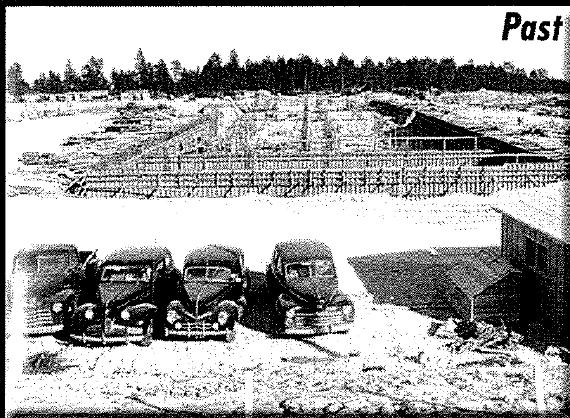
DOE/EIS-0350-S1
April 2011



Draft 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

01008

AVAILABILITY OF THE
DRAFT 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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COVER SHEET

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

Title: *Draft 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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This document is available on the DOE NEPA website (http://www.nepa.energy.gov/) and the NNSA Los Alamos Site Office website (http://www.nnsa.energy.gov/nepa/cmrrseis) for viewing and downloading.

***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 which 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 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, as well as 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 Record of Decision. 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 its useful life.

Public Comments: NNSA conducted scoping for this draft *CMRR-NF SEIS* from October 1 through November 16, 2010. In preparation of this draft *CMRR-NF SEIS*, NNSA considered all comments received from the public. Locations and times of public hearings on this document will be announced in the *Federal Register*, on the CMRR Supplemental EIS website (http://nnsa.energy.gov/nepa/cmrrseis), the DOE NEPA website (http://nepa.energy.gov), and in local media. Comments on this draft *CMRR-NF SEIS* will be accepted for a period of 45 days following publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register* and will be considered in the preparation of the final SEIS. Any comments received after the 45-day comment period will be considered to the extent practicable.

OVERVIEW

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

Since the early 1950s, DOE has conducted analytical chemistry and materials characterization work in the Chemical and Metallurgy Research Building (CMR) at LANL. CMR 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. CMR is a Hazard Category 2 nuclear facility with significant nuclear material and nuclear operations, and the potential for significant onsite consequences.

The CMR 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. Recent geological studies identified a seismic fault trace located beneath two of the wings of CMR, 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 CMR. 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 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 EIS in November 2003 and a Record of Decision (ROD) in February 2004. The ROD announced that CMRR would consist of two buildings: a single, above-ground consolidated special nuclear material-capable, Hazard Category 2 laboratory building (the CMRR-NF), and a separate but adjacent administrative office and support building, the Radiological Laboratory/Utility/Office Building (RLUOB). Construction of the 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 CMRR are appropriate. Specifically, a new site-wide analysis of the geophysical structures that underlay the LANL area was prepared. In light of this new geologic information regarding seismic conditions at the site, and more detailed information on the various support functions and infrastructure needed for construction such as concrete batch plants and lay-down areas, NNSA has proposed changes to the design of CMRR-NF. 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 CMRR-NF.

Though the changes would affect the structural aspects of the building and not its purpose, NNSA elected to prepare a Supplemental EIS (SEIS) to address the ways in which the potential environmental effects of the proposed CMRR-NF may have changed since the project was analyzed in the 2003 EIS. Development of the 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 CMRR – as a necessary step in maintaining critical analytical chemistry and materials characterization capabilities at LANL – the SEIS is not intended to revisit that decision. Instead the SEIS is limited to supplementing the prior analysis by examining the potential environmental impacts related to the proposed change in CMRR design. So in addition to the no-action alternative (proceed with

CMRR-NF as announced in the 2004 ROD), the SEIS considers two action alternatives: construct a new CMRR-NF in accordance with the modified CMRR-NF design concept (construction options include shallow and deep excavation); and continue using CMR with minor upgrades and repairs to ensure safety, together with RLUOB.

On March 11, 2011, the Fukushima Daiichi nuclear power station in Japan was damaged by the tsunami generated by a magnitude 9.0 earthquake. Officials from the U.S. Department of Energy, the U.S. Nuclear Regulatory Commission, and other Federal agencies are maintaining close contact with Japanese officials and providing the Japanese government with expertise in a variety of areas. At the current time, efforts are focused on emergency response, and we do not yet have all of the information needed on lessons to be learned from the incident. Nevertheless, safety and security remain at the forefront of our management of the nuclear weapons complex. Bearing in mind the critical differences between a nuclear power plant and a nuclear materials research laboratory, DOE is committed to learning from Japan's experience, will continue to monitor the unfolding events, and will make every effort to keep stakeholders updated as new information relevant to this SEIS develops.

SUMMARY

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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*
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
LANL	Los Alamos National Laboratory
LANL SWEIS	*Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico*
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
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
TRU	transuranic

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/million	Parts/million	1 [a]	Milligrams/liter
Micrograms/liter	1 [a]	Parts/billion	Parts/billion	1 [a]	Micrograms/liter
Micrograms/cubic meter	1 [a]	Parts/trillion	Parts/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 C + 17.78	1.8	Degrees F	Degrees F - 32	0.55556	Degrees C
Relative					
Degrees C	1.8	Degrees F	Degrees F	0.55556	Degrees C
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}

SUMMARY

This document summarizes the U.S. Department of Energy (DOE) National Nuclear Security Administration's (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 scoping 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

This *CMRR-NF SEIS* (DOE/EIS-0350-S1) has been prepared in accordance with the National Environmental Policy Act (NEPA), as amended (42 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[1] has completed over the last 7 years, as well as the changes to the CMRR-NF proposal that are the subject of this *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 FR 6967). In the *CMRR EIS* 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 be decontaminated, decommissioned, and demolished (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 operations, and one floor above ground, containing Hazard Category 3 operations. An underground

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[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 [P.L. 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.*

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.

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 2012.

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 (EIS) 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 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.

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."

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 the CMRR-NF planning process.

Over the past 7 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 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. This *CMRR-NF SEIS* addresses the CMRR-NF design 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.

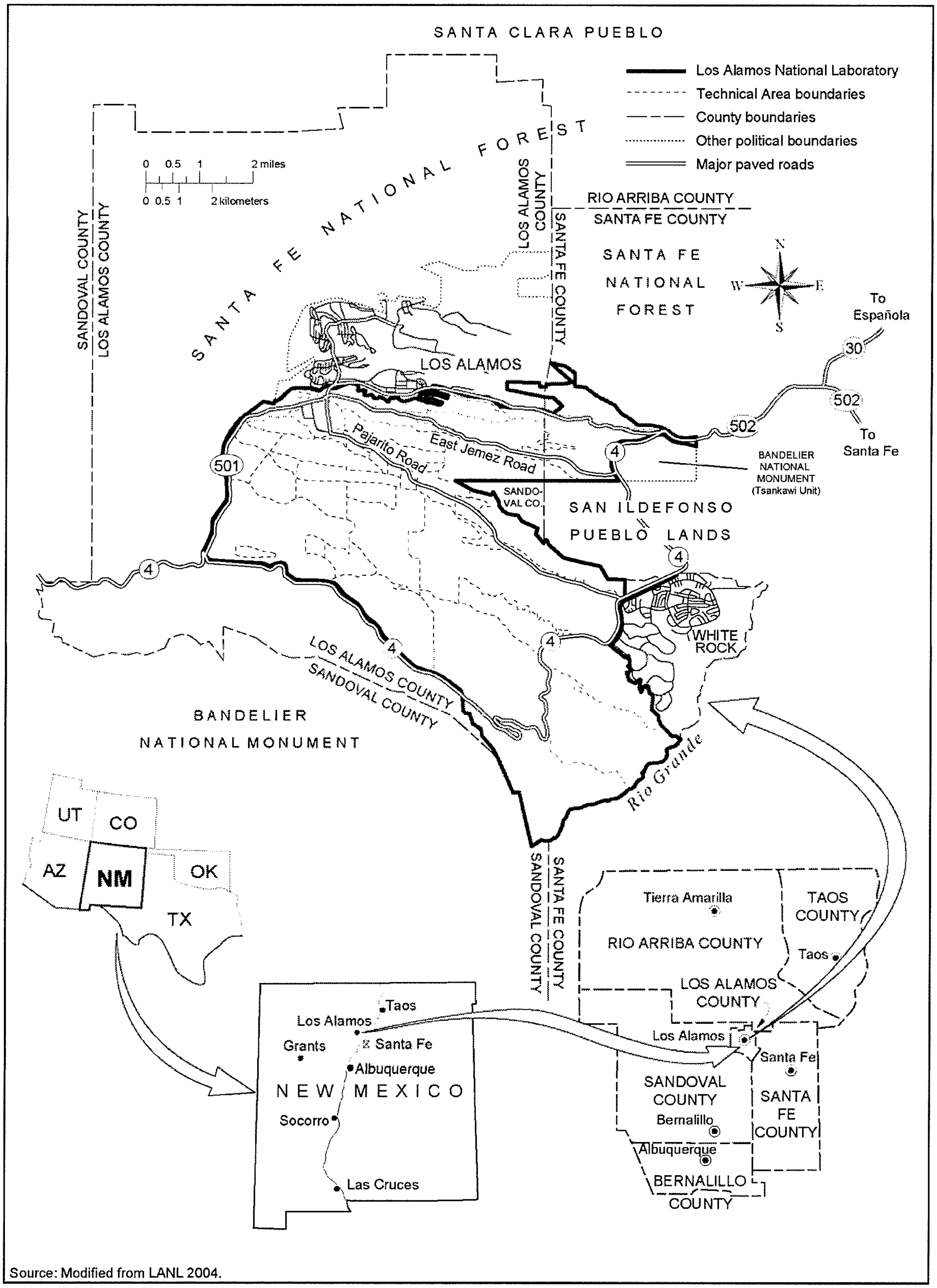

Figure S–1 Location of Los Alamos National Laboratory

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 support a number of critical national security missions, including nuclear nonproliferation programs and the manufacturing, development, and surveillance of nuclear weapons pits.[5] 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 (see following paragraphs), 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 have 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

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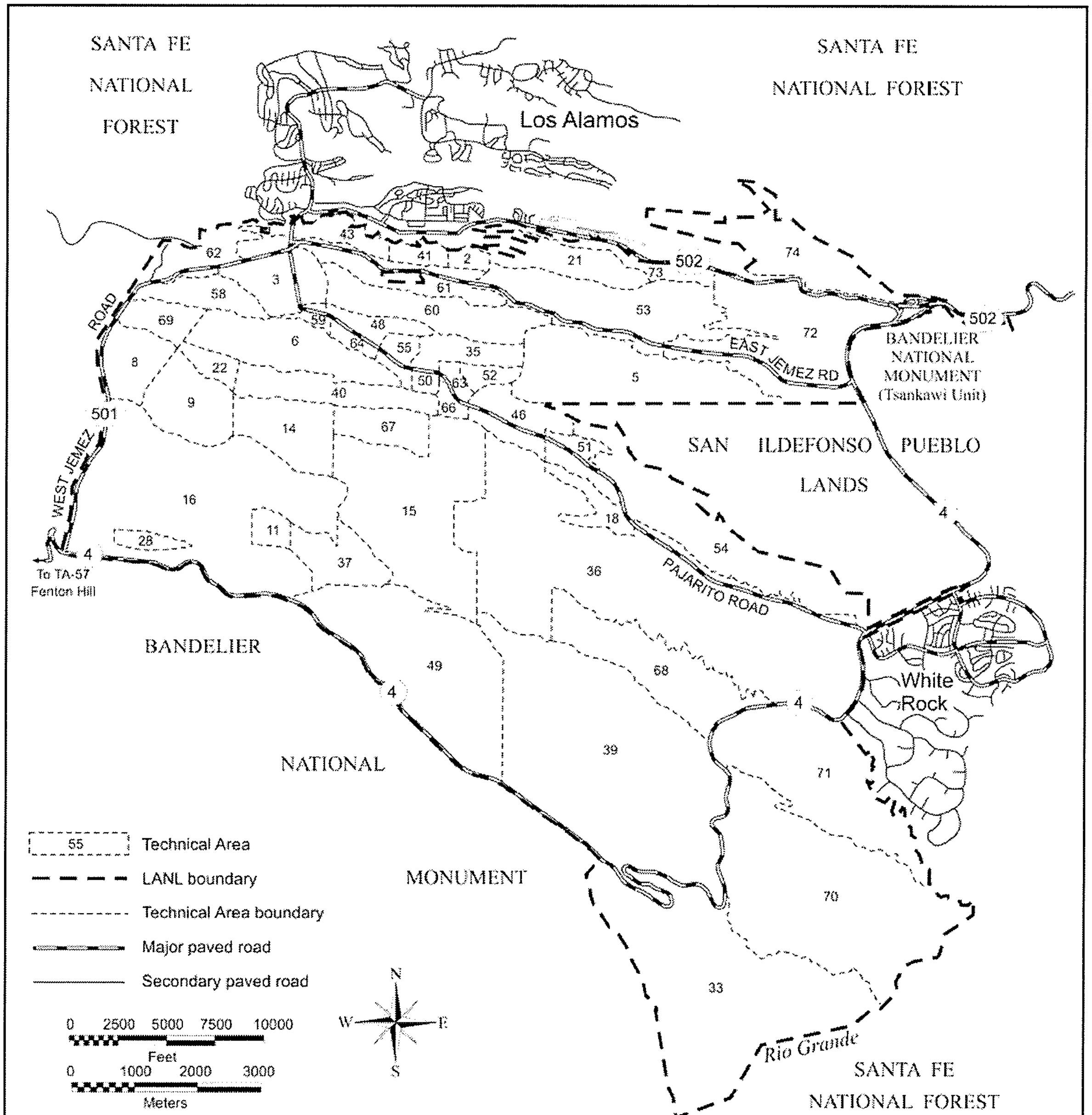
[4] "Actinide" refers to any member of the group of elements with atomic numbers from 89 (actinium) to 103 (lawrencium), including uranium and plutonium. All members of this group are radioactive.
[5] A pit is the central core of a primary assembly in a nuclear weapon typically composed of plutonium-239 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.



Source: Modified from LANL 2004.

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

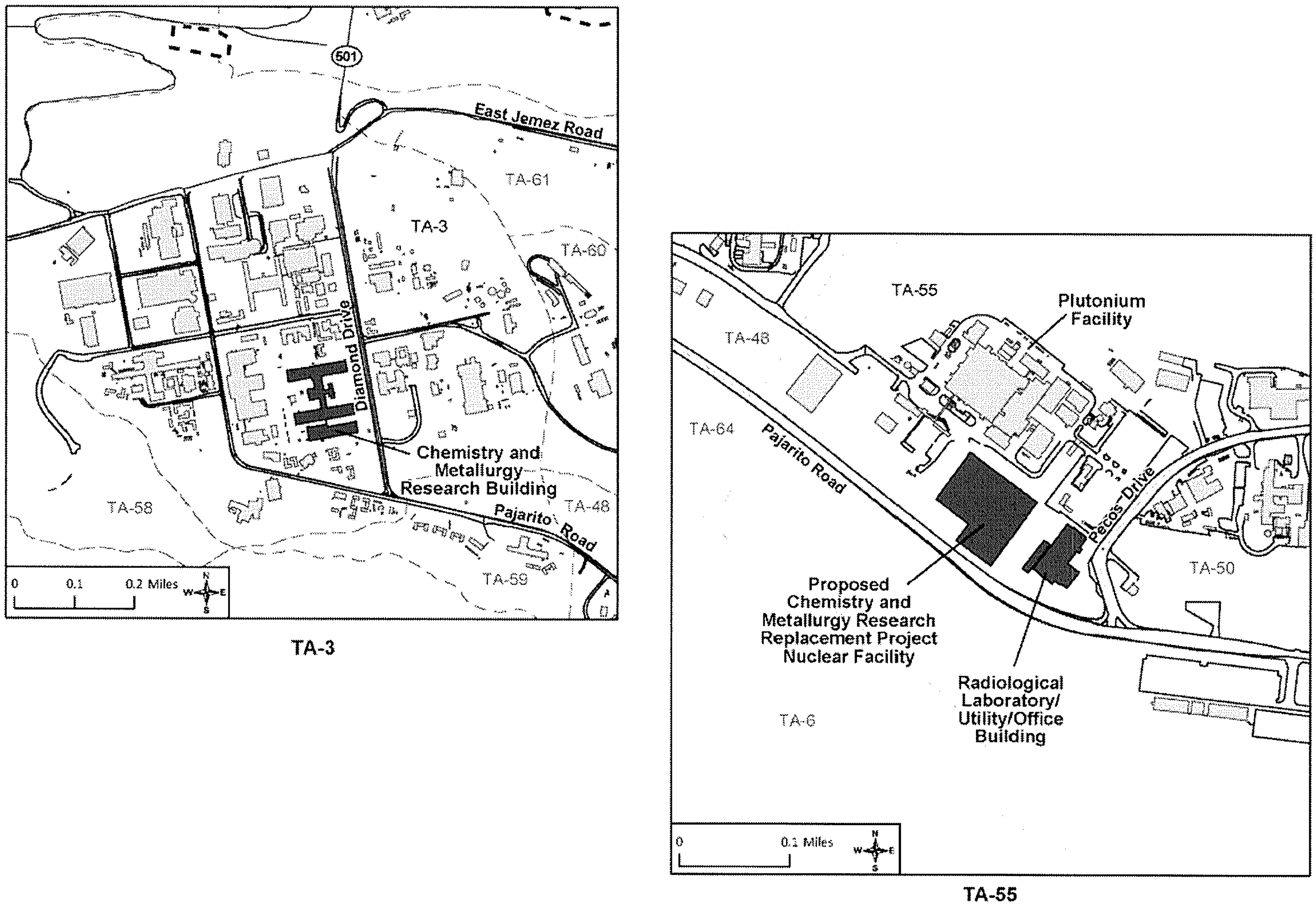


Figure S–3 Location of Facilities in Technical Areas 3 and 55

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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. CMR 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 Proposed Action and Scope of this *CMRR-NF SEIS*

NNSA issued the *CMRR EIS* ROD in 2004 that announced its decision to implement the preferred alternative, to construct 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 activities identified through the design process, NNSA is analyzing the following three alternatives in this *CMRR-NF SEIS*. These alternatives are addressed in more detail in Section S.8 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 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.

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[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 this *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 this *CMRR-NF SEIS*, or it may elect to implement only a portion of these alternatives.

The environmental impact analyses of the alternatives considered in this *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 this *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 related to maintenance of CMR operational capabilities at LANL to support critical NNSA missions. NNSA also is not planning to revisit decisions regarding maintaining other complex consolidation activities and operations reached in 2008 and issued through the 2008 *Complex Transformation SPEIS* ROD. CMR capabilities were a fundamental component of Project Y during the Manhattan Project era, and the decision to facilitate 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 that, due to lack of information on proposal(s) for replacement of the CMR Building to provide for its continued operations and capabilities support, 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 transverses 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 this *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 this *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 occupancy in 2011.

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 three alternatives analyzed the environmental impacts of three levels of operations: 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 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 issued on September 26, 2008 (73 FR 55833), and a second ROD was issued on July 10, 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 this *CMRR-NF SEIS*, and the additional support activities analyzed under that alternative, as well as certain elements from the Expanded Operations Alternative.

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 The Scoping Process and Issues of Public Concern

During the NEPA process, there are several opportunities for public involvement (see **Figure S–4**). On October 1, 2010, NNSA published a Notice of Intent to prepare this *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 proposed scope of the *CMRR-NF SEIS*. The Notice of Intent listed the issues initially identified by NNSA for evaluation in this *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 this *CMRR-NF SEIS*. The Notice of Intent informed the public that comments on the proposed action could be submitted via U.S. mail, email, 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 scheduled to end on November 1, 2010. In response to public comment, NNSA extended the public scoping period through November 16, 2010 (75 FR 67711).

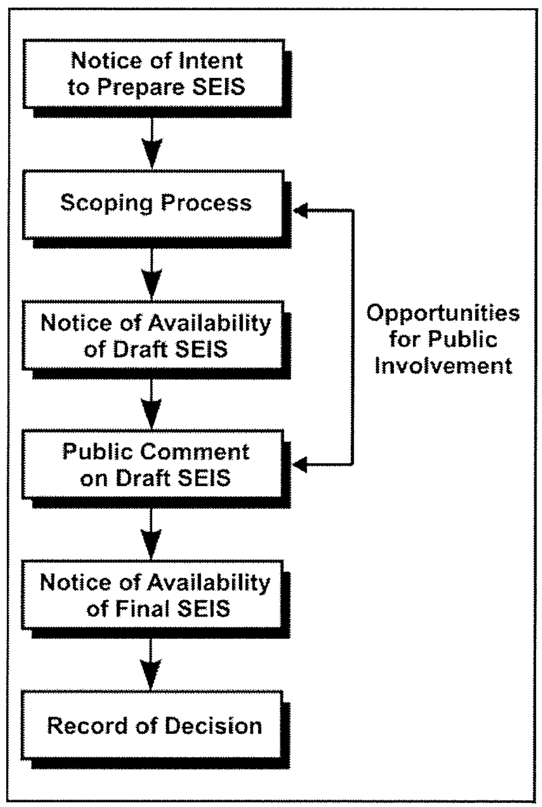

Figure S–4 National Environmental Policy Act Process for this *CMRR-NF SEIS*

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 this *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 the other channels previously mentioned, which were available to the public until the end of the scoping period. All comments were considered by NNSA in preparing this *CMRR-NF SEIS*.

Approximately 85 comment statements or documents were received from citizens, interested groups, local officials, and representatives of Native American pueblos in the vicinity of LANL during the scoping process. 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 this *CMRR-NF SEIS*. Issues found to be relevant to this SEIS are addressed in the appropriate chapters or appendices of this *CMRR-NF SEIS*.

Comments on the NEPA Process

- ***Comment Summary:*** There were comments on the scoping meeting format. Commentors requested that comments at the meeting be transcribed by a court reporter and entered into the comment record. Commentors also requested additional scoping meetings in other areas of New Mexico and at other NNSA sites, as well as an extension of the public scoping period. Commentors questioned how notice was provided to the public and to affected parties that an SEIS was to be prepared. In addition, there were suggestions on how the public participation for the draft SEIS should be addressed, including the format and locations of meetings, the length of the comment period, and the availability of SEIS references for public review.

  NNSA's Response: As noted above, NNSA issued its Notice of Intent to prepare a supplement to the *CMRR EIS* in the *Federal Register* and placed notices of scoping meetings in local news media. In addition, NNSA's Los Alamos Site Office sent a notification letter to its list of interested parties and stakeholders on October 1, 2010, notifying the recipients of NNSA's determination to prepare a supplement to the *CMRR EIS* and inviting comments and participation in the NEPA process and public scoping meetings. The list of interested parties comprises organizations and individuals who have previously expressed interest in NEPA-related activities conducted at LANL. The scoping meetings were planned to enable NNSA to collect input on the scope of the planned SEIS. To the extent practicable, NNSA made changes to the meeting format for the second meeting. In response to requests, the public scoping comment statements and documents were posted on the NNSA website (http://nnsa.energy.gov/nepa/cmrrseis). With issuance of the Notice of Availability for this *Draft CMRR-NF SEIS*, NNSA is announcing the locations and times of public hearings on the draft document, and how interested parties can obtain copies of this draft SEIS and access to references.

- ***Comment Summary:*** Comments addressed the type of document NNSA should prepare, calling for development of a new EIS rather than an SEIS, based on changes in construction materials, project costs, and the schedule, as well as perceived scope changes in the years since the 2004 *CMRR EIS* ROD was issued. Commentors questioned the timing of the preparation of this SEIS while DOE is conducting an independent review of the CMRR-NF and another facility replacement project at the Y–12 National Security Complex in Tennessee. 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. Others stated that a new EIS should consider relocating all LANL plutonium operations to another site. Several commentors asked that funding of the CMRR-NF be halted while this SEIS is being prepared.

  NNSA's Response: NNSA has determined that a supplement to the *CMRR EIS* is the appropriate level of review, based on CEQ and DOE NEPA regulations (40 CFR 1502.9(c) and 10 CFR 1021.341(a) – (b), respectively), to address the changes in construction of the CMRR-NF based on additional seismic information. However, this *CMRR-NF SEIS* does include information that was not available at the time the *CMRR EIS* was prepared and addresses recent guidance such as including impacts of greenhouse gases. The accident analysis has been updated based on additional seismic and population data. In November, 2010, the Secretary of Energy invited experts to provide him with their individual assessment of program requirements for the CMRR-NF and the Uranium Processing Facility at the Y-12 National Security Complex in

Oak Ridge, Tennessee (DOE 2010). In addition, the Department of Defense is conducting a review, with support from an independent group of experts, to consider safety, security, and program requirements and to develop an independent assessment of estimated cost range data for the CMRR-NF and the Uranium Processing Facility. Analyses and recommendations from these independent assessments, information in this *CMRR-NF SEIS,* and other programmatic considerations will be weighed as NNSA moves toward a final decision on the construction and operation of a CMRR-NF. As discussed in Section S.5, NNSA is not planning to revisit either the need for the CMRR-NF or locating the facility at another site. The *Complex Transformation SPEIS* (DOE 2008b) addressed the location for manufacturing and research and development involving plutonium. In the ROD for that document, NNSA announced its decision that that mission would remain at LANL and its decision to construct and operate the CMRR-NF at LANL. Based on these decisions and the congressional funding, NNSA intends to proceed with the CMRR-NF planning process.

Comments on U.S. National Security Policy and NNSA Priorities

- ***Comment Summary:*** There were several comments opposing nuclear weapons, pointing out apparent inconsistencies with U.S. policy on disarmament, and calling for an end to NNSA's weapons mission at LANL. Others suggested that NNSA should change its mission at LANL to research and development of clean and renewable energy or pursue solutions to climate change. Some comments stated that the project money would be better used on helping the people of New Mexico, cleaning up legacy waste, and ensuring that facilities like RLWTF and the TRU Waste Facility are constructed. Some commentors also expressed concern that the use of funds for constructing the CMRR-NF would interfere with NNSA's carrying out the requirements of the Consent Order.

  NNSA's Response: NNSA acknowledges that there is substantial opposition to the nuclear weapons mission. However, decisions on nuclear weapons policy are made by the President and Congress and are outside the NEPA process. Section S.5 discusses the decisions that NNSA does not plan to reconsider in this SEIS, including changes in the Stockpile Stewardship Program mission at LANL. That same section also states that NNSA is not planning to revisit its decisions on projects located along the Pajarito Road corridor, including the TRU Waste Facility and the RLWTF, or its commitment to closure of various material disposal areas at the direction of the New Mexico Environmental Department and in compliance with the Consent Order.

