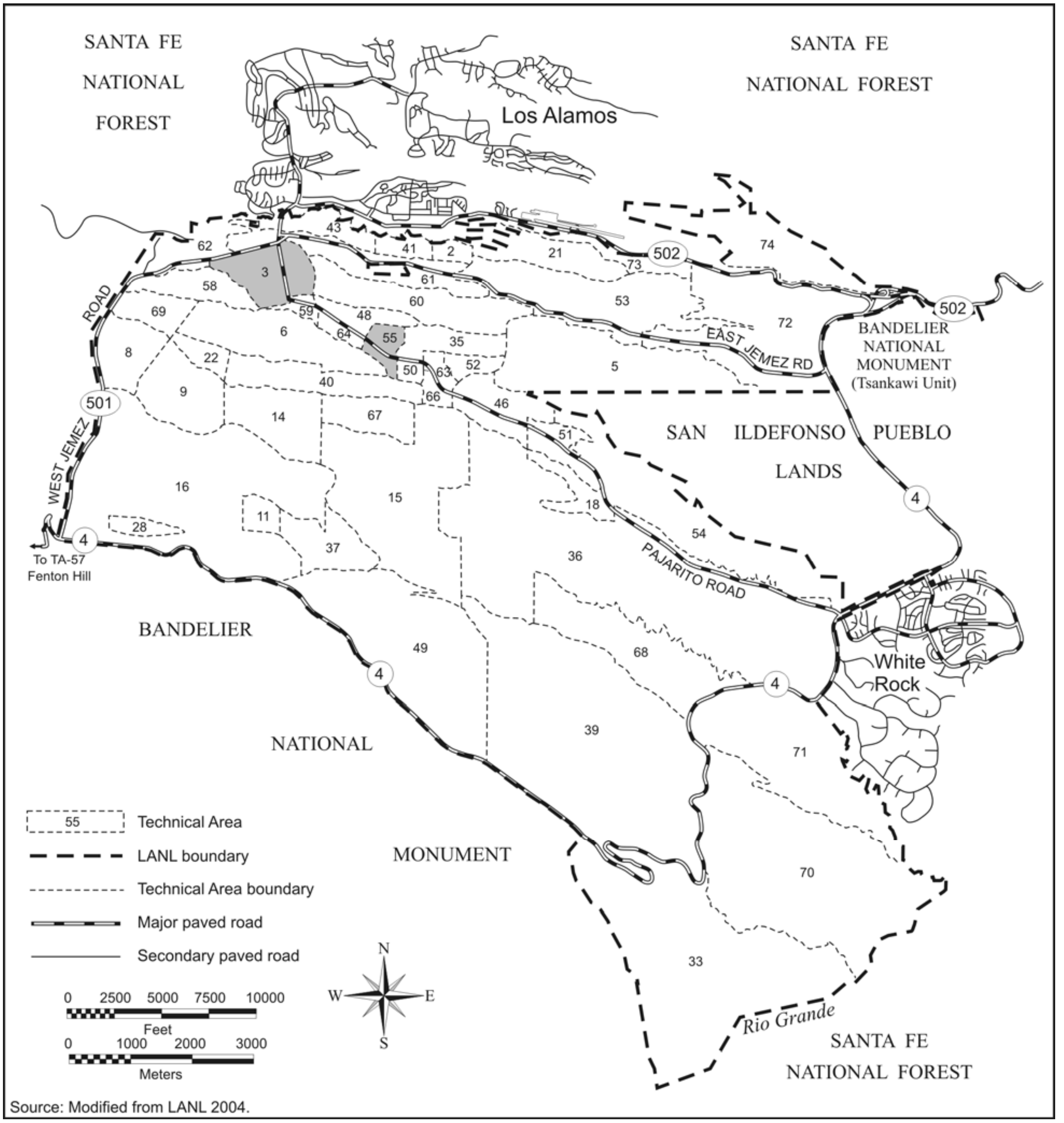

Figure S–2 Identification and Location of Los Alamos National Laboratory Technical Areas

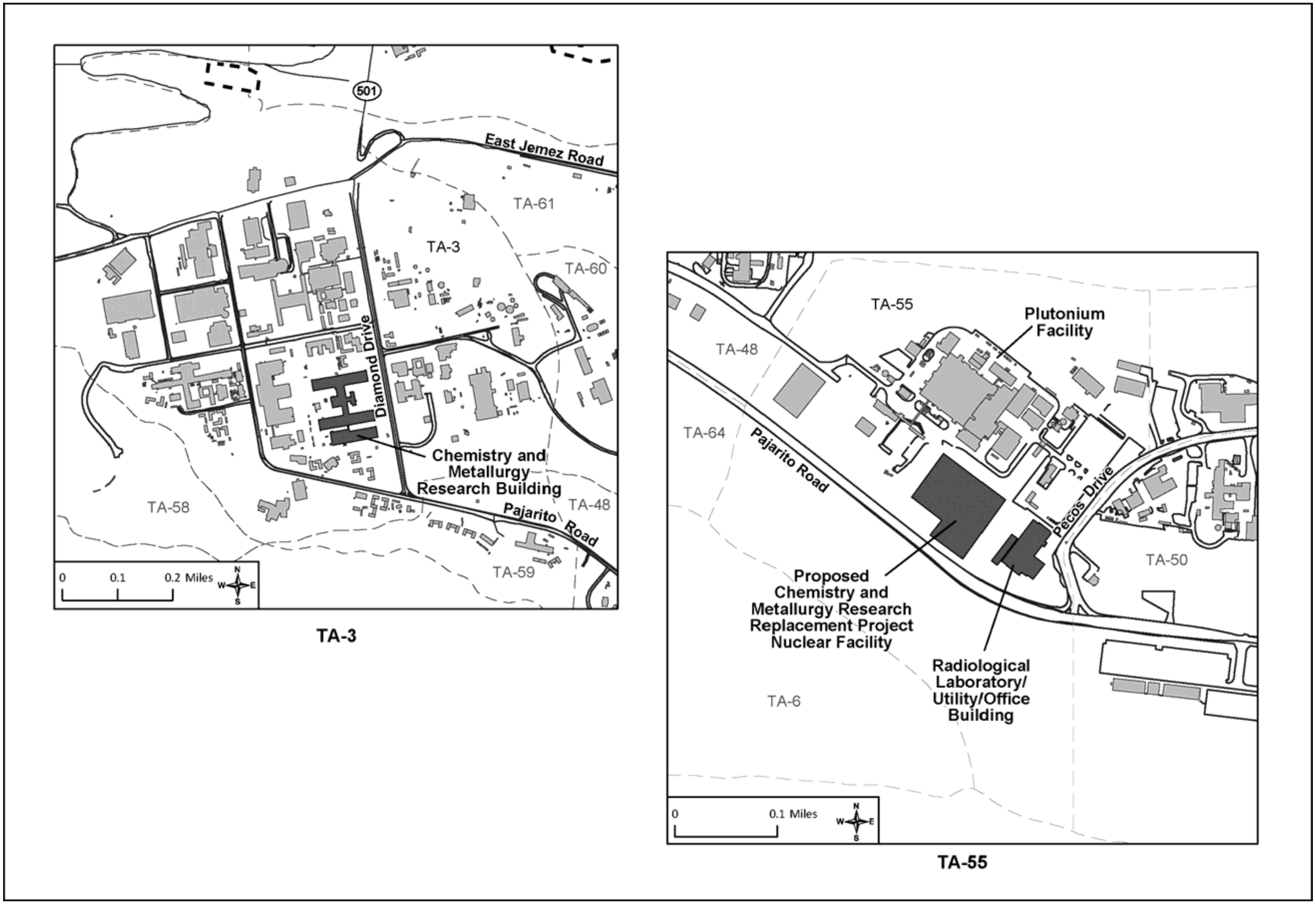

Figure S–3 Location of Facilities in Technical Areas 3 and 55

S.3 Purpose and Need for Agency Action

The purpose and need for NNSA action has not changed since issuance of the 2003 *CMRR EIS*. NNSA needs to provide the physical means for accommodating the continuation of mission-critical AC and MC capabilities at LANL beyond the present time in a safe, secure, and environmentally sound manner. Concurrently, NNSA proposes to take advantage of the opportunity to consolidate like activities for the purpose of operational efficiency and cost economies.

AC and MC activities historically conducted at the CMR Building are fundamental capabilities required for support of all DOE and NNSA mission work that involves SNM at LANL. These AC and MC capabilities have been available at LANL for the entire history of the site since the mid-1940s, and these capabilities remain critical to future work at the site. The CMR Building's nuclear operations and capabilities are currently restricted to maintain compliance with safety requirements. Due to facility limitations, the CMR Building is not being operated to the full extent needed to meet DOE and NNSA operational requirements for the foreseeable future. In addition, consolidation of AC and MC activities at TA-55 would enhance operational efficiency in terms of security, support, and risk reduction related to handling and transportation of nuclear materials.

S.4 Scope and Alternatives

NNSA issued the *CMRR EIS* ROD in 2004, announcing its decision to implement the preferred alternative, construction and operation of the two-building CMRR Facility at TA-55 of LANL. RLUOB has been constructed at the southeastern corner of TA-55, and NNSA has proceeded with the planning and design of the CMRR-NF. Based on facility modifications and additional support functions identified through the design process, NNSA is analyzing the following three alternatives in the *CMRR-NF SEIS*. These alternatives are addressed in more detail in Section S.9 of this Summary.

- ***No Action Alternative (2004 CMRR-NF):*** Construct and operate a new CMRR-NF at TA-55, adjacent to RLUOB, as analyzed in the 2003 *CMRR EIS* and selected in the associated 2004 ROD and the 2008 *Complex Transformation SPEIS* ROD, with two additional project activities (management of excavated soils and tuff and a new electrical substation) analyzed in the 2008 *LANL SWEIS*. Based on new information learned since 2004, the 2004 CMRR-NF would not meet the standards for a Performance Category 3 (PC-3)[7] structure as required to safely conduct the full suite of NNSA AC and MC mission work. Therefore, the 2004 CMRR-NF would not be constructed.

- ***Modified CMRR-NF Alternative:*** Construct and operate a new CMRR-NF at TA-55, adjacent to RLUOB, with certain design and construction modifications and additional support activities that address seismic safety, infrastructure enhancements, nuclear-safety-basis requirements, and sustainable design principles (sustainable development – see glossary). This alternative has two construction options: the Deep Excavation Option and the Shallow Excavation Option. All necessary AC and MC operations could be performed as required to safely conduct the full suite of NNSA mission work. The Modified CMRR-NF embodies the maturation of the 2004 CMRR-NF design to meet all safety standards and operational requirements.

[7] *Each structure, system, and component in a DOE facility is assigned to one of five performance categories depending upon its safety importance. Performance Category 3 structures, systems, and components are those for which failure to perform their safety function could pose a potential hazard to public health, safety, and the environment from release of radioactive or toxic materials. Design considerations for this category are to limit facility damage as a result of design-basis natural phenomena events (for example, an earthquake) so that hazardous materials can be controlled and confined, occupants are protected, and the functioning of the facility is not interrupted (DOE 2002).*

- ***Continued Use of CMR Building Alternative:*** Do not construct a replacement facility to house the capabilities planned for the CMRR-NF, but continue to perform operations in the CMR Building at TA-3, with normal maintenance and component replacements at the level needed to sustain programmatic operations for as long as feasible. Certain AC and MC operations would be restricted. Administrative and radiological laboratory operations would take place in RLUOB at TA-55.

S.5 Decisions to be Supported by the *CMRR-NF SEIS*

NNSA must decide whether to implement one of the alternatives wholly or one or more of the alternatives in part. NNSA may choose to implement either of the action alternatives in its entirety as described and analyzed in the *CMRR-NF SEIS*, or it may elect to implement only a portion of these alternatives.

The environmental impact analyses of the alternatives considered in the *CMRR-NF SEIS* provide the NNSA decisionmakers with important environmental information to assist in the overall CMRR-NF decisionmaking process. The 2008 *Complex Transformation SPEIS* provided the environmental impacts basis for the NNSA Administrator's decision to programmatically retain the plutonium-related manufacturing and research and development capabilities at LANL and, in support of these activities, to maintain AC and MC functions at LANL during CMRR-NF construction and operations in accordance with the earlier *CMRR EIS* ROD. These decisions were issued in the 2008 *Complex Transformation SPEIS* ROD. Remaining project-specific decisions to be made by the NNSA Administrator regarding the CMRR-NF include (1) whether to construct a new Modified CMRR-NF to meet recently identified building construction requirements and implement all or some of the additional construction support activities identified under the Modified CMRR-NF Alternative, which is NNSA's Preferred Alternative, or (2) whether to forgo construction of the CMRR-NF in favor of continuing to operate the CMR Building as a Hazard Category 2 Nuclear Facility with a restricted level of operations for mission support work under the Continued Use of CMR Building Alternative. The remaining alternative, to construct the 2004 CMRR-NF as it was described and analyzed in the 2003 *CMRR EIS* and its associated ROD, the 2008 *LANL SWEIS*, the *Complex Transformation SPEIS* and its associated ROD, and in the *CMRR-NF SEIS* as the No Action Alternative, does not meet NNSA's purpose and need and thus, would not be implemented.

NNSA is not planning to revisit decisions at this time that it reached in 2008 and issued through the 2008 *Complex Transformation SPEIS* ROD related to maintaining CMR operational capabilities at LANL to support critical NNSA missions. CMR capabilities were a fundamental component of Project Y during the Manhattan Project era, and the decision to establish these capabilities at the Los Alamos site was made originally by the U.S. Army Corps of Engineers, Manhattan District. DOE's predecessor agency, the Atomic Energy Commission, made the decision to continue support for and expand CMR capabilities at LANL after World War II; the CMR Building was constructed to house these needed capabilities. DOE considered the issue of maintaining CMR capabilities (along with other capabilities at LANL) in 1996 as part of its review of the Stockpile Stewardship Program and made decisions at that time that required the retention of CMR capabilities at LANL. DOE concluded in the 1999 *LANL SWEIS* ROD (64 FR 50797) that, due to lack of information on proposal(s) for replacement of the CMR Building to provide for its continued operations and capabilities, it was not the appropriate time to make specific decisions on the project. With the support of the *LANL SWEIS* impact analyses, however, DOE made a decision on the level of operations at LANL that included the capabilities housed by the CMR Building. In 2003, NNSA prepared the *CMRR EIS* and, in 2004, issued its implementation decisions for locating the CMRR Facility at LANL in TA-55, for constructing a two-building CMRR Facility with Hazard Category 2 laboratories above ground, and for the DD&D of the existing CMR Building after all operations have been re-established at the new CMRR Facility. The *LANL SWEIS* supported NNSA decisions on the level of operations at LANL that included both the operational capabilities housed by the CMR Building and the construction of the CMRR Facility at TA-55. However, NNSA deferred decision(s) on the CMRR-NF until 2008, after completion of the programmatic impacts analysis (the *Complex Transformation SPEIS*) for transforming the nuclear weapons complex into a smaller, more-efficient enterprise. NNSA issued its decisions in December 2008 on the nuclear enterprise, which included the decision to construct and operate the CMRR-NF at LANL, as proposed in the *CMRR EIS*. There is no current proposal to change or modify the operation of the CMRR-NF as it was described in any of these prior NEPA documents, nor is there any current proposal to alternatively disposition the existing CMR Building after it has been decommissioned and decontaminated.

NNSA is not planning to revisit decision(s) made recently on actions geographically associated with the LANL Pajarito Mesa (where TA-55 is located) or along the Pajarito Road corridor (which traverses portions of Pajarito Mesa and Pajarito Canyon). These actions include the following:

- Nuclear Materials Safeguards and Security Upgrades Project (NMSSUP) activities, which focus on upgrading various intrusion alarm systems and related security measures for existing LANL facilities
- Plutonium Facility Complex Refurbishment Project, also referred to as the "TA-55 Reinvestment Projects," which focuses on refurbishing and repairing the major building systems at the Plutonium Facility to extend its reliable future operations
- Replacement of the existing, aging Radioactive Liquid Waste Treatment Facility (RLWTF) with a new, smaller-capacity facility
- Replacement of the TRU [transuranic] Waste Facility with a new, smaller-capacity facility, which is necessary to facilitate implementation of the TA-54 Material Disposal Area G low-level radioactive waste disposal site closure
- Closure of various material disposal areas at LANL at the direction of the New Mexico Environment Department and in compliance with a Compliance Order on Consent (Consent Order)[8]
- Continuation of waste disposal projects and programs, including the Waste Disposition Project at TA-54
- Occupancy and operation of RLUOB

With the exception of NNSA's 2004 decision to construct and operate RLUOB, the other projects and programs were analyzed in the *LANL SWEIS*, and decisions were made to implement these actions in the 2008 and 2009 *LANL SWEIS* RODs. These actions are not connected to or dependent on the alternatives evaluated in the *CMRR-NF SEIS*.

[8] *In March 2005, the New Mexico Environment Department, DOE, and the LANL management and operating contractor entered into a Compliance Order on Consent (Consent Order) (NMED 2005). The purposes of the Consent Order are (1) to define the nature and extent of releases of contaminants at, or from, LANL; (2) to identify and evaluate, where needed, alternatives for corrective measures to clean up contaminants in the environment and prevent or mitigate the migration of contaminants at, or from, LANL; and (3) to implement such corrective measures.*

S.6 Other National Environmental Policy Act Documents

There are a number of NEPA documents that are related to the *CMRR-NF SEIS.* These documents were important in developing the *CMRR-NF SEIS* proposed action and alternatives and are summarized below.

Environmental Assessment for the Proposed CMR Building Upgrades at the Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EA-1101). In February 1997, DOE issued this environmental assessment that analyzed the effects that could be expected from performing various necessary extensive structural modifications and systems upgrades at the existing CMR Building. Changes to the CMR Building included structural modifications needed to meet then-current seismic criteria and building ventilation, communications, monitoring, and fire protection systems upgrades and improvements. A Finding of No Significant Impact was issued on the CMR Building Upgrades Project on February 11, 1997.

These upgrades were intended to extend the useful life of the CMR Building for an additional 20 to 30 years. However, beginning in 1997 and continuing through 1998, a series of operational, safety, and seismic issues surfaced regarding the long-term viability of the CMR Building. In the course of considering these issues, DOE determined that the extensive upgrades originally planned for the CMR Building would be much more time-consuming than had been anticipated and would be only marginally effective in providing the operational risk reduction and program capabilities required to support NNSA mission assignments at LANL. As a result, DOE reduced the number of CMR Building upgrade projects to only those needed to ensure safe and reliable operations through at least the year 2010. CMR Building operations and capabilities are currently being restricted to ensure compliance with safety and security constraints. The CMR Building is not fully operational to the extent needed to meet DOE and NNSA requirements. In addition, continued support of NNSA's existing and evolving mission roles at LANL was anticipated to require additional capabilities, such as the ability to remediate large containment vessels.

Final Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EIS-0350). Issued in 2003, this EIS examined the potential environmental impacts associated with the proposed action of consolidating and relocating the mission-critical CMR capabilities from an aging building to a new, modern building (or buildings). NNSA issued its decision to construct a two-building CMRR Facility adjacent to the Plutonium Facility Complex in TA-55 in the 2004 ROD (69 FR 6967). Design and construction of RLUOB has been completed, and that building is currently being outfitted for office occupancy in 2011 and radiological operations in 2013.

Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EIS-0380). In the 2008 *LANL SWEIS*, NNSA analyzed the potential environmental impacts associated with continued operation of LANL. The LANL SWEIS analyzed the environmental impacts of three alternatives for the level of operations at LANL: No Action, Reduced Operations, and Expanded Operations. Under the No Action Alternative, LANL would operate at the levels selected in the 1999 *LANL SWEIS* ROD and implement other LANL activities that had undergone NEPA analyses since 1999. The 2008 *LANL SWEIS* stated that construction of RLUOB had begun, but construction of the CMRR-NF would be delayed until NNSA had completed and issued certain programmatic analyses and decisions. Two actions that would potentially support CMRR-NF construction and operation (installation of an electric power substation in TA-50 and removal and transport of about 150,000 cubic yards [115,000 cubic meters] of geologic material per year during construction from the CMRR-NF building site and other construction sites to other LANL locations for storage) were included in the 2008 *LANL SWEIS* environmental impact analyses. The first ROD for the 2008 *LANL SWEIS* was signed on September 19, 2008 (73 FR 55833), and a second ROD was signed on June 29, 2009 (74 FR 33232). Both RODs selected implementation of the No Action Alternative, which included construction and operation of the CMRR Facility, as described in the No Action Alternative analyzed in the *CMRR-NF SEIS*, and the additional support activities analyzed under that alternative, as well as certain elements from the Expanded Operations Alternative, including seismic upgrades to the TA-55 Plutonium Facility.