Comments on the Scope of this CMRR-NF SEIS

- ***Comment Summary:*** There were suggestions for changes in the alternatives and for additional alternatives to be addressed in the SEIS. Some comments called for a change in the No Action Alternative that was proposed in the Notice of Intent, requesting that the No Action Alternative analyze not constructing the CMRR-NF, or constructing only a vault structure. Others suggested that continued use of the existing CMR Building for AC and MC operations should be the No Action Alternative. Addressing the proposed action, there were suggestions that NNSA consider locating the AC and MC operations in available space in other LANL facilities, such as the TA-55 Plutonium Facility or RLUOB, so that the CMRR-NF would not be required. One commentor called for a review of available space throughout the DOE complex nationwide for alternative locations for CMR operations. A commentor questioned the need for deep excavation below the poorly welded tuff layer.

  NNSA's Response: The No Action Alternative considered in this *CMRR-NF SEIS* is the Preferred Alternative that was selected by NNSA for implementation in the 2004 ROD based on the 2003 *CMRR EIS.* This *CMRR-NF SEIS* also considers an alternative that would continue to rely upon the restricted use of the CMR Building without constructing the CMRR-NF even though, as discussed in Section 1.4, this would not meet NNSA's purpose and need for taking action. RLUOB has not been constructed as a nuclear-qualified space, and NNSA would not operate the building as anything other than a radiological facility, which would significantly limit the total quantity of SNM 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 conduct mission-required AC and MC operations at LANL. As stated above, while NNSA does not intend to revisit its decision regarding locating AC and MC operations at LANL, using other existing LANL nuclear facilities to accommodate all or some of the AC and MC operations would result in these operations being spread out over LANL, would likely require significant facility upgrades, and would require the elimination of other current mission support work that is now performed by these nuclear facilities to free up room for the AC and MC operations. This suggested action would not meet NNSA's stated purpose and need for action and is not evaluated further in this SEIS. With regard to deep excavation, since the issuance of the Notice of Intent in October 2010, NNSA has added an additional construction option to the Modified CMRR-NF Alternative. This *CMRR-NF SEIS* analyzes two construction options: Deep Excavation, which would involve excavation to a nominal depth of 130 feet (40 meters) below ground and removal of the poorly welded tuff layer beneath the Modified CMRR-NF construction site; and Shallow Excavation, which would involve less excavation (to a nominal depth of 58 feet [18 meters]) because the Modified CMRR-NF's base elevation would be located above the poorly welded tuff layer. See Section S.8 for further description of the construction options.

In addition, commentors identified specific topics listed below to be addressed in this *CMRR-NF SEIS*. These are addressed as part of the analysis of impacts in Chapter 4 of this *CMRR-NF SEIS*.

- Number of jobs associated with construction and operation of the CMRR-NF
- Infrastructure impacts, including water and electrical usage
- Environmental justice analysis
- Health and safety impacts on workers and the public
- Climate change impacts, which are addressed as part of air emissions and greenhouse gas emissions
- Impacts of radiological emissions on the public through direct exposure, inhalation, and food consumption
- Local and commuter traffic and transportation of construction materials and wastes, including legacy wastes

S.8 Description of the Alternatives

S.8.1 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

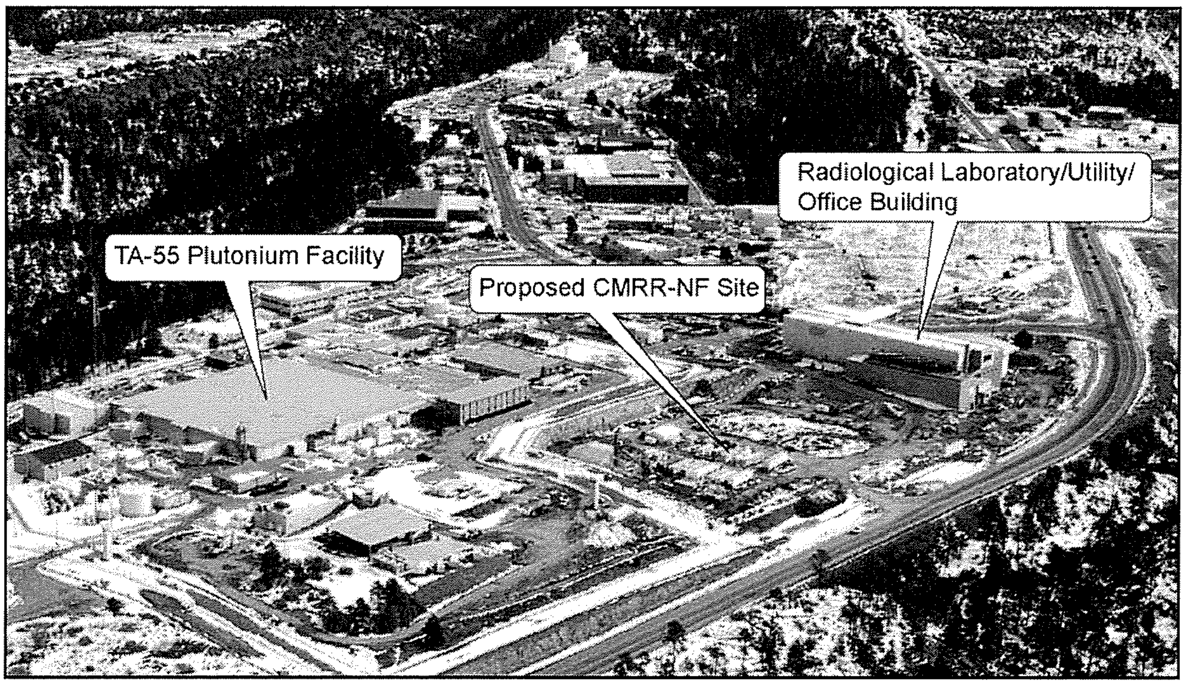

Figure S–5 Proposed Chemistry and Metallurgy Research Building Replacement Nuclear Facility Site in Technical Area 55

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 2–4 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 have been by about 2023.

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 a building "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 SEIS* ROD in 2004. The structure would be constructed to meet the current International Building Code; 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 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 91 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 92 feet (28 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 on the northwest side and two stories below ground on the southeast due to site sloping; there would be two stories and a partial roof level above ground on the southeast side.

There is no preferred construction option at this time. The Deep Excavation Option is more mature, having undergone technical review by NNSA, NNSA's contractors, and the Defense Nuclear Facilities Safety Board. At this time there is more uncertainty associated with the Shallow Construction Option. The Shallow Construction Option needs to be subjected to the same level of technical review as the Deep Construction Option so the two options can be evaluated on the same basis.

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, located 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 in a physically prudent fashion. 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 this *CMRR-NF SEIS* as a prudent measure in light of possible future fiscal budgetary constraints.

S.8.2 Alternatives Considered but Not Analyzed in Detail

A number of alternatives were considered but were not analyzed in detail in this *CMRR-NF SEIS*. 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 77656), 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. Therefore, no additional sites outside of LANL are being considered in this *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. 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 laboratory, 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 possible candidates for the CMRR-NF and none are being considered in this *CMRR-NF SEIS.*

Extensive Upgrades to the Existing CMR Building: 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 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 infeasibility of extensive seismic upgrades to the entire CMR Building, as discussed in the 2003 *CMRR EIS* remains. However, 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 this *CMRR-NF SEIS.*

Distributed Capabilities at Other LANL Nuclear Facilities: 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 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 or requirements for this type of work.

Other designated Hazard Category 2 facilities at LANL are not candidates because they have been decommissioned for safety and security reasons, are closure sites (specifically, environmental cleanup potential release sites), or 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.

S.9 The Preferred Alternative

CEQ regulations require an agency to identify its preferred alternative, if one or more exists, in the draft EIS (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 (Deep Excavation or Shallow Excavation) at this time.

S.10 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 18,400 people. 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. The 47 contiguous LANL technical areas (which are not numbered sequentially) have been established so that they segregate the entire LANL site (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 2000b). About 46 percent of the square footage of LANL facilities is considered laboratory or production space; the rest is considered administrative, storage, service, and miscellaneous space (LANL 2011).

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. 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 security fence surrounds all nuclear hazard facilities in TA-55.

Table S–1 lists the technical areas that have been identified as affected by one or more of the three alternatives in this *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)*	*Techncial Area Size (acres)*
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	357
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	824
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	2,779
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	258
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	No Action, Modified CMRR-NF	116
50	Contains 33 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	62
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	149
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	69
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	848

Technical Area	*Technical Area Description*	*Land Use Category*	*Potential Project Element*	*Alternative(s)*	*Techncial Area Size (acres)*
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	No Action, Modified CMRR-NF	93
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	50
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	49
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	1,192

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.11 Comparison of Alternatives

This section summarizes the alternatives analyzed in this *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 common to all alternatives are also summarized. These include CMR Building and CMRR-NF disposition impacts.

S.11.1 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 this *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 this *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 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) of TA-55 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 in TA-55 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 125 acres (51 hectares) of land would be used under the Deep Excavation Option and a total 105 acres (42 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 construction laydown and support, including spoils storage areas in TA-5/52, 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 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-50 (permanent), TA-63 (temporary), and TA-64 (temporary) – 1.5 acres (0.6 hectares)
- Permanent changes for the TA-50 electrical substation – 1.4 acres (0.6 hectares)

Permanent land disturbance under the Modified CMRR-NF Alternative would affect about 28.1 acres (11.5 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 parking lot and electrical substation, and stormwater detention ponds in TA-50 and TA-63. 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 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. 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, 27 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, would use all of 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.

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.

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 CEQ guidance threshold for more-detailed evaluation and would have made up about 1 percent of site-wide generation based on LANL's 2008 baseline inventory.[9] 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 make up about 3 percent of site-wide generation based on LANL's 2008 baseline inventory.

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 make up 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 make up about 25 percent of site-wide generation 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 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 make up about 10 percent of site-wide generation 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 Summary of Impacts 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

[9] *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.*

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.

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 three 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, and one in TA-50 to collect runoff from the facility site during construction and after operations begin, should this alternative be implemented. 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. RLWTF does not discharge liquid to the environment.

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. RLWTF does not discharge liquid to the environment.

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 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 125 acres [51 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 6 acres (2.4 hectares) would be permanently disturbed and 95 acres (38 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. After biological evaluation, NNSA determined 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 2011, USFWS 2003, 2005, 2006, 2007, 2009). All project activities would be reviewed for compliance with the *Threatened and Endangered Species Habitat Management Plan* (LANL 2000a). 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; 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 17 cultural resources sites eligible for listing in the National Register of Historic Places 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, 5 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

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[10] which would have increased the annual risk of a single latent cancer fatality in the population by 1×10^{-3}. The *CMRR EIS* used 2000 census data to estimate the population surrounding the facility (about 309,000).[11] The average individual would have received a dose of 0.0063 millirem annually.[12] 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 maximally exposed individual (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.

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} per year. This *CMRR-NF SEIS* projects the population to 2030 (about 545,000) using census data through 2009 to estimate population dose. The average individual would receive a dose of 0.0033 millirem annually.[13] 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 536,000) would be approximately 0.014 person-rem, which would increase the likelihood of a single latent cancer fatality in the population by 8×10^{-6} per year. The average individual would receive a dose of 0.000027 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

[10] *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.*

[11] *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.*

[12] *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.*

[13] *The projected population dose of 1.8 person-rem was divided by 545,000 individuals, equaling an average dose of about 0.0033 millirem per individual.*

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 this *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 hazards analysis, it was concluded that a design-basis earthquake with a return interval of about 2,500 years would have an estimated horizontal peak ground acceleration of 0.52 *g*. The previous estimated horizontal peak ground acceleration for an earthquake with a return interval of about 2,500 years was about 0.3 *g* (LANL 2007). 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 greatly increased the 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*. 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 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 0.007 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 0.01, 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 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 a design-basis earthquake without significant damage. Construction of the Modified CMRR-NF would involve the use of larger amounts of concrete (150,000 cubic yards [115,000 cubic meters] of structural concrete compared to 3,194 cubic yards [2,442 cubic meters]) and structural steel (560 tons [508 metric tons] compared to 267 tons [242 metric tons]) compared to what was estimated for the 2004 CMRR-NF. For the design-basis earthquake resulting 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/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 accidents with the highest potential risk to the offsite population would be a facility-wide fire or the loading dock spill/fire. These accidents would present an increased risk of a single latent cancer fatality in the entire population of 4×10^{-5} per year, or about 1 chance in 25,000. 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 be from a seismically induced spill or the loading dock spill/fire. The risk a latent cancer fatality to the noninvolved worker from these accidents would be 6×10^{-6}, or about 1 chance in 160,000 per year.

The accident with the highest potential risk to the offsite population under the Continued Use of CMR Building Alternative would be an earthquake that would severely damage the CMR Building, resulting in a seismically induced spill of radioactive materials. 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 entire population of 0.003 per year. In other words, the likelihood of developing one fatal cancer in the entire population would be about 1 chance in 333 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} per year. In other words, the offsite MEI's likelihood of developing a fatal cancer from this event is about 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 0.0003, or about 1 chance in 3,333 per year.

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 operations of the 2004 CMRR-NF and operations of RLUOB.

Under the Modified CMRR-NF Alternative, there would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or operations of the Modified CMRR-NF and operation of RLUOB. Doses from normal operations to all individuals would be low, and the average nonminority or non-low-income individual's radiological impacts would be greater than those received by the average minority or low-income member of the general population. Under the Modified CMRR-NF Alternative, the average annual dose to a nonminority individual from operation of the Modified CMRR-NF and RLUOB would be 0.0035 millirem compared to 0.0032 millirem for the average minority individual; the average annual dose to a non-low-income individual would be 0.0034 millirem compared to 0.0031 millirem for the average low-income individual.

Under the Continued Use of CMR Building Alternative, the average annual dose to a nonminority individual from the continued operation of the CMR Building would be 3.1×10^{-5} millirem compared to 2.4×10^{-5} millirem for the average minority individual, and the average annual dose to a non-low-income individual would be 2.8×10^{-5} millirem compared to 2.1×10^{-5} millirem for the average low-income individual. 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.

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 what was 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 this *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. This *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) 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 (0.007) 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 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 1.1 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 0.4 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 (0.003) 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	About 125 acres of land would be used under the Deep Excavation Option and about 105 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 lot – up to 15 acres • Temporary power upgrades – 9.1 acres • Pajarito Road realignment – 3.4 acres • Stormwater detention ponds – 1.5 acres • TA-50 electrical substation – 1.4 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 28.1 acres, including the building site, the Pajarito Road realignment, the TA-50 electrical substation and parking lot, 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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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		Not applicable
Water (million gallons per year)	0.75	5	4	Not applicable
Operations				
Electricity (MW-hours per year)	19,300	161,000		59,000 [c]
Natural gas (million cubic feet per year)	Not available	58		38 [c]
Water (million gallons per year)	10.4	16		7 [c]
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 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 CEQ guidance threshold for more-detailed evaluation and about 25 percent of site-wide generation.[d] 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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

[b] Site infrastructure estimates for construction and operation have been re-estimated for the Modified CMRR-NF. 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] 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 this *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.

[d] 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.

01055

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 be 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 three 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.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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

01056

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.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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 less than 1 percent of the regional workforce and would have little socioeconomic effect.	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; RLUOB = Radiological Laboratory/Utility/Office Building.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Human Health [b]			
Normal Operations			
Offsite population			
Dose (person-rem per year)	1.9	1.8	0.014
Annual population LCF risk	1×10^{-3}	1×10^{-3}	8×10^{-6}
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}	4×10^{-5}	3×10^{-3}
MEI (risk)	7×10^{-3}	2×10^{-7}	1×10^{-5}
Noninvolved worker (risk)	1×10^{-2}	6×10^{-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.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

[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.

01059

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.	There would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or operations. 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 impacts on the average nonminority or non-low-income member of the general population. • Average dose to nonminority individual: 0.0035 millirem • Average dose to minority individual: 0.0032 millirem • Average dose to non-low-income individual: 0.0034 millirem • Average dose to low-income individual: 0.0031 millirem	There would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or operations. 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 impacts on the average nonminority or non-low-income member of the general population. • Average dose to nonminority individual: 3.1×10^{-5} millirem • Average dose to minority individual: 2.4×10^{-5} millirem • Average dose to non-low-income individual: 2.8×10^{-5} millirem • Average dose to low-income individual: 2.1×10^{-5} millirem

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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Waste Management			
Construction			
Solid waste (tons) [b]	578	2,600	Not applicable
Operations (annual generation rates) [c]			
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	5,230,000
Liquid low-level radioactive waste (gallons)	2,700,000	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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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

[c] 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.

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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need.

[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 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	$0.42 / 3 \times 10^{-4}$ $0.01 / 1 \times 10^{-5}$ $0.02 / 1 \times 10^{-5}$	
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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need.

[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.

01063

S.11.2 Environmental Impacts Common to Multiple Alternatives

S.11.2.1 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, RLUOB operations would continue. At the existing CMR Building, where operational restrictions would remain in effect, operations would decrease beginning in 2020 (for the Modified CMRR-NF) as operations move to the new 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.11.2.2 CMR Building and CMRR Facility Disposition Impacts

Under all alternatives in this *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.11.2.3 Summary of Cumulative Impacts

In accordance with CEQ regulations, a cumulative impacts analysis was conducted for this *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 this *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 2010).

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 what was estimated for the 2004 CMRR-NF (under the No Action Alternative). Should these projections be fully realized, LANL and Los Alamos County could cumulatively require 100 percent of the current electric peak load capacity, 67 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 increase the requirements for electric peak load by 3 percent, electricity by 1 percent, and water by less than 1 percent (DOE 2011).

Of most concern is the potential to exceed electric peak 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 2011).

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 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.12 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.

design-basis threat — The elements of a threat postulated for the purpose of establishing requirements for safeguards and security programs, systems, components, equipment, and information.

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).

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 populations exist where either the minority population of the affected area exceeds 50 percent or the minority population percentage of the affected area is meaningfully greater than in the general population or other appropriate unit of geographic analysis (such as a governing body's jurisdiction, a neighborhood, census tract, or other similar unit). "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.

sustainable buildings (or high-performance buildings) — Buildings designed and built to minimize resource consumption, to reduce life-cycle costs, and to maximize health and environmental performance across a wide range of measures – from indoor air quality to habitat protection.

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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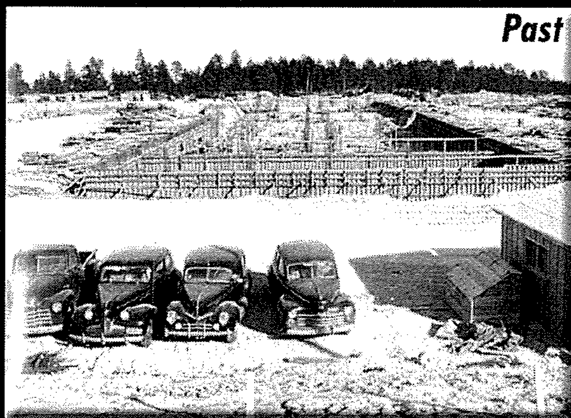
DOE/EIS-0350-S1
April 2011



Draft 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

CHAPTERS 1 through 10

APPENDICES A through D

Conceptual Drawing CMRR Facility

01075

AVAILABILITY OF THE
DRAFT 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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COVER SHEET

Responsible Agency: U.S. Department of Energy (DOE)
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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 which 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 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, as well as 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 Record of Decision. 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 its useful life.

Public Comments: NNSA conducted scoping for this draft *CMRR-NF SEIS* from October 1 through November 16, 2010. In preparation of this draft *CMRR-NF SEIS*, NNSA considered all comments received from the public. Locations and times of public hearings on this document will be announced in the *Federal Register*, on the CMRR Supplemental EIS website (http://nnsa.energy.gov/nepa/cmrrseis), the DOE NEPA website (http://nepa.energy.gov), and in local media. Comments on this draft *CMRR-NF SEIS* will be accepted for a period of 45 days following publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register* and will be considered in the preparation of the final SEIS. Any comments received after the 45-day comment period will be considered to the extent practicable.

OVERVIEW

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

Since the early 1950s, DOE has conducted analytical chemistry and materials characterization work in the Chemical and Metallurgy Research Building (CMR) at LANL. CMR 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. CMR is a Hazard Category 2 nuclear facility with significant nuclear material and nuclear operations, and the potential for significant onsite consequences.

The CMR 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. Recent geological studies identified a seismic fault trace located beneath two of the wings of CMR, 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 CMR. 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 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 EIS in November 2003 and a Record of Decision (ROD) in February 2004. The ROD announced that CMRR would consist of two buildings: a single, above-ground consolidated special nuclear material-capable, Hazard Category 2 laboratory building (the CMRR-NF), and a separate but adjacent administrative office and support building, the Radiological Laboratory/Utility/Office Building (RLUOB). Construction of the 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 CMRR are appropriate. Specifically, a new site-wide analysis of the geophysical structures that underlay the LANL area was prepared. In light of this new geologic information regarding seismic conditions at the site, and more detailed information on the various support functions and infrastructure needed for construction such as concrete batch plants and lay-down areas, NNSA has proposed changes to the design of CMRR-NF. 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 CMRR-NF.

Though the changes would affect the structural aspects of the building and not its purpose, NNSA elected to prepare a Supplemental EIS (SEIS) to address the ways in which the potential environmental effects of the proposed CMRR-NF may have changed since the project was analyzed in the 2003 EIS. Development of the 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 CMRR – as a necessary step in maintaining critical analytical chemistry and materials characterization capabilities at LANL – the SEIS is not intended to revisit that decision. Instead the SEIS is limited to supplementing the prior analysis by examining the potential environmental impacts related to the proposed change in CMRR design. So in addition to the no-action alternative (proceed with

CMRR-NF as announced in the 2004 ROD), the SEIS considers two action alternatives: construct a new CMRR-NF in accordance with the modified CMRR-NF design concept (construction options include shallow and deep excavation); and continue using CMR with minor upgrades and repairs to ensure safety, together with RLUOB.

On March 11, 2011, the Fukushima Daiichi nuclear power station in Japan was damaged by the tsunami generated by a magnitude 9.0 earthquake. Officials from the U.S. Department of Energy, the U.S. Nuclear Regulatory Commission, and other Federal agencies are maintaining close contact with Japanese officials and providing the Japanese government with expertise in a variety of areas. At the current time, efforts are focused on emergency response, and we do not yet have all of the information needed on lessons to be learned from the incident. Nevertheless, safety and security remain at the forefront of our management of the nuclear weapons complex. Bearing in mind the critical differences between a nuclear power plant and a nuclear materials research laboratory, DOE is committed to learning from Japan's experience, will continue to monitor the unfolding events, and will make every effort to keep stakeholders updated as new information relevant to this SEIS develops.

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Appendix C

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

AASHTO	American Association of State Highway and Transportation Officials
AC and MC	analytical chemistry and materials characterization
ACHP	Advisory Council on Historic Preservation
AEA	Atomic Energy Act
AEI	areas of environmental interest
ALARA	as low as is reasonably achievable
ATSDR	Agency for Toxic Substances and Disease Registry
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
CAIRS	Computerized Accident/Incident Reporting System
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CMR	Chemistry and Metallurgy Research
CMRR	Chemistry and Metallurgy Research Building Replacement
CMRR-NF	Chemistry and Metallurgy Research Building Replacement Nuclear Facility
CWA	Clean Water Act
DART	days away, restricted, or transferred
dB	decibels
dBA	decibels A-weighted
DD&D	decontamination, decommissioning, and demolition
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DSA	Documented Safety Analysis
EA	Environmental Assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FR	*Federal Register*
GHG	greenhouse gases
GTCC	Greater-Than-Class C
HCM	Highway Capacity Manual
HEPA	high-efficiency particulate air filter
HLW	high-level radioactive waste
IPCC	Intergovernmental Panel on Climate Change
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LCF	latent cancer fatality
LEED	Leadership in Energy and Environmental Design
LEED-NC	Leadership in Energy and Environmental Design for New Construction and Major Renovations

LLW	low-level radioactive waste
LOS	level of service
MAR	material at risk
MDA	Material Disposal Area
MEI	maximally exposed individual
MLLW	mixed low-level radioactive waste
MMI	Modified Mercalli Intensity
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environmental Department
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PC	Performance Category
PCB	polychlorinated biphenyl
PDSA	preliminary documented safety analysis
PHV	peak hourly volume
PM_n	particulate matter less than or equal to n microns in aerodynamic diameter
POVs	privately owned vehicles
ppm	parts per million
PRSs	potential release sites
PSHA	Probabilistic Seismic Hazards Analysis
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
RLUOB	Radiological Laboratory/Utility/Office Building
RLWTF	Radioactive Liquid Waste Treatment Facility
RMP	Resource Management Plan
ROD	Record of Decision
ROI	Region of Influence
RSL	Remote Sensing Laboratory
SA	supplement analysis
SC	Safety Class
SEIS	Supplemental Environmental Impact Statement
SERF	Sanitary Effluent Reclamation Facility
SNM	special nuclear material
SSC	structure, system, and component
SWEIS	site-wide environmental impact statement
SWPPP	Storm Water Pollution Prevention Plan

SWWS	Sanitary Wastewater Systems Plant
TA	technical area
TRAGIS	Transportation Routing analysis Geographic Information System
TRCs	total recordable cases
TRU	transuranic waste
TSD	treatment storage and disposal
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
VAP	Vehicle Access Portals
VCP	Vehicle Control Point
VMT	vehicle miles traveled
WETF	Weapons Engineering Test Facility
WIPP	Waste Isolation Pilot Plant

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/million	Parts/million	1 [a]	Milligrams/liter
Micrograms/liter	1 [a]	Parts/billion	Parts/billion	1 [a]	Micrograms/liter
Micrograms/cubic meter	1 [a]	Parts/trillion	Parts/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 C + 17.78	1.8	Degrees F	Degrees F - 32	0.55556	Degrees C
Relative					
Degrees C	1.8	Degrees F	Degrees F	0.55556	Degrees C
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	35.314	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}

CHAPTER 1
INTRODUCTION AND PURPOSE AND NEED FOR AGENCY ACTION

1 INTRODUCTION AND PURPOSE AND NEED FOR AGENCY ACTION

Chapter 1 presents an overview of the U.S. Department of Energy/National Nuclear Security Administration *Draft 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). This chapter briefly relates the progression of project planning and National Environmental Policy Act environmental impact reviews, provides background information, and discusses the purpose and need for action and the alternatives analyzed in this *CMRR-NF SEIS* for constructing and operating the Nuclear Facility portion of the Chemistry and Metallurgy Research Building Replacement Project. The chapter further summarizes the associated environmental impact reviews, discusses decisions to be made now, and describes public participation actions conducted for this *CMRR-NF SEIS.*

1.1 Introduction

This *Draft 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) has been prepared in accordance with the National Environmental Policy Act (NEPA), as amended (42 U.S.C. 4321 et seq.), as well as Council on Environmental Quality (CEQ) regulations and U.S. Department of Energy (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 National Nuclear Security Administration (NNSA)[1] has completed over the last 8 years, as well as the changes to the CMRR-NF proposal that are the subject of this *CMRR-NF SEIS.*

Five alternatives were analyzed in the November 2003 *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):

- Alternative 1 (the Preferred Alternative): Construct a new Chemistry and Metallurgy Research Building Replacement (CMRR) Facility at Technical Area 55 (TA-55).
- Alternative 2 (Greenfield Site Alternative): Construct a new CMRR Facility at TA-6.
- Alternative 3 (Hybrid Alternative at TA-55): Construct new Hazard Category 2 and 3 laboratory buildings (above or below ground) at TA-55 and continue use of the Chemistry and Metallurgy Research (CMR) Building.
- Alternative 4 (Hybrid Alternative at TA-6): Construct new Hazard Category 2 and 3 laboratory buildings (above or below ground) at TA-6 and continue use of the CMR Building.
- No Action Alternative: Continue use of existing CMR Building – no new building construction.

The Preferred Alternative (Alternative 1) was selected for implementation in a 2004 Record of Decision (69 FR 6967).

[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 [P.L. 106-65]).*

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), which was followed by the issuance of a Record of Decision (ROD) in February 2004 (69 FR 6967) (DOE 2004a). In the *CMRR EIS* 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 and 3 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 be decontaminated, decommissioned, and demolished (DD&D) in its entirety (under *CMRR EIS* Disposition Option 3). The preferred alternative includes 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.

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" by 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."

As described in the *CMRR EIS*, the administrative and support building would provide office space in addition to laboratory space used for such activities as glovebox mockup, process testing, chemical experimentation, training, and general research and development. The laboratory areas within it 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 operations, and one floor above ground, containing Hazard Category 3 operations. Each building would have multiple stories and a total of about 200,000 square feet (19,000 square meters) of floor space. 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 buildings.

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

[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 as radiological facilities.*

Building (RLUOB), was fully planned and constructed over the past 6 years, from 2004 through 2010. NNSA prepared the *Supplement Analysis, Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement (CMRR) Project at Los Alamos National Laboratory, Los Alamos, New Mexico: Changes to the Location of the CMRR Facility Components (CMRR SA)* (DOE/EIS-0350-SA-01) (DOE 2005a) in 2005 to evaluate a proposal to place RLUOB at a location other than the one analyzed specifically in the 2003 *CMRR EIS*. In the *CMRR SA*, NNSA determined that the *CMRR EIS* impacts analysis encompassed this proposal and that an SEIS was not required. However, the RLUOB site location was later changed back to the location originally considered in the *CMRR EIS*, and the building site considered in the *CMRR SA* was used, as proposed and analyzed in the *CMRR EIS*, for the construction of a permanent paved parking area, with temporary construction trailers and other support functions being located within this parking area. RLUOB is now being outfitted and equipped, and interior finishing is under way. Occupancy of RLUOB is currently estimated to begin in 2011, with radiological laboratory operations commencing in about 2012.

Chemistry and Metallurgy Research Building Replacement Project Terminology

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

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 administrative and support facility component of the CMRR Facility. The RLUOB has been constructed in TA-55.

Chemistry and Metallurgy Research Building Replacement Project 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.

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 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 so as not to limit the range of reasonable alternatives.

Both the *LANL SWEIS* and the *Complex Transformation SPEIS* were issued in 2008. Among the various decisions supported by the analysis contained in the *Complex Transformation SPEIS* 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. These decisions were issued in a December 2008 *Complex Transformation SPEIS* ROD (73 FR 77644). 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, including those at TA-55 and within surrounding and nearby TAs along the Pajarito Road corridor. 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 the CMRR-NF planning process.

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 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 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. This *CMRR-NF SEIS* addresses the CMRR-NF design alternatives, as well as updated information on the ancillary and support activities, that have developed since the *CMRR EIS* and *LANL SWEIS* were published.

NNSA decided in 2008, and again in 2009, to continue to defer certain programmatic decisions until after the release of the Administration's next *Nuclear Posture Review Report*, which was issued in April 2010 (DoD 2010). To date, no further related programmatic decisions have been announced by NNSA since this report was released, although additional decisions may be announced later through the NEPA compliance process.

1.2 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 1–1**). 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.

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 County are the Los Alamos townsite and the White Rock residential development (see Figure 1–1). Together, these two residential areas are home to about 18,400 people. About 13,000 people work at LANL, only about half of whom reside within Los Alamos County. LANL operations occur within numerous facilities located over 47 designated TAs within the LANL boundaries and at other leased properties situated near LANL. The 47 contiguous LANL TAs (which are not numbered sequentially) have been established so that they segregate the entire LANL site (see **Figure 1–2**). Most of LANL is undeveloped forested land that provides a buffer for security and safety, as well as expansion opportunities for future use. About 46 percent of the square footage of LANL facilities is considered laboratory or production space; the rest is considered administrative, storage, service, and miscellaneous space (LANL 2011).

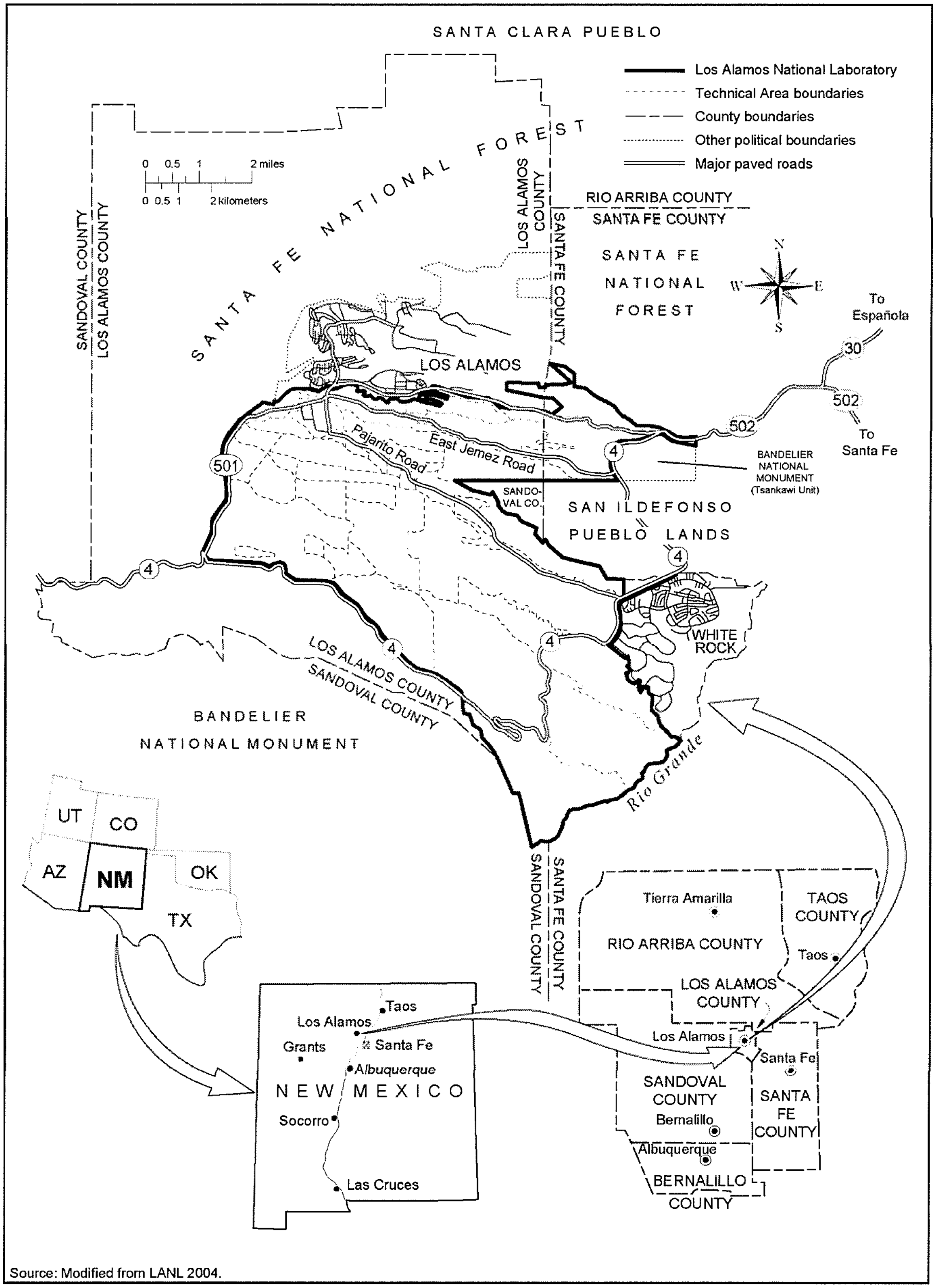

Figure 1–1 Location of Los Alamos National Laboratory

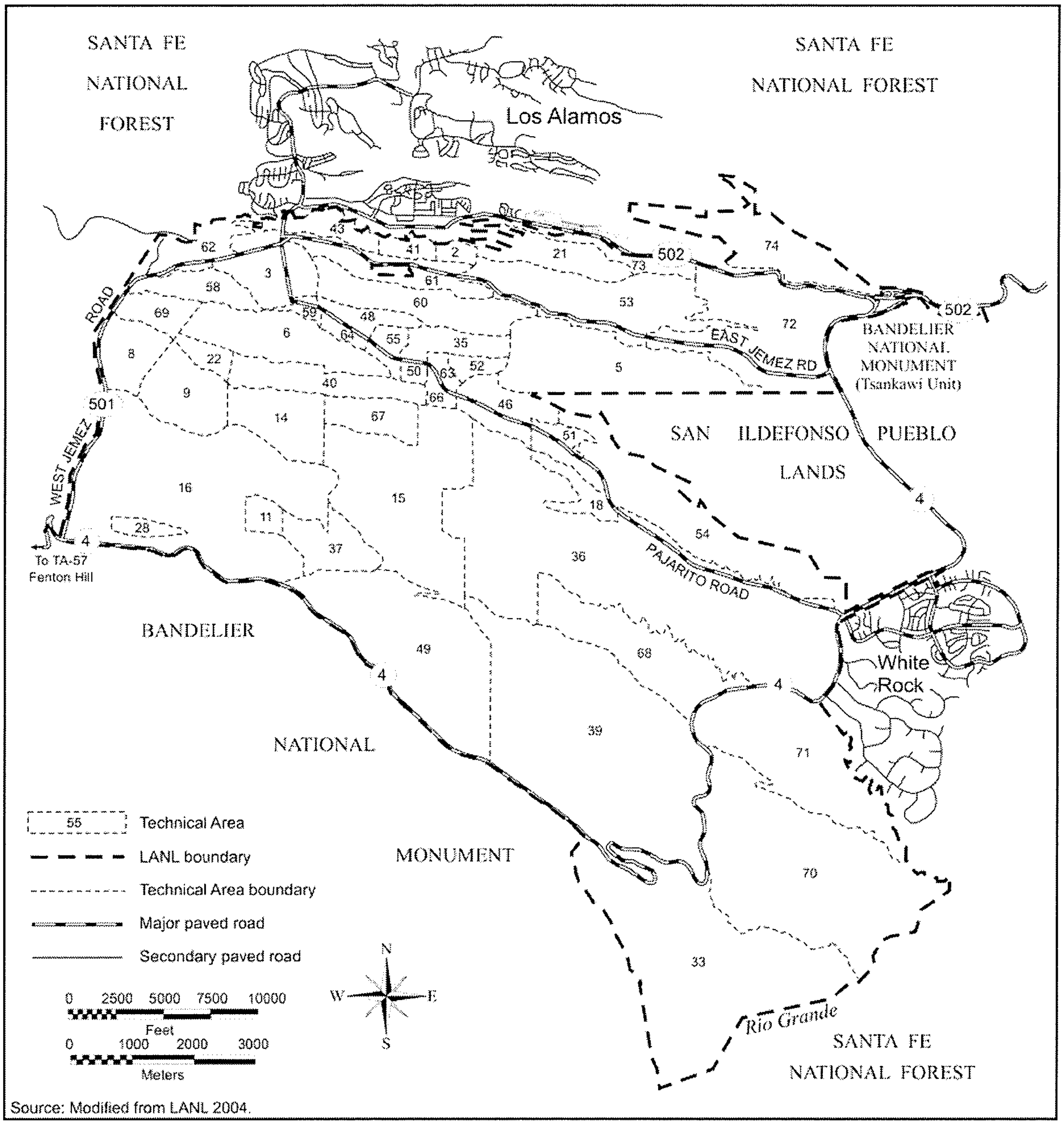

Figure 1–2 Identification and Location of Los Alamos National Laboratory Technical Areas

Since its creation in 2000, NNSA has had the following congressionally assigned missions: (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.

NNSA and DOE generally assign mission element work to LANL[4] based on the facilities and expertise of the staff located there, as well as other factors. Theoretical research (including analysis, mathematical modeling, and high-performance computing), experimental science and engineering, advanced and nuclear materials research, and development of applications (including weapons components testing, fabrication, stockpile assurance, replacement, surveillance, and maintenance) are performed at LANL using the facilities and staff there. These capabilities allow activities—such as high-explosives processing, chemical research, nuclear physics research, materials science research, systems analysis and engineering, human genome mapping, and research and development of biotechnology applications and remote sensing technologies—to be performed that can be applied to resource exploration and environmental surveillance activities conducted at LANL.

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 research, design, and development of nuclear weapons; maintaining the knowledge base and capabilities needed to support testing of nuclear weapons and the assessment and certification of their 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 (Building 3-29) located in TA-3 (see **Figure 1–3**), which has unique capabilities for performing AC, MC and actinide[5] 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 support a number of critical national security missions, including nuclear nonproliferation programs and the manufacturing, development, and surveillance of nuclear weapons pits.[6] 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 1999a) 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 1–3), and several certified pits[7] 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.

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[4] *Additional information regarding DOE and NNSA work assignments at LANL is presented in both the 1999 and 2008* LANL SWEISs. *These documents and other related documents can be found on the Internet at http://nepa.energy.gov/DOE_NEPA_ documents.htm and http://www.lanl.gov/.*

[5] *"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.*

[6] *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.*

[7] *A certified pit meets the specifications for use in the U.S. nuclear stockpile.*

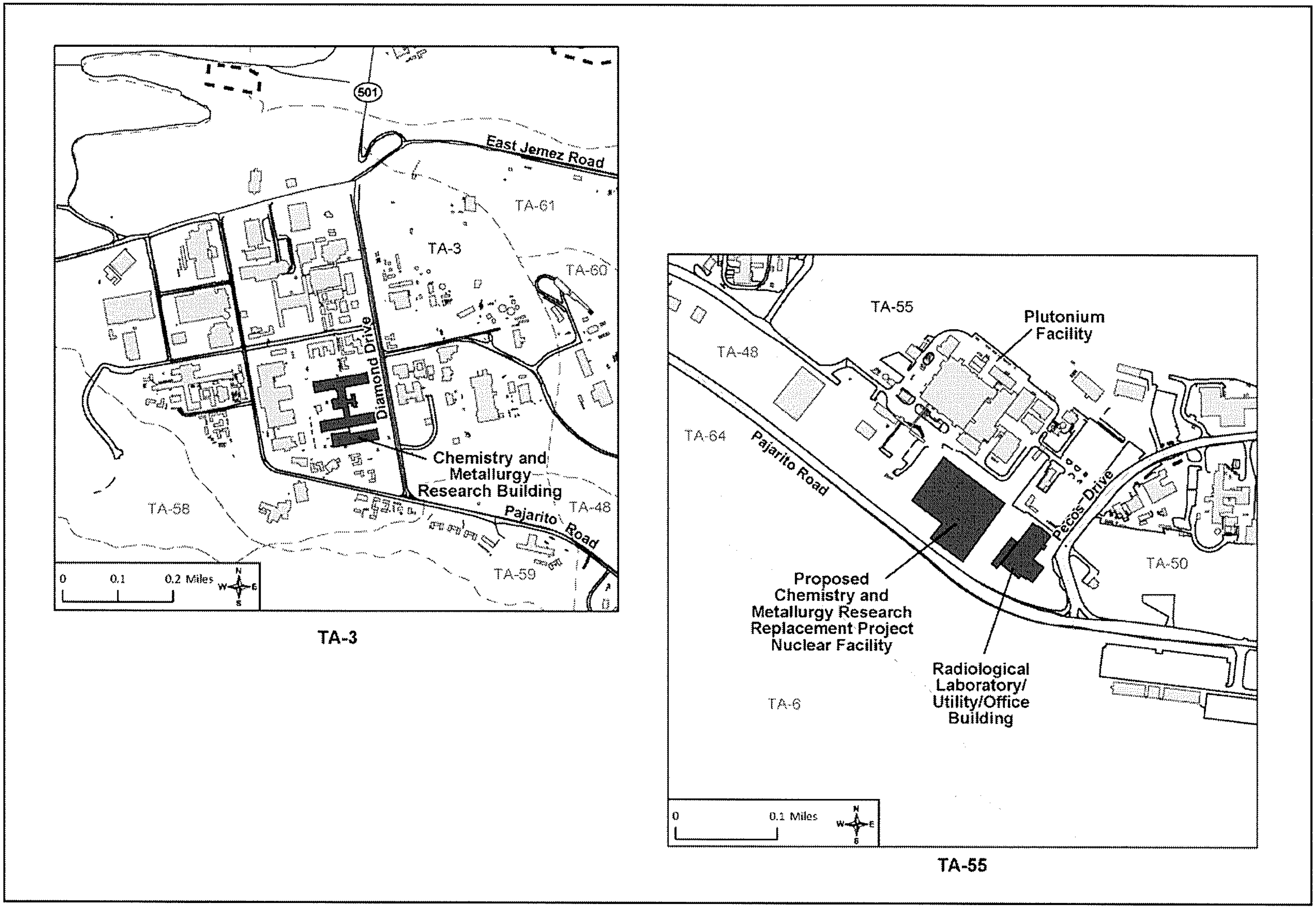

Figure 1–3 Location of Facilities in Technical Areas 3 and 55

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 (see following paragraphs), 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 have 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 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 at the time 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 selective 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.

1.3 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 act 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 AC and MC activities for the purpose of increasing operational efficiency and enhancing security.

AC and MC activities historically conducted at the CMR Building are fundamental capabilities required for support of all DOE and NNSA nuclear mission work at LANL. CMR 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. As discussed above, 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 like activities at TA-55 would enhance operational efficiency in terms of security, support, and risk reduction related to handling and transportation of nuclear materials.

1.4 Scope and Alternatives

This section introduces the three alternatives analyzed in this *CMRR-NF SEIS* for carrying out AC and MC operations at LANL. These alternatives are addressed in more detail in Chapter 2, Section 2.6. See Section 2.7 for a discussion of alternatives that were considered and dismissed from detailed analysis.

- ***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 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)[8] 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.

- ***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.

1.4.1 No Action Alternative

Under the No Action Alternative, NNSA would implement the decisions made in the 2004 *CMRR EIS*, the *Complex Transformation SPEIS* ROD, and the 2008 *LANL SWEIS* RODs. NNSA would construct the new CMRR-NF (referred to as the "2004 CMRR-NF") at LANL within TA-55 next to the already constructed RLUOB (see Figure 1–3). The 2004 CMRR-NF would be an aboveground building described under Alternative 1, Construction Option 3, in the 2003 *CMRR EIS*. As part of the No Action Alternative, which was selected in the *LANL SWEIS* ROD, the 2008 *LANL SWEIS* 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.

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[8] *Each structure, system, and component in a DOE facility is assigned to one of five performance categories depending upon its safety importance. PC-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 2002c).*

AC and MC operations and associated research and development Hazard Category 2 and 3 laboratory capabilities would be 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 continue in the 2004 CMRR-NF over about a 50-year period. After laboratory operations are removed from the CMR Building, it would undergo 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 occur. The phased elimination of CMR Building operations was originally estimated to be completed by around 2010; completion is now projected by about 2023.

Construction of the 2004 CMRR-NF would include the construction of connecting tunnels to RLUOB and the TA-55 Plutonium Facility, material storage vaults, utility structures and trenches, security structures, parking area(s), and a variety of other support areas (such as material laydown areas, a concrete batch plant, and equipment storage and parking areas). The construction force would peak at 300 workers. Each of these actions and activities was described in the 2003 *CMRR EIS*, the 2008 *LANL SWEIS*, and the 2008 *Complex Transformation SPEIS*. Specifically, NNSA would build the 2004 CMRR-NF at TA-55 as one building of a two-building CMRR Facility (under Alternative 1, Construction Option 3, as analyzed in the *CMRR EIS* and selected in the *CMRR EIS* ROD).

The 2004 CMRR-NF would be entirely designed as a Hazard Category 2 facility. The 2004 CMRR-NF would have a building "footprint" measuring about 300 by 210 feet (91 by 64 meters) and would comprise approximately 200,000 square feet (18,600 square meters) of solid floor space divided between two stories, and would also include one steel grating "floor" where mechanical and other support systems would be located and one small roof cupola enclosing the elevator equipment. The 2004 CMRR-NF would have an aboveground portion (consisting of a single story) that would house the Hazard Category 3 laboratories and a belowground portion (consisting of a single story) that would house the Hazard Category 2 laboratories and extend an average of 50 feet (15 meters) below ground. The total amount of laboratory workspace where mission-related AC and MC operations would be 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 NNSA/LANL integrated nuclear planning activities (DOE 2005b). Fire protection systems for the 2004 CMRR-NF would be 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 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. The 2004 CMRR-NF would not be constructed.

1.4.2 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, as identified in the No Action Alternative, with certain construction enhancements and additional associated construction support activities. The structure would be constructed to meet the current *International Building Code*; 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. As under the No Action Alternative, AC and MC operations and associated research and development Hazard Category 2 and 3 laboratory capabilities would be relocated in stages from their current locations at the CMR Building and the TA-55 Plutonium Facility 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 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 power lines, site stormwater detention ponds, road realignments, turn 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 91 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 92 feet (28 meters) in the other dimension was to provide corridor space for movement of equipment, to avoid interference between systems (mechanical, electrical, piping), 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 and backfill 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 be 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 remainder of the construction activities would be as described previously under the No Action Alternative. 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 bury the building to the vault roof level. The building would have three stories below ground on the northwest and two stories below ground on the southeast due to site sloping, with two stories and a partial roof level above ground on the southeast.

There is no preferred construction option at this time. The Deep Excavation Option is more mature, having undergone technical review by NNSA, NNSA's contractors, and the Defense Nuclear Facilities Safety Board. At this time, there is more uncertainty with the Shallow Construction Option. The Shallow Construction Option needs to be subjected to the same level of technical review as the Deep Construction Option so the two options can be evaluated on the same basis.

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 NNSA's stated purpose and need for taking action.

1.4.3 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, located 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" as necessary within portions of the CMR Building as routine safety and security measures to ensure continued safe worker conditions.

This alternative would result in very limited AC and MC capabilities at LANL over the extended period, and these capabilities could gradually become more limited and more focused on supporting plutonium operations, depending on the overall ability of the CMR Building to be safely operated and maintained in a physically prudent fashion. 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 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 this *CMRR-NF SEIS* as a prudent measure in light of possible future fiscal budgetary constraints.

1.5 Decisions to be Supported by this *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 this *CMRR-NF SEIS*, or it may elect to implement only a portion of the alternatives.

The environmental impact analyses of the alternatives considered in this *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 those 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 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 2004 ROD, the 2008 *LANL SWEIS*, the *Complex Transformation SPEIS* and its associated ROD, and in this *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 related to maintenance of CMR operational capabilities at LANL to support critical NNSA missions reached in 2008 and issued through the 2008 *Complex Transformation SPEIS* ROD. AC and MC capabilities were a fundamental component of Project Y during the Manhattan Project era, and the decision to facilitate 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 AC and MC 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 that, due to a lack of information on proposal(s) for replacement of the CMR Building to provide for its continued operations and capabilities support, it was not the appropriate time to make specific decisions on the project. With the support of the 1999 *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 operations below ground, and for the DD&D of the existing CMR Building after all operations were re-established at the new CMRR Facility. The 2008 *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 implementing decision(s) on the CMRR-NF until completion of the programmatic impact analysis (the *Complex Transformation SPEIS*) for transforming the nuclear weapons complex into a smaller, more-efficient enterprise. In December 2008, NNSA issued its decisions on the nuclear enterprise, which included the decision to construct and operate the CMRR-NF at LANL as identified in the *CMRR EIS* ROD. There is no current proposal to change or modify the operation of the CMRR-NF as it was described in these prior NEPA documents, nor is there any current proposal to change the disposition of the existing CMR Building after it has been decommissioned and decontaminated.

NNSA is not planning to revisit decision(s) made recently on actions geographically located along the LANL Pajarito Mesa (where TA-55 is located) or along the Pajarito Road corridor (which transverses 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 TA-55 Plutonium Facility to extend its reliable future operations
- Replacement of the existing, aging Radioactive Liquid Waste Treatment Facility 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)[9]
- 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 listed above were analyzed in the 2008 *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 this *CMRR-NF SEIS*.

NNSA may make new, additional decisions in the future on other actions analyzed in the *LANL SWEIS* and *Complex Transformation SPEIS*, such as the need for the construction of some additional replacement buildings to house ongoing LANL operations and to make modifications to facility operations at LANL. As appropriate, any such decision(s) would be announced in one or more new RODs, which would be published in the *Federal Register* and be made publicly available on the Internet. New NEPA documents appear on the DOE NEPA website at http://nepa.energy.gov/.

1.6 Other National Environmental Policy Act Documents

Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management (Stockpile Stewardship and Management PEIS) (DOE/EIS-0236). In September 1996, DOE issued the *Stockpile Stewardship and Management PEIS* (DOE 1996a), which evaluated the potential environmental impacts resulting from activities associated with nuclear weapons research, design, development, and testing, as well as the assessment and certification of weapons' safety and reliability. The document

[9] *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.*

analyzed the development of three new facilities to provide enhanced experimental capabilities. In the December 26, 1996, *Stockpile Stewardship and Management PEIS* ROD (61 FR 68014), DOE elected to downsize a number of weapons complex facilities, build the National Ignition Facility at Lawrence Livermore National Laboratory, and re-establish a pit fabrication capability at LANL. A supplement analysis (DOE/EIS-0236-SA) was prepared to examine the plausibility of a building-wide fire at the TA-55 Plutonium Facility and to examine new studies regarding seismic hazards at LANL. The supplement analysis concluded that there was no need to prepare an SEIS. The impacts of this decision were included in the baseline assessment and in the potential cumulative impacts resulting from the *CMRR EIS* proposed action. In addition, as identified in the *CMRR EIS* Notice of Intent (67 FR 48160), CMR capabilities at LANL supported the Stockpile Stewardship Program mission addressed in the *Stockpile Stewardship and Management PEIS.*

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 (DOE 1997a) 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.