Complex Transformation Supplemental Programmatic Environmental Impact Statement (DOE/EIS-0236-S4). The *Complex Transformation SPEIS* was issued on October 24, 2008; it analyzed the environmental impacts of alternatives for transforming the nuclear weapons complex into a smaller, more-efficient enterprise that could respond to changing national security challenges and ensure the long-term safety, security, and reliability of the nuclear weapons stockpile. Programmatic alternatives considered in the *Complex Transformation SPEIS* specifically addressed facilities that use or store significant (that is, Security Category I/II) quantities of SNM. In the associated 2008 ROD (73 FR 77644) for the programmatic alternatives, NNSA announced its decision to transform the plutonium and uranium manufacturing aspects of the complex into smaller and more-efficient operations while maintaining the capabilities NNSA needs to perform its national security missions. The ROD also stated that manufacturing and research and development involving plutonium would remain at LANL. To support these activities, the *Complex Transformation SPEIS* ROD stated that NNSA would construct and operate the CMRR-NF at LANL as a replacement for portions of the CMR Building, a structure that is nearly 60 years old and faces significant safety and seismic challenges to its long-term operation.

S.7 Public Involvement

During the NEPA process, there are two opportunities for public involvement (see **Figure S–4**). These opportunities include the scoping process and the public comment period. Although scoping is optional for an SEIS under DOE's NEPA implementing procedures (10 CFR 1021.314(d)), NNSA invited public participation in the scoping process and held two scoping meetings. A public comment period on the draft SEIS is required by 40 CFR 1503.1 and 10 CFR 1021.314(d). Section S.7.1 summarizes the scoping process and major comments received from the public. Section S.7.2 summarizes the public comment process for the *Draft CMRR-NF SEIS* and the major comments received from the public. Section S.8 summarizes changes NNSA made in the *Final CMRR-NF SEIS* in response to the public comments.

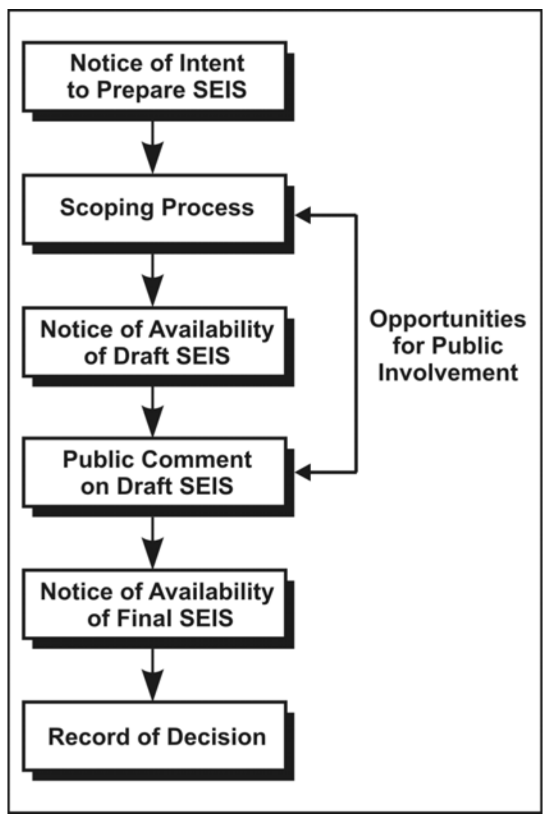

Figure S–4 National Environmental Policy Act Process for the *CMRR-NF SEIS*

S.7.1 Scoping Process

On October 1, 2010, NNSA published a Notice of Intent to prepare the *CMRR-NF SEIS* in the *Federal Register* (75 FR 60745) and on the DOE NEPA website. In this Notice of Intent, NNSA invited public comment on the *CMRR-NF SEIS* proposal. The Notice of Intent listed the issues initially identified by NNSA for evaluation in the *CMRR-NF SEIS*. Public citizens, civic leaders, and other interested parties were invited to comment on these issues and to suggest additional issues that should be considered in the *CMRR-NF SEIS*. The Notice of Intent informed the public that comments on the proposed action could be submitted via U.S. mail, e-mail, a toll-free phone line, a fax line, and in person at public meetings to be held in the vicinity of LANL. The public scoping period was originally scheduled to end on

November 1, 2010. In response to public comments, NNSA extended the public scoping period through November 16, 2010 (75 FR 67711).

Public scoping meetings were held on October 19, 2010, in White Rock, New Mexico, and on October 20, 2010, in Pojoaque, New Mexico. NNSA representatives were available to respond to questions and comments on the NEPA process and the proposed scope of the *CMRR-NF SEIS*. Members of the public were encouraged to submit written comments, enter comments into a computer database, or record oral comments during the meetings, in addition to submitting comments via letters, the DOE website, or the fax line until the end of the scoping period. All scoping comments were considered by NNSA in preparing the *CMRR-NF SEIS*.

For purposes of this NEPA document, a comment is defined as a single statement or several statements concerning a specific issue. An individual commentor's statement may contain several such comments. Most of the oral and written public statements submitted during the *CMRR-NF SEIS* scoping period contained multiple comments on various specific issues. These issues are summarized in the following paragraphs.

Summary of Major Scoping Comments

Approximately 85 comment statements or documents were received during the scoping process from citizens, interested groups, local officials, and representatives of Native American Pueblos in the vicinity of LANL. Where possible, comments on similar or related topics were grouped into common categories for the purpose of summarizing them. After the issues were identified, they were evaluated to determine whether they were relevant to the *CMRR-NF SEIS*. Issues found to be relevant to the SEIS are addressed in the appropriate chapters or appendices of the *CMRR-NF SEIS*.

Many comments were received regarding the type of document that NNSA should prepare, calling for a new EIS rather than an SEIS. Others called for a programmatic EIS, reopening the question of whether the CMRR-NF should be constructed at all and whether it should be constructed at another NNSA site. Similarly, a commentor called for a review of available space throughout the DOE complex (nationwide) for alternative locations for CMR operations. As indicated in Section S.1, NNSA has determined that a supplement to the *CMRR EIS* is the appropriate level of analysis, based on CEQ and DOE NEPA regulations (40 CFR 1502.9c and 10 CFR 1021.341(a)-(b), respectively). NNSA is not planning to revisit the decisions regarding the need for the capabilities that would be housed in the proposed CMRR-NF or the decision to locate these capabilities at LANL, as decided in the 2008 *Complex Transformation SPEIS* ROD. There were comments about the alternatives and requests that the No Action Alternative analyze not constructing the CMRR-NF, constructing only a vault structure, or continuing use of the existing CMR Building for AC and MC operations. NNSA has determined that the No Action Alternative considered in the *CMRR-NF SEIS* is the Preferred Alternative that was selected by NNSA for implementation in the 2004 ROD based on the 2003 *CMRR EIS*, and the Continued Use of CMR Building Alternative in the *CMRR-NF SEIS* analyzes the continued use of the CMR Building. Others suggested that NNSA consider locating AC and MC operations in available space in other LANL facilities, such as the TA-55 Plutonium Facility or RLUOB, or building a separate vault that could be used in conjunction with existing LANL facilities so that the CMRR-NF would not be required. In response, RLUOB was not constructed to address the security and safety requirements of Hazard Category 2 or 3 levels of nuclear material. Thus, NNSA would not operate RLUOB as anything other than a radiological facility, which would significantly limit the total quantity of special nuclear material that could be handled in the building. As a result, AC and MC operations requiring Hazard Category 2 and 3 work spaces could not be carried out in RLUOB. Likewise, constructing only the vault structure would not meet NNSA's purpose and need for action to provide sufficient space to safely conduct mission-required AC and MC operations at LANL.

A commentor questioned the need for deep excavation below the poorly welded tuff layer. Since the issuance of the Notice of Intent in October 2010, NNSA has added an additional construction option to the Modified CMRR-NF Alternative. The *CMRR-NF SEIS* analyzes two construction options: Deep Excavation, which would involve excavation to a nominal depth of 130 feet (40 meters) below the ground surface and removal of the poorly welded tuff layer, and Shallow Excavation, which would involve less excavation (to a nominal depth of 58 feet [18 meters]) and constructing the Modified CMRR-NF above the elevation of the poorly welded tuff layer.

Other concerns identified by commentors were related to analyzing the impacts of waste generation, transportation of waste, traffic, and water usage. Additional areas of concern were jobs and DD&D of the CMR Building. NNSA addressed all of these topics in the *Draft CMRR-NF SEIS* and in the *Final CMRR-NF SEIS.*

S.7.2 Public Comments on the *Draft CMRR-NF SEIS*

NNSA prepared the *CMRR-NF SEIS* in accordance with NEPA and CEQ and DOE NEPA regulations (40 CFR Parts 1500 – 1508 and 10 CFR Part 1021, respectively). An important part of the NEPA process is solicitation of public comments on a draft EIS and consideration of those comments in preparing a final EIS. NNSA distributed copies of the *Draft CMRR-NF SEIS* to those organizations, government officials, and individuals who were known to have an interest in LANL, as well as those organizations and individuals who requested a copy. Copies also were made available on the Internet and in regional DOE public document reading rooms and public libraries.

On April 29, 2011, NNSA published a notice in the *Federal Register* (76 FR 24018), concurrent with the U.S. Environmental Protection Agency's Notice of Availability (76 FR 24021), announcing the availability of the *Draft CMRR-NF SEIS*, the duration of the comment period, the location and timing of the public hearings, and the various methods for submitting comments. NNSA announced a 45-day comment period, from April 29 to June 13, 2011, to provide time for interested parties to review the *Draft CMRR-NF SEIS*. In response to requests for additional review time, the comment period was extended by 15 days, through June 28, 2011, giving commentors a total review and comment period of 60 days (76 FR 28222). In addition, because of the Las Conchas wildfire, NNSA also accepted and responded to comments submitted after the June 28, 2011, deadline through July 31, 2011.

Three public hearings were scheduled at regional venues near LANL from May 24 through May 26, 2011 (Los Alamos, Española, and Santa Fe). In response to requests for additional public hearings, NNSA held a fourth public hearing in Albuquerque on May 23 (76 FR 28222), and provided informal meetings as requested. Newspaper advertisements related to the public hearings, including the Albuquerque hearing, began to run in local newspapers on May 8 and continued through May 19, 2011. NNSA representatives were available to respond to questions on the NEPA process and the *Draft CMRR-NF SEIS* at the hearings and informal meetings. A court reporter was present at each hearing to record the proceedings and prepare a transcript of the public comments. These transcripts are available on the *CMRR-NF SEIS* website at http://nnsa.energy.gov/nepa/cmrrseis. To facilitate participation from hearing attendees, NNSA provided a number of other ways to submit comments at each hearing: a court reporter to record individual comments, computers for entering comments into a computer database, a voice recorder to receive oral comments, and comment forms that could be received at the hearing or mailed by the commentor at a later date. For those unable to attend the hearings, NNSA indicated that comments could be submitted by U.S. mail, e-mail, a toll-free phone line, and a toll-free fax line.

The following is a summary of the comments received on the *Draft CMRR-NF SEIS*. All comments submitted to NNSA during the public comment period and late comments were considered in preparing the *Final CMRR-NF SEIS*. Comments determined not to be within the scope of the *CMRR-NF SEIS* are acknowledged as such in the Comment Response Document (CRD) (Volume 2 of this

Final CMRR-NF SEIS). The remaining comments were reviewed and responded to by policy experts, subject matter experts, and NEPA specialists, as appropriate. The comment letters, including campaign letters, as well as the public hearing transcripts, are provided with NNSA responses in the CRD. The CRD is organized as follows:

- Section 1 describes the public comment process for the *Draft CMRR-NF SEIS*; the format used in the public hearings on the draft SEIS; the organization of the CRD and how to use the document; and the changes made by NNSA to the *Final CMRR-NF SEIS* in response to the public comments and recent developments that occurred since publication of the *Draft CMRR-NF SEIS*.
- Section 2 presents summaries of the major issues identified from the public comments received on the *Draft CMRR-NF SEIS* and NNSA's response to each issue.
- Section 3 presents a side-by-side display of all comments received by NNSA on the *Draft CMRR-NF SEIS* and NNSA's response to each comment.
- Section 4 contains the references cited in the CRD.

Summary of Comments on the *Draft CMRR-NF SEIS*

Commentors requested changes in the scope of the SEIS. A large number stated that NNSA should prepare an EIS that would address the need for the nuclear weapons mission or the need for the CMRR-NF. Other comments criticized the No Action Alternative, suggesting that it should analyze not constructing the CMRR-NF as selected in the 2004 *CMRR EIS* ROD. Commentors objected to the range of alternatives because two of the three alternatives would not meet NNSA's stated purpose and need. Others suggested different alternatives that NNSA should consider, including use of RLUOB, the TA-55 Plutonium Facility, or other onsite and offsite locations for AC and MC operations.

A number of commentors suggested that a capacity study or a "plutonium infrastructure" study should be conducted. Commentors made a variety of comments related to the need for and function of the CMRR-NF. Commentors stated directly or implied that the CMR Building, the proposed CMRR-NF, or both, were or would be used to manufacture plutonium pits or "triggers." Some commentors questioned the need for the CMRR-NF, indicating that a production rate of 20 pits per year supported by current facilities and the number of pits in storage should be sufficient. Commentors also questioned the need for pit production because pits are reported to have a greater than 100-year life. Other commentors asked what pit production rate the CMRR-NF was intended to support.

Many commentors expressed concerns and opinions about the geologic features of the LANL area in general and the proposed construction site specifically. In addition to concerns expressed regarding the nearness of a fault and the potential for a seismic event, it was also noted that the construction site lies over a layer of soft volcanic ash that could be compacted by the weight of the building.

Additionally, commentors expressed the fear that an accident similar to that which occurred recently in Japan at the Fukushima Daiichi Nuclear Power Plant could happen at LANL. Specific comments referenced other nuclear accidents, such as those at the Rocky Flats Plant, the Church Rock spill, and the accidents at Three Mile Island and Chernobyl. Many commentors expressed a desire to ensure that similar accidents would not occur at LANL by not building the proposed CMRR-NF or by shutting down other nuclear facilities at LANL. One commentor cited a recent report on volcanic activity in the LANL region. Due to the recent Las Conchas fire of June 2011, commentors were concerned about the impact of wildfires on the CMRR-NF.

Commentors expressed concerns that the Compliance Order on Consent (Consent Order) signed with the State of New Mexico would not be honored if a new nuclear facility were constructed at LANL. Specifically, commentors were doubtful that the cleanup of the Material Disposal Area G in TA-54 would be implemented by December 31, 2015, as required by the Consent Order. Commentors also expressed a desire that funds should be spent on cleanup activities at LANL rather than on a new nuclear facility.

Commentors did not agree with the results of the environmental justice analysis. The U.S. Environmental Protection Agency suggested that the analysis be revised to specifically address minority and low-income populations within 5-, 10-, and 20-mile (8-, 16-, and 32-kilometer) distances of the CMRR-NF site.

As with the individual comments, responses to these major topics are included in Volume 2, CRD, of the *CMRR-NF SEIS*. In preparing the *Final CMRR-NF SEIS*, NNSA incorporated changes in response to the comments and more recent information, as discussed in the following section.

S.8 Changes from the *Draft CMRR-NF SEIS*

In preparing the *Final CMRR-NF SEIS,* NNSA made revisions in response to comments received from other Federal agencies, state and local government entities, Native American tribal governments, and the public. In addition, the *Final CMRR-NF SEIS* was changed to provide additional environmental baseline information, include additional analyses, correct inaccuracies, make editorial corrections, and clarify text. The following summarizes the more important changes made in the *Final CMRR-NF SEIS*.

Chapter 1, "Introduction and Purpose and Need for Agency Action," was updated to discuss the reason why the design of the CMRR-NF needed to be modified and how this change resulted in the need to develop an SEIS. Section 1.7, Public Involvement, was modified to summarize the comments received during the scoping period and to include information related to the public comment period and public hearings on the *Draft CMRR-NF SEIS*. Section 1.8, Changes from the *Draft CMRR-NF SEIS*, was added to summarize the changes that have been made. Section 1.9, Organization of the *CMRR-NF SEIS*, was modified to include a paragraph on the addition of the CRD as Volume 2 of the *Final CMRR-NF SEIS*.

Chapter 2, "Project Description and Alternatives," was updated to include additional project-related information. Section 2.4, Proposed Chemistry and Metallurgy Research Building Replacement Project Capabilities, was updated to include additional information on the AC and MC capabilities that would be present in the proposed facility. Section 2.6.2, Modified CMRR-NF Alternative, was updated to include additional information on the evolution of the Deep and Shallow Construction Options and to add propane to the construction requirements associated with this alternative. Propane would be used to heat the building during the winter months for 3 to 6 years. The addition of propane use resulted in small changes in the air quality and greenhouse gas impacts for this alternative, as shown in Chapter 4, Section 4.3.4, Air Quality and Noise, as well as changes in Section 4.3.3, Infrastructure. Information was added in Section 2.6.2 regarding the weight of the proposed CMRR-NF and the ability of the ground beneath the proposed facility to support this weight. A bus parking lot that would be constructed on the boundary of TA-48/55 was also added to this alternative to provide room for buses from the proposed construction workers parking lot in TA-72 to remain near the proposed construction site. This change resulted in a small increase in land use for this alternative, as discussed in Section 4.3.2, Land Use and Visual Resources. The description of potential power upgrades associated with this alternative was modified to indicate that the potential power upgrades from TA-5 to TA-55 to support the Modified CMRR-NF could be temporary or permanent, depending on future power requirements. This does not change the amount of land that may be affected, but could change the impacts from temporary to permanent, as indicated in Section 4.3.2. Section 2.7, Alternatives Considered and Dismissed, was revised to describe in more detail the alternatives that NNSA considered and determined not to be reasonable for meeting the purpose and need for continuing CMR operations into the future.

Section 2.7.4 was added to describe other alternatives and proposals considered and to explain why they were not analyzed further in the *CMRR-NF SEIS*. Section 2.10, Summary of Environmental Consequences, was modified to show how the environmental impacts associated with the Modified CMRR-NF Alternative and Continued Use of CMR Building Alternative have changed as a result of the changes discussed in Chapter 4. These changes are all relatively small and do not significantly change any of the environmental consequences presented in the *Draft CMRR-NF SEIS*. Section 2.10 has also been modified to include a summary of the intentional destructive acts sections of Chapter 4 (Sections 4.2.10.3, 4.3.10.3, and 4.4.10.3).

Chapter 3, Affected Environment, was updated in a number of sections. Information was updated in the *Final CMRR-NF SEIS* to reflect the most recent environmental data from the 2009 *SWEIS Yearbook* (LANL 2011c). Information was included in Sections 3.2, Land Use and Visual Resources, and 3.7, Ecological Resources, on the Las Conchas wildfire. None of this information affects the impacts analyses presented in Chapter 4. Section 3.3 was updated to include new estimates of the amount of electricity available to LANL and Los Alamos County. The amount of peak power was reduced from 150 megawatts to 140 megawatts, reflecting the unavailability of two steam-driven turbine generators in TA-3 and increased power available from the Abiquiu Turbine Hydropower Project. These changes resulted in a change in the estimated amount of available electricity and are reflected in changes in the infrastructure sections in Chapter 4, Sections 4.3.3 and 4.4.3, for the Modified CMRR-NF Alternative and Continued Use of CMR Building Alternative, respectively, as well as in Section 4.6, Cumulative Impacts. The availability of electricity continues to cover expected requirements under any of the alternatives. However, peak demand could theoretically exceed available power under the Modified CMRR-NF Alternative, as discussed in the draft SEIS, but this is not expected to occur because actual LANL peak demand has consistently been lower than the estimate included in the 2008 *LANL SWEIS* and used in future forecasts. Additional information was included in the *Final CMRR-NF SEIS* to better describe the seismic studies and information developed for the proposed CMRR-NF site and LANL. This information is included in Section 3.5, Geology and Soils, and includes information from the 2009 update (LANL 2009) to the 2007 probabilistic seismic hazard analysis (LANL 2007). An error in the reported vertical peak ground acceleration at LANL (0.3 *g*) [gravitational acceleration] was corrected to 0.6 *g*. This typographical error in the Executive Summary of the source document (LANL 2007) is not reflective of information presented elsewhere in the probabilistic seismic hazard analysis and was not used in the design of the proposed Modified CMRR-NF. The 2009 update changed the peak horizontal and vertical ground accelerations for the proposed CMRR-NF site in TA-55. The updated factors were lower than the factors included in the 2007 analysis (0.47 *g* compared to 0.52 *g* for peak horizontal ground acceleration and 0.51 *g* compared to 0.6 *g* for peak vertical ground acceleration). The updated values were factored into the design of the proposed Modified CMRR-NF, as described in the *Draft CMRR-NF SEIS,* and do not change any of the analyses presented in the *Final CMRR-NF SEIS*. (This updated information was not available for unlimited public distribution when the *Draft CMRR-NF SEIS* was issued.) Information was included in Section 3.5, Geology and Soils, describing the volcanic history in the region. This information is factored into a revised discussion of potential accidents included in Appendix C. Section 3.9, Socioeconomics, was updated to include the latest information from the 2010 census on the region of influence and to show later unemployment data for the region. These changes did not result in any significant changes to the socioeconomics impacts sections in Chapter 4.

The 2010 census data were used to update the population projections to 2030 for total population, minority populations, and low-income population. As a result of slower than previously projected growth through 2010, the 2030 population projection for the 50-mile (80-kilometer) radius area surrounding TA-55 was reduced from about 545,000 to 511,000, and for the area surrounding TA-3, from about 536,000 to 502,000. Chapter 3, Section 3.10, Environmental Justice, was updated to include changes as a result of 2010 census data and to break the information down to smaller areas for evaluation (5-, 10-, and 20-mile [8-, 16-, and 32-kilometer] radii) in addition to the area within 50 miles (80 kilometers) of TA-55 and TA-3, as requested by the U.S. Environmental Protection Agency. The distribution of the population over the 50-mile (80-kilometer) radius was also updated using the latest census data, and more refined data were used (block data versus block group data; see Appendix B) to estimate the population within 10 miles (16 kilometers) of TA-55 and TA-3. As a result, more people are located closer to LANL (within 5 miles [8 kilometers]) than previously projected. The updated population projections and distributions were used to re-estimate the human health impacts associated with the No Action Alternative (2004 CMRR-NF) (Chapter 4, Section 4.2.10.2, for accidents); the Modified CMRR-NF Alternative (Section 4.3.10); and the Continued Use of CMR Building Alternative (Section 4.4.10), as well as the environmental justice analysis presented in Sections 4.3.11 and 4.4.11. The projected population doses from normal operations and the population accident doses changed slightly as a result of these changes, but not to the extent that the assessment from the draft SEIS would change. Similarly, the doses included in the environmental justice analysis changed, but not significantly. Additional information was included in Chapter 3, Section 3.11, Human Health, on historical health effects studies that have been done on the area surrounding LANL. This information is presented for background and does not affect any of the impacts analyses presented in Chapter 4.

In addition to the updates to Chapter 4 discussed above, other changes have been made to Chapter 4 since the *Draft CMRR-NF SEIS* was issued. Information has been added in Section 4.2.10.2 on the accident analysis that was performed for the *CMRR-NF SEIS*, as presented in Appendix C, as well as the changes in the accident analysis since the *Draft CMRR-NF SEIS* was issued. These changes do not significantly change the results, with the exception of significantly higher doses to the maximally exposed individual (MEI) and noninvolved worker under the seismically induced spill and fire accident at the CMRR-NF. In the *Final CMRR-NF SEIS*, this accident assumes that the earthquake initiates a radioactive material spill that is followed shortly thereafter by a fire, instead of both accidents occurring simultaneously, as was assumed in the *Draft CMRR-NF SEIS*. This change in assumptions results in a larger dose to the MEI and noninvolved worker because the radioactive materials associated with the assumed spill are not immediately lofted by the fire, which would lessen doses to persons close to the accident site. Additional discussion also was added to the accident analysis section for the Modified CMRR-NF Alternative (Section 4.3.10.2) regarding the potential for a wildfire affecting the facility and the effects of a seismic event that damages the CMRR-NF and other plutonium facilities in TA-55.

A special pathways consumer analysis was added to the environmental justice sections in Chapter 4, Sections 4.3.11 and 4.4.11, to show the potential impacts of the alternatives on individuals who may subsist on fish and wildlife caught within the vicinity of LANL. This analysis shows that special pathway consumers would not be exposed to significant risks as a result of implementing either of these alternatives. Section 4.6, Cumulative Impacts, was updated to account for newly acquired information about other projects in the vicinity of LANL, but these projects do not change the impacts discussions presented in this section.

Appendix B was updated to include a revised Section B.3, Air Quality, which factors in the requirement for propane use during construction at the Modified CMRR-NF and a revised number of emergency backup generators associated with the proposed CMRR Facility. Section B.5, Geology and Soils, was modified to eliminate Table B–9, which was related to the Modified Mercalli Intensity Scale. The Modified Mercalli Intensity Scale is not considered in the design of buildings. The design of the CMRR-NF is influenced by peak ground acceleration factors, as discussed in Chapter 3, Section 3.5. Section B.10, Environmental Justice, was modified to include a discussion of changes related to the use of 2010 census data in projecting the affected population to the year 2030, as well as an evaluation of a special pathways receptor.

Appendix C, Evaluation of Human Health Impacts from Facility Accidents, was updated to include a discussion of the Fukushima Daiichi Nuclear Power Plant accident (Section C.9) and wildfires and volcanic activity in the LANL vicinity (Section C.4.1) as they relate to the proposed action in the *CMRR-NF SEIS*. Section C.6 was added to discuss the potential for offsite land contamination in the event of a severe earthquake that results in the release of radioactive materials. Appendix C was also updated to include a discussion of the impact of a severe earthquake on the multiple plutonium facilities in TA-55 should the CMRR-NF be built there (Section C.7). In the event of such an earthquake, it is expected that the consequences would be dominated by releases from the TA-55 Plutonium Facility, which is currently being upgraded to address seismic concerns.

The population consequences and risks shown in Appendix C have been re-estimated using the latest population projections and distributions, as discussed above. The estimated consequences for some accidents have changed as a result of these changes, but the risks associated with these accidents are not significantly different from those presented in the *Draft CMRR-NF SEIS*. The accident with the largest changes is the seismically induced spill followed by a fire accident scenario for the CMRR-NF that was changed, as discussed above. This accident scenario was changed from that presented in the *Draft CMRR-NF SEIS* to reflect changes in the understanding of how it would progress and to present a more conservative accident scenario with respect to doses to the MEI and noninvolved worker.

S.9 Description of the Alternatives

S.9.1 Alternatives Evaluated

No Action Alternative: Under the No Action Alternative, NNSA would implement the decisions made in the 2004 *CMRR EIS* ROD, the 2008 and 2009 *LANL SWEIS* RODs, and the *Complex Transformation SPEIS* ROD. NNSA would construct the new CMRR-NF (referred to as the "2004 CMRR-NF") within TA-55 next to the already constructed RLUOB (see **Figure S–5**), with a portion of the building extending above ground, as described under Alternative 1, Construction Option 3, in the 2003 *CMRR EIS*. As stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the AC and MC work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

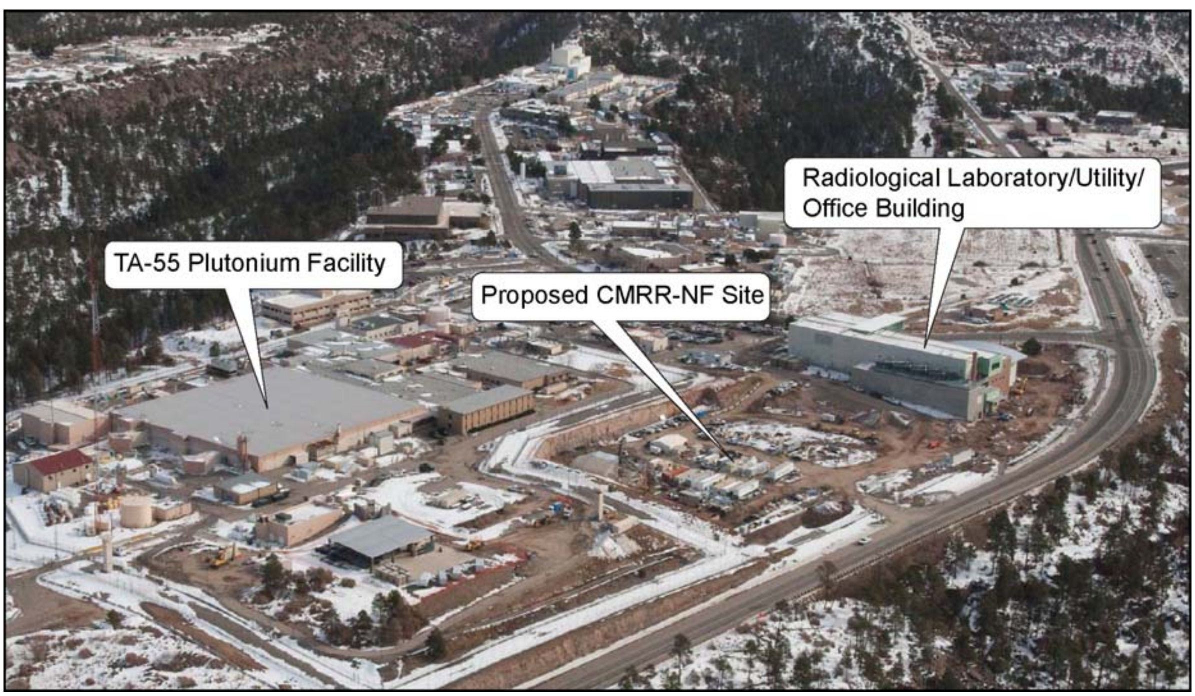

Figure S–5 Proposed Chemistry and Metallurgy Research Building Replacement Nuclear Facility Site in Technical Area 55

As analyzed in the 2003 *CMRR EIS*, AC and MC operations and associated research and development Hazard Category 2 and 3 laboratory capabilities would have been relocated in stages over 2 to 4 years from their current locations at the CMR Building to the 2004 CMRR-NF; those operations and activities would have continued in the 2004 CMRR-NF over about a 50-year period. After laboratory operations were removed from the CMR Building, it would have undergone DD&D activities. Following the closeout of operations at the new 2004 CMRR-NF toward the end of the twenty-first century, DD&D activities at that facility would have occurred. The phased elimination of CMR Building operations was originally estimated to be completed by around 2010; now, completion would not occur until about 2017.

Construction of the 2004 CMRR-NF would have included the construction of connecting tunnels, material storage vaults, utility structures and trenches, security structures, parking area(s), and a variety of other support activities (such as material laydown areas, a concrete batch plant, and equipment storage and parking areas). The construction force would have peaked at 300 workers.

As part of the *LANL SWEIS* No Action Alternative, which was selected in the 2008 ROD, NNSA evaluated (1) the transportation and storage of up to 150,000 cubic yards (115,000 cubic meters) per year of excavated soil or spoils (soil and rock material) from the 2004 CMRR-NF construction and other construction projects that could be undertaken at the site and (2) installation of a new substation on the existing 13.8-kilovolt power distribution loop in TA-50 to provide independent power feed to the existing TA-55 Plutonium Complex and the new CMRR Facility.

The entire 2004 CMRR-NF would have been designed as a Hazard Category 2 facility. The 2004 CMRR-NF would have had an areal footprint measuring about 300 by 210 feet (91 by 64 meters) and would have comprised approximately 200,000 square feet (18,600 square meters) of solid floor space divided between two stories. It would also have included one steel grating "floor" where mechanical and other support systems would have been located and one small roof cupola enclosing the elevator equipment. The 2004 CMRR-NF would have had an aboveground portion (consisting of a single story) that would have housed Hazard Category 3 laboratories and a belowground portion (consisting of a single story) that would have housed Hazard Category 2 laboratories and extended an average of 50 feet (15 meters) below ground. The total amount of laboratory workspace where mission-related AC and MC operations would have been performed was not stated in the 2003 *CMRR EIS*. In 2004, the estimate of 22,500 square feet (2,100 square meters) of laboratory space was provided as a result of integrated nuclear planning activities (DOE 2005). Fire protection systems for the 2004 CMRR-NF would have been developed and integrated with the existing exterior TA-55 site-wide fire protection water storage tanks and services.

As it was envisioned to be constructed in the *CMRR EIS*, the 2004 CMRR-NF could not satisfy current DOE nuclear facility seismic and nuclear safety requirements. Therefore, the 2004 CMRR-NF would not be able to safely function at a level sufficient to fully satisfy DOE and NNSA mission support needs, and thus would not fully meet DOE's stated purpose and need for taking action.

Modified CMRR-NF Alternative: Under the Modified CMRR-NF Alternative, which is NNSA's Preferred Alternative, NNSA would construct the new CMRR-NF (referred to as the "Modified CMRR-NF") at TA-55 next to the already constructed RLUOB, with certain construction enhancements and additional associated construction support activities. These enhancements and associated construction support activities are necessary to make the facility safe to operate based on new seismic information available since issuance of the *CMRR EIS* ROD in 2004. The structure would be constructed to meet the current International Building Code standards; Leadership in Energy and Environmental Design® (LEED) certification requirements, as applicable; and DOE requirements for nuclear facilities, including projected seismic event response performance and nuclear safety-basis requirements based on new site geologic information, fire protection, and security requirements. The AC and MC operations and associated research and development Hazard Category 2 and 3 laboratory capabilities would be relocated in stages over 3 years from their current locations at the CMR Building to the Modified CMRR-NF, where operations and activities are expected to continue over about the next 50 years. The phased elimination of CMR Building operations is projected to be completed by about 2023. Both the CMR Building and the Modified CMRR-NF would undergo DD&D after operations are discontinued, as identified under the No Action Alternative.

Under this alternative, the Modified CMRR-NF construction phase would also include the construction of connecting tunnels, material storage vaults, utility structures and trenches, security structures, parking area(s), and a variety of other support areas identified under the No Action Alternative. Implementing the Modified CMRR-NF Alternative construction would require the use of additional structural concrete and reinforcing steel for the construction of the building's walls, floors, and roof; additional soil excavation, soil stabilization, and special foundation work would also be necessary. Also, a set of fire suppression water storage tanks would be located within the building, rather than connecting with the existing fire suppression system at TA-55. Additional temporary and permanent actions required to construct the Modified CMRR-NF under this alternative beyond those actions identified under the No Action Alternative would include (1) additional construction personnel, (2) the installation and use of additional parking areas, construction equipment and building materials storage areas, excavation spoils storage areas, craft worker office and support trailers, and personnel security and training facilities; (3) the installation and use of up to two additional concrete batch plants (for a total of three) and a warehouse building; and (4) the installation of overhead and/or underground power lines, site stormwater detention ponds, road realignments, turning lanes, intersections, and traffic flow measures at various locations.

Under the Modified CMRR-NF Alternative, the Modified CMRR-NF would also be an above- and belowground structure; the amount of laboratory floor space where AC and MC operations would occur would be about the same as described under the No Action Alternative (22,500 square feet [2,100 square meters]). The estimated building footprint is about 342 feet long by 304 feet wide (104 meters by 93 meters), with about 344,000 square feet (32,000 square meters) of usable floor space divided among four stories and a partial roof level.

The footprint of the Modified CMRR-NF is larger than that of the 2004 CMRR-NF due to space required for engineered safety systems and equipment, such as an increase in the size and quantity of heating, ventilation, and air conditioning ductwork and the addition of safety-class fire suppression equipment, plus the associated electrical equipment. This equipment added 42 feet (13 meters) to the building in one dimension. The addition of 94 feet (29 meters) in the other dimension was for corridor space for movement of equipment; to avoid interference between systems (mechanical, electrical, piping system); and to allow enough space for maintenance, repair and inspection, and mission support activities (maintenance shop, waste management areas, and radiological protection areas). Part of the increase in building footprint over the 2004 CMRR-NF is due to thicker walls and other structural features required by current seismic and nuclear safety requirements.

The Modified CMRR-NF Alternative includes two construction options, designated as the Deep Excavation Option and the Shallow Excavation Option. Under either option, the Modified CMRR-NF would be designed to meet all current facility operations requirements. Under the Deep Excavation Option, NNSA would excavate the building footprint area down to a depth below a poorly welded tuff layer that lies from about 75 feet (23 meters) to 130 feet (40 meters) below the original ground level. Then the excavated site would be partially backfilled with low-slump concrete to form a 60-foot-thick (18-meter-thick) engineered building site. Three of the building's floors would be located below ground; the fourth floor and a roof equipment penthouse would extend above ground. The removed geologic material would be transported to storage areas at LANL for reuse in other construction projects or for landscaping purposes. The Shallow Excavation Option would avoid the poorly welded tuff layer by constructing the basemat well above that layer in the overlying stable geologic layer, which would act in a raft-like fashion to allow the building to "float" over the poorly welded tuff layer. Under this option, the

Modified CMRR-NF's base elevation would be about 8 feet (2.4 meters) lower than the excavation described under the No Action Alternative. Engineered backfill would be used to partially bury the building. The building would have three stories below ground and one above ground on the northwest side. Due to site sloping, there would be two stories below ground and two stories and a partial roof level above ground on the southeast side.

The original building elevation (as defined by the bottom of the basemat) considered for the CMRR-NF was located sufficiently shallow such that extensive excavation below the building basemat would not be required and would not extend into the poorly welded tuff layer. This design held through the completion of the conceptual and preliminary design phases of the project. This building location was reviewed by a number of organizations external to the project team, including NNSA and the Defense Nuclear Facilities Safety Board.

When the probabilistic seismic hazard analysis was published in 2007, the building design was adjusted to increase both the thickness in certain floors and the thickness of the basemat. The end result was that the overall building height measured from the bottom of the basemat to the top of the roof was now larger. In response to these changes, the building excavation was deepened to maintain the aboveground height of the building at the same elevation as the previous design. This design change would have resulted in penetration of the poorly welded tuff layer, requiring additional excavation (the Deep Excavation Option).

In 2011, a review of the requirements for the design of the CMRR-NF identified an opportunity to reduce the amount of additional excavation and concrete fill required for the Deep Excavation Option by raising the bottom of the basemat to near the original design elevation. The overall building height would remain the same, but the top of the roof would be higher above ground than it was in the conceptual and preliminary design. At the current level of design maturity, this approach, known as the Shallow Excavation Option, appears to provide some reductions in construction impacts and cost without affecting other building design requirements. Both construction options require the same sets of safety controls and are expected to remain close in offsite environmental consequences as shown in the analyses contained in this SEIS. At this time, both construction options are being considered by NNSA. As the design studies continue and more details become available, one option or the other may be judged to have significant advantages in the time and/or cost expected for executing the excavation phase of construction that will facilitate NNSA's selection of a preferred construction option.

Under either construction option, the Modified CMRR-NF, as envisioned to be constructed under this alternative, would meet all applicable codes and standards for new nuclear facility construction. Therefore, implementing this alternative would allow operations within the Modified CMRR-NF that would fully satisfy DOE and NNSA mission support needs. This alternative would fully meet DOE's stated purpose and need for taking action.

Continued Use of CMR Building Alternative: Under the Continued Use of CMR Building Alternative, NNSA would continue to carry out laboratory operations in the CMR Building at TA-3, with radiological laboratory and administrative support operations moving to the newly constructed RLUOB in TA-55. The continued operation of the CMR Building over an extended period (years to decades) would result in continued reduction of laboratory space as operations are further consolidated or eliminated due to safety concerns. It may also include the administrative reduction of "materials at risk" within portions of the CMR Building as necessary to maintain continued safe working conditions.