As mentioned in Section 1.2, 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 (CMRR EIS) (DOE/EIS-0350). Issued in 2003, the *CMRR EIS* (DOE 2003b) 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 occupancy in 2011.

Supplement Analysis, Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement (CMRR) Project at Los Alamos National Laboratory, Los Alamos, New Mexico: Changes to the Location of the CMRR Facility Components (CMRR SA) (DOE/EIS-0350-SA-01). Issued in 2005, the *CMRR SA* (DOE 2005a) was prepared to evaluate placement of the administrative and support building (now RLUOB) for the CMRR Project in the same vicinity, but at locations other than those detailed in the *CMRR EIS* ROD. NNSA concluded that the environmental impacts of the proposed action were adequately bounded by the analyses of impacts presented in the 2003 *CMRR EIS*, and no SEIS was required. However, the RLUOB site location was later changed back to the location originally considered in the 2003 *CMRR EIS*, and the building site considered in the *CMRR SA* was used, as proposed and analyzed in the 2003 *CMRR EIS*, as a location for a permanent paved parking area and temporary construction trailers and other support functions.

Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico (LANL SWEIS) (DOE/EIS-0380). In the 2008 *LANL SWEIS* (DOE 2008a), NNSA analyzed the potential environmental impacts associated with continued operation of LANL. The three alternatives analyzed the environmental impacts of three levels of operations: 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 NEPA analyses and decisions. Two support 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 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 issued on September 26, 2008 (73 FR 55833), and a second ROD was issued on July 10, 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 for this *CMRR-NF SEIS*, and the additional support activities analyzed under that alternative, as well as certain elements from the Expanded Operations Alternative.

Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS) (DOE/EIS-0236-S4). The *Complex Transformation SPEIS* was issued on October 24, 2008 (DOE 2008c); 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.

1.7 Public Participation

During the NEPA process, there are several opportunities for public involvement (see **Figure 1–4**). On October 1, 2010, NNSA published a Notice of Intent to prepare this *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 this *CMRR-NF SEIS*. Although scoping is optional for an SEIS under DOE's NEPA implementing procedures (10 CFR 1021.314(d)), 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 this *CMRR-NF SEIS*. The Notice of Intent informed the public that comments on the proposed action could be submitted via U.S. mail, email, 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 this *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 comments were considered by NNSA in preparing this *CMRR-NF SEIS.*

A comment is defined as a single statement concerning a specific issue for NEPA public scoping purposes. 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.

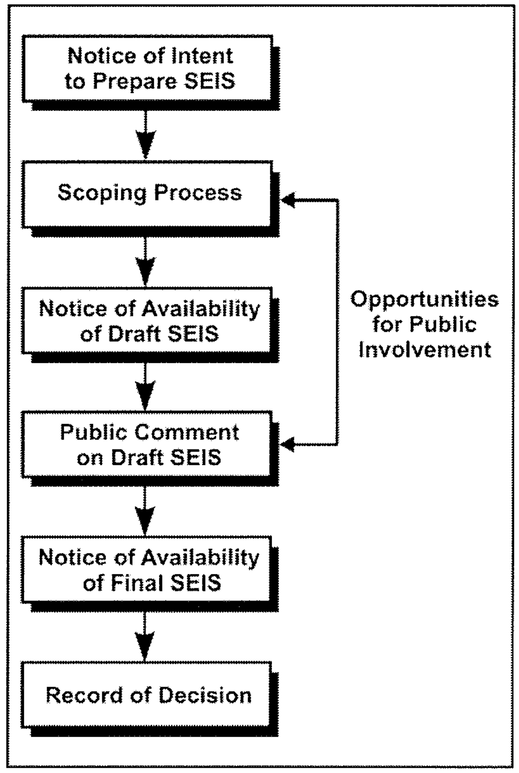

Figure 1–4 National Environmental Policy Act Process for this *CMRR-NF SEIS*

Summary of Major Comments

Approximately 85 comment statements or documents were received from citizens, interested groups, local officials, and representatives of Native American pueblos in the vicinity of LANL during the scoping process. 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 this *CMRR-NF SEIS.* Issues found to be relevant to this SEIS are addressed in the appropriate chapters or appendices of this *CMRR-NF SEIS.* 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 this *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 comments were considered by NNSA in preparing this *CMRR-NF SEIS.*

Comments on the DOE/NNSA NEPA Process

- ***Comment Summary:*** There were comments on the scoping meeting format. Commentors requested that oral comments at the meeting be transcribed by a court reporter and entered into the comment record. Commentors also requested additional scoping meetings in other areas of New Mexico and at other NNSA sites, as well as an extension of the public scoping period. Commentors questioned how notice was provided to the public and to affected parties that an SEIS was to be prepared. In addition, there were suggestions on how the public participation for the draft SEIS should be addressed, including the format and locations of meetings, the length of the comment period, and the availability of SEIS references for public review.

NNSA's Response: As noted above, NNSA issued its Notice of Intent to prepare a supplement to the *CMRR EIS* in the *Federal Register* and placed notices of scoping meetings in local news media. In addition, NNSA's Los Alamos Site Office sent a notification letter to its list of interested parties and stakeholders on October 1, 2010, notifying the recipients of NNSA's determination to prepare a supplement to the *CMRR EIS* and inviting comments and participation in the NEPA process and public scoping meetings. The list of interested parties comprises organizations and individuals who have previously expressed interest in NEPA-related activities conducted at LANL. The scoping meetings were planned to enable NNSA to collect input on the scope of the planned SEIS. To the extent practicable, NNSA made changes to the meeting format for the second meeting. In response to requests, the public scoping comment statements and documents were posted on the NNSA website (http://nnsa.energy.gov/nepa/cmrrseis). With issuance of the Notice of Availability for this *Draft CMRR-NF SEIS,* NNSA is announcing the locations and times of public hearings on the draft document, and how interested parties can obtain copies of the draft SEIS and access to references.

- ***Comment Summary:*** Comments addressed the type of document NNSA should prepare, calling for development of a new EIS rather than an SEIS, based on changes in construction materials, project costs, and the schedule, as well as perceived scope changes in the years since the 2004 *CMRR EIS* ROD was issued. Commentors questioned the timing of the preparation of this SEIS while DOE is conducting an independent review of the CMRR-NF and another facility replacement project at the Y–12 National Security Complex in Tennessee. 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. Others stated that a new EIS should consider relocating all LANL plutonium operations to another site. Several commentors asked that funding of the CMRR-NF be halted while this SEIS is being prepared.

NNSA's Response: 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 1502.9(c) and 10 CFR 1021.341(a) - (b), respectively), to address the changes in construction of the CMRR-NF based on additional seismic information. The *CMRR-NF SEIS* also includes information that was not available at the time the *CMRR SEIS* was prepared and addresses recent guidance such as including impacts of greenhouse gases. The accident analysis has been updated based on additional seismic and population data. In November 2010, the Secretary of Energy invited experts to provide him with their individual assessment of program requirements for the CMRR-NF and the Uranium Processing Facility at the Y-12 National Security Complex in Oak Ridge, Tennessee (DOE 2010). In addition, the U.S. Department of Defense is conducting a review, with support from an independent group of experts, to consider safety, security, and program requirements and to develop an independent assessment of estimated cost range data for the CMRR-NF and the Uranium Processing Facility. Analyses and recommendations from these independent assessments, information in this *CMRR-NF SEIS,* and other programmatic considerations will be weighed as NNSA moves toward a final decision on the construction and operation of a CMRR-NF. As discussed in Section 1.5, NNSA is not planning to revisit either the need for the CMRR-NF or locating the facility at another site. The *Complex Transformation SPEIS* (DOE 2008c) addressed the location for manufacturing and research and development involving plutonium. In the ROD for that document, NNSA announced its decision that that mission would remain at LANL and its decision to construct and operate the CMRR-NF at LANL. Based on these decisions and the authorization for the project and appropriation of funding, NNSA intends to proceed with the CMRR-NF planning process.

Comments on U.S. National Security Policy and DOE Priorities

- ***Comment Summary:*** There were several comments opposing nuclear weapons, pointing out apparent inconsistencies with U.S. policy on disarmament, and calling for an end to NNSA's weapons mission at LANL. Others suggested that NNSA should change its mission at LANL to research and development of clean and renewable energy or pursue solutions to climate change. Some comments stated that the project money would be better used on helping the people of New Mexico, cleaning up legacy waste, and ensuring that facilities like the Radioactive Liquid Waste Treatment Facility and the TRU Waste Facility are constructed. Some commentors also expressed concern that the use of funds for constructing the CMRR-NF would interfere with NNSA's carrying out the requirements of the Consent Order.

  NNSA's Response: NNSA acknowledges that there is substantial opposition to the nuclear weapons mission. However, decisions on nuclear weapons policy are made by the President and Congress and are outside the NEPA process. Section 1.5 of this *CMRR-NF SEIS* discusses the decisions that NNSA does not plan to reconsider in this SEIS, including changes in the Stockpile Stewardship Program mission at LANL. That same section also states that NNSA is not planning to revisit its decisions on projects located along the Pajarito Road corridor, including the TRU Waste Facility and the Radioactive Liquid Waste Treatment Facility, or its commitment to closure of various material disposal areas at the direction of the New Mexico Environmental Department and in compliance with the Consent Order.

Comments on the Scope of the CMRR-NF SEIS

- ***Comment Summary:*** There were suggestions for changes in the alternatives and for additional alternatives to be addressed in the SEIS. Some comments called for a change in the No Action Alternative that was proposed in the Notice of Intent, requesting that the No Action Alternative analyze not constructing the CMRR-NF, or constructing only a vault structure. Others suggested that continued use of the existing CMR Building for AC and MC operations should be the No Action Alternative. Addressing the proposed action, there were suggestions that NNSA consider locating the AC and MC operations in available space in other LANL facilities, such as the TA-55 Plutonium Facility or RLUOB so that the CMRR-NF would not be required. One commentor called for a review of available space throughout the DOE complex (nationwide) for alternative locations for CMR operations. A commentor questioned the need for deep excavation below the poorly welded tuff layer.

  NNSA's Response: The No Action Alternative considered in this *CMRR-NF SEIS* is the Preferred Alternative that was selected by NNSA for implementation in the 2004 ROD based on the 2003 *CMRR EIS*. This *CMRR-NF SEIS* also considers an alternative that would continue to rely upon the restricted use of the CMR Building without constructing the CMRR-NF even though, as discussed in Section 1.4, this would not meet NNSA's purpose and need for taking action. RLUOB has not been constructed as a nuclear-qualified space to handle Hazard Category 2 or 3 levels of nuclear material. Thus, NNSA would not operate the building as anything other than a radiological facility, which would significantly limit the total quantity of SNM 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. As stated above, while NNSA does not intend to revisit its decision regarding locating AC and MC operations at LANL, using other existing LANL nuclear facilities to accommodate all or some of the AC and MC operations would result in these operations being spread out over LANL, would likely require significant facility upgrades and would require the elimination of other current mission support work that is now performed by these nuclear facilities to free up room for the AC and MC operations. This suggested action would not meet NNSA's stated purpose and need for action and is not evaluated further in this SEIS. With regard to deep excavation, since the issuance of the Notice of Intent in October 2010, NNSA has added an additional construction option to the Modified CMRR-NF Alternative. This *CMRR-NF SEIS* analyzes two construction options: Deep Excavation, which would involve excavation to a nominal depth of 130 feet (40 meters) below ground and removal of the poorly welded tuff layer beneath the Modified CMRR-NF construction site; and Shallow Excavation, which would involve less excavation (to a nominal depth of 58 feet [18 meters]) because the Modified CMRR-NF's base elevation would be located above the poorly welded tuff layer. See Chapter 2, Section 2.6.2.1 for further description of the construction options.

- ***Comment Summary:*** Commentors requested that a number of specific issues be analyzed in this *CMRR-NF SEIS*. Commentors requested that economic and ethnicity analyses be done on the impacts of shipping waste as part of an environmental justice analysis. Commentors also were concerned about the impacts on health and safety. Some stated that this *CMRR-NF SEIS* should evaluate health effects for particular portions of the general population and objected to health effects methodology based on a generic "reference man," rather than considering the potential impacts to the most vulnerable individuals. Others requested an analysis of climate change impacts, even if CEQ guidance on such analysis is not complete. Commentors also called for analysis of cumulative impacts on the public. Some mentioned the safety of land and water for food production and farming; one commentor was concerned about prime farmland. One commentor requested a compilation of every permit and any releases resulting from the proposal.

  NNSA's Response: The environmental justice discussion in Chapter 4, Sections 4.2.11, 4.3.11, and 4.4.11, of this *CMRR-NF SEIS* addresses low-income and minority populations. Sections 4.2.10, 4.3.10 and 4.4.10 also describe potential health and safety impacts on workers and the public during construction, normal operations, and in the case of accidents. As part of the analysis, estimates of potential releases are presented and these data are used to calculate doses to individuals from direct exposure and exposure through food consumption. CEQ guidance recommends that greenhouse gas emissions be considered in evaluating project impacts. The air quality sections in Chapter 4 (Sections 4.2.4.2, 4.3.4.2, and 4.4.4.2) of this *CMRR-NF SEIS* include data on the generation of greenhouse gases.

  NNSA's methodology for health effects analysis uses a risk factor that is consistent with risk factors in a population with equal numbers of males and females and with an age distribution similar to that of the entire U.S. population. Thus, this risk factor is based on a wider range of the population than adult males; however, NNSA does not analyze impacts on specific vulnerable individuals in its NEPA documents. The cumulative impacts discussion in the 2008 *LANL SWEIS* includes impacts of the No Action Alternative of this *CMRR-NF SEIS*, namely construction and operation of the 2004 CMRR-NF selected in the 2004 ROD for the 2003 *CMRR EIS*. The cumulative impacts discussion in Chapter 4, Section 4.6, of this *CMRR-NF SEIS* is based on the 2008 *LANL SWEIS* analysis and presents a cumulative impacts analysis of the Modified CMRR-NF Alternative. Chapter 5 describes the applicable laws, regulations, and permits for this proposal. NNSA routinely provides information on LANL releases and health effects in its annual site environmental reports, which are available at http://www.lanl.gov/environment/all/esr.shtml. The site environmental reports include the results of sampling air, water, fish, and produce to calculate potential doses to the public from LANL operations.

- ***Comment Summary:*** Commentors were concerned about the impacts of transporting waste generated by the proposed action and requested that this *CMRR-NF SEIS* detail where legacy and newly generated waste at LANL would be disposed of and how waste would be transported to offsite facilities, including proposed transportation modes and routes and the impacts on communities. They also requested a description of emergency preparedness capabilities along the proposed routes.

NNSA's Response: Chapter 4 of this *CMRR-NF SEIS* provides data on the amount of waste generated under each of the alternatives (see Sections 4.2.12, 4.3.12, and 4.4.12) and analysis of the transportation impacts of shipping the waste for disposal (see Sections 4.2.13.1, 4.3.13.1, and 4.4.13.1). The relationship of these quantities of project-specific wastes to quantities of LANL legacy waste is described in Section 4.6, "Cumulative Impacts." More information about disposal of legacy waste can be found in descriptions of LANL environmental restoration wastes in Chapter 5, Section 5.9, and Appendix I of the 2008 *LANL SWEIS.*

- ***Comment Summary:*** Commentors were concerned about water usage in the face of stricter limits. The statement was made that DOE estimated in the 2003 *CMRR EIS* that waste generation could double and annual water consumption could increase by 10.4 million gallons. Other commentors expressed concern about water use during construction. One commentor called for use of clean, treated effluent as the water source for concrete production.

  NNSA's Response: Water usage during construction and operations is addressed in Chapter 4 of this *CMRR-NF SEIS* (see Sections 4.2.3, 4.3.3, and 4.4.3). Current requirements for water conservation and the use of clean, treated effluent as a water source are addressed in Section 4.7, "Mitigation Measures." Regarding the commentors' statements about waste generation and annual water consumption from the 2003 *CMRR EIS*, that EIS presents operations data for the CMRR Project, which includes both RLUOB and the CMRR-NF. Water usage for both buildings was estimated at that time to be about 5 percent of total LANL available capacity (see Table 4–8 of the 2003 *CMRR EIS*). Chapter 4 of this *CMRR SEIS* evaluates the potential impacts on water supply and waste management from construction and operations as described in the alternatives for the CMRR-NF.

- ***Comment Summary:*** Several commentors questioned how a nuclear facility like the CMRR-NF could be LEED-certified if it uses so many materials, generates waste, has the potential to emit contaminants or discharge contaminated water, and supports production of nuclear weapons.

  NNSA's Response: Appendix B, Section B.2.3, describes the LEED green building certification system and its rating criteria. LEED certification does not depend on a building's use, only its sustainable design proficiency.

- ***Comment Summary:*** Commentors were especially concerned about the traffic impact of trucking large amounts of construction material in White Rock and Los Alamos and the impact on LANL commuters. Others were concerned about the impacts of potential long-term Pajarito Road closures, especially in an emergency. There were suggestions on how to accommodate the increase in traffic due to construction workers.

  NNSA's Response: The transportation analysis in Chapter 4, Sections 4.2.13, 4.3.13 and 4.4.13, addresses the impacts on traffic along site and area highways. Long-term Pajarito Road closures are no longer being considered for implementing the CMRR-NF Project.

- ***Comment Summary:*** Issues were raised concerning impacts of aircraft accidents and possible terrorist acts. One commentor was concerned that the possibility of an aircraft accident was not taken seriously. Other commentors requested that the results of the terrorism analysis be partially declassified.

NNSA's Response: The accident analyses presented in Chapter 4, Sections 4.2.10.2, 4.3.10.2, and 4.4.10.2, present the impacts of a range of possible accidents. The range of accidents considered is consistent with those evaluated in safety analysis documents; these include the crash of a light airplane. The risks from the accidents evaluated in the SEIS would be as large as or larger than those of a light airplane crash. A classified appendix was prepared to address the impact of intentional destructive acts, which include terrorism. Substantive details are not released to the public because disclosure of this information could be exploited by terrorists to plan attacks.

- ***Comment Summary:*** Commentors were concerned that jobs would not go to local workers in northern New Mexico communities, despite NNSA's statements to the contrary in local meetings. Some stated that this project would not produce new long-term jobs. Some commentors requested that this *CMRR-NF SEIS* address socioeconomic concerns, such as the number of workers involved in construction and the impacts on housing, schools, and traffic.

  NNSA's Response: Chapter 4, Sections 4.2.9, 4.3.9, and 4.4.9, of this *CMRR-NF SEIS* address the socioeconomic impacts of the alternatives.

- ***Comment Summary:*** Commentors requested that this *CMRR-NF SEIS* address DD&D of the existing CMR Building and the proposed CMRR-NF; several called for including a DD&D work plan in this *CMRR-NF SEIS* to ensure that it becomes a part of the complete NEPA analyses.

  NNSA's Response: Chapter 4, Section 4.5, of this *CMRR-NF SEIS* addresses DD&D of both the existing CMR Building and the CMRR-NF. A work plan for DD&D is not required for NEPA analysis and is not a part of this document. Detailed planning and analysis is not practical at this point because for the CMR Building, this work is potentially at least 10 to 15 years in the future and for the CMRR-NF, it is approximately 60 years in the future.

1.8 Organization of this *CMRR-NF SEIS*

This *CMRR-NF SEIS* consists of Chapters 1 through 10 and Appendices A through D. The CMRR-NF alternatives are described in Chapter 2, which also includes a comparison of potential impacts under each of the alternatives. In Chapter 3, the LANL environment is described in terms of resource areas to establish the baseline for the impact analysis. Chapter 4 provides descriptions of the potential impacts of the alternatives on the resource areas. Chapter 4 also includes discussions of DD&D, cumulative impacts, irreversible and irretrievable commitments of resources, the relationship between short-term uses of the environment and long-term productivity, and mitigation. Chapter 5 provides a description of the environmental, health, and safety compliance requirements governing implementation of the alternatives, including permits and consultations. Chapters 6, 7, 8, 9, and 10 are the glossary of terms, the list of references, the list of preparers, the *CMRR-NF SEIS* distribution list, and the index, respectively. Appendices A, B, C, and D are the list of applicable *Federal Register* notices, the methodologies to assess impacts on environmental resource areas, evaluation of human health impacts from facility accidents, and the contractor disclosure statement, respectively.

CHAPTER 2
PROJECT DESCRIPTION AND ALTERNATIVES

2 PROJECT DESCRIPTION AND ALTERNATIVES

Chapter 2 begins with a summary description of the current and future support that the Los Alamos National Laboratory analytical chemistry (AC) and materials characterization (MC) capabilities are providing to the Stockpile Stewardship Program. It provides descriptions of the existing Chemistry and Metallurgy Research Building and current AC and MC capabilities, as well as the proposed new Chemistry and Metallurgy Research Building Replacement Nuclear Facility Project. This chapter includes a description of the reasonable alternatives, the alternatives considered and subsequently eliminated from detailed evaluation, and the planning assumptions and bases for the analyses presented in this *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)*; identifies the National Nuclear Security Administration's Preferred Alternative; and presents a comparison of the impacts of the three alternatives addressed in this *CMRR-NF SEIS*.

2.1 Current and Future Support of Stockpile Stewardship

Los Alamos National Laboratory (LANL) has been assigned a variety of science, research and development, and production missions that are critical to the accomplishment of the U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) national security objectives, as reflected in the *Programmatic Environmental Impact Statement for Stockpile Stewardship and Management (SSM PEIS)* (DOE 1996a) and its associated Record of Decision (ROD), which was published in the *Federal Register* on December 26, 1996 (61 FR 68014), and the *Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS)* (DOE 2008c) and its associated RODs, which were published in the *Federal Register* on December 19, 2008 (73 FR 77644; 73 FR 77656). Specific LANL assignments for the foreseeable future include production of weapons components, assessment and certification of the nuclear weapons stockpile, surveillance of weapons components and weapons systems, ensuring safe and secure storage of strategic materials, and management of excess plutonium inventories. In addition, LANL supports actinide[1] science missions ranging from the plutonium-238 heat-source program for the National Aeronautics and Space Administration to arms control and technology development.

> **Special nuclear material** is 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.

The capabilities needed to execute the NNSA and DOE missions require facilities at LANL that can be used to handle actinide metals and other radioactive materials in a safe and secure manner. Of primary importance are the facilities located within Technical Area 3 (TA-3) (primarily the Chemistry and Metallurgy Research [CMR] Building) and TA-55 (primarily the Plutonium Facility) that are used for processing, characterizing, and storing large quantities of special nuclear material. The operations in these two facilities, along with those in several support facilities, are critical to the Stockpile Stewardship Program and to critical programs supporting the DOE Offices of Science; Environmental Management; Nonproliferation and National Security; and Nuclear Energy, Science, and Technology.

[1] *Actinides are any of a series of elements with atomic numbers ranging from actinium-89 through lawrencium-103.*

In January 1999, NNSA approved a strategy for managing operational risks at the CMR Building. This strategy recognized that the 60-year-old CMR Building could not continue its mission support at an acceptable level of risk to public and worker health and safety without operational restrictions. The strategy also committed NNSA and its operating contractor to manage the facility to a planned end-of-life in or about the year 2010. In addition, it committed NNSA and its operating contractor to develop long-term facility and site plans to relocate CMR capabilities elsewhere in LANL as necessary to maintain support of national security missions into the future. Since this strategy was approved, CMR capabilities have been restricted substantially, both by planned NNSA actions and by unplanned facility outages, including the shutdown of operations within three of the eight wings of the CMR Building. As time passes, additional CMR operations and capabilities are being restricted due to safety and security constraints. For example, the Security Category I special nuclear material storage vault at the CMR Building has been reclassified to a Security Category III/IV storage vault, which limits material inventories. It is apparent that action is required to ensure that LANL can maintain its support of critical national security missions. The Chemistry and Metallurgy Research Building Replacement Nuclear Facility (CMRR-NF) Project seeks to ensure long-term support of NNSA Stockpile Stewardship Program strategic objectives; these capabilities are necessary to support the current and future directed stockpile work and campaign activities at LANL.

2.2 Description of the Existing Chemistry and Metallurgy Research Building

2.2.1 Overview

The CMR Building (Building 3-29) was designed and built within TA-3 as an actinide chemistry and metallurgy research facility (see **Figure 2–1**). The main corridor, with seven wings (Wings 1, 2, 3, 4, 5, 7, and an Administration Wing), was constructed between 1949 and 1952. In 1960, a new wing (Wing 9) was added for activities that must be performed in hot cells (enclosed, shielded areas that safely facilitate the remote manipulation of radioactive materials). The planned Wings 6 and 8 were never constructed. In 1986, a special nuclear material storage vault was added underground. The three-story CMR Building now has eight wings connected by a spinal corridor and contains a total of 550,000 square feet (51,000 square meters) of space. It is a multiple-user facility in which specific wings are associated with different activities. In the past, the CMR Building provided full capabilities for performing special nuclear material analytical chemistry (AC) and materials characterization (MC). The broad spectrum of MC work once performed in Wing 2 of the CMR Building has been suspended or relocated as a result of restrictions on the quantity of special nuclear material allowed in the building. Now only a limited set of MC work is performed in Wings 5 and 7. Pit production does not take place at the CMR Building.

Waste management conducted within the CMR Building is designed to meet waste acceptance criteria for onsite or offsite waste management and disposal facilities. The aqueous waste from radioactive activities and other nonhazardous aqueous chemical wastes from the CMR Building are discharged from each wing into a network of drains specifically designated to transport waste solutions to the existing Radioactive Liquid Waste Treatment Facility (RLWTF) in TA-50 for treatment and disposal. The primary sources of radioactive liquid waste at the CMR Building are laboratory sinks, duct washdown systems, and overflows and blowdowns from circulating chilled water systems.