This alternative would result in very limited AC and MC capabilities at LANL over the extended period, depending on the overall ability of the CMR Building to be safely operated and maintained. Over time, these capabilities could gradually become more limited and more focused on supporting plutonium operations necessary for the immediate requirements of the stockpile. Moving the TA-3 CMR Building personnel and radiological laboratory functions into RLUOB over the next couple of years would result in considerable operational inefficiencies because personnel would have to travel by vehicle between offices and radiological laboratories at RLUOB and Hazard Category 2 laboratories that remain in the CMR Building. Additionally, the overall laboratory space allotted for certain functions, along with associated materials, might have to be duplicated at the two locations. When AC and MC laboratory operations eventually cease in the CMR Building, the building would undergo DD&D.

This alternative does not completely satisfy NNSA's stated purpose and need to carry out AC and MC operations at a level to satisfy the entire range of DOE and NNSA mission support functions. However, this alternative is analyzed in the *CMRR-NF SEIS* as a prudent measure in light of possible future fiscal constraints.

S.9.2 Alternatives Considered but Not Analyzed in Detail

A number of alternatives were considered, but were not analyzed in detail in the *CMRR-NF SEIS* because NNSA determined they are unreasonable. As required in the CEQ's NEPA regulations, the reasons for their elimination from detailed study are discussed in this section.

Alternative Sites: As discussed in Section S.6, the *Complex Transformation SPEIS* analyzed other possible locations outside of LANL for the activities that would be accomplished in the CMRR-NF. In the ROD for the *Complex Transformation SPEIS* (73 FR 77644), NNSA included its decision to retain plutonium manufacturing and research and development at LANL, and in support of these activities, to proceed with construction and operation of the CMRR-NF at LANL as a replacement for portions of the CMR Building. These decisions support NNSA's goal of consolidating activities and reducing the size of the Nation's nuclear weapons complex, together with modernizing outmoded infrastructure. Therefore, because the alternative sites for key activities within the nuclear weapons complex, as well as the need for CMRR-NF, have been reviewed in depth and programmatic decisions have been issued as recently as December, 2008, no additional sites outside of LANL are being considered further in the *CMRR-NF SEIS*.

In the 2003 *CMRR EIS*, an alternative site in TA-6 at LANL was evaluated as a possible site for the CMRR Facility. The TA-6 site was, in effect, a greenfield site that, if chosen, would have resulted in the central portion of the technical area changing from a largely natural woodland to an industrial site. As indicated in the 2003 *CMRR EIS*, development of the TA-6 site would have resulted in greater environmental impacts than building the proposed CMRR Facility in TA-55. Located near the western boundary of LANL at a slightly higher elevation and about 1 mile (1.6 kilometers) west of TA-55, TA-6 is situated over the same geologic stratigraphy as TA-55. It is also nearer to several known fault traces. In the February 2004 ROD associated with the *CMRR EIS*, NNSA decided that the location for the CMRR Facility would be in TA-55. The site proposed for the CMRR-NF (2004 or Modified) in TA-55 reflects NNSA's goal to bring all LANL nuclear facilities into a nuclear core area. Siting of the CMRR-NF in TA-55 would collocate the AC and MC capabilities near the existing TA-55 Plutonium Facility, where the programs that make most use of these capabilities are located. As discussed in Section S.1, RLUOB (which contains a training facility, incident control center, and radiological laboratories, as well as offices for personnel who would work in the CMRR-NF) has already been constructed in TA-55. No other sites at LANL have been identified as appropriate candidates for the CMRR-NF and none are being considered further in the *CMRR-NF SEIS*.

Extensive Upgrades to the Existing CMR Building in Whole or in Part: The proposal to complete extensive upgrades to the existing CMR Building's structural and safety systems to meet current mission support requirements for another 20 to 30 years of operations was considered and dismissed for analysis by NNSA in the 2003 *CMRR EIS*. Beginning in 1997 and continuing through 1998, a series of operational, safety, and seismic issues surfaced regarding the long-term structural viability of the CMR Building. In the course of considering these issues, DOE determined that the extensive facility-wide upgrades originally planned for the CMR Building would be less technically feasible than had been anticipated and would be only marginally effective in providing the operational risk reduction and program capabilities required to support NNSA's missions at LANL. The technical challenges of implementing extensive seismic upgrades to the entire CMR Building are exacerbated by the findings of the subsequent seismic hazard analysis and the magnitude of the current design-basis earthquake (LANL 2007). Structurally upgrading the entire structure to a significant extent would require construction of new walls and other building components adjacent to the existing ones that have utilities and structural building features already in place. In addition, the floors of the building would need to be significantly upgraded. This work would have to occur while continuing to provide mission-essential operations in CMR using nuclear materials and hazardous chemicals.

The technical challenges of implementing extensive seismic upgrades to the entire CMR Building, as discussed in the 2003 *CMRR EIS* remain. NNSA has considered undertaking a more limited, yet intensive, set of upgrades to a single wing of the CMR Building, Wing 9, to meet current seismic design requirements so that this wing could be used for a limited set of Hazard Category 2 AC and MC operations. However, after consideration of the various engineering and geological issues; the costs of implementing upgrades to an older structure and developing a new security infrastructure; the costs of maintaining the security infrastructure and safety basis (in addition to that for TA-55); the mission work disruptions associated with construction; operational constraints due to limited laboratory space; and programmatic and operational issues and risks from moving special nuclear material between TA-3 and TA-55, this action was not analyzed further as a reasonable alternative to meet NNSA's purpose and need for action in the *CMRR-NF SEIS*.

NNSA also has considered the possibility of renovating, upgrading, and reusing other CMR Building wings and additional wing combinations to provide the space needed for continuing AC and MC work in the building. However, for the reasons cited in the previous paragraph, the other wings and wing combinations are not reasonable alternatives for providing adequate safe and secure space for future operations in a feasible, cost-effective manner and, therefore, were not considered further in the *CMRR-NF SEIS*.

Distributed Capabilities at Other LANL Existing Nuclear Facilities, Including New Vault Construction: The distribution of AC and MC capabilities among multiple facilities at LANL has been suggested. Because of the quantities of SNM involved, to fully perform the AC and MC and plutonium research capabilities, facilities would need to be classified as Hazard Category 2 and Security Category 1. Due to seismic concerns and limitations on the quantity of SNM that can be safely managed, the current CMR Building has a limited ability to support continued operations. Using space and capabilities in the TA-55 Plutonium Facility would interfere with performing work currently being conducted there and reduce the space available in the building that could be used to conduct future DOE and NNSA mission support work. Use of other locations at LANL would introduce new hazards for which the facilities were not designed and would not conform to the objective of collocating plutonium operations near the TA-55 Plutonium Facility. Performing work at a location remote from the TA-55 Plutonium Facility would necessitate periodic closure of roadways and heightened security to enable transport of materials between the facilities. In addition, other facilities would not have the available space, vaults, or engineered safety controls required for this type of work.

Construction of only the proposed CMRR-NF vault at TA-55 and use of the TA-55 Plutonium Facility was also considered by NNSA to determine whether that proposed combination, together with the planned future use of RLUOB, would provide adequate space for AC and MC operations over the long term. However, augmenting the existing TA-55 Plutonium Facility with only additional vault storage space would not alleviate the need for more work space for AC and MC laboratory operations. Space does not exist in the TA-55 Plutonium Facility to support this work, and these operations cannot be accomplished within RLUOB because RLUOB is not able to support the level of radiological operations required to support the work needed. RLUOB is a radiological facility capable of handling less-than-Hazard Category 3 radioactive materials, per DOE Standard 1027. It is currently authorized to handle up to 8.4 grams (0.3 ounces) of plutonium-239 equivalent. The CMRR-NF is being designed as a Hazard Category 2 facility capable of using kilogram quantities of plutonium-239 equivalent. This alternative, therefore, was not analyzed further in the *CMRR-NF SEIS*.

Other designated Hazard Category 2 facilities at LANL are not candidates because (1) they have been decommissioned for safety and security reasons and are no longer considered Hazard Category 2 facilities; (2) they are closure sites (specifically, environmental cleanup potential release sites); or (3) they are support facilities. The support facilities would not have the necessary space to perform AC and MC operations and to perform their support functions (for example, waste management facilities). Additionally, as noted above for other facilities, use of these support facilities would introduce new hazards for which the facilities were not designed.

Other Alternatives Considered: Other alternatives have also been considered by NNSA for providing the necessary physical means for accommodating the continuation of mission-critical CMR capabilities in a safe, secure, and environmentally sound manner at LANL. These alternatives included delaying any decision on CMRR-NF at this time and re-examining it at a later date, perhaps as long as several decades from now.

NNSA also considered other suggested construction proposals for building the CMRR-NF, such as constructing a smaller building; reconfiguring the building laboratories and other room partitions; constructing a building with a larger footprint and fewer floors so that the building would require a shallower excavation; constructing a building with more floors above ground so that the building would require a shallower excavation; and reconfiguring the internal walls and laboratory arrangements. However, space is needed to support AC and MC mission-support work and additional space has been determined necessary for building support systems (for example, air handling and filtration); security requirements; safety requirements and equipment; and general utilities. Building an undersized facility, in terms of useful AC and MC laboratory space, would not meet NNSA's needs and would not be a good investment. Space for construction at TA-55 is limited by the geographic features of the mesa and canyon setting; road requirements; other building, utilities, and land use requirements; and security requirements related to the site that reduce the amount of appropriate available building space. A multi-storied building design is also more efficient in terms of heating and cooling for worker comfort, as well as for other general utility consumption.

Another construction proposal considered was a CMRR Facility comprising three buildings (RLUOB and two nuclear facilities). A three-building CMRR Facility, as considered in the 2003 *CMRR EIS*, would have separated the nuclear facility functions by hazard categorization, resulting in two buildings (a Hazard Category 2 nuclear facility and a Hazard Category 3 nuclear facility). A parallel concept that was also considered was separation of the CMRR Facility functions, based on their security classification requirements, which would also result in two nuclear facilities. Segregation based on security requirements would be very similar to segregation according to hazard category because materials that contain larger quantities of plutonium, and so require a Hazard Category 2 facility, are also materials that would need Security Category I/II levels of protection. The proposed nuclear materials vault would be part of the Security Category I/II building, which would reside inside the TA-55 enhanced security perimeter (that is, a perimeter intrusion, detection, assessment, and delay system [PIDADS]); the Security Category III building, which would house Hazard Category 3 activities, could reside at TA-55 outside of the PIDADS.

To meet mission requirements, the needed laboratory space would not change appreciably if two nuclear facilities were built rather than a single nuclear facility. Dividing the laboratory space between two nuclear facilities rather than using a single nuclear facility does not change the task area space requirements for performing the AC, MC, and research functions. However, dividing laboratory space between facilities results in a slight increase in the overall task area space needed because some task area space would have to be duplicated in each building, specifically, space for sample management, and waste/materials management. Both buildings would require specialized ventilation systems that support gloveboxes, open-front gloveboxes, and fume hoods.

NNSA recently performed a qualitative evaluation of the construction of a two-building nuclear facility compared to the baseline proposal of constructing a single Hazard Category 2, Security Category I/II facility. For the two-building proposal, the evaluation indicated that an overall increase in the size of the buildings and the building footprint would likely result because certain functions would have to be provided in each building and, therefore, would be duplicated. Although the level of controls would differ, each building would require credited safety controls (structures, systems, and components) to ensure that releases would be controlled in the event of an accident. Systems and support space (for example, change rooms, utilities, air-handling and filtration systems, and monitoring and control systems) would be required in each building. Constructing two buildings (and duplicating the systems and support space) would increase the required amounts of construction materials and, if they were constructed in parallel, would require additional land areas for support space (LANL 2011d).

The two-building proposal could provide flexibility with respect to funding requirements if design and construction were undertaken sequentially. Although segregating the CMRR-NF into two separate buildings could provide short-term budgetary flexibility compared to the single building included in the Modified CMRR-NF Alternative, it would extend the schedule with no increase in function or reduction in facility size (LANL 2011d). Programmatically, NNSA would prefer construction of the Security Category I/II building first to provide needed vault storage and MC capabilities and capacity. However, addressing the design, construction, or both sequentially would delay the availability of the Security Category III facility and would extend the time (and associated risk) that NNSA would have to continue to rely on the CMR Building and the period of construction-related disruptions at TA-55. Operating two separate buildings would require a slight increase in personnel as a result of requirements for more support personnel (for example, radiological control technicians) and more operational personnel (for example, materials and waste packaging and transfer staff).

In summary, various construction proposals have been considered during the iterative planning stages of the project to date, and NNSA has arrived at the current proposed building configuration and size after careful deliberation. Additional building configuration and construction proposals for the CMRR-NF were not, therefore, further analyzed in the *CMRR-NF SEIS*. Additional discussion of alternatives and proposals for providing AC and MC capabilities is presented in Chapter 2, Section 2.7 of the *CMRR-NF SEIS* and in Section 2.11 of the CRD.

S.10 The Preferred Alternative

CEQ regulations require an agency to identify its preferred alternative in the final EIS unless another law prohibits the expression of such a preference (40 CFR 1502.14(e)). The preferred alternative is the alternative that the agency believes would fulfill its statutory mission, giving consideration to environmental, economic, technical, and other factors. The Modified CMRR-NF Alternative is NNSA's Preferred Alternative for the replacement of the CMR capabilities. NNSA has not identified a preferred construction option at this time. At this time, both construction options are being considered by NNSA. As the design studies continue and more details become available, one option or the other may be judged to have significant advantages in the time and/or cost expected for executing the excavation phase of construction that will facilitate NNSA's selection of a preferred construction option.

S.11 Affected Environment

LANL occupies about 40 square miles (104 square kilometers) of land on the eastern flank of the Jemez Mountains along the area known as the Pajarito Plateau. The terrain in the LANL area consists of mesa tops and canyon bottoms that trend in a west-to-east manner, with the canyons intersecting the Rio Grande to the east of LANL. Elevations at LANL range from about 7,800 feet (2,400 meters) at the highest point on the western side to about 6,200 feet (1,900 meters) at the lowest point along the eastern side, above the Rio Grande. The two primary residential areas within Los Alamos County are the Los Alamos townsite and the White Rock residential development (see Figure S–1). Together, these two residential areas are home to about 18,000 people (DOC 2011). About 13,000 people work at LANL, only about half of which reside within Los Alamos County. LANL operations occur within numerous facilities located over 47 designated technical areas within the LANL boundaries and at other leased properties situated near LANL (see Figure S–2). Most of LANL is undeveloped forested land that provides a buffer for security and safety, as well as expansion opportunities for future use; however, major constraints to development exist and include such factors as topography, slope, soils, vegetation, geology and seismology, endangered species, archaeology and cultural resources, and surface hydrology (LANL 2000). About 46 percent of the floor space of LANL facilities is considered laboratory or production space; the rest is considered administrative, storage, service, and miscellaneous space (LANL 2011a:LANL Site, 006).

TA-3, where the existing CMR facility is located, is situated in the west-central portion of LANL, and it is separated from the Los Alamos townsite by Los Alamos Canyon. It is approximately 0.7 miles (1.1 kilometers) south of the Los Alamos townsite. TA-3 is the main technical area at LANL that houses approximately one-half of its employees and total floor space. It is the administration complex within LANL and contains the director's office, administrative offices, and support facilities. Major facilities within TA-3 include the CMR Building, the Sigma Complex, the Nicholas C. Metropolis Center for Modeling and Simulation, the Main Shops, and the Materials Science Laboratory. Other buildings house central computing facilities, chemistry and materials science laboratories, earth and space science laboratories, physics laboratories, technical shops, cryogenics laboratories, the main cafeteria, badge office, and the study center.

TA-55 is the proposed location for the CMRR-NF. It is situated in the west-central portion of LANL, approximately 1.1 miles (1.8 kilometers) south of the Los Alamos townsite. The newly constructed RLUOB is located in TA-55. TA-55 facilities, including the Plutonium Facility, provide research and applications in chemical and metallurgical processes for recovering, purifying, and converting plutonium and other actinides into many compounds and forms, as well as research into material properties and fabrication of parts for research and stockpile applications. A PIDADS surrounds all nuclear hazard facilities in TA-55.

Table S–1 lists the technical areas within LANL that have been identified as potentially affected by one or more of the three alternatives analyzed in the *CMRR-NF SEIS*.

Table S–1 Technical Areas Potentially Affected by the Proposed Action or Alternatives

Technical Area	*Technical Area Description*	*Land Use Category*	*Potential Project Element*	*Alternative(s)*
3	The main technical area housing approximately half of the LANL employees and about half of its floor space. Site of the present CMR Building. The area is highly developed.	Administration, Service, and Support; Experimental Science; Nuclear Materials Research and Development; Public and Corporate Interface; Reserve; Theoretical and Computational Science	Location of CMR Building	All
5	Contains five physical support facilities, an electrical substation, test wells, as well as archaeological sites and environmental monitoring and buffer areas. The area is largely undeveloped and includes vegetated mesas and canyons.	Administration, Service, and Support; Reserve	Construction laydown and support	Modified CMRR-NF
36	Contains four active sites that support explosives testing. The area is largely undeveloped, with predominantly natural vegetation.	High Explosives Testing	Spoils storage	Modified CMRR-NF
46	Supports basic laboratory research and site of the Sanitary Wastewater Systems Plant. The central and southeastern portions of the technical area are highly developed, while the remainder is forested.	Administration, Service, and Support; Experimental Science; Reserve	Construction laydown and support	Modified CMRR-NF
48	Supports research in nuclear and radiochemistry, geochemistry, production of medical isotopes, and chemical synthesis. The central portion of the technical area is developed. Remaining portions of the mesa top are open or sparsely vegetated, and Mortandad Canyon is largely forested.	Experimental Science; Reserve	Construction laydown and support, bus parking	No Action, Modified CMRR-NF
50	Contains waste support structures. Much of the technical area is developed or disturbed grassland. The southern portion of the technical area within Twomile Canyon is forested.	Reserve	Electrical substation, stormwater detention, parking	No Action, Modified CMRR-NF
51	Used for research and studies on the long-term impact of radioactive materials on the environment. Development within the technical area is scattered; the north wall of Pajarito Canyon is the most heavily vegetated area.	Experimental Science; Reserve	Spoils storage	Modified CMRR-NF
52	Supports theoretical and computational research and development. The central portion of the technical area is developed; the remainder is largely vegetated, especially the south wall of Mortandad Canyon	Administration, Service, and Support; Experimental Science; Reserve	Construction laydown and support	Modified CMRR-NF
54	Supports management of radioactive solid and hazardous chemical wastes. Some development and open fields occur in the western portion of the technical area; remaining areas are largely vegetated.	Waste Management; Reserve	Spoils storage	Modified CMRR-NF
55	Supports research of and applications for the chemical and metallurgical processes of recovering, purifying, and converting plutonium and other actinides into many compounds and forms, as well as research into material properties and fabrication of parts for research and stockpile applications. The technical area is largely developed; only the south wall of an extension of Mortandad Canyon has significant vegetative cover.	Nuclear Materials Research and Development; Reserve	Proposed CMRR-NF site, construction laydown and support, road realignment, bus parking	No Action, Modified CMRR-NF

Technical Area	**_Technical Area Description_**	**_Land Use Category_**	**_Potential Project Element_**	**_Alternative(s)_**
63	Contains physical support facilities, a trailer, and transportable office space. The mesa-top portion of this technical area is largely developed; however, the south-facing wall of Twomile Canyon and north-facing wall of Mortandad Canyon are forested.	Administration, Service, and Support/Experimental Science; Reserve	Construction laydown and support	Modified CMRR-NF
64	Contains Central Guard Facility, office and storage space for the Hazardous Materials Response Team, as well as several storage sheds and water tanks. Development and open fields dominate the mesa top within this technical area; however, the south-facing wall of Twomile Canyon is forested.	Administration, Service, and Support; Reserve	Stormwater detention	Modified CMRR-NF
72	Contains the live firing range used by LANL protective force personnel for required training, as well as a truck inspection station. The area is sparsely developed and remains largely in a natural vegetated state.	Administration, Service, and Support; Reserve	Parking and road improvements	Modified CMRR-NF

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; LANL = Los Alamos National Laboratory.
Note: To convert acres to hectares, multiply by 0.40469.

S.12 Comparison of Alternatives

This section summarizes the alternatives analyzed in the *CMRR-NF SEIS* in terms of their expected environmental impacts and other possible decision factors. The following subsections summarize the environmental consequences and risks by construction and operations impacts for each alternative. The RLUOB portion of the CMRR Facility has already been constructed in TA-55. The No Action and the Modified CMRR-NF Alternatives would result in the construction of the CMRR-NF in TA-55, adjacent to RLUOB. Environmental impacts are also summarized. These include CMR Building and CMRR-NF disposition impacts.

S.12.1 Comparison of Potential Consequences of Alternatives

This section provides an overview of the potential environmental consequences of each alternative. Note that the impacts shown for the No Action Alternative reflect impacts as reported in the *CMRR EIS* for the purpose of comparison with the action alternatives, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. As stated in Section S.4, the 2004 CMRR-NF could not be constructed to meet the current standards required for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the AC and MC work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need. **Table S–2**, at the end of this section, presents a comparison of the environmental impacts of each of the alternatives discussed in detail in Chapter 4, including facility construction and operations impacts.

Land Use and Visual Resources

Under the No Action Alternative, 26.75 acres (10.8 hectares) of land in TA-48, TA-50, and TA-55 were expected to be used to support the construction of the CMRR Facility, including about 4 acres (1.6 hectares) for RLUOB, 5 acres (2.0 hectares) for a parking lot, and 4.75 acres (1.9 hectares) for the proposed CMRR-NF. About 7 acres (2.8 hectares) would have been used to support construction laydown areas and the concrete batch plant proposed under this alternative. About 6 acres (2.4 hectares) of land would have been disturbed by the potential need to realign roads to allow adequate distance between the road and the CMRR-NF site. The 2004 CMRR-NF would have blended in with the industrial look of TA-55.

Under the Modified CMRR-NF Alternative, larger amounts of land at LANL would be affected by the Modified CMRR-NF construction effort. Additional land would be needed to provide space for additional laydown and spoils areas due to the larger amounts of construction materials needed to support construction of the larger building and to store greater amounts of excavated materials due to the larger excavation needed to support construction of the Modified CMRR-NF. Also, the Modified CMRR-NF would require up to three concrete batch plants (not operating concurrently). A total of about 128 to 147 acres (52 to 59 hectares) of land would be used under the Deep Excavation Option and a total 108 to 127 acres (44 to 51 hectares) under the Shallow Excavation Option to support the proposed construction effort, including the proposed site of the CMRR-NF. Many project elements would occur in areas presently designated as "Reserve" (this designation is applied to areas of LANL not assigned other specific use categories). Areas of temporary disturbance could be restored to their original land use designation following project completion. The breakdown of land uses to support the Modified CMRR-NF Alternative include the following:

- Permanent changes to the CMRR-NF site – 4.8 acres (1.9 hectares)
- Temporary changes for construction laydown areas/concrete batch plants in TA-48/55 and TA-46/63 – 60 acres (24 hectares)

- Temporary changes for spoils storage areas in TA-36, TA-51 and TA-54 – Deep Excavation Option, 30 acres (12 hectares); Shallow Excavation Option, 10 acres (4 hectares)
- Temporary changes for a parking lot in TA-72 – up to 15 acres (6.1 hectares)
- Temporary changes for a bus parking lot in TA-48/55 – up to 3 acres (1.2 hectares)
- Temporary power upgrades along TA-5 to TA-55 – 9.1 acres (3.7 hectares)
- Permanent changes for the Pajarito Road realignment in TA-55 – 3.4 acres (1.4 hectares)
- Stormwater detention ponds in TA-48 (temporary), TA-50 (permanent), TA-63 (one temporary and one permanent), TA-64 (permanent), TA-72 (temporary) – 2.5 acres (1.0 hectares)
- Permanent changes for the TA-50 electrical substation – 1.4 acres (0.6 hectares)
- Temporary changes for construction laydown and support in TA-5/52 – 19.1 acres (7.7 hectares)

Permanent land disturbance under the Modified CMRR-NF Alternative would affect about 12 acres (4.9 hectares), including the building site, which was previously disturbed as a result of the geologic investigation of the TA-55 site, the Pajarito Road realignment, the TA-50 electrical substation, and stormwater detention ponds in TA-50, TA-63, and TA-64. The Modified CMRR-NF would blend with the industrial look of TA-55.

Under the Continued Use of CMR Building Alternative, there would be no new impacts in terms of land use or visual impacts at LANL. No construction activities would be undertaken under this alternative, and operations would be conducted in the existing CMR Building.

Site Infrastructure

Under the No Action Alternative, about 0.75 million gallons (2.8 million liters) of water and 63 megawatt-hours of electricity were estimated to be used annually to support the construction of the 2004 CMRR-NF and RLUOB. Annual operations for the 2004 CMRR-NF and RLUOB were estimated to require about 10.4 million gallons (38 million liters) of water and 19,300 megawatt-hours of electricity. Natural gas requirements were not estimated in the *CMRR EIS*. These water and electrical requirements were pre-conceptual design estimates and are now known to be greatly underestimated (see updated estimates in the Modified CMRR-NF Alternative).

Under the Modified CMRR-NF Alternative, about 4 million to 5 million gallons (14 million to 17 million liters) of water and 31,000 megawatt-hours of electricity would be used annually for 9 years to support the construction of the Modified CMRR-NF. These water and electrical requirements would fall within the normal annual operating levels of LANL and would not require the addition of any permanent infrastructure at the site. In addition, approximately 19,200 gallons (73,000 liters) of propane would be needed annually to support construction activities for 3 to 6 years. Annual operations for the Modified CMRR-NF and RLUOB are projected to require about 16 million gallons (61 million liters) of water, 161,000 megawatt-hours of electricity, and 58 million cubic feet of natural gas. These requirements are higher than those estimated for the 2004 CMRR Facility due to the increase in the size of the Modified CMRR-NF and the availability of more-accurate estimates. When compared to the available site capacity, operation of the Modified CMRR-NF and RLUOB would require 12 percent of the available water, 31 percent of the available electricity, and 1 percent of the available natural gas. The peak electrical demand estimate of 26 megawatts, when combined with the site-wide peak demand, could exceed the available capacity at the site. Regardless of the decisions to be made regarding the CMRR-NF, adding a third transmission line and/or re-conductoring the existing two transmission lines are being studied by LANL to increase transmission line capacities up to 240 megawatts to provide additional capacity across the site.[9]

Under the Continued Use of CMR Building Alternative, the infrastructure requirements associated with the continued operation of the existing CMR Building would not change from those included in the site's annual usage estimates and are expected to decrease over time as less work can be safely performed in the building.

Operation of RLUOB would require 7 million gallons (26 million liters) of water, 59,000 megawatts of electricity, and 38 million cubic feet (1.1 million cubic meters) of natural gas, annually. These RLUOB requirements apply to all three alternatives considered in this *CMRR-NF SEIS*.

Air Quality and Noise

Under the No Action Alternative, criteria pollutant concentrations were estimated to remain below New Mexico Ambient Air Quality and Clean Air Act Standards during construction of the 2004 CMRR-NF. There were estimated to be slight noise increases associated with construction activities and increased traffic during the construction period. Annual greenhouse gas emissions during the construction period would have been below the draft CEQ guidance threshold for more-detailed evaluation (CEQ 2010), which suggests that proposed alternatives that are reasonably anticipated to emit 25,000 tons or more of direct carbon-dioxide-equivalent air emissions should be further evaluated, and would have made up about 1 percent of site-wide generation based on LANL's 2008 baseline inventory.[10] Under the No Action Alternative, the air quality and noise associated with the operation of the 2004 CMRR-NF and RLUOB would not have exceeded standards. Annual greenhouse gas emissions during the operation of the 2004 CMRR-NF and RLUOB would have been below the CEQ guidance threshold for more-detailed evaluation and would be about 3 percent of site-wide generation based on LANL's 2008 baseline inventory. Greenhouse gas emissions associated with electricity use during the operation of the 2004 CMRR-NF are estimated to be approximately 12,700 tons of carbon-dioxide equivalent per year (11,500 metric tons of carbon-dioxide equivalent per year); however, the electrical requirement estimated in the 2003 *CMRR EIS* was based on preconceptual design information and is now known to be greatly underestimated.

Under the Modified CMRR-NF Alternative, criteria pollutant concentrations would remain below New Mexico Ambient Air Quality and Clean Air Act Standards during construction of the Modified CMRR-NF under either the Deep or Shallow Excavation Option. There would also be slight noise increases associated with construction activities and increased traffic during the construction period. Annual greenhouse gas emissions during the construction period under either construction option would be below the CEQ guidance threshold for more-detailed evaluation and would be about 7 percent of site-wide generation based on LANL's 2008 baseline inventory. Under the Modified CMRR-NF Alternative, the air quality and noise associated with the operation of the Modified CMRR-NF and RLUOB would not exceed standards. Annual greenhouse gas emissions during operation of the Modified CMRR-NF and RLUOB would be below the CEQ guidance threshold for more-detailed evaluation and would increase site-wide generation by about 25 percent based on LANL's 2008 baseline inventory.

Under the Continued Use of CMR Building Alternative, the air quality and noise associated with operation of the existing CMR Building and RLUOB would not change from the minimal air quality and noise impacts associated with building operations. Applicable New Mexico Ambient Air Quality and

[9] *Evaluated by DOE in a 2000 Environmental Assessment,* Environmental Assessment for Electrical Power Systems Upgrades at Los Alamos National Laboratory *(DOE/EA-1247).*

[10] *The projected LANL site-wide greenhouse gas emissions associated with the electrical usage corresponding to the operations selected in the 2008* LANL SWEIS *RODs would be 543,000 tons per year of carbon-dioxide-equivalent; the LANL 2008 baseline inventory is 440,000 tons per year of carbon-dioxide-equivalent.*

Clean Air Act Standards and noise standards would not be exceeded. Annual greenhouse gas emissions during operation of the CMR Building and RLUOB the would be below the CEQ guidance threshold for more-detailed evaluation and would increase site-wide generation by about 10 percent based on LANL's 2008 baseline inventory.

Geology and Soils

Under the No Action Alternative, construction in TA-55 would have occurred in the geologic layer above the poorly welded tuff layer. Operation of the 2004 CMRR-NF and RLUOB would not have impacted geology and soils on the site. (See the Human Health Impacts – Facility Accidents subsection of this Comparison of Potential Consequences of Alternatives for a discussion of the impacts of a design-basis earthquake on the CMRR-NF.)

Under the Modified CMRR-NF Alternative, construction of the Modified CMRR-NF in TA-55 would either occur in the layer below the poorly welded tuff layer, which would be excavated and replaced with low-slump concrete (under the Deep Excavation Option), or in the layer above the poorly welded tuff layer (under the Shallow Excavation Option). In addition to the material already removed from the construction site for geologic characterization, another 545,000 cubic yards (417,000 cubic meters) of material would be excavated from the construction site under the Deep Excavation Option and stored in designated spoils areas for future use at LANL. About 236,000 cubic yards (180,000 cubic meters) of material would be excavated from the construction site under the Shallow Excavation Option and would be stored in designated spoils areas for future use at LANL. Operation of the Modified CMRR-NF and RLUOB would not result in any further impacts in terms of geology and soils at LANL.

Under the Continued Use of CMR Building Alternative, geology and soils at LANL would not be affected by operation of the existing CMR Building and RLUOB. However, there are identified fault traces in association with an identified active and capable fault zone lying below some of the wings of the CMR Building that have called into question the ability of the building to survive a design-basis earthquake. These concerns have resulted in reduced operations at the CMR Building. See the discussion of Human Health Impacts – Facility Accidents subsection of this Comparison of Potential Consequences of Alternatives for more information, as well as Appendix C.

Surface-Water and Groundwater Quality

Under the No Action Alternative, construction of the 2004 CMRR-NF in TA-55 would have resulted in the potential for temporary impacts on surface-water quality from stormwater runoff. Appropriate soil erosion and sediment control measures and spill prevention practices would have been implemented to minimize suspended sediment and material transport and reduce potential water quality impacts. Operation of the 2004 CMRR-NF and RLUOB would not have resulted in any direct discharges of liquid effluent to the environment. Nonradioactive effluent would have been sent to the sanitary wastewater system for treatment. Radiological effluents would have been piped directly to RLWTF for treatment. RLWTF does not discharge liquid to the environment.

Under the Modified CMRR-NF Alternative, construction of the Modified CMRR-NF in TA-55 would result in the potential for temporary impacts on surface-water quality from stormwater runoff. Appropriate soil erosion and sediment control measures and spill prevention practices, in accordance with an approved Storm Water Pollution Prevention Plan, would minimize suspended sediment and material transport and reduce potential water quality impacts. One stormwater detention pond would be expanded and five new ponds would be built at LANL: one in TA-64 to collect runoff from the laydown area in TA-48/55; one in TA-63 to collect runoff from the construction laydown and support areas in TA-46/63; one in TA-50 to collect runoff from the facility site during construction and after operations begin; and one in TA-48 and one in TA-72 to collect runoff from the parking areas. Operation of the Modified

CMRR-NF and RLUOB would have no impact on surface-water or groundwater quality. Radiological effluents would be piped directly to RLWTF for treatment.

Under the Continued Use of CMR Building Alternative, surface-water and groundwater quality would not be impacted by operation of the CMR Building and RLUOB. All nonradioactive liquid effluent from the CMR Building is now sent to the sanitary wastewater system under the LANL Outfall Reduction Project, and there is no longer an outfall permitted by the National Pollutant Discharge Elimination System at the building; all radiological effluents would be piped directly to RLWTF for treatment.

Ecological Resources

Under the No Action Alternative, construction sites would have included some recently disturbed areas that were not vegetated due to site disturbance, as well as others that are vegetated. Where construction would have occurred on previously developed land, there would be little or no impact on terrestrial resources. Some construction activities would have also removed some previously undisturbed ponderosa pine forest and might have led to displacement of associated wildlife. (Since the issuance of the 2004 ROD associated with the *CMRR EIS*, activities at the proposed TA-55 site related to RLUOB construction and geological studies have resulted in the elimination of this forest land.) There would not have been any direct or indirect impacts on wetlands or aquatic resources. Portions of the project areas that would have been impacted by this alternative included both core and buffer zones in an area of environmental interest for the federally threatened Mexican spotted owl. Construction of the 2004 CMRR-NF could have removed a small portion of potential habitat area for the Mexican spotted owl; however no Mexican spotted owls have been observed in the areas of concern under this alternative. Therefore, NNSA determined this project “may affect, is not likely to adversely affect” the Mexican spotted owl and the U.S. Fish and Wildlife Service (USFWS) concurred (USFWS 2003). Operation of the 2004 CMRR-NF and RLUOB would not have directly affected any endangered, threatened, or special status species. Noise levels associated with the facility would have been low, and human disturbance would have been similar to that which already occurs within TA-55.

Under the Modified CMRR-NF Alternative, construction-related areas include larger areas than those that would be impacted under the No Action Alternative (up to 147 acres [59 hectares] compared to 26.75 acres [10.8 hectares]). Where construction would occur on previously developed land, there would be little or no impact on terrestrial resources. Within areas of undeveloped ponderosa pine forest and pinyon-juniper woodland, about 5 acres (2 hectares) would be permanently disturbed and 110 to 119 acres (40 to 48 hectares) would be temporarily disturbed. Most of these areas are within or adjacent to developed land or land that has been previously disturbed. Construction on undeveloped land in TA-72 and spoils storage areas would cause loss of some wildlife habitat, but would be timed to avoid disturbance of migratory birds during the breeding season (June 1 through July 31). Under the Deep Excavation Option, only wetlands located in TA-36 could be potentially indirectly affected, due to possible stormwater runoff and erosion into the Pajarito watershed from spoils storage in the area. This may also indirectly affect, due to erosion concerns, potential southwestern willow flycatcher habitat which lies adjacent to the potentially impacted area in TA-36. No willow flycatchers of the southwestern subspecies have been confirmed on LANL. A sediment and erosion control plan would be implemented to control stormwater runoff during construction, preventing impacts on the wetlands located farther down Pajarito Canyon and potential southwestern willow flycatcher habitat. Under the Shallow Excavation Option, there would be no direct or indirect impacts on any LANL wetlands or potential southwestern willow flycatcher habitat. Portions of TA-55 and other technical areas affected by construction under the Modified CMRR-NF Alternative include potential habitat for the Mexican spotted owl, which fall within both core and buffer zones in an area of environmental interest. Previously undisturbed land in TA-5/52 used for a construction laydown and support area would impact 9.7 acres (3.9 hectares) of potential core habitat and 12.9 acres (5.2 hectares) of potential buffer habitat for the Mexican spotted owl. However, no Mexican spotted owls have been observed during annual surveys within any of the areas of concern potentially affected under this alternative. NNSA initiated consultation with USFWS, as the Federal agency with regulatory responsibility for the Endangered Species Act, in April 2003 regarding the CMRR Facility. As the project has progressed and new areas have been identified for project activities, NNSA performed biological assessments and amended its consultation with the USFWS (USFWS 2003, 2005, 2006, 2007, 2009, 2011). NNSA determined, and USFWS concurred, that construction in these potential areas of concern may affect, but is not likely to adversely affect, the Mexican spotted owl or the southwestern willow flycatcher (LANL 2011a:Ecological Resources, 019, 020, 021). All project activities have been reviewed for compliance with the *Threatened and Endangered Species Habitat Management Plan* (LANL 2011b). In accordance with the plan, annual surveys are performed to determine the location of any special status species and to determine whether any additional consultation with USFWS is necessary. Additionally, in accordance with the *Sensitive Species Best Management Practices Source Document, Version 1* (LANL 2010), best management practices would be implemented for project activities to reduce risks to sensitive state-listed species. Operation of the Modified CMRR-NF and RLUOB is not expected to adversely affect any endangered, threatened, or special status species. Noise levels associated with operating the facility would be low, and human disturbance would be similar to that which already occurs within TA-55.

Under the Continued Use of CMR Building Alternative, ecological resources would not be impacted by operation of the CMR Building and RLUOB because no new areas would be disturbed under this alternative, and no emissions from the building are expected to adversely impact ecological resources.

Cultural and Paleontological Resources

Under the No Action Alternative, project elements would have had the potential to impact cultural resources sites eligible for listing in the National Register of Historic Places (NRHP); however, no impacts would have been expected to occur through avoidance. All cultural sites would have been clearly marked and fenced to avoid direct or indirect disturbance by construction equipment and workers. If cultural resources sites had been discovered during construction, work would have been stopped and appropriate assessment, regulatory compliance, and recovery measures, including consultation with the State Historic Preservation Officer, would have been undertaken.

Under the Modified CMRR-NF Alternative, Deep Excavation Option, nine technical areas with 31 cultural resources sites eligible for listing in the NRHP would be in the vicinity of project activities. In all cases, there would be no effect on these sites through avoidance. Project personnel would work with LANL cultural resources staff to relocate a portion of the access trail to a cultural resources site that would be impacted by construction of the TA-72 parking lot. Under the Shallow Excavation Option, 16 fewer cultural resources sites could be affected than under the Deep Excavation Option because only TA-5/52 and TA-51 would be needed for spoils storage. All cultural sites would be clearly marked and fenced to avoid direct or indirect disturbance by construction equipment and workers. If cultural resources sites are discovered during construction, work would be stopped and appropriate assessment, regulatory compliance, and recovery measures, including consultation with the State Historic Preservation Officer, would be undertaken.

Under the Continued Use of CMR Building Alternative, cultural resources would not be impacted by operations of the CMR Building and RLUOB.

Socioeconomics

Under the No Action Alternative, an increase in construction-related jobs and businesses in the region surrounding LANL would have been expected. Construction employment, over the course of the 34-month construction period, was projected to peak at about 300 workers. Operation of the 2004 CMRR-NF and RLUOB was estimated to employ about 550 existing workers at LANL.

Under the Modified CMRR-NF Alternative, an increase in construction-related jobs and businesses in the region surrounding LANL is also expected. Construction employment would be needed over the course of a 9-year construction period under either the Deep or Shallow Excavation Option. Construction employment under either option is projected to peak at about 790 workers, which is expected to generate about 450 indirect jobs in the region. Operation of the Modified CMRR-NF and RLUOB would involve about 550 workers at LANL, with additional workers using the facility on a part-time basis. The personnel working in the Modified CMRR-NF and RLUOB, when fully operational, would relocate from other buildings at LANL, including the existing CMR Building, so an increase in the overall number of workers at LANL is not expected.