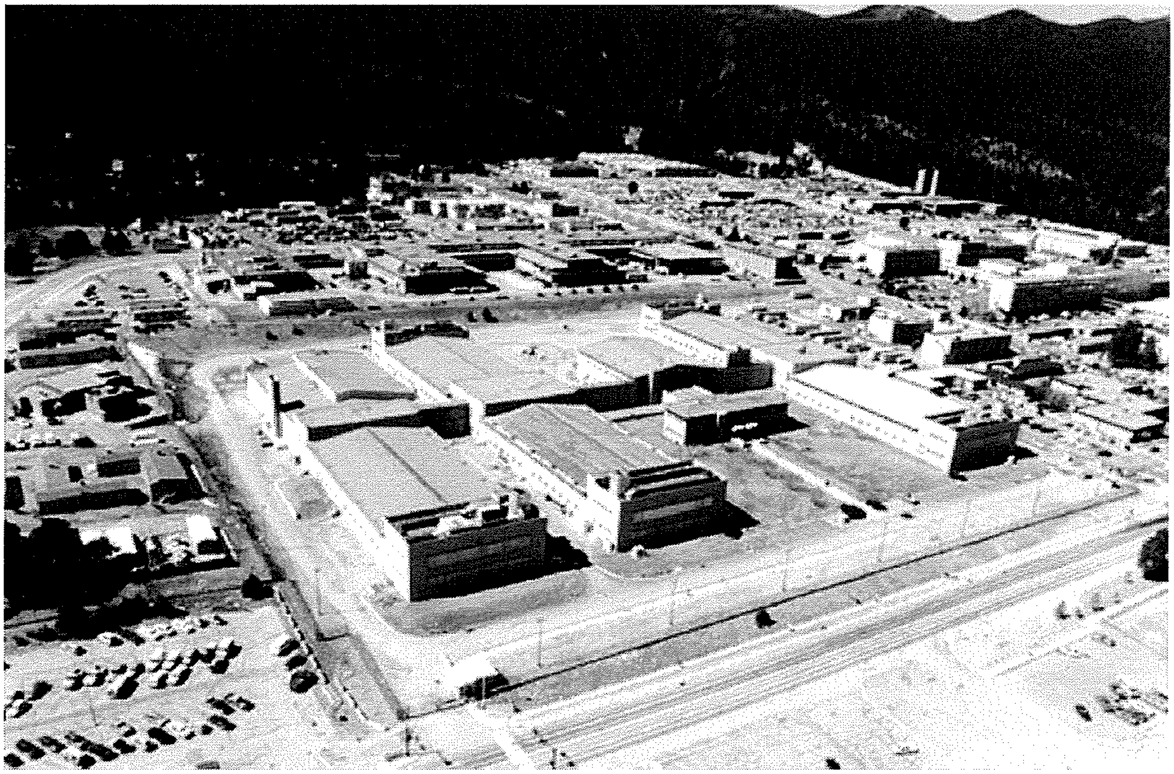

Figure 2–1 Existing Chemistry and Metallurgy Research Building

The CMR Building infrastructure was designed with air, temperature, and power systems that are operational nearly 100 percent of the time. Short-term back-up power is provided for these systems by an uninterruptible power supply; longer-term backup is provided by the TA-3 Power Plant.

The CMR Building was constructed between 1949 and 1952 to the building code standards in effect at that time. Over the intervening years, DOE has systematically identified and corrected some deficiencies and upgraded some systems to address changes in standards or to improve safety performance. However, over time, the effects of facility aging, combined with changes to safety codes, standards, and requirements, have resulted in a situation in which the building cannot be safely operated for mission support work without restrictions on the types and levels of activities and limits on material inventories. Although completed upgrades to the CMR Building allow for continued safe nuclear operations at an acceptable level of risk, it cannot be relied upon to meet mission support requirements for 50 years into the future. Major upgrades to building structural and safety systems would be required to sustain nuclear operations of the type and at the levels required to meet all DOE and NNSA mission support work requirements. Furthermore, geologic studies and seismic investigations completed at LANL from 1996 through 1998 and supplemented by a 2007 probabilistic seismic hazards analysis (LANL 2007a) identified possible connections between several faults in the surrounding area that could increase the likelihood of fault rupture in TA-3 and beneath the CMR Building that would result in an unacceptable level of damage and potentially destroy the building in the event of a severe earthquake. Upgrades to the structure of the CMR Building to address these concerns and meet the latest seismic code requirements so that the building could be operated as needed to fully support the building's identified mission were recognized as being physically very complicated and difficult to the point of being almost impossible to address without tearing down several wings of the existing structure and rebuilding them from the basements up.

The CMR Building was originally designated as a Hazard Category 2, Security Category II nuclear facility under the criteria contained in DOE-STD-1027-92 (*Hazard Categorization and Accident Analysis Techniques for Compliance With DOE Order 5480.23, Nuclear Safety Analysis Reports*) and DOE Order 474.1A (*Control and Accounting of Nuclear Materials*). The security category designation of a facility is determined by the type, quantity, and attractiveness level (that is, how readily the material could be converted into a nuclear explosive device) of the material of concern. A Hazard Category 2 facility is defined as a nuclear facility for which a hazard analysis shows the potential for significant onsite consequences. As noted previously, NNSA and its operating contractor have restricted CMR Building operations and have reduced special nuclear material quantities allowed within the building. The CMR Building is currently operated as a Hazard Category 2, Security Category III nuclear facility.

2.2.2 Administrative Wing and Wing 1

The Administrative Wing and Wing 1 consist of individual office spaces, passageways, and conference rooms on three floors (see **Figure 2–2**). Access to the CMR Building is through these wings and is controlled. The CMR Building Operations Center, housed in the Administration Wing, monitors all important system parameters.

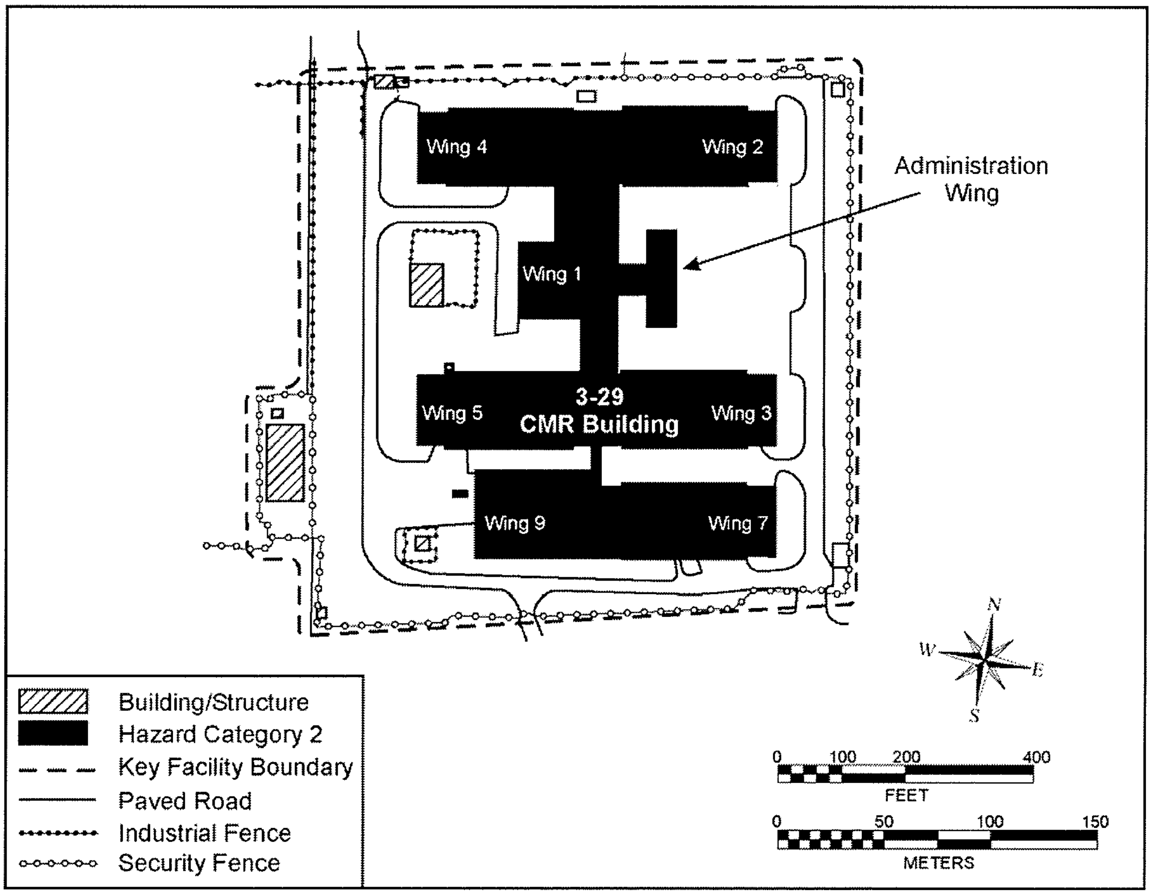

Figure 2–2 Chemistry and Metallurgy Research Building Schematic

2.2.3 Laboratories (Wings 2, 3, 4, 5, and 7)

Each CMR Building wing consists of a basement and a first and second floor. Laboratory Wings 2, 3, 4, 5, and 7 consist of laboratory modules, passageways, office space, change rooms, and electrical and ventilation equipment rooms separated by interior walls. Change rooms are located at the first floor entrance to each wing. Radiological laboratory modules are located in the center of the first floor of the associated wing. Office spaces are typically located outside the laboratory modules, separated by passageways. Filter towers, which contain ventilation and electrical equipment rooms, are located at the end of each wing, opposite the spinal corridor. A large ventilation equipment room is located on the second floor of each wing, adjoining the spinal corridor. Radiological laboratories contain gloveboxes (enclosed stainless steel or paint metal boxes with protective gloves that facilitate the safe handling of hazardous materials) and hoods required for individual processes. A radioactive liquid waste drainline system routes liquid waste from CMR Building laboratories to the existing RLWTF in TA-50. Wings 5 and 7 are currently being operated at reduced levels due to safety and seismic concerns (that is, radiological safety in the event of an earthquake that would cause structural damage to the building). Wings 2 and 3 are shut down to minimize risks related to seismic concerns and are currently undergoing hazard reduction activities. Hazard reduction activities include removal of laboratory hoods, cabinets, and miscellaneous equipment with the goal of reducing the wing inventory to less than 200 plutonium-equivalent grams; it does not include removal of gloveboxes or equipment and ventilation systems connected to gloveboxes. Hazard reduction in Wing 4 has been completed. There is no active decontamination or decommissioning work being done at the CMR Building.

2.2.4 Hot Cells (Wing 9)

Wing 9 consists of office spaces, change rooms, hydraulic plant spaces, laboratories, hot cells, and associated operating areas, a radioactive material transfer area, a machine shop, and floor well storage. Typically, utility service sources are located in the attic, with service piping or conduit dropping down to the serviced spaces.

Hot cell operations include transfer of materials between the high-bay area and the hot cell corridors; loading and unloading of radioactive materials or sources from shipping or storage casks; unpackaging and packaging radioactive materials, sources, or wastes; inspections; remote machining operations; remote welding operations; remote sample preparation; chemical processing; mechanical testing; or any similar remote handling operation. These operations also include maintenance and setup activities associated with the hot cells and corridors.

2.3 Chemistry and Metallurgy Research Capabilities

The operational CMR capabilities at LANL involve work with both radioactive and nonradioactive substances. Work involving radioactive material (including uranium-235, depleted uranium, thorium-231, plutonium-238, plutonium-239, and americium-241) is performed inside specialized ventilation hoods, hot cells, and gloveboxes. Chemicals such as various acids, bases, and organic compounds are used in small quantities, generally in preparation of radioactive materials for processing or analysis.

The 1999 *Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 1999a) described ongoing CMR Building capabilities at the time it was issued. This description was updated in the *Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Los Alamos, New Mexico* (*CMRR EIS*) (DOE 2003b) and the 2008 *Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico* (2008 *LANL SWEIS*) (DOE 2008a). Some of the capabilities described in these documents are no longer performed at the CMR Building. The principal capabilities currently performed at the CMR Building are described in the following paragraphs.

2.3.1 Analytical Chemistry and Materials Characterization

AC capabilities involve the study, evaluation, and analysis of radioactive materials. In general terms, AC is that branch of chemistry that deals with the separation, identification, and determination of the components in a sample. MC relates to the measurement of basic material properties and the changes in those properties as a function of temperature, pressure, or other factors. These AC and MC activities support research and development associated with various nuclear materials programs, many of which are performed at other LANL locations on behalf of or in support of other sites across the DOE complex (such as Lawrence Livermore National Laboratory, the Savannah River Site, and Sandia National Laboratories).

Examples of sample characterization activities include assay and determination of isotopic ratios of plutonium, uranium, and other radioactive elements and identification of major and trace elements in materials, the content of gases, constituents at the surfaces of various materials, and methods to characterize waste constituents in hazardous and radioactive materials. A full suite of MC capabilities was previously performed in the CMR Building, but now only a small subset of those activities is performed in Wings 5 and 7. If the decision is made to construct a new CMRR-NF, the full suite of MC capabilities would be re-established.

2.3.2 Destructive and Nondestructive Analysis

Destructive and nondestructive analysis employs AC; metallographic analysis; measurement on the basis of alpha, neutron, or gamma radiation from an item; and other measurement techniques. These activities are used in support of product quality for weapons and nuclear fuels programs, component surveillance, nuclear materials control and accountability, special nuclear material standards development, research and development, environmental restoration, and waste treatment and disposal.

2.3.3 Actinide Research and Processing

Actinide research and processing at the CMR Building typically involve small quantities of solid and aqueous solutions. However, any research involving highly radioactive materials or remote handling may use the hot cells in Wing 9 of the CMR Building to minimize personnel exposure to radiation or other hazardous materials. CMR actinide research and processing may include separation of medical isotopes from targets, research and development of nuclear fuel, processing of neutron sources, and research into the characteristics of materials, including the behavior or characteristics of materials in extreme environments such as high temperature or pressure.

2.4 Proposed Chemistry and Metallurgy Research Building Replacement Project Capabilities

This section presents the portion of the operational capabilities proposed to be included within the CMRR-NF and identifies those capabilities that have been housed within the CMR Building that are not planned to carry over into the CMRR-NF. Conversely, if the Continued Use of CMR Building Alternative is selected for implementation, these operational capabilities would be subject to progressive limitations based on the suitability of the structure to continue to safely shelter them, new programmatic decisions, and DOE and NNSA mission support needs. Pit production does not take place at the CMR Building and would not take place in the CMRR-NF.

2.4.1 Analytical Chemistry and Materials Characterization Capabilities

These capabilities include the facility space and equipment needed to support nuclear operations, spectroscopic and analytical instrumentation, nonnuclear space and offices, and nonnuclear laboratory space for staging and testing equipment and experimental work with stable (nonradioactive) materials. Most of these capabilities are found at the CMR Building, although a subset of AC and MC capabilities resides in the TA-55 Plutonium Facility and other locations at LANL. This project element includes relocating all mission-essential CMR Building AC and MC capabilities and consolidating other AC and MC capabilities at LANL in the CMRR-NF, where possible, to provide efficient and effective mission support.

An appropriate amount of space and equipment for the purpose of relocating stockpile stewardship AC and MC research capabilities currently located within the TA-55 Plutonium Facility into the new CMRR-NF would be provided as part of the proposed action. These capabilities would be sized consistent with mission capacity requirements. At the present time, a set of these capabilities is provided within the TA-55 Plutonium Facility to (a) streamline material processes associated with pit fabrication and pit surveillance programs and (b) minimize security costs and lost time associated with shipping large special nuclear material items to the CMR Building from the TA-55 Plutonium Facility.

2.4.2 Special Nuclear Material Storage Capability

A special nuclear material storage capability would be provided to support CMRR-NF operations. The CMRR-NF storage capability would be designed to replace the storage vault at the CMR Building. The special nuclear material storage requirements would be developed in conjunction with, and would be integrated into, a long-term LANL special nuclear material storage strategy.

2.4.3 Nuclear Materials Operational Capabilities and Space for non–Los Alamos National Laboratory Users

This operational capability would provide research laboratory space for non-LANL users. Research laboratory space within the CMRR-NF would be used by other NNSA nuclear sites to support LANL missions related to defense programs.

2.4.4 Existing Chemistry and Metallurgy Research Capabilities and Activities Not Proposed for Inclusion within the New Chemistry and Metallurgy Research Building Replacement Nuclear Facility Project

Not all capabilities either previously or currently performed within the existing CMR Building at LANL would be transferred into the new CMRR Facility. Such capabilities include the Wing 9 hot cell operations, medical isotope production, uranium production and surveillance activities, nonproliferation training, and other capabilities that are available at DOE or NNSA sites other than LANL. These capabilities could cease to exist at LANL when the CMR Building becomes nonoperational.

2.5 Description of Actions Taken to Date Related to the Chemistry and Metallurgy Research Building Replacement Project

As envisioned in the 2004 ROD associated with the 2003 *CMRR EIS*, an administrative and support function building, now referred to as the Radiological Laboratory/Utility/Office Building (RLUOB), has been constructed in the southeastern corner of TA-55 (see **Figure 2–3**). The RLUOB equipment installation phase is under way, and the building is scheduled to be occupied by workers beginning in October 2011. The operation of RLUOB would be consistent across all three of the alternatives analyzed in this *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).*

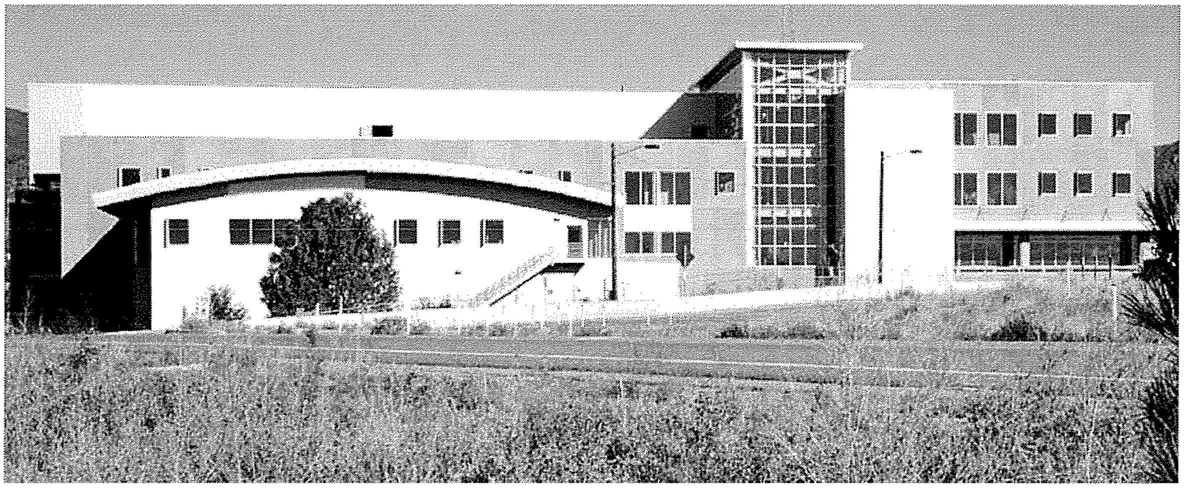

Figure 2–3 Radiological Laboratory/Utility/Office Building in Technical Area 55

RLUOB contains about 208,000 square feet (19,000 square meters) of floor space distributed over several stories, located on a 4.0-acre (1.6-hectare) site. One story and, due to the slope of the building site, part of another story are below ground, and three stories are above ground. RLUOB provides office space for about 400 staff. A large number of the workers with offices in RLUOB would work in the CMRR-NF. RLUOB includes worker training classrooms and facilities and CMRR Facility incident command and emergency response capabilities. In addition to office space, RLUOB contains a 19,500-square-foot (1,800-square-meter) radiological laboratory capable of handling less than Hazard Category 3 radioactive materials per DOE-STD-1027. RLUOB was classified by the preliminary hazard analysis as a low-hazard, Performance Category 1[2] (PC-1) facility; however, the structure was designated to be designed and constructed at the PC-2 level based on the prudent management practice to provide defense in depth for safety and to maintain radiation doses as low as reasonably achievable.

A separate structure, the Central Utility Building, houses utility equipment for power, hot water, sanitary sewer, potable water, nonpotable water, de-ionized water, chilled water, heat (natural gas), compressed air, specialty gases, the fuel oil system, and backup power supply for all elements of the proposed CMRR Facility in TA-55. The structure is two stories tall with a basement. Although this structure was sized to support both RLUOB and the CMRR-NF, it has not been fully equipped to support both buildings. Equipment has been included to support RLUOB and additional equipment would be added if the decision is made to construct the CMRR-NF at the TA-55 site. The 25,000 square feet (2,300 square meters) of floor space that make up the Central Utility Building are included in the total estimated square footage of RLUOB. RLUOB is separated from the Central Utility Building by a 4-hour fire-rated construction of two concrete walls separated by a 12-inch airspace.

RLUOB is anticipated to be awarded a Silver Certification under the U.S. Green Building Council Leadership in Energy and Environmental Design® for New Construction and Major Renovations

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[2] Each structure, system, and component in a DOE facility is assigned to one of five performance categories (PCs) depending upon its safety importance. For PC-1 structures, systems, and components, the primary concern is preventing major structural damage, collapse, or other failure that would endanger personnel (life safety). A PC-2 structure, system, and component designation is meant to ensure the operability of essential facilities or to prevent physical injury to in-facility workers. The PC-2 structures, systems, and components should result in limited structural damage from design-basis natural phenomena events (such as an earthquake) to ensure minimal interruption to facility operation and repair following the event (DOE 2002c).

(LEED-NC) rating system. In 2010, NNSA awarded the CMRR Project its Pollution Prevention Award for Best in Class for Sustainable Design/Green Building. Later in 2010, the project received the DOE EStar Environmental Sustainability Award in Recognition of Exemplary Environmental Sustainability Projects and Practices. The NNSA and DOE awards were presented for RLUOB integrated planning, design, procurement, and construction. The CMRR-NF is also registered under the LEED-NC rating system, with many of the same credits anticipated to be achievable. Lessons learned from design and construction of RLUOB from a LEED perspective are being incorporated into the Modified CMRR-NF design.

At the time RLUOB was being constructed, the adjacent area proposed for the CMRR-NF was also excavated in support of geologic characterization of the CMRR-NF site and seismic mapping, and was subsequently used as a laydown area for RLUOB construction equipment and materials. As a result, most of the proposed site of the CMRR-NF has been excavated down to about 30 feet (9.1 meters) already. The site is now roughly level with Pajarito Road, as shown in **Figure 2–4**, and would need to be further excavated if the decision is made to proceed with construction of the CMRR-NF (either the 2004 CMRR-NF or the Modified CMRR-NF) in TA-55.

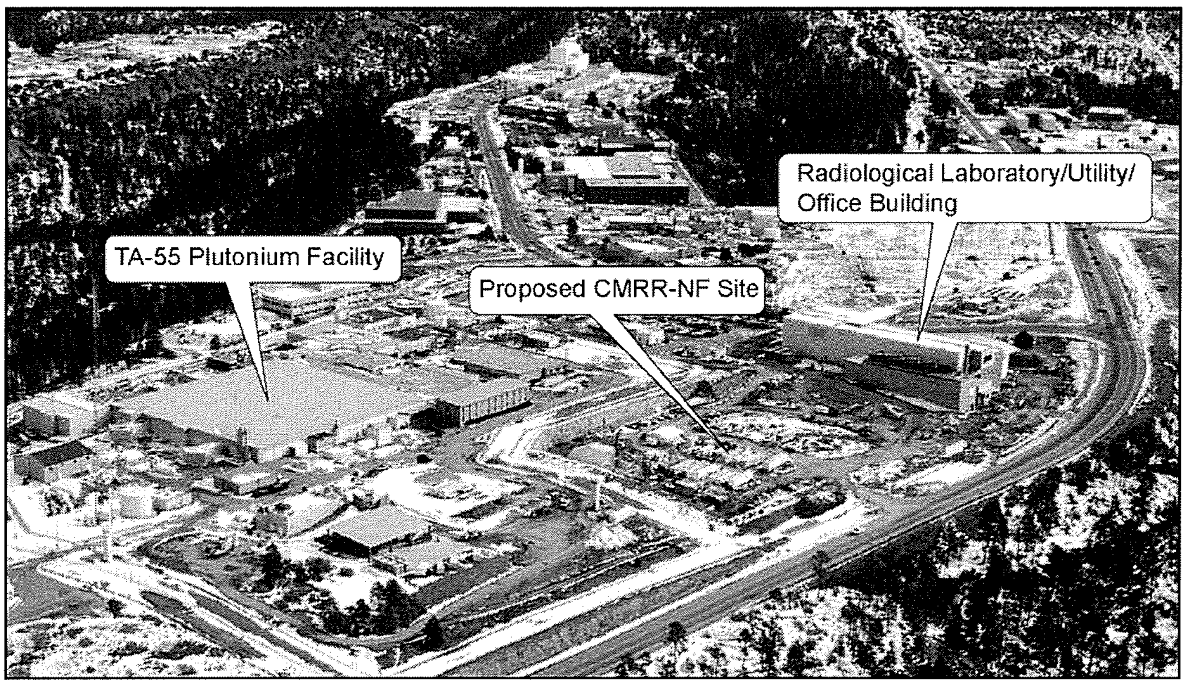


Figure 2–4 Proposed Chemistry and Metallurgy Research Building Replacement Nuclear Facility Site in Technical Area 55

In support of the CMRR Project, a permanent paved vehicle parking lot has been built in TA-50 across Pajarito Road from RLUOB. The parking lot currently contains construction trailers associated with the CMRR Project and provides parking for individuals working on the project and in nearby technical areas.

2.6 Description of the Alternatives

As previously identified, this *CMRR-NF SEIS* analyzes the potential environmental impacts of three alternatives. This section of Chapter 2 presents detailed descriptions of each of the three alternatives, identifying actions that would be common across one or more of the alternatives and actions that would be different or additive across the alternatives.

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 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 PC-3[3] 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.

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.

2.6.1 No Action Alternative

The 2004 CMRR-NF design would not meet the 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's stated purpose and need for action to provide a full suite of AC and MC operations at LANL. The following description of the No Action Alternative (construction and operation of the 2004 CMRR-NF within TA-55 as described in the 2003 *CMRR EIS* and selected in the 2004 *CMRR EIS* ROD [69 FR 6967]) is provided as a basis for comparison to other alternatives. The 2004 CMRR-NF was conceived to be constructed as one part of a two-building CMRR Facility; as discussed in Section 2.5, RLUOB has already been constructed at the southeastern corner of TA-55. **Figure 2–5** shows the land areas that have previously been analyzed in support of CMRR Facility construction. The 2004 CMRR-NF would have housed Hazard Category 2 and 3 operations, requiring the entire facility to be designed as a Hazard Category 2 nuclear facility.

[3] *Each structure, system, and component in a DOE facility is assigned to one of five performance categories depending upon its safety importance. PC-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 2002c).*

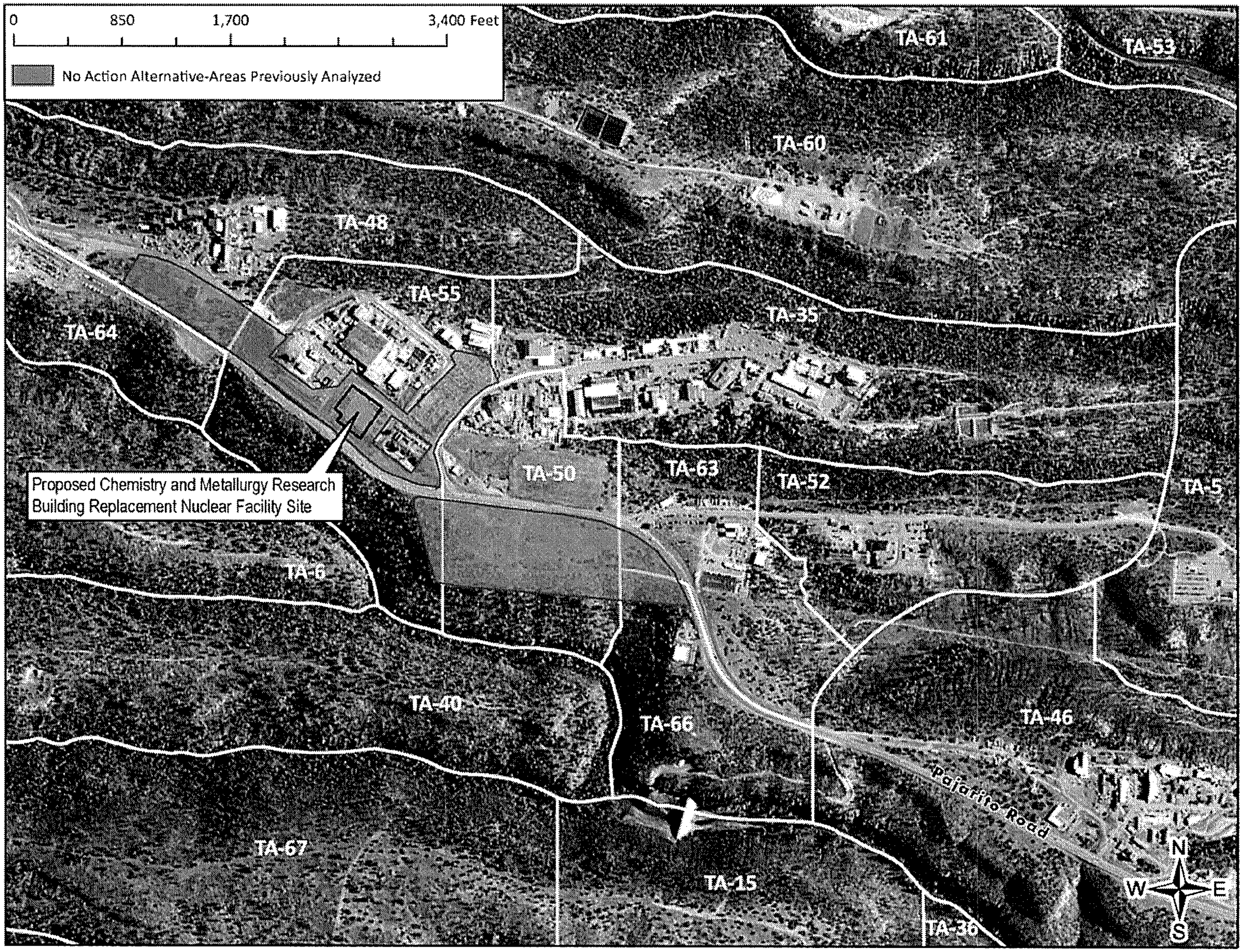


Figure 2–5 No Action Alternative Areas

The 2004 CMRR-NF would have had a building "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, and 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 be performed was not stated in the *CMRR EIS*. In 2004, the estimate of 22,500 square feet (2,100 square meters) was provided as a result of integrated nuclear planning activities (DOE 2005b). 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 discussed in detail in Chapter 3, Section 3.5.4, of this *CMRR-NF SEIS*, a comprehensive update to the LANL seismic hazards analysis was completed in June 2007, providing a better understanding of the seismic behavior of the design-basis earthquake (LANL 2007a). The updated report used more-recent field study data, most notably from the proposed CMRR-NF site, and the application of the most current seismic analysis methods, to update the seismic source model, ground motion attenuation relationships, dynamic properties of the subsurface (primarily the Bandelier Tuff) beneath LANL, as well as the probabilistic seismic hazard, horizontal and vertical hazards, and design-basis earthquake for LANL. Based on this updated seismic hazard analysis, the geotechnical properties of the bedrock (that is, the structural stability of the rock) at the proposed CMRR-NF location have been further evaluated with respect to the proposed CMRR-NF structure and the associated depth of excavation (Kleinfelder 2007a, 2007b). Using this information, it was determined that a design-basis earthquake would result in severe damage to the 2004 CMRR-NF if it were constructed as originally envisioned and described and analyzed in the *CMRR EIS*.

General requirements necessary for public and worker safety and resulting design criteria are strongly driven by the requirements of "Nuclear Safety Management" (10 CFR Part 830). Since the conceptual design analyzed in the *CMRR EIS* was developed, the maturity of applying the Nuclear Safety Management requirements, and the maturity of understanding seismic impact analysis have led to concerns related to the overall conceptual design parameters used for the 2004 CMRR-NF in the *CMRR EIS*. As discussed in the *CMRR EIS*, the CMRR-NF would need to be safety class PC-3 for seismic events. Because of the updated and refined seismic design criteria, the 2004 CMRR-NF design would not meet today's PC-3 requirements.

A revised accident analysis was performed for the 2004 CMRR-NF in this *CMRR-NF SEIS* as discussed in Chapter 4, Section 4.1. This revised accident analysis determined that the human health risks to workers and the public, should the 2004 CMRR-NF be constructed and operated as originally envisioned, would be unacceptable in the event of an actual design-basis earthquake event. Such an earthquake could be expected to occur every 100 to 10,000 years. The damaged 2004 CMRR-NF building could provide an open pathway for public and worker exposure to radioactive materials being stored or used in the facility at the time of the earthquake.

The No Action Alternative is not being evaluated in this *CMRR-NF SEIS* as an alternative that would meet NNSA's stated purpose and need. The 2004 CMRR-NF design would not meet the 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. Concerns about the ability of the 2004 CMRR-NF design to survive a design-basis earthquake have led to the CMRR-NF being redesigned as described in the Modified CMRR-NF Alternative. Updates to the construction parameters have been completed per requirements of the seismic probabilistic hazard curve, and the safety analysis has matured greatly beyond that performed in the preliminary hazards analysis on which the *CMRR EIS* was based. Because of these updates and maturity of the facility design, the Modified CMRR-NF now has a more complete set of safety controls and definitive design criteria. The safety control set is the integrated set of engineered structures, systems, and components that are incorporated into a facility's design to control risks associated with internal and external events that could affect facility operation. It includes systems such as the ventilation system, fire suppression system, and radiological monitoring and alarm system. For a facility that incorporates the safety control set to be designed, constructed and operated, to meet the updated seismic design requirements, additional floor space is required to house the major systems. The Modified CMRR-NF structure would still be required to meet the same functional requirement of PC-3 design today as was described in the *CMRR EIS* and the latest preliminary hazards analysis. The Modified CMRR-NF would be designed to survive a design-basis earthquake (for example, with much thicker walls and more reinforcing steel) without a significant release of radioactive materials to the environment and this alternative is being fully evaluated in this *CMRR-NF SEIS* as discussed in Section 2.6.2.

2.6.2 Modified CMRR-NF Alternative

2.6.2.1 Construction Activities Associated with the Modified CMRR-NF

Nuclear safety requirements stemming from 10 CFR Part 830, "Nuclear Safety Management," mandate a comprehensive analysis of identified hazards and postulated accidents to protect the public, workers, and the environment; this information is used for both developing the engineered designs of facilities and equipment and identifying administrative work requirements. This safety analysis and integration process is an iterative process that would continue as the CMRR-NF design evolves, as the CMRR-NF is constructed, and as operations are conducted. In 2007, the probabilistic seismic hazards analysis (LANL 2007a) for LANL was updated, providing a better understanding of the probable seismic behavior of various geological material layers occurring at LANL and, therefore, a better understanding of the structural building requirements necessary for constructing the proposed CMRR-NF so that the building and equipment within the building would be able to withstand a sizable earthquake event without major damage. In addition to the probabilistic seismic hazards analysis, other seismic and geologic studies have been conducted for the CMRR Project (LANL 2005, 2007b, 2007c, 2008; Kleinfelder 2007a, 2007b, 2010a). To meet the seismic protection design requirements resulting from the probabilistic seismic hazards analysis and the other studies for what is referred to as the "design-basis earthquake," together with the nuclear safety requirements identified through iterative planning processes, it was determined that the 2004 CMRR-NF would need to be designed with various structural and equipment modifications to allow it to fully meet the operational requirements set forth by NNSA for the facility.

The Modified CMRR-NF would require additional structural and reinforcing concrete and steel for the construction of the building's walls, floors, and roof than was estimated and analyzed in the 2003 *CMRR EIS* for the structure as it was conceived of then. These portions of the Modified CMRR-NF would have to be thicker and stronger, with more bracing than previously estimated. Also, most of the worker access areas for building systems and equipment access and repairs would be constructed with solid floors rather than steel grating flooring; fire protection water storage tanks would be located inside the Modified CMRR-NF rather than using existing exterior water storage tanks in TA-55 (the large size and weight of these tanks require additional structural considerations by themselves); various utilities would be installed with added protection measures and bracing; and other seismic protection and safety measures would be incorporated into the building design and the installation requirements for the equipment. (See **Figure 2–6**, picture in RLUOB, which was constructed with some of the same seismic protections with regard to using solid floors rather than steel grating flooring in the worker access areas for building systems and equipment and with regard to equipment bracing and other protective installation measures.) These structural modifications resulted in an overall increase in the size and height of the Modified CMRR-NF. 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, addition of safety-class fire suppression equipment, plus the associated electrical equipment. This equipment added 42 feet to the building in one dimension. The addition of 92 feet in the other dimension was to provide corridor space for movement of equipment, to avoid interference between systems (mechanical, electrical, piping), and to allow enough space for maintenance, repair and inspection, and mission support activities (maintenance shop, waste management areas, and radiological protection areas). The increased dimensions noted above also included space required for concrete wall thicknesses for seismic stiffening. **Table 2–1** shows the estimated construction requirements associated with the Modified CMRR-NF.

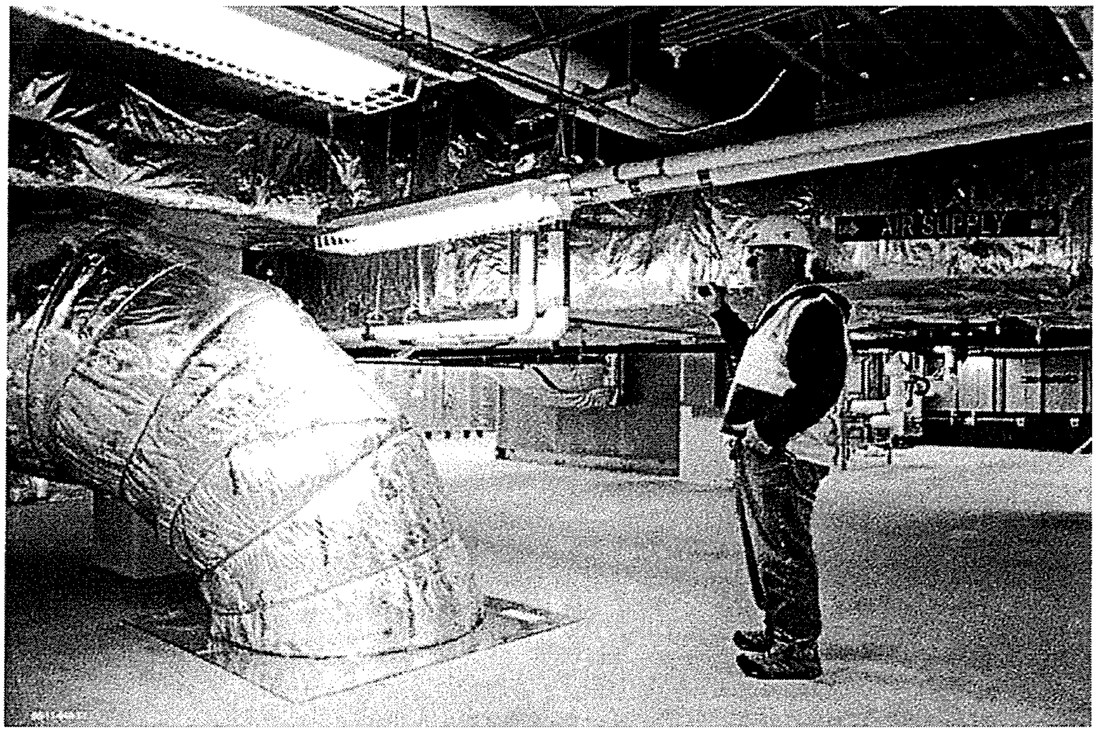


Figure 2–6 Utility System Floorspace in the Radiological Laboratory/Utility/Office Building

Among the concerns identified in the seismic and geologic studies is the presence of a poorly welded tuff layer of volcanic ash material beneath the proposed CMRR-NF construction site. This layer, identified as the lower portion of Bandelier Tuff, Unit 3, underlies the proposed facility location in TA-55 and is widespread across LANL. Either the Modified CMRR-NF would need to be constructed at a sufficient distance above this poorly welded tuff layer to ensure the performance of the structure during a seismic event, or the layer would need to be excavated and backfilled with an engineered material (for example, concrete) to provide a stable medium on which to build the structure.

Two options are being considered for construction of the Modified CMRR-NF. The Deep Excavation Option would involve excavating through a layer of poorly welded tuff, then partially backfilling the excavation with a low-slump concrete. The 10-foot-thick (3-meter-thick) concrete basemat on which the building foundation would rest would be constructed on top of the concrete backfill. 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. The Deep Excavation Option design is more mature, having undergone technical review by NNSA, NNSA's contractors, and the Defense Nuclear Facilities Safety Board. At this time there is more uncertainty with the design for the Shallow Construction Option. The Shallow Construction Option design needs to reach the same level of design maturity and be subjected to the same level of technical review as the Deep Construction Option so the two options can be evaluated on the same basis; this process is currently ongoing.

Table 2–1 Summary of Chemistry and Metallurgy Research Building Replacement Nuclear Facility Project Construction Requirements

Building/Material Usage	*Modified CMRR-NF Alternative Deep Excavation Option* [a]	*Modified CMRR-NF Alternative Shallow Excavation Option* [a]
Land – permanent changes (acres)	12	12
Land – temporary changes (acres)	114	94
Building – length by width (feet)	342 by 304	342 by 304
Building size (square feet) [b]	407,600	407,600
Nominal excavation depth (feet)	130	58
Remaining material to be excavated (cubic yards) [c]	545,000	236,000
Water (million gallons per year)	4.6	3.8
Electricity (megawatt-hours per year)	31,000	31,000
Concrete (cubic yards)	150,000 (structural) 250,000 (low-slump)	150,000 (structural)
Steel (tons)	560 (structural) 18,000 (foundation & reinforcing)	560 (structural) 18,000 (foundation & reinforcing)
Peak construction workers	790	790
Average number of construction workers	420	410
Estimated number of offsite truck trips [d]	38,000	29,000
Nonhazardous waste (metric tons)	2,600	2,600
Construction period (years)	9	9
Transition from CMR Building complete	2023	2023

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

[a] The Deep and Shallow Excavation Options refer to options to build the Modified CMRR-NF with a nominal 130-foot excavation or a nominal 58-foot excavation, respectively.

[b] Building size is expressed in gross square feet, including the width of the walls.

[c] Includes tuff remaining to be excavated for the CMRR-NF building and the tunnels that would connect the CMRR-NF to RLUOB and the TA-55 Plutonium Facility. Approximately 30 feet of material have already been excavated from the proposed CMRR-NF site in TA-55 as part of the previous geological investigation of the site.

[d] Offsite truck trips include the delivery of construction equipment, construction materials, and building equipment and supplies to the building site over the life of the construction project.

Note: To convert acres to hectares, multiply by 0.404685; feet to meters, by 0.3048; gallons to liters, by 3.7854; cubic yards to cubic meters, by 0.76455; tons to metric tons, by 0.9072.

Source: LANL 2011.

The Modified CMRR-NF would have a building "footprint" measuring about 342 by 304 feet (104 by 91 meters) and would comprise approximately 408,000 gross square feet (37,900 gross square meters), 344,000 net square feet (32,000 net square meters), of floor space divided between four floors plus a partial roof level compared to the 200,000 gross square feet (18,600 gross square meters) estimated in the *CMRR EIS*. One of these floors would be devoted to utility system floor space and, while the square footage of this floor would add to the total building square footage amount because of the hard floor, it would not be occupied full time by building workers. The lowest building floor or level would be devoted to the fire suppression water storage tanks, other facility support equipment, and maintenance areas. This floor would not be occupied full time by building workers. Inclusion of a dedicated water source for fire protection within the building assists in meeting nuclear safety and design requirements. The other two building levels would be occupied by the CMRR-NF workers and AC and MC operations in dedicated laboratories, building systems, the vault, and other direct laboratory support functions such as waste management. The total amount of laboratory workspace where mission-related AC and MC operations would be performed would be the same as estimated for the 2004 CMRR-NF, namely, about

22,500 square feet (2,100 square meters). The maximum amount of radioactive materials that could be in the laboratories at any given time has been restricted to no more than 300 kilograms of plutonium-239-equivalent special nuclear material, the same as originally planned for the 2004 CMRR-NF. The total quantity of plutonium-239-equivalent special nuclear material that would be permitted in the facility (including short-term and long-term storage vaults) would also be the same as estimated for the 2004 CMRR-NF, 6,000 kilograms.

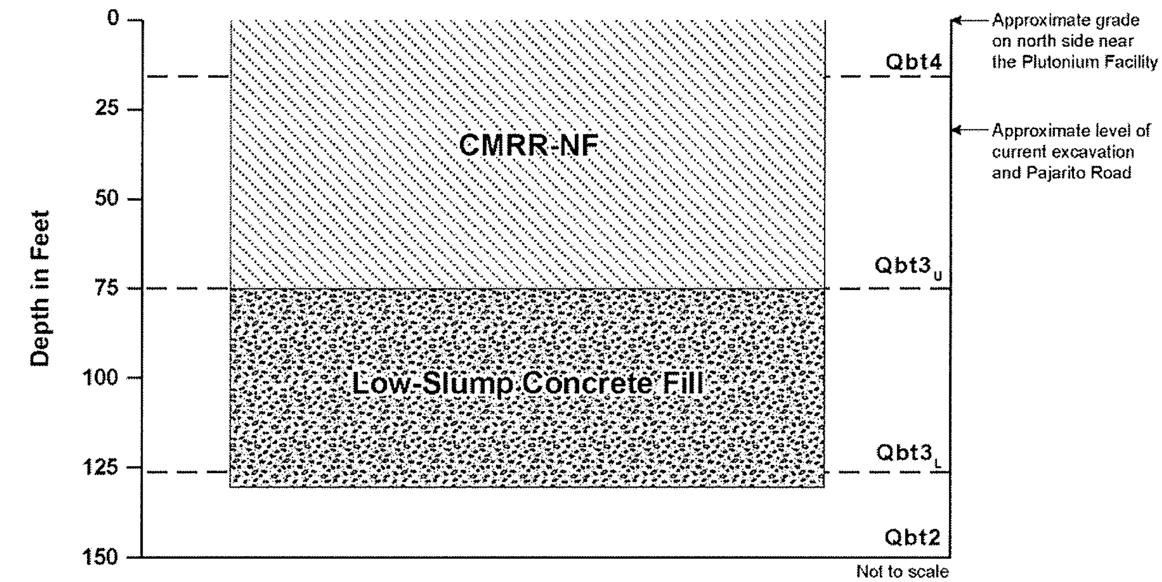
NNSA would construct the Modified CMRR-NF in TA-55 next to the already constructed RLUOB (see Figure 2–4). The structure would be constructed to meet or exceed current *International Building Codes*; LEED certification initiatives; and internal DOE requirements for nuclear facilities, fire protection, site seismic design, and security such that it could be operated to fully meet DOE and NNSA mission-support work requirements for AC and MC operations. Sustainable design considerations were integrated early in the CMRR Project planning and design phases, and these would be maintained throughout the procurement and construction process for the Modified CMRR-NF to ensure the construction and operation of high-performance sustainable buildings. Consistent with DOE Order 413.3B (*Program and Project Management for the Acquisition of Capital Assets*), sustainable facility designs would include features that would allow the structures to be constructed and operated with reduced electricity and water use. Optimized energy performance would be achieved by using highly reflective roofing materials, energy-efficient equipment, specialized building envelope design and materials, and lighting controls. Low-flow fixtures would reduce water use over the life of the building. Interior and exterior building materials would include recycled content materials and local/regional materials. Native plant species would be used for landscaping. Only temporary irrigation would be used to establish new landscaping. Various control methods would be used to improve indoor air quality, including heating, ventilating, and air conditioning system protection to control dust and debris and use of products (for example, paints, furniture, adhesives and sealants) that emit low amounts of volatile organic compounds. Permanent exterior safety and security lighting at the buildings and structures, as well as along the facility's fenced boundary, would be designed so that it is directed toward the facility and away from roads and canyons as much as possible. Certification under the LEED-NC rating system would be pursued.

NNSA would continue to operate and maintain the existing CMR Building on a smaller scale, with reduced operations and limited maintenance, during the construction phase and until all necessary functions are moved (transitioned) or otherwise cease. Based on the facility hazard categorization and the safeguards and security requirements, the Modified CMRR-NF would be a Hazard Category 2, Security Category I building, as the CMRR-NF was originally envisioned to be in 2003, and as analyzed in the *CMRR EIS*. As was planned for the 2004 CMRR-NF, the Modified CMRR-NF would be linked to the newly constructed RLUOB via an underground tunnel with a separate security station, and another underground tunnel would be constructed to connect the TA-55 Plutonium Facility with the Modified CMRR-NF. The vault capacity for long-term storage and short-term storage of special nuclear materials would be located within the footprint of the Modified CMRR-NF.

In general, construction of the Modified CMRR-NF would be accomplished using the same methods of construction, materials, and types of construction equipment originally planned for the 2004 CMRR-NF. However, as already noted, the structure would be stronger, with thicker walls, floors, roof, and other components. As previously mentioned, two different construction options are being considered for the Modified CMRR-NF to address the previously discussed poorly welded tuff layer present beneath the proposed building site: the Deep Excavation Option and Shallow Excavation Option. These two construction options are described in more detail in the following paragraphs.

The Deep Excavation Option would involve excavating the identified footprint another 100 feet (30 meters) to a nominal depth of 130 feet (40 meters) below ground, thus removing the poorly welded tuff layer (see **Figure 2–7**). The resulting excavated site would then be backfilled up to about 60 feet

(18 meters) with low-slump concrete. A basemat foundation for the Modified CMRR-NF under the Deep Excavation Option would be constructed directly on this low-slump concrete layer once it has sufficiently cured (see Figure 2–7). The building would have three stories located below ground on the northwest and two stories below ground on the southeast due to site sloping, with two stories and a partial roof level above ground on the southeast. The aboveground portion would rise approximately 53 feet (16 meters) above ground at its highest point in the northeastern corner.



CMRR-NF = Chemistry and Metallurgy Research Building Replacement Nuclear Facility
Qbt4 = Bandelier Tuff, Unit 4 (structurally stable layer)
Qbt3$_U$ = Bandelier Tuff, Unit 3 Upper (structurally stable layer)
Qbt3$_L$ = Bandelier Tuff, Unit 3 Lower (poorly welded tuff layer)
Qbt2 = Bandelier Tuff, Unit 2 (structurally stable layer)
— — Geologic contact

Note: Geologic contacts vary across the site and may not represent actual conditions.

Source: Kleinfelder 2007a.

Figure 2–7 Modified CMRR-NF, Deep Excavation Option, Relative to Geologic Stratigraphy

An estimated 720,000 cubic yards (550,000 cubic meters) of soil and tuff would be removed from the excavation of the Modified CMRR-NF and the connecting tunnels under the Deep Excavation Option. Approximately 175,000 cubic yards (134,000 cubic meters) of soil and tuff has already been removed from the construction site, and another 545,000 cubic yards (417,000 cubic meters) would need to be removed if the Modified CMRR-NF were built using the Deep Excavation Option.

The Shallow Excavation Option would involve much less site excavation than the Deep Excavation Option because the Modified CMRR-NF's base elevation would be located above the poorly welded tuff layer (see **Figure 2–8**). The Shallow Excavation Option would involve excavating the building's footprint an additional 28 feet (8.5 meters) from the current ground level to a nominal depth of 58 feet (18 meters) below ground. A basemat foundation for the Modified CMRR-NF under the Shallow Excavation Option would be constructed directly in the geologic layer overlying the poorly welded tuff layer, about 17 feet (5.2 meters) above the interface with the poorly welded tuff layer. Engineered backfill would be used to partially bury the building. The building would have three stories below ground on the west and two on the east due to site sloping, with two stories and a partial roof level above ground on the east.