Under the Continued Use of CMR Building Alternative, about 210 employees would continue to work in the CMR Building until safety concerns force additional reductions in facility operations. In addition, about 140 employees would be employed at RLUOB. A total of about 350 personnel would have their offices relocated to RLUOB. The personnel working in the CMR Building and RLUOB, when fully operational, would not result in an increase in the overall number of workers at LANL.

Human Health Impacts – Normal Operations

The projected human health impacts from normal operations under all of the alternatives analyzed in the *CMRR-NF SEIS* were compared to the impacts included in the 2008 *LANL SWEIS* and were found to be consistent with the incremental impacts associated with CMR operations or the proposed CMRR operations included in the SWEIS. The impacts associated with any of the alternatives included in the SEIS are a small fraction of the impacts associated with overall LANL operations, as estimated in the *LANL SWEIS*. For example, the largest estimated annual population dose associated with any of these alternatives, 1.9 person-rem under the No Action Alternative, would be approximately 6 percent of the total estimated annual population dose from normal LANL operations under the No Action Alternative in the *LANL SWEIS*.

Under the No Action Alternative, the annual projected population dose to persons residing within 50 miles (80 kilometers) of the CMRR Facility in TA-55 would have been about 1.9 person-rem[11] which would have increased the annual likelihood of a single latent cancer fatality in the population by 1×10^{-3}, or 1 in 1,000 per year. The *CMRR EIS* used 2000 census data to estimate the population surrounding the facility (about 309,000).[12] The average individual would have received a dose of 0.0063 millirem annually.[13] This would have equated to an average annual individual risk of developing a latent cancer fatality of about 4×10^{-9}, or 1 chance in 250 million. The MEI would have received a projected dose of 0.33 millirem annually. This would have equated to an annual risk to the MEI of developing a latent cancer fatality of about 2×10^{-7}, or 1 chance in 5 million. The total annual projected worker dose for the 2004 CMRR-NF and RLUOB would have been about 61 person-rem for the radiological workers in the facility. The average radiological worker dose would have been 110 millirem annually. This would have equated to an average annual individual worker risk of developing a latent cancer fatality of about 7×10^{-5}, or approximately 1 chance in 14,000.

[11] *Doses shown for the No Action Alternative from the* CMRR EIS *were based on internal dose conversion factors from Federal Guidance Report 11 (EPA 1988) that were used in the then-current version of GENII, Version 1.485. For the same exposure, doses would be slightly lower using the more-recent Federal Guidance Report 13 (EPA 1993) factors included in the latest version of GENII, Version 2 which was used to conduct the analysis of the Modified CMRR-NF Alternative.*

[12] *The* CMRR EIS *used data from the 2000 census to estimate the population residing within 50 miles (80 kilometers) of TA-55. The No Action Alternative was not updated because the No Action Alternative is not being evaluated in this CMRR-NF SEIS as an alternative that would meet the NNSA's purpose and need. The Modified CMRR-NF Alternative projects the population surrounding TA-55 out to 2030 using recent data from the U.S. Census Bureau, including data from the 2010 census.*

[13] *Average individual dose is calculated by dividing the projected population dose by the population of the affected area. In this case, 1.9 person-rem was divided by 309,000 individuals, equaling an average dose of about 0.0063 millirem per individual. The numbers are not exact due to rounding of the population and the projected population dose.*

Under the Modified CMRR-NF Alternative, the annual projected population dose to persons residing within 50 miles (80 kilometers) of TA-55 would be approximately 1.8 person-rem, which would increase the likelihood of a single latent cancer fatality in the population by 1×10^{-3}, or 1 in 1,000 per year. The *CMRR-NF SEIS* projects the population to 2030 (about 511,000) using 2010 census data to estimate population dose. The average individual would receive a dose of 0.0035 millirem annually.[14] This equates to an average annual individual risk of developing a latent cancer fatality of about 2×10^{-9}, or 1 chance in 500 million. The MEI would receive a projected dose of 0.31 millirem annually. This equates to an annual risk to the MEI of developing a latent cancer fatality of about 2×10^{-7}, or 1 chance in 5 million. The total annual projected worker dose for the Modified CMRR-NF and RLUOB would be about 60 person-rem for the radiological workers in the facilities. The average radiological worker dose is projected to be 109 millirem annually. This equates to an average annual individual worker risk of developing a latent cancer fatality of about 7×10^{-5}, or approximately 1 chance in 14,000.

Under the Continued Use of CMR Building Alternative, the human health impacts of normal operations of the CMR Building would be smaller than those associated with either the No Action or Modified CMRR-NF Alternative because of the limited amount of radiological work currently allowed in the building due to the safety concerns associated with the seismic threat to the building, as discussed earlier in this Summary. The annual projected population dose to persons residing within 50 miles (80 kilometers) of TA-3 (about 502,000) would be approximately 0.016 person-rem, which would increase the likelihood of a single latent cancer fatality in the population by 1×10^{-5}, or 1 in 100,000, per year. The average individual would receive a dose of 0.000032 millirem annually. This equates to an average annual individual risk of developing a latent cancer fatality of about 2×10^{-11}, or essentially zero. The MEI would receive a projected dose of 0.0023 millirem annually. This equates to an annual risk to the MEI of developing a latent cancer fatality of about 1×10^{-9}, or 1 chance in 1 billion. The total annual projected worker dose for the CMR Building and RLUOB would be about 24 person-rem for the radiological workers in these facilities. The average radiological worker dose is projected to be 68 millirem annually. This equates to an average annual individual worker risk of developing a latent cancer fatality from this dose of about 4×10^{-5}, or approximately 1 chance in 25,000.

Human Health Impacts – Facility Accidents

The accidents associated with the 2004 CMRR-NF have been reevaluated in the *CMRR-NF SEIS* to reflect concerns associated with the ability of the 2004 CMRR-NF to survive the latest estimates of ground acceleration in the event of a design-basis earthquake. Based on an updated probabilistic seismic hazard analysis, it was concluded that a design-basis earthquake with a return interval of about 2,500 years would have an estimated peak horizontal ground acceleration of 0.47 *g* and a peak vertical ground acceleration of 0.51 *g* (LANL 2009). The estimated peak horizontal and vertical ground accelerations at the time the *CMRR EIS* was prepared were about 0.31 *g* and 0.27 *g*, respectively.[15]

The accident that would have had the highest potential human health risk to the noninvolved worker and members of the public was determined to be a seismically induced spill. The frequency of such an accident was estimated to range from once every 10,000 years to once every 100 years. A design-basis earthquake would have resulted in an unacceptable risk of developing a fatal cancer in the population surrounding the facility if the 2004 CMRR-NF were constructed and operated as originally envisioned in the *CMRR EIS* because it would not be expected to survive a design-basis earthquake of the magnitude included in the latest probabilistic seismic hazard analysis. The annual risk of developing a single fatal cancer in the population from this accident would have been 0.8, or an 80 percent chance of a latent fatal

[14] The projected population dose of 1.8 person-rem was divided by 511,000 individuals, equaling an average dose of about 0.0035 millirem per individual.
[15] The return period for the obsolete peak horizontal and vertical ground accelerations of 0.31 and 0.27, respectively, was 2,000 years; the return interval for the current design-basis earthquake at TA-55, with peak horizontal and vertical ground accelerations of 0.47 g and 0.51 g, respectively, is 2,500 years.

cancer. As a result, latent cancer fatalities would have been expected to occur in the surrounding population if the 2004 CMRR-NF were built and operated as originally envisioned and a design-basis earthquake occurred at LANL. The annual risk of a latent cancer fatality to the offsite MEI would have been 7×10^{-3} from a design-basis earthquake-induced spill, or about 1 chance in 143 per year of facility operation. The risk of a latent cancer fatality to a noninvolved worker would have been 1×10^{-2}, or about 1 chance in 100 per year of facility operation. The risks associated with seismically induced accidents at the 2004 CMRR-NF, if they were to occur, would have exceeded DOE guidelines (DOE-STD-3009) and would have presented unacceptable risks to the public and the LANL workforce.

Under either the Deep Excavation or Shallow Excavation Option, the Modified CMRR-NF would be constructed to survive the design-basis earthquake included in the latest probabilistic seismic hazard analysis without significant damage. Construction of the Modified CMRR-NF would involve the use of larger amounts of structural concrete (150,000 cubic yards [115,000 cubic meters]) and structural steel (560 tons [508 metric tons]) compared to the amounts estimated for the 2004 CMRR-NF (3,194 cubic yards [2,442 cubic meters] of structural concrete and 267 tons [242 metric tons] of structural steel). For a beyond-design-basis earthquake that results in a spill of nuclear materials in the Modified CMRR-NF, the annual risk of a single fatal cancer developing in the population surrounding the facility would be 2×10^{-5} or about 1 chance in 50,000 of a fatal cancer occurring compared to an 80 percent chance under the No Action Alternative. The risk of a latent cancer fatality to the offsite MEI from this accident would be 9×10^{-8} or about 1 chance in 11 million per year of facility operation compared to 1 chance in 143 under the No Action Alternative. The risk of a latent cancer fatality to a noninvolved worker would be 6×10^{-6} or about 1 chance in 160,000 per year of facility operation compared to 1 chance in 100 under the No Action Alternative.

Under the Modified CMRR-NF Alternative, the accident with the highest potential risk to the offsite MEI would be a loading dock spill and fire caused by mishandling material or an equipment failure. The annual risk of a latent cancer fatality to the offsite MEI from this accident would be 2×10^{-7} or about 1 chance in 5 million. The accident with the highest potential risk to the offsite population would be a beyond-design-basis seismically induced spill of radioactive materials followed by a fire. This accident would present an increased risk of a single latent cancer fatality in the population surrounding the facility of 5×10^{-5} per year, or about 1 chance in 20,000. Statistically, latent cancer fatalities are not expected to occur in the population from these accidents. The maximum risk of a latent cancer fatality to a noninvolved worker would also be from a beyond-design-basis seismically induced spill of radioactive materials followed by a fire. The risk of a latent cancer fatality to the noninvolved worker from this accident would be 7×10^{-6}, or about 1 chance in 143,000 per year.

The accident with the highest potential risk to the offsite population under the Continued Use of CMR Building Alternative would be a design-basis earthquake or one of lower magnitude that could severely damage the CMR Building, resulting in a seismically induced spill of radioactive materials followed by a fire. The frequency of such an accident was estimated to range from once every 10,000 years to once every 100 years. For this accident, there would be an increased risk of a single latent fatal cancer in the population surrounding the facility of 4×10^{-3} per year. In other words, the likelihood of developing one latent fatal cancer in the population surrounding the facility would be about 1 chance in 250 per year. Statistically, the radiological risk for the average individual in the population would be small. This accident would present a risk of a latent cancer fatality for the offsite MEI of 1×10^{-5} or 1 chance in 100,000 per year. The risk of a latent cancer fatality to a noninvolved worker located at a distance of 300 yards (240 meters) from the CMR Building would be 3×10^{-4}, or about 1 chance in 3,333 per year.

Intentional Destructive Acts

NNSA has prepared a classified appendix to the *CMRR-NF SEIS* that evaluates the potential impacts of malevolent, terrorist, or intentional destructive acts. Substantive details of terrorist attack scenarios, security countermeasures, and potential impacts are not released to the public because disclosure of this information could be exploited by terrorists to plan attacks. NNSA's strategy for mitigation of environmental impacts resulting from extreme events, including intentional destructive acts, has three distinct components: (1) prevention or deterrence of incidents; (2) planning and timely and adequate response to emergency situations; and (3) progressive recovery through long-term response in the form of monitoring, remediation, and support for affected communities and the environment.

Depending on the intentional destructive acts, the impacts could be similar to the impacts of the accidents analyzed in the *CMRR-NF SEIS*. However, there may be intentional destructive act scenarios for which the impacts exceed those of the accidents analyzed. Analysis of these intentional destructive act impacts provides NNSA with information upon which to base, in part, decisions regarding the construction and operation of the CMRR-NF. The classified appendix evaluates the similarity of scenarios involving intentional destructive acts with those evaluated in the 2008 *LANL SWEIS* and the 2008 *Complex Transformation SPEIS* and presents the potential consequences to a noninvolved worker, an MEI, and the population in terms of physical injuries, radiation doses, and latent cancer fatalities. Although the results of the analyses cannot be disclosed, the following general conclusion can be drawn: the potential consequences of intentional destructive acts are highly dependent on the distance to the site boundary and the size and proximity of the surrounding population; the closer and denser the surrounding population, the higher the consequences. In addition, it is generally easier and more cost-effective to protect new facilities because new security and safety features can be incorporated into their design. New facilities can, as a result of design features, better prevent attacks and reduce the impacts of such attacks.

Environmental Justice

Under the No Action Alternative, there would not have been any disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or normal operations of the 2004 CMRR-NF and RLUOB.

Under the Modified CMRR-NF Alternative, the potential impacts to the general population from construction, operations, and transportation would be small. Additionally, there are not expected to be any disproportionately high and adverse impacts on minority or low-income populations under this alternative. There are not expected to be any significant impacts on cultural resources within LANL or surrounding communities, or any significant impacts on air or water quality as a result of implementing this alternative. There are not expected to be any significant impacts on transportation routes or traffic in the area surrounding LANL during construction or operations as a result of implementing this alternative. A separate analysis was performed on the specific impacts of transporting radioactive materials from LANL to Pojoaque, New Mexico, and from Pojoaque to Santa Fe, New Mexico, transportation routes that include sections through tribal lands. The results of this analysis show that the incident-free population risks are small, at most 2×10^{-5} or 1 chance in 50,000 that the radiological dose to the public from this transportation would result in a latent cancer fatality in the affected population. Similarly, accident risks associated with this transportation on these routes are small, at most 4×10^{-4} or 1 chance in 2,500 that a traffic accident involving one of the trucks would result in a fatality in the affected population. Radiological doses from normal operations to all individuals would be low. Under the Modified CMRR-NF Alternative, the estimated average annual dose to a nonminority individual from operation of the Modified CMRR-NF and RLUOB would be 0.0037 millirem compared to 0.0033 millirem for the average minority individual; the average annual dose to a non-low-income individual would be 0.0036 millirem compared to 0.0027 millirem for the average low-income individual.

A similar analysis was done for individuals living within 5, 10, and 20 miles (8, 16, and 32 kilometers) of TA-55, and the results were largely the same. For the most part, the estimated average annual dose to nonminority and non-low-income individuals would be the same or higher than the estimated doses to the average minority and low-income individuals. The only instance where the estimated average annual dose to minority individuals exceeded the estimated average annual dose to nonminority individuals was for those individuals living within 5 miles (8 kilometers) of TA-55 (0.042 millirem compared to 0.039 millirem). In both cases, these doses are very low; the difference in estimated annual dose of 0.003 millirem would be less than 1/1,000 of a percent of the approximately 480 millirem that a person residing near LANL would receive annually from background radiation.

Under the Continued Use of CMR Building Alternative, the potential impacts to the general population from operations and transportation would be small. There are no construction impacts under this alternative. There are not expected to be any disproportionately high and adverse impacts on minority or low-income populations under this alternative. There are not expected to be any impacts on cultural resources within LANL as a result of implementing this alternative because no land would be disturbed. There are not expected to be any significant impacts on air or water quality as a result of implementing this alternative. There are not expected to be any significant impacts on transportation routes or traffic in the area surrounding LANL as a result of implementing this alternative. The average annual dose to a nonminority individual from the continued operation of the CMR Building would be 0.000039 millirem compared to 0.000027 millirem for the average minority individual, and the average annual dose to a non-low-income individual would be 0.000034 millirem compared to 0.000019 millirem for the average low-income individual. A similar analysis was done for individuals living within 5, 10, and 20 miles (8, 16, and 32 kilometers) of TA-3, and the results were largely the same. For the most part, the average annual dose to nonminority and non-low-income individuals would be the same or higher than the estimated doses to the average minority and low-income individuals. The only instances where the estimated average annual dose to minority individuals exceeded the estimated average annual dose to nonminority individuals was for those individuals living within 5 and 10 miles (8 and 16 kilometers) of TA-3 (0.00076 millirem compared to 0.00069 millirem and 0.0005 millirem compared to 0.00048 millirem, respectively). These doses are very low; the difference in estimated annual dose of up to 0.00007 millirem would be about 1/7,000 of a percent of the approximately 480 millirem that a person residing near LANL would normally receive annually from background radiation.

Doses under the Continued Use of CMR Building Alternative would be less than those projected under the Modified CMRR-NF Alternative due to the reduced operations in the CMR Building as a result of safety and seismic concerns that are limiting the work that can be safely conducted there. A special pathways receptor analysis was performed in support of the 2008 *LANL SWEIS*. In this analysis, it was determined that a special pathways receptor who consumed increased amounts of fish, deer, and elk from the areas surrounding LANL; surface water and Indian tea (Cota); and other potentially contaminated foodstuffs could receive an additional dose of up to 4.5 millirem per year from those special pathways (see Appendix C, Section C.1.4, of the 2008 *LANL SWEIS* [DOE 2008a]). Doses associated with normal operation of the proposed CMRR-NF would not be expected to increase these doses. Therefore, if the MEI associated with the *CMRR-NF SEIS* were also assumed to be a special pathways receptor, their maximum dose would be up to 4.8 millirem per year (4.5 millirem associated with special pathways and about 0.3 millirem associated with normal operations of the 2004 CMRR-NF or Modified CMRR-NF). This dose is low; it would represent an increase of 1 percent above the approximately 480 millirem that a person residing near LANL would normally receive annually from background radiation. In terms of increased risk of a fatal cancer from the special pathways dose plus the dose from normal operations of the CMRR-NF, it would represent an annual estimated risk of 3×10^{-6} or about 1 chance in 333,000.

Waste Management

Under the No Action Alternative, waste generation from construction of the 2004 CMRR-NF and RLUOB would have been about 578 tons (524 metric tons) and, based on later information from construction of RLUOB, it is now understood that this number was underestimated. Operation of the 2004 CMRR-NF and RLUOB would have resulted in about 88 cubic yards (67 cubic meters) of transuranic waste, 2,640 cubic yards (2,020 meters) of low-level radioactive waste, 26 cubic yards (20 cubic meters) mixed low-level radioactive waste, and about 12.4 tons (11 metric tons) of chemical waste per year. Operation of the 2004 CMRR-NF and RLUOB would have resulted in about 2.7 million gallons (10 million liters) of low-level liquid radioactive waste annually that would have been treated at RLWTF and 7.2 million gallons (27 million liters) of sanitary wastewater per year that would have been sent to the Sanitary Wastewater Systems Plant. The *CMRR EIS* did not include an estimate for solid waste resulting from operations.

Under the Modified CMRR-NF Alternative, waste generation from construction of the Modified CMRR-NF would be larger than that estimated for construction of the 2004 CMRR-NF (2,600 tons [2,360 metric tons] compared to 578 tons [524 metric tons]) because the Modified CMRR-NF is a larger facility to address the seismic concerns associated with the 2004 CMRR-NF design, and it is now known that the earlier estimate was underestimated based on the amount of waste generated during construction of RLUOB. Operation of the Modified CMRR-NF and RLUOB would result in the same amount of waste annually as estimated for the No Action Alternative, with the exception of 95 tons (86 metric tons) of solid waste that is included in the estimates for the Modified CMRR-NF and RLUOB. Sanitary wastewater would be sent to the Sanitary Wastewater Systems Plant. Also, due to efforts to reduce the amount of liquid waste being generated as a result of LANL operations, modifications of operations at the Modified CMRR-NF and RLUOB are estimated to result in a much smaller amount of low-level liquid radioactive waste, about 344,000 gallons (1.3 million liters), which would be treated at RLWTF. The amount of radioactive waste generated under this alternative would be consistent with the levels analyzed in the 2008 *LANL SWEIS* and would be a fraction of the annual amount generated at LANL. No additional treatment or disposal facilities would be needed at LANL to handle these wastes.

Under the Continued Use of CMR Building Alternative, annual waste generation rates from operation of the CMR Building and RLUOB would be lower than those estimated under the Modified CMRR-NF Alternative because operations in the CMR Building are currently limited due to safety and seismic concerns. The amount of radioactive waste generated under this alternative would be lower than the levels analyzed in the 2008 *LANL SWEIS* and would be a fraction of the annual estimated waste generated at LANL. No new treatment or disposal facilities would be needed at LANL to handle these wastes.