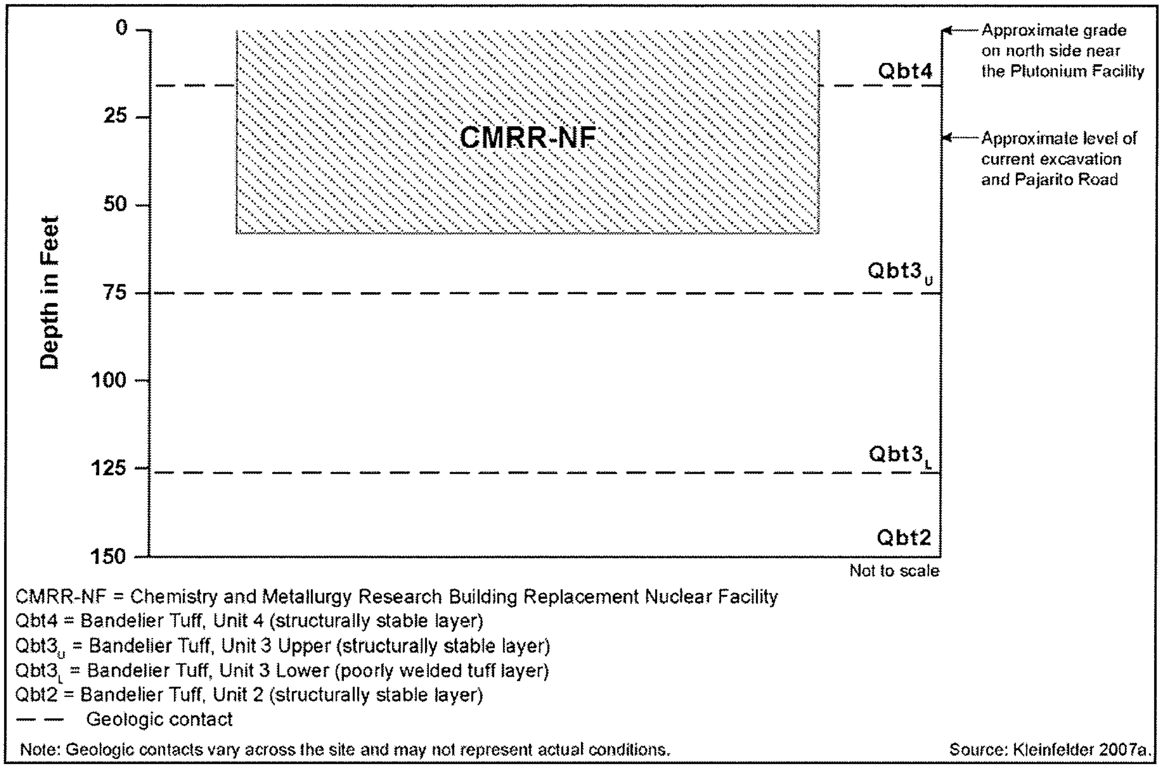


Figure 2–8 Modified CMRR-NF, Shallow Excavation Option, Relative to Geologic Stratigraphy

An estimated 411,000 cubic yards (315,000 cubic meters) of soil and tuff would be removed from the excavation of the CMRR-NF and the connecting tunnels under the Shallow Excavation Option. Approximately 175,000 cubic yards (134,000 cubic meters) of soil has already been removed from the construction site, and another 236,000 cubic yards (180,000 cubic meters) would need to be removed if the Modified CMRR-NF is built using the Shallow Excavation Option.

Under either of the construction options, excavated soil and rock material (spoils) from the Modified CMRR-NF site would be transported by truck to storage areas within LANL in accordance with routine material reuse practices; the spoils would ultimately be beneficially reused. Under the Deep and Shallow Excavation Options, approximately 150,000 cubic yards (115,000 cubic meters) of the material would be reused as fill for other project activities related to CMRR infrastructure and construction support (such as fill for leveling the parking lots and the TA-46/63 and TA-48/55 laydown areas), and up to approximately 395,000 cubic yards (302,000 cubic meters) would be staged at LANL materials staging areas for future appropriate reuse on other LANL construction and landscaping projects (see discussion below on spoils storage areas). Reuse of this material at LANL would directly offset future needs to purchase and transport fill material from offsite locations because of the limited amount of suitable fill material remaining within existing LANL borrow pits.

Because of safety and seismic concerns, additional concrete (including cement and suitable aggregate materials), steel, and other supplies and goods would be needed to construct the stronger Modified CMRR-NF. Under the Deep Excavation Option, it is estimated that an additional 390,000 cubic yards (300,000 cubic meters) of concrete would be needed to build the Modified CMRR-NF beyond that estimated for the 2004 CMRR-NF. The majority of this concrete (250,000 cubic yards [190,000 cubic meters]) would be the low-slump concrete fill upon which the building would be constructed. While the Shallow Excavation Option would not require the low-slump concrete fill included in the Deep

Excavation Option, it would still require an additional 140,000 cubic yards (110,000 cubic meters) of concrete compared with the 2004 CMRR-NF estimate. In addition, the Modified CMRR-NF would require over 18,000 tons (16,000 metric tons) of additional steel for construction compared with the 2004 CMRR-NF estimate under either the Deep or Shallow Excavation Option. These additional construction materials and the additional construction waste that would be generated during construction of the Modified CMRR-NF would result in additional truck transportation of materials to and from LANL. The greater quantities of excavated soil and rock material would also require additional transportation within LANL beyond what would have been required for the 2004 CMRR-NF.

In total, it is estimated that the Deep or Shallow Excavation Option would require up to 38,000 or 29,000 offsite truck trips, respectively, to support construction of the Modified CMRR-NF, depending on the size of the trucks used for the construction materials deliveries and waste transportation off site for disposal. The increased truck trips would average up to 17 additional truck trips per day on the roads leading to LANL over the life of the construction project under the Deep or Shallow Excavation Option, compared with 1 additional truck trip per day that would have been required for the 2004 CMRR-NF. The largest number of trips would occur during the period in which the low-slump concrete would be poured and the materials needed to support mixing the required concrete would be delivered under the Deep Excavation Option. The largest number of trips under the Shallow Excavation Option would occur when engineered backfill would be required to support completion of the Modified CMRR-NF.

About 790 construction workers would be on site during the peak construction period under both the Deep and Shallow Excavation Options, compared with an estimated peak of 300 workers in the *CMRR EIS*. This peak number of workers would add about 500 vehicles to local LANL roadways during peak construction times. Most of these workers would park their personal vehicles in the parking area to be built in TA-72 and would be shuttled to the construction site using buses.

Under both construction options, construction of the Modified CMRR-NF would begin in 2012, with completion expected in 2020. These construction period estimates are longer than the approximately 3-year construction period estimated in the *CMRR EIS*. Under either construction option, there would be a 3-year transition period from the existing CMR Building as the Modified CMRR-NF is completed and approved for startup and operations.

Additional anticipated actions and activities required for the Modified CMRR-NF beyond those included in the *CMRR EIS* and the 2008 *LANL SWEIS* regarding the CMRR-NF are described in the following paragraphs. The locations of these CMRR Project activities are shown in **Figure 2–9**. In general, many of these activities make use of previously developed[4] land that is industrial in character. Most of the undeveloped sites would be used temporarily during the construction period and then reclaimed and revegetated.

Construction Office Trailers and Support Facilities

The Modified CMRR-NF construction phase would use the construction office trailers and parking lot in TA-50 that were established in earlier phases of the CMRR Project. When Modified CMRR-NF Alternative construction activities reach a point that the temporary office trailers are no longer needed, they would be vacated and removed from LANL site by the lessor. As the CMRR Project nears completion, the parking lot would be converted for use by the CMRR Facility workforce and by other employees working at nearby technical areas.

[4] *For the purposes of this impacts analysis, areas that are considered to be "previously developed" are those in which land has been changed such that the former state of the area and its functioning ecological processes have been altered.*

Figure 2–9 Potentially Affected Areas Under the Modified CMRR-NF Construction Plan

Due to the expected size of the construction work force to support the project, existing office space in White Rock would be leased for personnel badging and training. All construction workers would be processed through the badging and training facility.

TA-72 Parking Lot

A parking lot with a perimeter property protection fence would be constructed in TA-72 along the south side of East Jemez Road, east of the TA-72 firing range. This parking lot would provide 600 to 800 parking spaces and would include a large-truck turn-around loop. Road improvements would be made, including turning lanes and a traffic signal light. Electrical power for the traffic signal would be extended along the East Jemez Road right-of-way from either the intersection with New Mexico State Road 4 or the TA-72 firing range. Between 13 and 15 acres (5.3 and 6.0 hectares) would be disturbed for the parking lot, truck loop, and road improvements as necessary. This total acreage is mostly undeveloped, forested land, but the site was evaluated in the 2008 *LANL SWEIS* for the construction of a large warehouse, security worker building, and permanent truck inspection site; however, NNSA has not yet made a decision on whether to construct and operate that facility. After the Modified CMRR-NF construction phase ends, the parking lot site would be regraded and revegetated.

The Modified CMRR-NF construction personnel would park their vehicles in this temporary lot and would be shuttled to and from the job site in buses. The truck loop area would be used to minimize disturbance of traffic flow along East Jemez Road. The LANL truck inspection station is located near the intersection of East Jemez Road and New Mexico State Road 4; this truck loop would enable Modified CMRR-NF Project supply trucks to change directions after being inspected at the LANL truck inspection station. The trucks would continue west along East Jemez Road, enter a signaled left-turn lane into the parking lot, use the truck loop area, and exit the parking lot, turning right to return to New Mexico State Road 4 and then continue on toward White Rock, then to the CMRR-NF construction site.

Pajarito Road Realignment

The Modified CMRR-NF Project may require the shift of a short segment of Pajarito Road slightly to the south at a location in the vicinity of the entrance to TA-55. The road shift would be needed to integrate permanent security requirements for the CMRR Project and TA-55 site security needs, specifically, to ensure proper placement of the perimeter intrusion fence in proximity to Pajarito Road after construction of the CMRR-NF is nearly complete. The proposed road shift would move an estimated one-half-mile segment of Pajarito Road (near the entrance to TA-55 that is just southeast of RLUOB and extending an estimated 2,100 feet [640 meters] to the northwest) so that the road centerline would be shifted up to 56 feet (17 meters) south of its current position. Underground utilities in the area (sewer line, natural gas line, water line, and electrical and telecommunications duct banks) would be relocated; the existing roadbed would be moved; and up to one-half mile of a new road would be constructed with two driving lanes, shoulders, and a turn lane at the Pecos Drive/Pajarito Road intersection. The shifted road segment may require some buildup of the ground surface along the edge of Twomile Canyon, but the road would remain on the mesa top and would not enter the canyon after realignment. The proposed shift of the road segment would permanently disturb less than 2 acres (0.8 hectares) of previously undeveloped land and 1.4 acres (0.6 hectares) of previously developed land. Pajarito Road is not open to the public; it has vehicle access portals to control access to facilities between TA-64 and New Mexico State Road 4. Construction of the new segment of road is not expected to result in a closure of Pajarito Road to LANL worker traffic or to affect other operating facilities along Pajarito Road. No construction laydown and support areas beyond those established for the Modified CMRR-NF construction would be needed.

Construction Laydown and Support Areas (TA-46/63, TA-48/55, and TA-5/52)

Because of increased construction requirements for the Modified CMRR-NF, additional land would be required for construction equipment and materials laydown and support activities beyond that estimated in the *CMRR EIS*. Three additional areas for construction laydown and support services could be used: one area is located in portions of TA-46 and TA-63, a second area is located in TA-48 and TA-55, and a third is located in TA-5 and TA-52. These areas would be used temporarily and would occupy both undeveloped and developed land, including areas that have been used for prior material storage and laydown activities; after construction activities are complete, these areas would be regraded and revegetated and would then become available for future use by LANL operations.

The TA-46/63 laydown area would occupy an estimated 40 acres (16 hectares) that span the shared boundary of the technical areas. Activities in TA-63 would include the installation of two ten-plex construction office trailers; the construction of short access and haul roads, approximately 110 parking spaces, and two concrete batch plants (discussed separately later); relocation of utilities; and construction of laydown and storage areas. An existing stormwater detention pond would be enlarged. In TA-46, the laydown area would also require utility relocations, the installation of short access and haul roads, a construction office trailer, a parking area, and areas for construction material and equipment laydown and staging. A fully enclosed, climate-controlled storage building of about 50,000 square feet (4,600 square meters) of warehouse space may be installed at this site for specialized equipment storage. The TA-46/63 area contains both undeveloped and developed land, including areas that have been used for prior material storage and laydown activities.

The additional TA-48/55 laydown area would cover an estimated 10 acres (4 hectares) that span the shared boundary of the technical areas; activities at the site would include the installation of short access and haul roads, approximately 10,000 square feet (930 square meters) of construction craft and office trailers, and construction laydown areas. A structure being used during remediation of TA-21 may be used as a construction support building in TA-48/55; prior to moving the structure to TA-48/55 it would be surveyed to ensure it meets radiological release criteria. This additional TA-48/55 laydown area would be contiguous to the 10-acre (4.0-hectare) site in TA-55 that was identified for construction trailer, laydown, and concrete batch plant use in the *CMRR EIS*.

The 20-acre (8.1-hectare) site in TA-48/55 that would be required for the Modified CMRR-NF Alternative construction is mostly developed and previously disturbed land. There is a potential release site (PRS 48-001) that may affect a small portion of the TA-48 area proposed for use as a laydown area. During site development of the nearby area, if contamination is suspected, work would be stopped, characterization performed, and the necessary action and disposition completed. The extent of the potential release site is currently being evaluated; appropriate construction and operation measures would be employed to minimize potential disturbance of contaminated soils or other effects on the potential release site.

The additional TA-5/52 laydown and construction support area would cover an estimated 19 adjacent acres (8.7 hectares) that span the shared boundary of the technical areas. This additional TA-5/52 area could be used for construction trailers, laydown, or spoils storage, depending on the needs of the Modified CMRR-NF construction project.

Additional Concrete Batch Plants (TA-46/63)

The *CMRR EIS* included the use of a single concrete batch plant located on 5 acres (2 hectares) of land within TA-55 to support the CMRR Project construction (DOE 2003b). More concrete would be needed for the Modified CMRR-NF construction, which would require additional concrete production capability. Under this Modified CMRR-NF Alternative, up to two additional batch plants, for a total of three concrete batch plants, would be established. The production rates of the plants would be approximately 150 to 300 cubic yards (115 to 230 cubic meters) of concrete per hour. As with the concrete batch plant described in the *CMRR EIS*, the additional plants would be operated by electricity. They would be temporary installations operated on an as-needed basis to supply concrete throughout the Modified CMRR-NF construction period and would be subsequently removed. Two batch plants would be located in TA-63 (adjacent to the TA-46/63 laydown area) as a single facility. Only one plant would be used at a time, with the other serving as a backup. The TA-63 plants, including supporting functions, would occupy about 15 acres (6.1 hectares). This area is included in the total area discussed above related to the construction laydown area that would be built in TA-63.

The batch plants are not expected to operate at the same time. Peak operation of the TA-48/55 concrete plant of 150 cubic yards per hour is expected during the first year of Modified CMRR-NF construction (2012) under the Deep Excavation Option; the plant would be used to produce an estimated 250,000 cubic yards (191,000 cubic meters) of low-slump concrete that would be placed in the lower 60 feet (18 meters) of the site excavation to provide a stable surface for construction. In the following years, the plant could be converted to supply structural concrete for the Modified CMRR-NF. Under both construction options, a primary and backup concrete batch plant would be established in TA-46/63 to produce structural concrete for the Modified CMRR-NF.

Permanent Power Upgrades (TA-3 to TA-55)

Permanent power service to TA-55 would need to be upgraded for facility operations. This would be done either by building the TA-50 substation, as described in the 2008 *LANL SWEIS*, or by adding a new feed from the TA-3 electrical substation to TA-55. This feed would be extended from the TA-3 substation south along Diamond Drive and would follow Pajarito Road through TA-64 and TA-48 to TA-55. Existing duct banks in previously developed areas along the route would be used.

Temporary Power Upgrades (TA-5 to TA-55)

Temporary power services would be needed at the Modified CMRR-NF construction site and for various construction support activities. Temporary power would be brought along a route from the existing TA-5 eastern substation along Puye Road through TA-52 and TA-63, then along Pajarito Road through TA-50, and along Pecos Drive to the Modified CMRR-NF site in TA-55, affecting about 9.1 acres (3.7 hectares). Electric utility easements and overhead power poles that currently exist along this route would be used whenever possible, but some new overhead poles may be needed, and an estimated 2 acres (0.8 hectares) would likely be disturbed during the placement of these new poles and line. The new poles and line would be removed at the end of the project.

Additional Spoils Storage Areas (TA-36, TA-51, TA-54)

To carry out the Deep Excavation Option, the Modified CMRR-NF Project would need approximately 25 to 30 acres (10 to 12 hectares) of space for excavated spoils material storage. To carry out the Shallow Excavation Option, only approximately 10 acres (4.0 hectares) would be needed to store excavated spoils materials. Under either of the construction options, the space needed for spoils materials storage would not be collocated at the building site; instead, spoils storage could be distributed across available acreage at LANL. The 2008 *LANL SWEIS* estimated that about 150,000 cubic yards (115,000 cubic meters) per year of excavated soils could be generated and stored on site due to the various construction projects, including the CMRR Project, that were expected to be undertaken at LANL. Available acreage that could be used to store and stage excavated spoils beyond the areas included in the *LANL SWEIS* has been identified; however, not all of the areas would be used. Identified possible spoils storage areas include approximately 39 acres (16 hectares) in TA-36, 9 acres (3.6 hectares) in TA-51, and 19 acres

(7.7 hectares) in TA-54, as shown in Figure 2–8. Cultural resources and potential release sites in these areas would be avoided.

Stormwater Detention Ponds (TA-50, TA-63, TA-64)

Stormwater detention ponds would be built in TA-50, TA-63, and TA-64 to support the Modified CMRR-NF Project. A 0.5-acre (0.2-hectare) detention pond would be built in TA-50 to detain runoff from the CMRR-NF site during operations. An existing stormwater detention pond in TA-63 would be expanded from approximately 0.5 acres (0.2 hectares) to 1 acre (0.4 hectares). A second (temporary) 1-acre (0.4-hectare) detention pond would also be constructed in TA-63; the detention ponds would be built in TA-63 to collect stormwater from the proposed laydown area and concrete batch plant(s) (the detention ponds in TA-63 are included in the acreage discussed above for construction laydown areas). A temporary 1-acre (0.4-hectares) stormwater detention pond would be built in TA-64 to collect stormwater from the proposed laydown area and concrete batch plant in TA-48/55. When these temporary construction areas are reclaimed, the temporary stormwater detention pond sites would also be regraded and these areas would be reclaimed as well.

2.6.2.2 Operational Characteristics Associated with the Modified CMRR-NF

The following discussion highlights areas where operation of the Modified CMRR-NF would differ from operation of the 2004 CMRR-NF as it was envisioned in the *CMRR EIS*. As noted in Section 2.6, the 2004 CMRR-NF could not meet the standards for a PC-3 structure as required to safely conduct the full suite of NNSA AC and MC mission work; therefore, the 2004 CMRR-NF would not be built. The Modified CMRR-NF would be able to operate to support the full operational requirements of NNSA's nuclear weapons complex, as set forth in the *SSM PEIS,* the 2008 *LANL SWEIS,* and the *Complex Transformation SPEIS* RODs. Estimates of the infrastructure and utility requirements have evolved from those in the *CMRR EIS*. These changes reflect progress in the design of the facility from an early conceptual design to a more detailed design. The current stage of design provides the basis for more-accurate estimates of utility requirements.

Infrastructure Parameters: Additional infrastructure requirements would be needed on an annual basis for the Modified CMRR-NF compared to the 2004 CMRR-NF estimated requirements due to the increased size of the Modified CMRR-NF building and updated estimates. The current design includes a demineralization unit installed in the Central Utility Building to remove silica from all water used in the CMRR-NF and RLUOB. About 6 million gallons (23 million liters) of additional water would be used annually for the Modified CMRR-NF and RLUOB (16 million gallons [61 million liters] compared to the 10 million gallons [38 million liters] required by the 2004 CMRR-NF and RLUOB). The Modified CMRR-NF and RLUOB would also require about 140,000 additional megawatt-hours of electricity annually compared with the estimate included in the *CMRR EIS* and an additional 24 megawatts of peak power (the *CMRR EIS* electricity requirements are now known to have been underestimated). For the addition of the substation in TA-50 analyzed in the 2008 *LANL SWEIS* or the extension of a power line from the TA-3 eastern technical area substation along an existing right-of-way would ensure adequate power continues to be available at the site, should additional power availability at the site prove to be necessary. The Modified CMRR-NF would also require about 58 million cubic feet of natural gas annually to heat the larger building; natural gas would be piped to the Central Utility Building where burners would heat air that would be conveyed to the CMRR-NF for heating. The *CMRR EIS* did not project any requirement for natural gas.

Nonradiological Liquid Effluent: The Modified CMRR-NF would not include any permitted outfalls, so the discharge from this facility would be zero as it was from the CMRR-NF in the *CMRR EIS*. Nonradiological liquid effluents would be transferred via a pipeline to the TA-46 Sanitary Wastewater Systems Plant for treatment.

Radiological Liquid Effluent: The Modified CMRR-NF would generate about 340,000 gallons (1.3 million liters) of radiological liquid effluent annually (Balkey 2011), far less than the 3.8 million gallons (14 million liters) estimated in the *CMRR EIS*. The current estimate of radioactive liquid waste from the Modified CMRR-NF is based on a recent study (Balkey 2011) performed to provide engineering data regarding the necessary site capacity for radioactive liquid waste treatment. This recent study considered contemporary design and planned operations data; the *CMRR EIS* estimate was an older, conservatively high estimate based on unmetered water usage and a high level of operations at the CMR Building. These wastes would be collected and discharged into a network of drains that would route the solutions to the RLWTF in TA-50 for treatment and disposal.

Sanitary Waste Generation: The CMRR Facility would include a demineralization unit (in the existing Central Utility Building) to remove silica from water. Use of this demineralization unit would reduce typical performance problems associated with silica in major equipment, thus reducing maintenance, and would increase durability and operating life. The demineralization unit produces reject water that would be discharged from the Central Utility Building into the CMRR Facility sanitary wastewater collection system, which would be connected to the existing TA-46 Sanitary Wastewater Systems Plant. It is estimated that use of this demineralization unit would produce approximately 3.5 million gallons (13 million liters) of reject water annually. This reject water would be in addition to the 7 million gallons (27 million liters) of wastewater estimated in the *CMRR EIS*.

Workforce: The workforce that would use the Modified CMRR-NF and RLUOB includes a range of users. There are staff members whose assigned work location would be in the CMRR Facility, with most of them assigned to RLUOB. Many of these workers would perform research in the Modified CMRR-NF laboratories; some would perform work in the RLUOB laboratories. Additional workers whose assigned work location is another LANL facility would also perform laboratory work at the CMRR Facility (primarily at the Modified CMRR-NF). Additional workers at the facility would include inspectors and auditors, collaborating researchers from outside of LANL, and workers attending training. The full-time operational workforce at the Modified CMRR-NF and RLUOB would be equivalent to 550 people, the same number estimated in the *CMRR EIS*. The personnel that would work in the CMRR Facility would not be new workers to the site, but rather would be workers moving to the new facility from the existing CMR Building or other LANL locations. It is estimated that there would be the equivalent of about 550 radiological workers, annually, using the CMRR Facility, the same number as estimated in the *CMRR EIS*.

2.6.3 Continued Use of CMR Building Alternative

Continued use of the CMR Building would not involve the construction and operation of new laboratory buildings for AC and MC operations. The existing CMR Building in TA-3 would continue to be used for special nuclear material operations, as described in Sections 2.2 and 2.3, until it was no longer considered safe to do so. As discussed in Section 2.2.1, a portion of the CMR Building is located over a fault that could severely damage or destroy the building in the event of a severe earthquake.

The administrative support, office space, and radiological laboratory functions that were previously performed within the CMR Building would occur within the new RLUOB in TA-55. The CMR Building would receive routine maintenance and limited component replacement. The CMR Building would continue to be operated as a Hazard Category 2, Security Category III nuclear facility for as long as it could continue to be operated safely; this designation limits the amount of special nuclear material that can be used and the level of operations. These limitations do not currently support the missions that NNSA has assigned to LANL through the *SSM PEIS, LANL SWEIS,* and *Complex Transformation SPEIS* RODs. 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 this *CMRR-NF SEIS* as a prudent measure in light of possible future fiscal budgetary constraints

The various aspects of continued operation within the CMR Building are described in Section 2.3, and these would be common to the Continued Use of CMR Building Alternative. Operations in the CMR Building are generally expected to continue until the building can no longer be operated safely, a replacement facility is available, or NNSA makes other operational decisions. Eventually, the building would be completely shut down and demolished. Decontamination, decommissioning, and demolition (DD&D) of the CMR Building is discussed in Section 2.8.1.

2.7 Alternatives Considered and Dismissed

2.7.1 Alternative Sites

As discussed in Chapter 1, Section 1.6, 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. Therefore, no additional sites outside of LANL are being considered in this *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. In the February 2004 ROD (69 FR 6967) 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 2.5, RLUOB (which contains a training facility, incident control center, and radiological laboratory, 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 possible candidates for the CMRR-NF and none are being considered in this *CMRR-NF SEIS.*

2.7.2 Extensive Upgrades to the Existing Chemistry and Metallurgy Research Building

In the 2003 *CMRR EIS*, DOE considered 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 and dismissed it from detailed analysis. 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 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 mission assignments at LANL.

The technical infeasibility of extensive seismic upgrades to the entire CMR Building as discussed in the 2003 *CMRR EIS* remains. However, 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. After careful consideration of the complex engineering and operational issues, as well as the CMR Building site's seismic concerns, this potential Wing 9 upgrade alternative was also determined not to be a reasonable alternative for meeting NNSA's purpose and need for action.

CMR Building operations and capabilities are currently restricted due to safety and security constraints, as discussed in Section 2.6.3 of this *CMRR-NF SEIS*. Although the limited Wing 9 upgrade would allow the current operational restrictions on material quantities to be relaxed somewhat so that larger quantities of special nuclear material could be used within the laboratories, the size of Wing 9 would limit the amount of laboratory space that could be developed to less than half of that required to meet NNSA's purpose and need for mission support work. In addition, NNSA would not be able to meet its own Nuclear Enterprise goal for consolidating plutonium operations at one LANL location as stated in the 2008 ROD for the *Complex Transformation SPEIS* (73 FR 77644). Instead, a portion of the plutonium operations would be located within a security perimeter in TA-3, CMR Building, Wing 9, and the balance would be located in TA-55, Building PF-4. This physical separation would result in continuing programmatic and operational inefficiencies and ongoing risks associated with transporting nuclear material samples and hazardous materials between the two facilities. Additional life-cycle costs would be incurred by having to maintain separate security infrastructure and nuclear safety authorization basis documentation for the two locations. Additionally, the current set of operational safety controls present within Wing 9 is specific for the current operations; the installation of new engineered safety controls, such as glovebox ventilation and filtration, would be needed to address public and worker hazards protection. These engineered safety controls would be located within or in close proximity to Wing 9. In some cases, these controls would require a large amount of floor space; if installed in Wing 9, they would further limit the available space for operations. In order to maximize the available space within Wing 9 for AC and MC operations, a new, separate structure to house these controls would need to be built close to Wing 9 as part of the upgrade effort.