Transportation and Traffic

Transportation impacts associated with construction of the 2004 CMRR-NF were analyzed in the *CMRR-NF SEIS* to augment the analysis in the 2003 *CMRR EIS*. A transportation impact assessment was conducted in the 2003 *CMRR EIS* for the one-time shipment of special nuclear material during the transition from the existing CMR Building to the CMRR-NF. The public would not have received any measurable exposure. The *CMRR-NF SEIS* estimated that 489 truck trips would have been required for delivery of construction materials. There would have been no change in the level of service of roadways in the vicinity of LANL during the construction period. Employees currently working at the existing CMR Building and other facilities at LANL would have relocated to the CMRR Facility for operations there. There would have been no impact on traffic or transportation on the internal LANL road system, the vehicle access portals, or the public roadways external to LANL over the existing conditions.

Under the Modified CMRR-NF Alternative, transportation requirements associated with construction of the Modified CMRR-NF would be up to 38,000 and 29,000 offsite truck trips (about 4,300 and 3,300 trips per year on average) under the Deep or Shallow Excavation Option, respectively. These trips would be required to deliver construction materials and equipment to LANL in support of the construction effort, as well as offsite trips related to removing construction waste from the site. This number of truck trips is projected to result in up to 3 additional (2.5) truck accidents over the life of the construction project and 0 (0.3) additional fatalities. Operation of the Modified CMRR-NF and RLUOB would result in additional trips off site associated with the transportation of radioactive waste to treatment and disposal facilities. These trips would result in annual doses of about 2.5 person-rem to the crew of the trucks shipping this waste. No latent cancer fatalities are expected among the crews as a result of these doses. The trips would also result in estimated doses of about 0.8 person-rem per year to the public along the transportation routes. No latent cancer fatalities are expected in the public as a result of these doses. These waste shipments are projected to result in less than 1 additional truck accident annually and 0 (7×10^{-3}) additional fatalities. There is a greater chance of structural damage to Pajarito Road under the Modified CMRR-NF Alternative due to the greater total weight of materials that would be transported on the roadway and the longer duration of transports. Pajarito Road may be sufficiently strong to support the transports without damage if the underlying soil is strong. Should damage occur to the roadway surface, Pajarito road may require rehabilitation or repair sooner than currently anticipated. No change in the level of service of roadways in the vicinity of LANL is anticipated during the construction period. Because no net increase in operations employees is anticipated under the Modified CMRR-NF Alternative, there would be no significant impact on traffic or transportation on the internal LANL road system, the vehicle access portals, or the public roadways external to LANL.

Under the Continued Use of CMR Building Alternative, there would be no transportation requirements associated with construction. Operation of the CMR Building and RLUOB would result in additional trips off site associated with the transportation of radioactive waste to treatment and disposal facilities. These trips would result in annual doses of about 0.3 person-rem to the crew of the trucks shipping this waste. No latent cancer fatalities are expected among the crews as a result of these doses. The trips would also result in estimated doses of about 0.1 person-rem per year to the public along the transportation routes. No latent cancer fatalities are expected in the public as a result of these doses. These waste shipments are projected to result in less than 1 additional truck accident annually and 9×10^{-4} additional fatalities. The estimates of doses and accidents associated with these shipments are less than those projected under the Modified CMRR-NF Alternative because less waste is generated annually at the CMR Building and RLUOB due to reduced operations at the facility compared to full operation of the Modified CMRR-NF and RLUOB. Since continued CMR Building and RLUOB operations would not result in an increase in the number of employees currently working on the site, no changes in traffic are anticipated. There would be no change in the impact on traffic or transportation on the internal LANL road system, the vehicle access portals, or the public roadways external to LANL over the existing conditions.

Table S–2 Summary of Environmental Consequences of Alternatives

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Land Use and Visual Resources			
Construction	26.75 acres of land would have been used, much of it presently disturbed. Some activities would have occurred on land previously designated "Reserve." Construction would have altered views along Pajarito Road; however, the road is not open to the public. The breakdown of land uses includes the following: • CMRR-NF site – 4.75 acres • RLUOB site – 4 acres (completed) • Laydown areas/concrete batch plant – 7 acres • Parking lot – 5 acres • Road realignment – 6 acres	Up to 147 acres of land would be used under the Deep Excavation Option and up to 127 acres under the Shallow Excavation Option. Many project elements would occur in areas presently designated as "Reserve." Construction would alter views along Pajarito Road; however, the road is not open to the public. Areas of temporary disturbance (for example, laydown areas and spoils storage areas) would be restored to their original land use designation following project completion. Restoration of the parking lot in TA-72 would mitigate those long-term visual impacts. The breakdown of land uses includes the following: • CMRR-NF site – 4.8 acres • Laydown areas/concrete batch plants – 60 acres • Spoils areas – 30 acres (Deep Excavation Option), 10 acres (Shallow Excavation Option) • Parking lots – up to 18 acres • Power upgrades – 9.1 acres • Pajarito Road realignment – 3.4 acres • Stormwater detention ponds – 2.5 acres • TA-50 electrical substation – 1.4 acres • Construction support/laydown area – 19.1 acres	Not applicable, no new construction
Operations	Permanent land disturbance would have affected about 13.75 acres, including the building site and parking lot. The new CMRR-NF would have blended with the industrial look of TA-55.	Permanent land disturbance under both the Deep and Shallow Excavation Options would affect about 12 acres, including the building site, the Pajarito Road realignment, the TA-50 electrical substation, and stormwater detention ponds. The road realignment, power substation, and stormwater detention ponds would result in changes in present land use. The new CMRR-NF would blend with the industrial look of TA-55.	No change in current land use

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; RLUOB = Radiological Laboratory/Utility/Office Building; TA = technical area.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

Note: To convert acres to hectares, multiply by 0.40469.

Resource/Material Category	***No Action Alternative*** [a]	***Modified CMRR-NF Alternative***		***Continued Use of CMR Building Alternative***
Site Infrastructure [b]				
Construction		**Deep Excavation**	**Shallow Excavation**	
Electricity (MW-hours per year)	63	31,000 [c]		Not applicable
Water (million gallons per year)	0.75	5	4	Not applicable
Propane (gallons per year)	Not available	19,200	19,200	Not applicable
Operations				
Electricity (MW-hours per year)	19,300	161,000		59,000 [d]
Natural gas (million cubic feet per year)	Not available	58		38 [d]
Water (million gallons per year)	10.4	16		7 [d]
Air Quality and Noise				
Construction	Criteria pollutant concentrations would have remained below standards. Annual greenhouse gas emissions would have been below CEQ guidance threshold for more-detailed evaluation and about 1 percent of site-wide generation.	Criteria pollutant concentrations would remain below standards. Annual greenhouse gas emissions would be below draft CEQ guidance threshold for more-detailed evaluation and about 7 percent of site-wide generation.		Not applicable
	Slight noise increase to offsite public would have been realized from construction activities and traffic.	Slight noise increase to offsite public would be realized from construction activities and traffic.		Not applicable
Operations	Periodic testing of emergency backup generators would not have caused standards to be exceeded. Annual greenhouse gas emissions would have been below CEQ guidance threshold for more-detailed evaluation and about 3 percent of site-wide generation. No change in noise levels from LANL site operations would have been realized.	Periodic testing of emergency backup generators would not cause standards to be exceeded. Annual greenhouse gas emissions would be below draft CEQ guidance threshold for more-detailed evaluation and about 25 percent of site-wide generation. [e] No change in noise levels from LANL site operations would be realized.		Periodic testing of emergency backup generators would not cause standards to be exceeded. Annual greenhouse gas emissions would be below CEQ guidance threshold for more-detailed evaluation and about 10 percent of site-wide generation. No change in noise levels from LANL site operations would be realized.

CEQ = Council on Environmental Quality; CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; LANL = Los Alamos National Laboratory; MW = megawatts.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

[b] Site infrastructure estimates for construction and operation have been re-estimated for the Modified CMRR-NF compared to those included in the *CMRR EIS*. Estimates included in the *CMRR EIS* were based on preconceptual design information and are now known to have been underestimated in a number of areas.

[c] Annual site infrastructure estimates for electricity use for the Modified CMRR-NF Alternative round to 31,000 megawatt-hours for both the Deep and Shallow Excavation construction options. Although not apparent due to the rounding, the Deep Excavation Option would require more electricity over the life of the alternative for mixing the additional concrete for the layer of low-slump concrete fill.

[d] Operational requirements for the CMR Building are not metered separately and are accounted for in present site usage totals in the infrastructure table in Chapter 3 of the *CMRR-NF SEIS*. Only RLUOB requirements are included in this column to represent the increase in site requirements associated with the Continued Use of CMR Building Alternative.

[e] These greenhouse gases emitted by operations at the Modified CMRR-NF and RLUOB would add a relatively small increment (0.001 percent) to emissions of these gases in the United States.

Note: To convert cubic feet to cubic meters, multiply by 0.028317; gallons to liters, by 3.7854.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Geology and Soils			
Construction	A site survey and foundation study would have been conducted as necessary to confirm site geologic characteristics for facility engineering purposes.	*Deep Excavation Option* – The poorly welded tuff layer would be over-excavated and replaced with concrete fill material. The site would be excavated to a depth of 130 feet; about 545,000 cubic yards of materials remain to be excavated. *Shallow Excavation Option* – Construction would occur in the layer above the poorly welded tuff layer. The site would be excavated to a depth of 58 feet; about 236,000 cubic yards of material remain to be excavated. Under either option, excavated material would be stockpiled for future beneficial reuse.	Not applicable
Operations	There would not have been any impact on geology and soils.	No impact on geology and soils	No impact on geology and soils
Surface-Water and Groundwater Quality			
Construction	Potential temporary impacts could have resulted from stormwater runoff. Appropriate soil erosion and sediment control measures and spill prevention practices would have minimized suspended sediment and material transport and reduced potential water quality impacts.	Same as No Action Alternative, but a larger area of land and additional technical areas would be affected by the construction effort (see Land Use). In addition, under the Deep Excavation Option, control measures would be needed for much larger amounts of excavated spoils. In addition, one stormwater detention pond would be enlarged and five new ponds built to collect runoff during construction.	Not applicable
Operations	No impacts on surface water or groundwater would have been expected.	No impacts on surface water or groundwater.	No impacts on surface water or groundwater

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; NNSA = National Nuclear Security Administration; PC = performance category.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

Note: To convert feet to meters, multiply by 0.3048; cubic yards to cubic meters, by 0.76455.

Resource/Material Category	***No Action Alternative*** [a]	***Modified CMRR-NF Alternative***	***Continued Use of CMR Building Alternative***
Ecological Resources			
Construction	Some vegetation and wildlife habitat would have been removed. Implementation of this alternative may have affected, but would not have adversely affected, the Mexican spotted owl.	*Deep Excavation Option* – Additional habitat loss from use of about five times more land area than under the No Action Alternative. The project may affect, but would not adversely affect, the Mexican spotted owl or the southwestern willow flycatcher. Some project elements may remove a small portion of potential habitat for the Mexican spotted owl. Potential southwestern willow flycatcher habitat may be indirectly affected by stormwater runoff and erosion from spoils storage in the area. *Shallow Excavation Option* – Similar to the Deep Excavation Option; however, slightly less potential habitat would be removed due to the decrease in spoils storage area requirements; potential southwestern willow flycatcher habitat would not be affected.	Not applicable
Operations	None	None	None
Cultural and Paleontological Resources			
Construction/Operations	Resources in affected areas would have been protected by avoidance. Sites would have been protected and monitored to ensure their protection.	Resources in affected areas would be protected by avoidance. Sites would be protected and monitored to ensure their protection.	Not applicable

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; NNSA = National Nuclear Security Administration; PC = performance category.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Socioeconomics			
Construction	Employment would have resulted in little socioeconomic effect.	Peak direct (790 workers) plus indirect (450 workers) employment would represent a relatively small percentage of the total labor force in the four-county region of influence (less than 1 percent).	Not applicable
Operations	Approximately 550 workers would have been at the CMRR Facility (2004 CMRR-NF and RLUOB); they would have come from the CMR Building and other facilities at LANL so the facility would not have increased employment or changed socioeconomic conditions in the region.	Approximately 550 workers would be at the CMRR Facility (Modified CMRR-NF and RLUOB); they would come from the CMR Building and other facilities at LANL so the facility would not increase employment or change socio-economic conditions in the region.	Approximately 210 workers would continue work at the CMR Building, many of whom would be among the staff members whose offices would be relocated to RLUOB. Another 140 workers would work in RLUOB. Workers would come from the CMR Building and other facilities at LANL so there would not be an increase in employment or a change in socioeconomic conditions in the region.

CMR = Chemistry and Metallurgy Research; CMRR = Chemistry and Metallurgy Research Building Replacement; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; LANL = Los Alamos National Laboratory; NNSA = National Nuclear Security Administration; PC = performance category; RLUOB = Radiological Laboratory/Utility/Office Building.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative* [b]
Human Health			
Normal Operations			
Offsite population			
Dose (person-rem per year)	1.9	1.8	0.016
Annual population LCF risk	1×10^{-3}	1×10^{-3}	1×10^{-5}
MEI			
Dose (millirem per year)	0.33	0.31	0.0023
Annual LCF risk	2×10^{-7}	2×10^{-7}	1×10^{-9}
Workers			
Worker dose (person-rem per year)	61	60	24
Annual worker population LCF risk	4×10^{-2}	4×10^{-2}	1×10^{-2}
Average worker dose (millirem per year)	110	109	68
Average worker annual LCF risk	7×10^{-5}	7×10^{-5}	4×10^{-5}
Facility Accidents (maximum annual cancer risk [LCFs]) [c]			
Population (risk)	8×10^{-1}	5×10^{-5}	4×10^{-3}
MEI (risk)	7×10^{-3}	2×10^{-7}	1×10^{-5}
Noninvolved worker (risk)	1×10^{-2}	7×10^{-6}	3×10^{-4}

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; LCF = latent cancer fatality; MEI = maximally exposed individual; NNSA = National Nuclear Security Administration; PC = performance category.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

[b] The impacts shown for normal operations and facility accidents under the Continued Use of CMR Building Alternative reflect reduced operations at the facility due to safety and seismic concerns.

[c] Facility accident risk values include a dose-to-risk factor of 0.0006 LCFs per rem for population risks and MEI and noninvolved worker doses if less than 20 rem; a dose-to risk factor of 0.0012 LCFs per rem for MEI and noninvolved worker doses equal or greater than 20 rem; and the probability of the accident occurring.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Environmental Justice			
Construction/Operations	There would not have been any disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or operations.	Impacts on all individuals would be low. There would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction, operations, or transportation. Annual doses to all individuals would be low, and the average individual radiological impacts on members of minority and low-income groups would be less than or comparable to impacts on the average nonminority or non-low-income member of the general population. For the 50-mile (80-kilometer) population: • Average dose to nonminority individual: 0.0037 millirem • Average dose to minority individual: 0.0033 millirem • Average dose to non-low-income individual: 0.0036 millirem • Average dose to low-income individual: 0.0027 millirem A special pathways analysis was performed and found that impacts on special pathways consumers would be negligible.	Impacts on all individuals would be low. There would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction, operations, or transportation. Annual doses to all individuals would be low, and the average individual radiological impacts on members of minority and low-income groups would be less than or comparable to impacts on the average nonminority or non-low-income member of the general population. For the 50-mile (80-kilometer) population: • Average dose to nonminority individual: 0.000039 millirem • Average dose to minority individual: 0.000027 millirem • Average dose to non-low-income individual: 0.000034 millirem • Average dose to low-income individual: 0.000019 millirem A special pathways analysis was performed and found that impacts on special pathways consumers would be negligible.

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

Resource/Material Category	***No Action Alternative*** [a]	***Modified CMRR-NF Alternative***	***Continued Use of CMR Building Alternative*** [b]
Waste Management			
Construction			
Solid waste (tons) [c]	578	2,600	Not applicable
Operations (annual generation rates)			
Transuranic waste (cubic yards)	88	88	8.2
Low-level radioactive waste (cubic yards)	2,640	2,640	310
Mixed low-level radioactive waste (cubic yards)	26	26	4.1
Chemical waste (tons)	12.4	12.4	1.4
Solid waste (tons)	Not available	95	60
Sanitary wastewater (gallons)	7,200,000	10,800,000	5,220,000
Liquid low-level radioactive waste (gallons)	2,700,000 [d]	344,000	163,000

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

[b] The impacts shown for operations under the Continued Use of CMR Building Alternative reflect reduced operations at the facility due to safety and seismic concerns.

[c] The construction waste estimate for the No Action Alternative was based on preconceptual design information and is now known to have been underestimated.

[d] The liquid low-level radioactive waste estimate for the No Action Alternative was based on assumptions and is now known to have been overestimated.

Note: To convert gallons to liters, multiply by 3.7854; tons to metric tons, by 0.90718; cubic yards to cubic meters, by 0.76455.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*		*Continued Use of CMR Building Alternative*
Transportation and Traffic				
Transportation				
Construction				
Offsite truck trips	Not estimated	Deep Excavation Option – 38,000	Shallow Excavation Option – 29,000	Not applicable
Traffic fatalities	Not estimated	Deep Excavation Option – 0.3	Shallow Excavation Option – 0.2	Not applicable
Operations [b] **(based on annual shipment rate)**				
Incident-free				
Public: (person-rem/LCF) Total Route LANL to Pojoaque segment Pojoaque to Santa Fe segment	Not estimated [c]	$0.8 / 5 \times 10^{-4}$ $0.02 / 1 \times 10^{-5}$ $0.04 / 2 \times 10^{-5}$		$0.1 / 6 \times 10^{-5}$ [d] $0.003 / 2 \times 10^{-6}$ $0.005 / 3 \times 10^{-6}$
Crew (person-rem/LCF)	Not estimated [c]	$2.5 / 2 \times 10^{-3}$		$0.3 / 2 \times 10^{-4}$ [d]
Transportation accidents				
Public radiological risk	Not estimated [c]	1×10^{-7}		1×10^{-8} [d]
Public traffic fatality risk	Not estimated [c]	7×10^{-3}		9×10^{-4} [d]
Traffic				
Construction	Personnel and materials transportation would have increased traffic on local roads but would not have changed the level of service on these roadways. No abnormal damage to roadway pavement would have been anticipated.	Personnel and materials transportation would increase traffic on local roads but would not change the level of service on these roadways. No abnormal damage to roadway pavement would be anticipated.		Not applicable
Operations	Minimal impact on traffic would have been expected; some traffic that previously terminated in TA-3 would have continued through and proceeded down Pajarito Road to TA-55.	Minimal impact on traffic; some traffic that previously terminated in TA-3 would continue through and proceed down Pajarito Road to TA-55.		No change from current traffic conditions in TA-3.

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; LANL = Los Alamos National Laboratory; LCF = latent cancer fatality; TA = technical area.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

[b] LCF values include a dose-to-risk factor of 0.0006 LCFs per rem for crew and public.

[c] The *CMRR EIS* did not include an analysis of the shipment of radioactive waste off site because it was assumed that nearly all of the waste generated from CMRR Facility operations would be able to be disposed of onsite at LANL.

[d] The impacts shown under the Continued Use of CMR Building Alternative reflect reduced operations at the facility due to safety and seismic concerns.

Resource/Material Category	***No Action Alternative*** [a]	***Modified CMRR-NF Alternative***	***Continued Use of CMR Building Alternative***
Decontamination, Decommissioning, and Demolition (impacts applicable to all alternatives)			
CMR Building (annual based on a 2-year decommissioning, decontamination, and demolition period)			
Waste [b]			
Transuranic (cubic yards)	Not estimated	75	
Low-level radioactive (cubic yards)	16,000	19,000	
Mixed low-level radioactive (cubic yards)	Not estimated	140	
Radioactive liquid waste (gallons)	Not estimated	68,000	
Chemical (tons)	Not estimated	130	
Solid (cubic yards)	20,000	53,000	
Transportation [c, d]			
Incident-free			
Public: (person-rem/LCFs) Total LANL to Pojoaque segment Pojoaque to Santa Fe segment	Not estimated	 $0.4 / 3 \times 10^{-4}$ $0.01 / 1 \times 10^{-5}$ $0.02 / 1 \times 10^{-5}$	
Crew (person-rem/LCFs)	Not estimated	$1.9 / 1 \times 10^{-3}$	
Transportation accidents			
Public radiological risk	Not estimated	1×10^{-7}	
Public traffic fatality risk	Not estimated	4×10^{-2}	
CMRR-NF	Due to the relative sizes of the facilities, waste quantities are expected to be comparable to those for CMR Building decontamination and demolition.		Not applicable

CMR = Chemistry and Metallurgy Research; CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility; LANL = Los Alamos National Laboratory; LCF = latent cancer fatality.