The CMR Building is located in close proximity to geologic faults within TA-3; a fault trace has been identified beneath two wings of the structure. Before design of the new support structures could begin, it would be necessary for NNSA to determine the full extent of probable ground motion behaviors during a significant seismic event for the general Wing 9 location. This determination would require a thorough geotechnical characterization of the site, both to assess the potential for seismic surface rupture at the new support structure locations and to determine the potential horizontal and vertical ground motion during a seismic event. The geotechnical characterization, in turn, would entail the collection of detailed geotechnical data (by drilling of boreholes, excavating characterization trenches, and other sample collection methods) in order to support structural design. The subsurface area around Wing 9 has been previously disturbed by LANL activities (such as the construction of Wing 9 and the installation of subsurface site utilities); this could severely compromise the quality of the data collected for surface rupture displacement calculations, which are a critical design input for structures located on or near geologic faults. The extensive site geotechnical characterization performed for the TA-55 CMRR-NF site location (including an independent technical review and concurrence process) required about 5 years to complete. Although a limited amount of geotechnical information is already available for the TA-3 CMR Building site from earlier site geologic investigations, the remaining extensive site characterizations required for the Wing 9 area would be complicated by the existence of the existing structure, buried utilities, surface infrastructure, and ongoing facility operations and would take several years to accomplish.

Furthermore, the Wing 9 upgrades would require the installation of an enhanced security perimeter, the construction of a separate utilities building, and a materials storage vault. Because the upgrades would be made to a structure that is already over 50 years old, the expected lifetime of an upgraded Wing 9 would be significantly less than the 50-year design life of a new facility. Costs for the Wing 9 geotechnical investigations, structural and security upgrades, and construction of new support buildings and utilities installations, would be substantial, although not likely to approach those associated with either of the construction options considered under the Modified CMRR-NF Alternative. 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 a second security infrastructure and safety basis (in addition to that for TA-55); the mission work disruptions associated with construction; operational constraints due to the 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 this *CMRR-NF SEIS.*

2.7.3 Distributed Capabilities at Other Los Alamos National Laboratory Nuclear Facilities

The distribution of AC and MC capabilities among multiple facilities at LANL has been suggested. Because of the quantities of special nuclear material 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 special nuclear material that can be safely managed, the 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 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, and engineered safety controls and requirements for this type of work.

Other designated Hazard Category 2 facilities at LANL are not candidates because they have been decommissioned for safety and security reasons, are closure sites (specifically, environmental cleanup potential release sites), or 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.

2.8 Facility Disposition

2.8.1 Disposition of the Chemistry and Metallurgy Research Building Common to All Three Alternatives

Disposition of the existing CMR Building would involve DD&D of the entire building. While the DD&D procedures for dispositioning the CMR Building would be common actions across each of the alternatives analyzed in this *CMRR-NF SEIS*, the timing of the actions would be different under the Modified CMRR-NF Alternative versus the Continued Use of CMR Building Alternative. The various dispositioning requirements common to the three alternatives are discussed in the following text in detail.

Over the past 60 years of operation, certain areas within the CMR Building, pieces of equipment, and building systems have become contaminated with radioactive material during operations involving special nuclear material. These areas include contaminated conveyors, gloveboxes, hoods and other equipment items; contaminated ducts; contaminated hot cell floor space; and laboratory floor space. It is estimated that DD&D of the CMR Building would result in about 38,000 cubic yards (29,000 cubic meters) of low-level radioactive waste, 150 cubic yards (115 cubic meters) of transuranic waste, and 280 cubic yards (210 cubic meters) of mixed low-level radioactive waste. In addition, after decontamination, demolition of the building would result in about 110,000 cubic yards (84,000 cubic meters) of solid uncontaminated waste and 260 tons (235 metric tons) of chemical waste.

The existing CMR Building has not been completely characterized with regard to types and locations of contamination. In addition, project-specific work plans have not been prepared that would define the actual methods, timing, or workforce to be used for the decontamination and demolition of the building. Instead, general or typical methods of decontamination and demolition are presented in general terms below. Additional National Environmental Policy Act compliance analysis may be required when the specific actions of the disposition of the CMR Building actually become mature for decision.

2.8.2 Overview

The CMR Building consists of three levels and multiple wings, as described in Section 2.2. Except for Wing 9, the CMR Building is constructed of reinforced concrete floors (typically 4 inches [10 centimeters] thick) and walls (typically 18 inches [46 centimeters] thick). The building is supported on reinforced concrete basement walls and columns on spread footings. Wing 9 is constructed with above-grade walls consisting of lightly reinforced concrete masonry walls. The floor and grade slabs are approximately 11 inches (28 centimeters) thick with massive footings and concrete around and under the hot cells (LANL 2003). The total floor space is about 550,000 square feet (51,000 square meters) (DOE 2003b).

Over 60 years of operation, areas within the CMR Building, as well as building systems and equipment have become contaminated, principally with radioactive material. Principal building areas and systems believed to be significantly contaminated are summarized in **Table 2–2**.

Table 2–2 Principal CMR Building Contaminated Areas or Systems

Ventilation System	The exhaust side of the ventilation system is large and contaminated. Most contaminated ductwork is in the basement.
Radioactive Liquid Waste Line	The primary source of CMR Building contamination, this system carries contaminated wastewater to the existing RLWTF at TA-50; it consists of 9,200 feet (2,804 meters) of 5-inch- (13-centimeter-) diameter and 16,100 feet (4,907 meters) of 2.5-inch- (6-centimeter-) diameter stainless steel pipe. It is expected that most of this piping would be transuranic waste, with some portions being mixed transuranic or mixed low-level radioactive waste due to mercury contamination. Also, in areas of leakage there may be contamination in surrounding walls, floors, and adjacent surfaces.
Vacuum Systems	One of the two large vacuum systems in the CMR Building is highly contaminated, while the second, newer, system is expected to have only low levels of contamination.
Walls	Leaks from the radioactive liquid waste line have resulted in contamination within building walls.
Floors	Floor contamination is widespread and ranges from low to high levels. The basement floors have many areas of contamination, some of which have been painted over. Floor contamination in the attic is limited.
Asbestos Pipe Insulation and Floor and Ceiling Tile	Approximately 73,000 feet (22,000 meters) of asbestos pipe insulation have been found in the CMR Building, with another 9,400 square feet (870 square meters) on ducts. Floor tiles (up to 20,000 square feet [1,900 square meters]) and ceiling tiles may also contain asbestos.

CMR = Chemistry and Metallurgy Research; RLWTF = Radioactive Liquid Waste Treatment Facility; TA = technical area.
Source: DOE 2003b.

Of the three CMR Building levels, most of the contamination exists in the basement as summarized below (DOE 2003b):

- **Attic**—Contains primarily facility equipment and is expected to be mostly uncontaminated.
- **Main Floor**—Contains most of the laboratory and office space, with little contamination on the ceilings and increasing potential for contamination toward the floor. About 45 percent of equipment and surfaces are assumed to be contaminated to some degree.
- **Basement**—Contains facility equipment; all equipment and surfaces are assumed to be contaminated to some degree.

The 2003 *CMRR EIS* addressed three disposition options for the CMR Building (DOE 2003b):

- **Disposition Option 1:** Reuse of the building for administrative and other activities appropriate to the physical condition of the structure, with necessary structural and systems upgrades and repairs.
- **Disposition Option 2:** DD&D of some portions of the CMR Building, with other portions reused.
- **Disposition Option 3**: DD&D of the entire CMR Building.

In the ROD for the *CMRR EIS*, DOE decided to implement Disposition Option 3: DD&D of the entire CMR Building (69 FR 6967). This option is assumed for purposes of this *CMRR-NF SEIS*.

2.8.2.1 Decontamination and Demolition Process

The process that would be used to decontaminate and demolish the CMR Building is described in the following text box.[5] Detailed project-specific work plans would be developed and approved by NNSA before work began. These plans would include those requirements for environmental compliance and monitoring. All work would be planned in accordance with established state and Federal laws and regulations, DOE Orders, and LANL procedures and best management practices. Waste management and pollution prevention techniques would be implemented.

Decontamination

Radioactive and nonradioactive contamination would be removed using techniques such as vacuum blasting, sand blasting, carbon dioxide bead blasting, scabbling, and mechanical separation of radioactive and nonradioactive materials. Flooring, insulation, and ceiling tiles containing asbestos would be removed, as would paint contaminated with asbestos, lead, and other toxic materials such as polychlorinated biphenyls. About 50 percent of the asbestos debris is expected to be free of radioactive contamination, while the other 50 percent is expected to require handling as radioactive waste, as would other toxic or hazardous wastes contaminated with radionuclides. Radioactively contaminated debris would be segregated from uncontaminated debris to the extent feasible.

Air emissions generated during decontamination activities would be controlled using tents enclosing highly contaminated areas and high-efficiency particulate air filters to collect contaminated dust particles. Dust suppression techniques would also be used to ensure that particulate emissions are kept to a minimum. Decontamination workers would be protected by personal protective equipment and other engineering and administrative controls.

Worker exposure to ionizing radiation would be controlled in accordance with DOE regulations. The radiological limit for an individual worker is 5,000 millirem per year; however, the maximum dose to a worker involved in operations would be kept well below the DOE Administrative Control Level of 2,000 millirem per year (10 CFR Part 835). At LANL, an additional Notification Action Level of 1,000 millirem per year is imposed and all work is performed to maintain radiation doses as low as reasonably achievable. Occupational safety risks to workers would be mitigated by adherence to Federal and state laws, DOE requirements including regulations and orders, and plans and procedures for performing work. DOE regulations addressing worker health and safety include 10 CFR Part 851, "Worker Safety and Health Program," and 10 CFR Part 850, "Chronic Beryllium Disease Prevention Program." Workers are protected from specific hazards by training, monitoring, use of personal protective equipment, and other engineering and administrative controls.

[5] *The decontamination and demolition work elements described in this section are meant to be illustrative, rather than prescriptive.*

Decontamination and Demolition Work Elements

Characterization, Segregation of Work Areas, and Structural Evaluation: Walls, floors, ceilings, roof, equipment, ductwork, plumbing, and other building and site elements would be tested to determine the type and extent of contamination present. The CMR Building would be segregated into contaminated and uncontaminated areas, with contaminated areas being further subdivided by the type of contamination: radioactive materials, hazardous materials, toxic materials including asbestos, and any other Resource Conservation and Recovery Act (RCRA) listed or characteristic contamination. As part of the characterization and segregation of work areas, consideration would also be given to the structural integrity of the CMR Building. Some areas could require demolition work before decontamination.

Removal of Contamination: Workers would remove or stabilize contamination according to the type and condition of materials. If the surface of a wall were found to be contaminated, it might be physically stripped off. If contamination were found within a wall, a surface coating might be applied to keep the contamination from releasing contaminated dust during dismantlement and to keep the surface intact.

Demolition of the CMR Building, Foundation, and Parking Lot: After contaminated materials have been removed, wherever possible and practical, the demolition of all or portions of the CMR Building would begin. Demolition could involve simply knocking down the structure and breaking up large pieces. Knocking down portions of the CMR Building, foundation, and parking lot could require the use of equipment such as backhoes, front-end loaders, bulldozers, wrecking balls, shears, sledge and mechanized jack hammers, cutting torches, saws, and drills. If not contaminated, demolition material could be reused or disposed of as construction waste. Asphalt would be placed in containers and trucked to established storage sites within LANL, at TA-60 on Sigma Mesa.

Segregating, Packaging, and Transport of Debris: Demolition debris from the CMR Building would be segregated and characterized by size, type of contamination, and ultimate disposition. Debris that is radioactively contaminated would be segregated as low-level radioactive waste if no hazardous[1] contamination is present. Radioactively contaminated and uncontaminated asbestos debris would also be segregated. Other types of debris that would be segregated include mixed low-level radioactive waste,[2] uncontaminated construction debris, and debris requiring special handling. Segregation activities could be conducted on a gross scale using heavy machinery or on a smaller scale using hand-held tools. Segregated waste would be packaged as appropriate and stored temporarily pending transport to an appropriate onsite or offsite facility.

Debris would be packaged for transport and disposal according to waste type, characterization, ultimate disposition, and U.S. Department of Transportation or U.S. Department of Energy transportation requirements. Uncontaminated demolition debris would be recycled or reused to the extent practicable. Nonrecyclable debris would be disposed of by shipment to the Los Alamos County Eco Station or an offsite disposal facility.

Testing and Cleanup of Soil and Contouring and Seeding: The soils beneath the CMR Building would be sampled and tested for contamination. Contaminated soils would undergo cleanup per applicable environmental regulations and permit requirements and would be packaged and transported to the appropriate disposal facility, depending on the type and concentration of contamination. After clean fill and soil are brought to the site as needed, the site would be contoured. Contouring would be designed to minimize erosion and replicate or blend in with the surrounding environment. Subsequent seeding activities would utilize native plant seeds and the seeds of nonnative cereal grains selected to hold the soil in place until native vegetation becomes stabilized.

1 *Hazardous waste is a category of waste regulated under RCRA. Hazardous RCRA waste must exhibit at least one of four characteristics described in 40 CFR 261.20 through 40 CFR 261.24 (ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the U.S. Environmental Protection Agency in 40 CFR 261.31 through 40 CFR 261.33.*

2 *Mixed low-level radioactive waste contains both hazardous RCRA waste and source, special nuclear, or byproduct material subject to the Atomic Energy Act.*

Demolition

Once the CMR Building is decontaminated, demolition could proceed. All demolition debris would be sent to appropriate recycle or treatment, storage, or disposal facilities. The decontaminated CMR Building is not expected to be technically difficult to demolish and waste debris would be handled, transported, and dispositioned in accordance with standard LANL procedures.

Demolition of uncontaminated portions of the CMR Building would be performed using standard industry practices. A post-demolition site survey would be performed in accordance with the requirements of the *Multi-Agency Radiation Survey and Site Investigation Manual* (NRC/EPA/DOE 2000).

2.8.2.2 Waste Management and Pollution Prevention

Waste management and pollution prevention techniques would be implemented during the demolition of the CMR Building. Some of these techniques could include segregating wastes at the point of generation to avoid mixing and cross-contamination; decontaminating and reusing equipment and supplies; removing surface contamination from items before discarding; avoiding use of organic solvents during decontamination; using impermeable materials such as plastic liners to prevent the spread of contamination; reducing waste volumes using methods such as compaction; and recycling materials such as lead, scrap metals, and stainless steel to the extent practical.

Some of the wastes generated from the decontamination and demolition of the CMR Building would be considered residual radioactive material. DOE Order 458.1, *Radiation Protection of the Public and Environment*, establishes guidelines, procedures, and requirements to enable the reuse, recycle, or release of materials that meet established criteria. The residual radioactive material that would be generated by the decontamination and demolition of the CMR Building could include uncontaminated concrete, soil, steel, lead, roofing material, wood, and fiberglass. Concrete material could be crushed and used as backfill at LANL. Soil could also be used as backfill or topsoil cover. Steel and lead could be stored and reused or recycled. Materials such as wood, fiberglass, and roofing materials could be disposed by transfer to the Los Alamos County Eco Station or to appropriate offsite facilities.

Radioactive liquid waste lines and other equipment or materials categorized as transuranic or mixed transuranic waste would be packaged for disposal at the Waste Isolation Pilot Plant. Radioactively contaminated soil, concrete, walls, and tiles would be packaged as low-level radioactive waste and disposed of off site at the Nevada National Security Site (formerly known as the Nevada Test Site) or at a commercial disposal facility or could be disposed of on site while Area G continues to accept waste. Mixed low-level radioactive waste would be packaged and shipped to offsite commercial and/or DOE treatment, storage, or disposal facilities.

Toxic, hazardous, or other regulated wastes generated during building disposition would be addressed in accordance with LANL's chemical waste management program. Asbestos that is not radioactively contaminated would be packaged according to applicable requirements and shipped to a permitted asbestos disposal facility. Hazardous wastes would be packaged and possibly temporarily stored at TA-54 at LANL until sufficient quantities are accumulated for shipment to offsite treatment, storage, or disposal facilities. All offsite shipments would be transported by a properly licensed and permitted shipper in compliance with U.S. Department of Transportation regulations and DOE standards.

2.8.3 Disposition of the CMRR-NF Under Both CMRR-NF Alternatives

Common to both the No Action Alternative and the Modified CMRR-NF Alternative, disposition of the new CMRR-NF would be considered at the end of its designed lifetime operation of at least 50 years; it would, therefore, likely occur in the last quarter of the twenty-first century. It is anticipated that the impacts from the disposition of the new CMRR-NF would be similar to those discussed for the disposition of the existing CMR Building. However, advances made by DOE in the design and operation of nuclear facilities since the 1950s are expected to result in much lower levels of contaminated waste from DD&D of the CMRR-NF when compared with the existing CMR Building.

2.9 The Preferred Alternative

Council on Environmental Quality regulations require an agency to identify its preferred alternative, if one or more exists, in the draft environmental impact statement (40 CFR 1502.14(e)). The preferred alternative is the alternative that the agency believes would best 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.

2.10 Summary of Environmental Consequences of the CMRR-NF Project

This section summarizes the alternatives analyzed in this *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 common to all alternatives are also summarized. These include CMR Building and CMRR-NF disposition impacts.

2.10.1 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 this *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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need. **Table 2–3**, 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 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) of TA-55 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 in TA-55 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 125 acres (51 hectares) of land would be used under the Deep Excavation Option and a total 105 acres (42 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 construction laydown and support, including spoils storage areas in TA-5/52, 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 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-50 (permanent), TA-63 (temporary), and TA-64 (temporary) – 1.5 acres (0.6 hectares)
- Permanent changes for the TA-50 electrical substation – 1.4 acres (0.6 hectares)

Permanent land disturbance under the Modified CMRR-NF Alternative would affect about 28.1 acres (11.5 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 parking lot and electrical substation, and stormwater detention ponds in TA-50 and TA-63. 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 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. 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, 27 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, would use all of 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.

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.

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 CEQ guidance threshold for more-detailed evaluation and would have made up about 1 percent of site-wide generation based on LANL's 2008 baseline inventory[6]. 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 make up about 3 percent of site-wide generation based on LANL's 2008 baseline inventory.

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 make up 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 make up about 25 percent of site-wide generation 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 Clean Air Act Standards and noise standards would not be exceeded. Annual greenhouse gas emissions

[6] 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.

during operation of the CMR Building and RLUOB the would be below the CEQ guidance threshold for more-detailed evaluation and would make up about 10 percent of site-wide generation 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 Summary of Impacts 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.

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 three 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, and one in TA-50 to collect runoff from the facility site during construction and after operations begin, should this alternative be implemented. 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. RLWTF does not discharge liquid to the environment.

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. RLWTF does not discharge liquid to the environment.

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 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 125 acres [51 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 6 acres (2.4 hectares) would be permanently disturbed and 95 acres (38 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. After biological evaluation, NNSA determined 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 2011; USFWS 2003, 2005, 2006, 2007, 2009). All project activities would be reviewed for compliance with the *Threatened and Endangered Species Habitat Management Plan* (LANL 2000a). 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; 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 17 cultural resources sites eligible for listing in the National Register of Historic Places 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, 5 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

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[7] which would have increased the annual risk of a single latent cancer fatality in the population by 1×10^{-3}. The *CMRR EIS* used 2000 census data to estimate the population surrounding the facility (about 309,000).[8] The average individual would have received a dose of 0.0063 millirem annually.[9] 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 maximally exposed individual (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.

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} per year. This *CMRR-NF SEIS* projects the population to 2030 (about 545,000) using census data through 2009 to estimate population dose. The average individual would receive a dose of 0.0033 millirem annually.[10] 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

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[7] *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 1993b) factors included in the latest version of GENII, Version 2 which was used to conduct the analysis of the Modified CMRR-NF Alternative.*

[8] *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.*

[9] *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.*

[10] *The projected population dose of 1.8 person-rem was divided by 545,000 individuals, equaling an average dose of about 0.0033 millirem per individual.*

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 chapter. The annual projected population dose to persons residing within 50 miles (80 kilometers) of TA-3 (about 536,000) would be approximately 0.014 person-rem, which would increase the likelihood of a single latent cancer fatality in the population by 8×10^{-6} per year. The average individual would receive a dose of 0.000027 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 this *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 hazards analysis, it was concluded that a design-basis earthquake with a return interval of about 2,500 years would have an estimated horizontal peak ground acceleration of 0.52 *g*. The previous estimated horizontal peak ground acceleration for an earthquake with a return interval of about 2,500 years was about 0.3 *g* (LANL 2007a). 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 greatly increased the 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*. 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 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 0.007 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 0.01, 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 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 a design-basis earthquake without significant damage. Construction of the Modified CMRR-NF would involve the use of larger amounts of concrete (150,000 cubic yards [115,000 cubic meters] of structural concrete compared to 3,194 cubic yards [2,442 cubic meters]) and structural steel (560 tons [508 metric tons] compared to 267 tons [242 metric tons]) compared to what was estimated for the 2004 CMRR-NF. For the design-basis earthquake resulting 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/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 accidents with the highest potential risk to the offsite population would be a facility-wide fire or the loading dock spill/fire. These accidents would present an increased risk of a single latent cancer fatality in the entire population of 4×10^{-5} per year, or about 1 chance in 25,000. 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 be from a seismically induced spill or the loading dock spill/fire. The risk a latent cancer fatality to the noninvolved worker from these accidents would be 6×10^{-6}, or about 1 chance in 160,000 per year.

The accident with the highest potential risk to the offsite population under the Continued Use of CMR Building Alternative would be an earthquake that would severely damage the CMR Building, resulting in a seismically induced spill of radioactive materials. 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 entire population of 0.003 per year. In other words, the likelihood of developing one fatal cancer in the entire population would be about 1 chance in 333 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} per year. In other words, the offsite MEI's likelihood of developing a fatal cancer from this event is about 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 0.0003, or about 1 chance in 3,333 per year.

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 operations of the 2004 CMRR-NF and operations of RLUOB.

Under the Modified CMRR-NF Alternative, there would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or operations of the Modified CMRR-NF and operation of RLUOB. Doses from normal operations to all individuals would be low, and the average nonminority or non-low-income individual's radiological impacts would be greater than those received by the average minority or low-income member of the general population. Under the Modified CMRR-NF Alternative, the average annual dose to a nonminority individual from operation of the Modified CMRR-NF and RLUOB would be 0.0035 millirem compared to 0.0032 millirem for the average minority individual; the average annual dose to a non-low-income individual would be 0.0034 millirem compared to 0.0031 millirem for the average low-income individual.

Under the Continued Use of CMR Building Alternative, the average annual dose to a nonminority individual from the continued operation of the CMR Building would be 3.1×10^{-5} millirem compared to 2.4×10^{-5} millirem for the average minority individual, and the average annual dose to a non-low-income individual would be 2.8×10^{-5} millirem compared to 2.1×10^{-5} millirem for the average low-income individual. 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.

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 what was 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 this *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. This *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) 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 (0.007) 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 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 1.1 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 0.4 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 (0.003) 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 2–3 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	About 125 acres of land would be used under the Deep Excavation Option and about 105 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 lot – up to 15 acres • Temporary power upgrades – 9.1 acres • Pajarito Road realignment – 3.4 acres • Stormwater detention ponds – 1.5 acres • TA-50 electrical substation – 1.4 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 28.1 acres, including the building site, the Pajarito Road realignment, the TA-50 electrical substation and parking lot, 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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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

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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		Not applicable
Water (million gallons per year)	0.75	5	4	Not applicable
Operations				
Electricity (MW-hours per year)	19,300	161,000		59,000 [c]
Natural gas (million cubic feet per year)	Not available	58		38 [c]
Water (million gallons per year)	10.4	16		7 [c]
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 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 CEQ guidance threshold for more-detailed evaluation and about 25 percent of site-wide generation.[d] 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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

[b] Site infrastructure estimates for construction and operation have been re-estimated for the Modified CMRR-NF. 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] 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 this *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.

[d] 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 be 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 three 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.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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 less than 1 percent of the regional workforce and would have little socioeconomic effect.	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; RLUOB = Radiological Laboratory/Utility/Office Building.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Human Health [b]			
Normal Operations			
Offsite population			
Dose (person-rem per year)	1.9	1.8	0.014
Annual population LCF risk	1×10^{-3}	1×10^{-3}	8×10^{-6}
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}	4×10^{-5}	3×10^{-3}
MEI (risk)	7×10^{-3}	2×10^{-7}	1×10^{-5}
Noninvolved worker (risk)	1×10^{-2}	6×10^{-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.

[a] 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

[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.	There would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or operations. 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 impacts on the average nonminority or non-low-income member of the general population. • Average dose to nonminority individual: 0.0035 millirem • Average dose to minority individual: 0.0032 millirem • Average dose to non-low-income individual: 0.0034 millirem • Average dose to low-income individual: 0.0031 millirem	There would be no disproportionately high and adverse environmental impacts on minority or low-income populations due to construction or operations. 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 impacts on the average nonminority or non-low-income member of the general population. • Average dose to nonminority individual: 3.1×10^{-5} millirem • Average dose to minority individual: 2.4×10^{-5} millirem • Average dose to non-low-income individual: 2.8×10^{-5} millirem • Average dose to low-income individual: 2.1×10^{-5} millirem

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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need.

Resource/Material Category	*No Action Alternative* [a]	*Modified CMRR-NF Alternative*	*Continued Use of CMR Building Alternative*
Waste Management			
Construction			
Solid waste (tons) [b]	578	2,600	Not applicable
Operations (annual generation rates) [c]			
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	5,230,000
Liquid low-level radioactive waste (gallons)	2,700,000	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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet NNSA's purpose and need.

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

[c] 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.

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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need.

[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 operations would be able to be disposed of on site 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.

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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	 $0.42 / 3 \times 10^{-4}$ $0.01 / 1 \times 10^{-5}$ $0.02 / 1 \times 10^{-5}$	
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 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 this *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 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 this *CMRR-NF SEIS* as an alternative that would meet the NNSA's purpose and need.

[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.

2.10.2 Environmental Impacts Common to Multiple Alternatives

2.10.2.1 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, RLUOB operations would continue. At the existing CMR Building, where operational restrictions would remain in effect, operations would decrease beginning in 2020 (for the Modified CMRR-NF) as operations move to the new 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.

2.10.2.2 CMR Building and CMRR Facility Disposition Impacts

Under all alternatives in this *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 2–3. Annual waste generation rates in Table 2–3 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.

2.10.2.3 Summary of Cumulative Impacts

In accordance with CEQ regulations, a cumulative impacts analysis was conducted for this *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 this *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 2010a).

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 what was estimated for the 2004 CMRR-NF (under the No Action Alternative). Should these projections be fully realized, LANL and Los Alamos County could cumulatively require 100 percent of the current electric peak load capacity, 67 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 increase the requirements for electric peak load by 3 percent, electricity by 1 percent, and water by less than 1 percent (DOE 2011b).

Of most concern is the potential to exceed electric peak 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 2011).

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 Electricity. 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 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.