[a] The impacts shown for the No Action Alternative reflect the impacts analysis in the *CMRR EIS*, with the exception of the facility accident results, which were reanalyzed for the *CMRR-NF SEIS*, and transportation and traffic impacts and greenhouse gas emissions, which were not analyzed in the *CMRR EIS*. This information is provided for purposes of comparing the No Action Alternative with the action alternatives. However, as stated in Section S.4, the 2004 CMRR-NF would not meet the current standards for a PC-3 facility, and a PC-3 facility is required to safely conduct all of the analytical chemistry and materials characterization work required to support DOE and NNSA mission work. Therefore, the No Action Alternative is not being evaluated in the *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need and, accordingly, the impacts analysis for it is not generally being updated.

[b] The *CMRR EIS* included estimates of the amount of low-level radioactive waste and solid waste expected from decontamination and decommissioning of the CMR Building. Updated waste projections for this effort are included in the estimates for the Modified CMRR-NF and Continued Use of CMR Building Alternatives.

[c] LCF values include a dose-to-risk factor of 0.0006 LCFs per rem for crew and the public.

[d] The *CMRR EIS* did not include an analysis of the offsite shipment of radioactive waste from decontamination and decommissioning of the CMR Building for disposal.

Note: To convert gallons to liters, multiply by 3.7854; tons to metric tons, by 0.90718; cubic yards to cubic meters, by 0.76455.

S.12.2 Environmental Impacts Common to Multiple Alternatives

S.12.2.1 Impacts During the Transition from the CMR Building to the New CMRR-NF and RLUOB

Under the No Action or Modified CMRR-NF Alternative, there would be a transition period during which CMR operations at the existing CMR Building and other locations at LANL would be moved to the new CMRR-NF. Because RLUOB is already constructed, activities that do not rely on the CMRR-NF could be transitioned to RLUOB earlier. During CMRR-NF construction, the CMR Building and RLUOB would be operating. During the 3-year transition, both the CMR Building and the CMRR-NF would be operating, although at reduced levels, while RLUOB operations would continue. At the existing CMR Building, where operational restrictions would remain in effect, operations would decrease as operations move to the new CMRR-NF (beginning in 2014 for the 2004 CMRR-NF and 2020 for the Modified CMRR-NF). At the new CMRR-NF, levels of operations would increase as the facility becomes fully operational. In addition, routine onsite shipment of AC and MC samples would continue to take place while both facilities are operating. With both facilities operating at reduced levels at the same time, the combined demand for electricity, water, and manpower to support transition activities during this period may be higher than what would be required by the separate facilities. Nevertheless, the combined total impacts during this transition phase are expected to be less than the impacts attributed to the level of CMR operations analyzed under the Expanded Operations Alternative in the 2008 *LANL SWEIS.*

Also during the transition phase, the risks for accidents would change at both the existing CMR Building and the new CMRR-NF. At the existing CMR Building, the radiological material at risk and associated operations and storage would decline as material is transferred to the new CMRR-NF. This would have the positive effect of reducing the risk for accidents at the CMR Building. Conversely, at the new CMRR-NF, as the amount of radioactive material at risk and associated operations increase towards full operation, the risk from accidents would increase. However, the improvements in design and technology at the new CMRR-NF would have the positive effect of reducing overall accident risks when compared to the accident risks at the existing CMR Building. Because neither facility would be operating at its full capacity during transition, the expected net effect would be for the risk for accidents at each facility to be lower than the accident risks at either the existing CMR Building or the fully operational new CMRR-NF.

S.12.2.2 CMR Building and CMRR Facility Disposition Impacts

Under all alternatives in the *CMRR-NF SEIS*, the CMR Building would undergo DD&D. CMR Building DD&D would be conducted in a manner protective of all environmental resources, including air quality, surface-water and groundwater quality, ecological and cultural resources, and human health. The CMR Building has been deemed eligible for listing in the NRHP due to its association with important events during the Cold War years and its architectural and engineering significance (Garcia, McGehee, and Masse 2009). In conjunction with the State Historic Preservation Office, NNSA has developed documentation measures to reduce adverse effects on NRHP-eligible properties at LANL. These measures are incorporated into formal memoranda of agreement between NNSA and the New Mexico Historic Preservation Division. Typical memoranda of agreement terms include the preparation of a detailed report containing the history and description of the affected properties; such a report may need to be prepared for the CMR Building prior to any demolition activities.

Because activities at the CMR Building over more than a 50-year period have resulted in areas having varying levels of contamination, DD&D is projected to generate a relatively large annual quantity of radioactive, chemical, and solid wastes, as summarized in Table S–2. Annual waste generation rates in Table S–2 may be higher than those that would actually occur because they are based on completing DD&D in 2 years. Nonetheless, the quantities and types of wastes to be generated are expected to be within the capacity of existing waste management systems. Risks associated with transporting DD&D wastes to offsite treatment and disposal facilities are expected to be very small; no fatalities are expected along waste transport routes.

DD&D of the new CMRR-NF would be considered at the end of its lifetime, designed to be 50 years. For either the 2004 CMRR-NF or the Modified CMRR-NF, impacts of DD&D of the CMRR-NF are expected to be comparable to those of DD&D of the CMR Building. Although activities involving radioactive materials that would be performed at the CMRR-NF are similar to those currently performed at the CMR Building, construction and operation of the CMRR-NF would reflect over 50 years of experience in facility design and operation and contamination control, with implementation of pollution prevention and waste minimization practices.

S.12.2.3 Summary of Cumulative Impacts

In accordance with CEQ regulations, a cumulative impacts analysis was conducted for the *CMRR-NF SEIS* that included the incremental impacts of the action added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Based on this analysis, the only area of concern that would be significantly impacted by the actions being considered in the *CMRR-NF SEIS* in combination with other actions would be infrastructure requirements. Implementation of the Modified CMMR-NF Alternative would result in the greatest cumulative infrastructure impacts when added to the projected infrastructure requirements for other LANL activities and the demands of other non-LANL users. In the near term, no infrastructure capacity constraints are anticipated. LANL operational demands to date on key infrastructure resources, including electricity and water, have been below the levels projected in the 2008 *LANL SWEIS* (DOE 2008a) and well within site capacities. For example, actual electric peak load for LANL in 2010 was approximately 69 megawatts compared to the 109 megawatts projected in the 2008 *LANL SWEIS* (LANL 2011a:Infrastructure, 014).

Utility requirements to operate the Modified CMRR-NF are higher than those associated with operating either the existing CMR Building (under the Continued Use of CMR Building Alternative) or those estimated for the 2004 CMRR-NF (under the No Action Alternative). Should the utility requirements be fully realized, LANL and Los Alamos County could cumulatively require more than 100 percent of the current electric peak load capacity, 71 percent of its total available electrical capacity, 92 percent of the available water capacity, and 28 percent of the available natural gas capacity. Inclusion of infrastructure requirements associated with the construction of alternatives being analyzed in the *Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste* at LANL could result in an additional increase in the requirements for electric peak load by 3 percent, electricity by 1 percent, and water by less than 1 percent (DOE 2011a).

Of most concern is the potential to exceed peak electric load capacity. However, regardless of the decisions to be made regarding the CMRR-NF, LANL is studying the possibility of adding a third transmission line and/or re-conductoring the existing two transmission lines to increase transmission line capacities from 107 (firm) to 240 megawatts, which would provide additional capacity across the site (LANL 2011a:Infrastructure, 007).

As owner and operator of the Los Alamos Water Supply System, Los Alamos County is now the primary water supplier serving LANL. DOE transferred ownership of 70 percent of its water rights to the county and leases the remaining 30 percent. LANL is currently using approximately 76 percent of its water allotment, and the county is using about 98 percent of its allotment. County concerns about its water availability will be heightened if development plans move forward for additional homes in White Rock and Los Alamos on land that is being conveyed to the county from LANL.

Los Alamos County has implemented a *Conservation Plan for Water and Energy*. In this plan, the county describes a number of steps it has taken to conserve water, including an effluent reuse washwater system associated with the county's wastewater treatment plant that is estimated to conserve approximately 12 million gallons (45 million liters) annually (LADPU 2010). Los Alamos County has the right to use up to 390 million gallons (1.5 billion liters) of San Juan-Chama Transmountain Diversion Project water annually and is in the process of determining how best to make this water accessible to the county (LADPU 2010). Neither the conservation savings nor the San Juan-Chama water has been included in the analysis shown above.

In addition, the use of the Sanitary Effluent Reclamation Facility at LANL may be expanded to include other areas of LANL. Plans are to expand the Sanitary Effluent Reclamation Facility to provide additional treatment to treated effluent from the Sanitary Wastewater Systems Plant to allow the reclaimed water to be used to support the nonpotable water demands for the TA-3 Power Plant, the Metropolis Center for Modeling and Simulation, and the Laboratory Data Communications Center. Such expansions could save millions of gallons of water annually.

S.13 Glossary

***actinide* —** Any member of the group of elements with atomic numbers from 89 (actinium) to 103 (lawrencium), including uranium and plutonium. All members of this group are radioactive.

***analytical chemistry (AC)* —** The branch of chemistry that deals with the separation, identification, and determination of the components of a sample.

***areas of environmental interest (AEI)* —** Areas within Los Alamos National Laboratory (LANL) that are being managed and protected because of their significance to biological or other resources. Habitats of threatened and endangered species that occur or may occur at LANL are designated as AEIs. In general, a threatened and endangered species AEI consists of a core area that contains important breeding or wintering habitat for a specific species and a buffer area around the core area. The buffer protects the area from disturbances that would degrade the value of the core area to the species.

***Atomic Energy Commission* —** A five-member commission, established by the Atomic Energy Act of 1946, to supervise nuclear weapons design, development, manufacturing, maintenance, modification, and dismantlement. In 1974, the Atomic Energy Commission was abolished, and all functions were transferred to the U.S. Nuclear Regulatory Commission and the Administrator of the Energy Research and Development Administration. The Energy Research and Development Administration was later terminated, and functions vested by law in the Administrator were transferred to the Secretary of Energy.

***attractiveness level* —** A categorization of nuclear material types and compositions that reflects the relative ease of processing and handling required to convert that material to a nuclear explosive device.

***categories of special nuclear material (Categories I, II, III, and IV)* —** A designation determined by the quantity and type of special nuclear material or a designation of a special nuclear material location based on the type and form of the material and the amount of nuclear material present. A designation of the significance of special nuclear material based upon the material type, form of the material, and amount of material present in an item, grouping of items, or in a location.

***classified information* —** (1) information that has been determined pursuant to Executive Order 12958, any successor order, or the Atomic Energy Act of 1954 (42 U.S.C. 2011) to require protection against unauthorized disclosure; (2) certain information requiring protection against unauthorized disclosure in the interest of national defense and security or foreign relations of the United States pursuant to Federal statute or Executive order.

***collective dose* —** The sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation. Collective dose is expressed in units of person-rem or person-sieverts.

***criteria pollutants* —** An air pollutant that is regulated by National Ambient Air Quality Standards (NAAQS). The U.S. Environmental Protection Agency must describe the characteristics and potential health and welfare effects that form the basis for setting, or revising, the standard for each regulated pollutant. Criteria pollutants include sulfur dioxide; nitrogen dioxide; carbon monoxide; ozone; lead; and two size classes of particulate matter, less than 10 micrometers (0.0004 inch) in diameter, and less than 2.5 micrometers (0.0001 inch) in diameter. New pollutants may be added to, or removed from, the list of criteria pollutants as more information becomes available.

cultural resources — Archaeological sites, historical sites, architectural features, traditional use areas, and Native American sacred sites.

cumulative impacts — Impacts on the environment that result when the incremental impact of a proposed action is added to the impacts from other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes the other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

decommissioning — Retirement of a facility, including any necessary decontamination and/or dismantlement.

decontamination — The actions taken to reduce or remove substances that pose a substantial present or potential hazard to human health or the environment, such as radioactive or chemical contamination from facilities, equipment, or soils by washing, heating, chemical or electrochemical action, mechanical cleaning, or other techniques.

design-basis earthquake — The earthquake that a system, component, or structure is designed to withstand and maintain a certain level of performance. For a Performance Category 3 facility, the design-basis earthquake has a return period of 2,500 years.

detention pond — An area where excess stormwater is collected and stored or held temporarily to prevent flooding and erosion.

dose (radiological) — A measure of the energy imparted to matter by ionizing radiation. A generic term meaning absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or committed equivalent dose. The unit of dose is the rem or rad.

endangered species — Plants or animals that are in danger of extinction through all or a significant portion of their ranges and that have been listed as endangered by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service following the procedures outlined in the Endangered Species Act and its implementing regulations (50 CFR Part 424). The lists of endangered species can be found in 50 CFR 17.11 (wildlife), 50 CFR 17.12 (plants), and 50 CFR 222.23(a) (marine organisms).

engineered backfill — Material that is specially prepared to refill the excavation surrounding the building and restore the former ground surface.

environmental impact statement (EIS) — The detailed written statement required by Section 102(2)(C) of the National Environmental Policy Act for a proposed major Federal action significantly affecting the quality of the human environment. A U.S. Department of Energy (DOE) EIS is prepared in accordance with applicable requirements of the Council on Environmental Quality National Environmental Policy Act regulations in 40 CFR Parts 1500–1508 and the DOE National Environmental Policy Act regulations in 10 CFR Part 1021. The statement includes, among other information, discussions of the environmental impacts of the proposed action and all reasonable alternatives; adverse environmental effects that cannot be avoided should the proposal be implemented; the relationship between short-term uses of the human environment and enhancement of long-term productivity; and any irreversible and irretrievable commitments of resources.

***environmental justice* —** The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies. Executive Order 12898 directs Federal agencies to make achieving environmental justice part of their missions by identifying and addressing disproportionately high and adverse effects of agency programs, policies, and activities on minority and low-income populations.

***habitat* —** The environment occupied by individuals of a particular species, population, or community.

***latent cancer fatalities (LCF)* —** Deaths from cancer resulting from, and occurring some time after, exposure to ionizing radiation or other carcinogens.

***low-income population* —** Low-income populations, defined in terms of U.S. Bureau of the Census annual statistical poverty levels (*Current Population Reports*, Series P-60 on Income and Poverty), may consist of groups or individuals who live in geographic proximity to one another or who are geographically dispersed or transient (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. (See *environmental justice* and *minority population*.)

***low-slump concrete* —** A concrete mix that is stiffer and spreads less than a slump concrete when emplaced. Low-slump concrete contains less water than normal concrete.

***material at risk (MAR)* —** The amount of radionuclides (in grams or curies of activity for each radionuclide) available to be acted on by a given physical stress. For facilities, processes, and activities, the MAR is a value representing some maximum quantity of radionuclide present or reasonably anticipated for the process or structure being analyzed. Different MARs may be assigned for different accidents as it is only necessary to define the material in those discrete physical locations that are exposed to a given stress. For example, a spill may involve only the contents of a tank in one glovebox. Conversely, a seismic event may involve all of the material in a building.

***materials characterization (MC)* —** The measurement of basic material properties, and the change in those properties as a function of temperature, pressure, or other factors.

***maximally exposed individual (MEI)* —** A hypothetical individual whose location and habits result in the highest total radiological or chemical exposure (and thus dose) from a particular source for all exposure routes (for example, inhalation, ingestion, direct exposure).

***minority population* —**"Minority" refers to individuals who are members of the following population groups: American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. "Minority populations" include either a single minority group or the total of all minority persons in the affected area. They may consist of groups of individuals living in geographic proximity to one another or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. (See *environmental justice* and *low-income population*.)

National Register of Historic Places (NRHP) — The official list of the Nation's cultural resources that are worthy of preservation. The National Park Service maintains the list under direction of the Secretary of the Interior. Buildings, structures, objects, sites, and districts are included in the NRHP for their importance in American history, architecture, archaeology, culture, or engineering. Properties included in the NRHP range from large-scale, monumentally proportioned buildings to smaller-scale, regionally distinctive buildings. The listed properties are not just of nationwide importance; most are significant primarily at the state or local level. Procedures for listing properties on the NRHP are found in 36 CFR Part 60.

Notice of Intent — The notice that an environmental impact statement will be prepared and considered. The notice is intended to briefly: describe the proposed action and possible alternatives; describe the agency's proposed scoping process including whether, when, and where any scoping meeting will be held; and state the name and address of a person within the agency who can answer questions about the proposed action and the environmental impact statement.

nuclear facility — A facility subject to requirements intended to control potential nuclear hazards. Defined in U.S. Department of Energy directives as any nuclear reactor or any other facility whose operations involve radioactive materials in such form and quantity that a significant nuclear hazard potentially exists to the employees or the general public.

outfall — The discharge point of a drain, sewer, or pipe as it empties into a body of water.

person-rem — A unit of collective radiation dose applied to populations or groups of individuals (see collective dose); that is, a unit for expressing the dose when summed across all persons in a specified population or group. One person-rem equals 0.01 person-sieverts.

pit — The core element of a nuclear weapon's primary or fission component. The pit contains a potentially critical mass of fissile material, such as plutonium-239 or highly enriched uranium, arranged in a subcritical geometry and surrounded by some type of casing.

Record of Decision (ROD) — A concise public document that records a Federal agency's decision(s) concerning a proposed action for which the agency has prepared an environmental impact statement (EIS). The ROD is prepared in accordance with the requirements of the Council on Environmental Quality NEPA regulations (40 CFR 1505.2). A ROD identifies the alternatives considered in reaching the decision, the environmentally preferable alternative(s), factors balanced by the agency in making the decision, whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why they were not. [See *environmental impact statement (EIS)*.]

region of influence (ROI) — A site-specific geographic area in which the principal direct and indirect effects of actions are likely to occur and are expected to be of consequence for local jurisdictions.

security — An integrated system of activities, systems, programs, facilities, and policies for the protection of restricted data and other classified information or matter, nuclear materials, nuclear weapons and nuclear weapons components, and/or U.S. Department of Energy contractor facilities, property, and equipment.

special nuclear material(s) — A category of material subject to regulation under the Atomic Energy Act, consisting primarily of fissile materials. It is defined to mean plutonium, uranium-233, uranium enriched in the isotopes of uranium-233 or -235, and any other material that the U.S. Nuclear Regulatory Commission determines to be special nuclear material, but it does not include source material.

***spoils* —** The soil and rock (uncontaminated) removed from an excavation. If excavated material is contaminated with chemical or radioactive constituents, it is managed as waste.

***Stockpile Stewardship Program* —** A program that ensures the operational readiness (that is, safety and reliability) of the U.S. nuclear weapons stockpile by the appropriate balance of surveillance, experiments, and simulations.

***sustainable development* —** The incorporation of concepts and principles in the development of the built environment that are responsive (not harmful) to the environment, use materials and resources efficiently, and are sensitive to surrounding communities. Sustainable development and design encompass the materials to build and maintain a building, the energy and water needed to operate the building, and the ability to provide a healthy and productive environment for occupants of the building.

***threatened species* —** Any plants or animals likely to become endangered species within the foreseeable future throughout all or a significant portion of their ranges and that have been listed as threatened by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service following the procedures set in the Endangered Species Act and its implementing regulations (50 CFR Part 424). (See *endangered species*.)

***tuff* —** A fine-grained rock composed of ash or other material formed by volcanic explosion or aerial expulsion from a volcanic vent.

***vault (special nuclear material)* —** A penetration-resistant, windowless enclosure that has an intrusion alarm system activated by opening the door and the following: walls, floor, and ceiling substantially constructed of materials that afford forced-penetration resistance at least equivalent to that of 20-centimeter-thick (8-inch-thick) reinforced concrete and a built-in combination-locked steel door, which, for existing structures, is at least 2.54 centimeters (1 inch) thick, exclusive of bolt work and locking devices, and which, for new structures, meets Federal specifications and standards.

***welded tuff* —** A tuff that was sufficiently hot at the time of deposition to weld together (see *tuff*).

***wetland* —** Those areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas (for example, sloughs, potholes, wet meadows, river overflow areas, mudflats, natural ponds).

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