DOE/EA-1407

Environmental Assessment for the Proposed TA-16 Engineering Complex Refurbishment and Consolidation at Los Alamos National Laboratory, Los Alamos, New Mexico

April 23, 2002

Department of Energy
National Nuclear Security Administration
Office of Los Alamos Site Operations

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Acronyms and Terms

ac	acres
AEA	Atomic Energy Act of 1954
AM	Advanced Manufacturing
AOCs	areas of concern
BACMs	best available control measures
BAER	Burned Area Emergency Rehabilitation (team)
BMPs	best management practices
CFR	Code of Federal Regulations
CRMP	cultural resources management plan
dB	decibel
dBA	A-weighted frequency scale
DOE	(U.S.) Department of Energy
DOI	Department of the Interior
DU	depleted uranium
EA	environmental assessment
EIS	environmental impact statement
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ER	Environmental Restoration (Project)
ESA	Engineering Sciences and Applications
ft	feet
ft^2	square feet
ft^3	cubic feet
FY	fiscal year
ha	hectares
HE	high explosives
HEPA	high-efficiency particulate air
HVAC	heating, ventilation, and air conditioning
kg	kilograms
km	kilometers
km^2	square kilometers
LANL	Los Alamos National Laboratory
lb	pound
LIR	Laboratory Implementing Requirement
LLW	low-level radioactive waste
m	meters
m^2	square meters
m^3	cubic meters
mi	miles
mi^2	square miles
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standard for Hazardous Air Pollutants
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NRHP	National Register of Historic Places
OEL	occupational exposure limit
OLASO	Office of Los Alamos Site Operations
Plan	Construction Safety and Health Plan
PPE	personal protective equipment
PRSs	potential release sites
Rad	radionuclides
RCRA	Resource Conservation and Recovery Act
RLWTF	Radiological Liquid Waste Treatment Facility
ROD	Record of Decision
SHPO	State Historic Preservation Office
SWMUs	solid waste management units
SR	State Road
SWEIS	Site-Wide Environmental Impact Statement
TA	Technical Area (at LANL)
UC	University of California
U.S.	United States
yd^3	cubic yards

EXPONENTIAL NOTATION: Many values in the text and tables of this document are expressed in exponential notation. An exponent is the power to which the expression, or number, is raised. This form of notation is used to conserve space and to focus attention on comparisons of the order of magnitude of the numbers (see examples):

1×10^{4}	=	10,000
1×10^{2}	=	100
1×10^{0}	=	1
1×10^{-2}	=	0.01
1×10^{-4}	=	0.0001

Metric Conversions Used in this Document

Multiply	By	To Obtain
Length		
inch (in.)	2.50	centimeters (cm)
feet (ft)	0.30	meters (m)
yards (yd)	0.91	meters (m)
miles (mi)	1.61	kilometers (km)
Area		
acres (ac)	0.40	hectares (ha)
square feet (ft^2)	0.09	square meters (m^2)
square yards (yd^2)	0.84	square meters (m^2)
square miles (mi^2)	2.59	square kilometers (km^2)
Volume		
gallons (gal.)	3.79	liters (L)
cubic feet (ft^3)	0.03	cubic meters (m^3)
cubic yards (yd^3)	0.76	cubic meters (m^3)
Weight		
ounces (oz)	29.60	grams (g)
pounds (lb)	0.45	kilograms (kg)
short ton (ton)	0.91	metric ton (t)

EXECUTIVE SUMMARY

The National Nuclear Security Administration (NNSA)[1] has assigned a continuing role to Los Alamos National Laboratory (LANL) in carrying out NNSA's national security mission. To enable LANL to continue this enduring responsibility requires that NNSA maintain the capabilities and capacities required in support of its national mission assignments at LANL. These assignments include maintaining core intellectual and technical competencies in nuclear weapons and a safe, and reliable, national nuclear weapons stockpile. The NNSA fulfills this commitment through the Stockpile Stewardship Program. Several buildings and structures that house programmatic engineering and support functions that are essential to the overall LANL operations and nuclear weapons work performed for DOE and NNSA are located at Technical Area (TA) 3, TA-8, TA-11, and TA-16. These buildings have many identified structural, systemic, and security deficiencies associated with them and some are oversized for the mission activities they house. NNSA needs to correct these problems so that the necessary programmatic, management, and support functions housed at LANL can continue to function with a high level of efficiency. Additionally, NNSA also needs to minimize wherever possible the use of energy and the cost of maintaining operations.

The Proposed Action is to construct and operate offices, laboratories, and shops within the TA-16 engineering complex where Engineering and Science Applications (ESA) Division operations would be consolidated from other locations at LANL. The Proposed Action would also remove or demolish certain vacated structures that are no longer needed. The Proposed Action consists of constructing six new buildings (two office buildings, two machine shops, a crafts support building, and a calibration laboratory) and remodeling two other buildings within the existing TA-16 engineering complex. This Proposed Action also involves modifying or upgrading existing roads, parking, fencing, and utilities within the engineering complex. In addition, when construction is complete, the engineering complex would be landscaped. ESA personnel in these technical areas would be relocated to the new or remodeled buildings in TA-16. Once temporary buildings are vacated, they would be removed from the engineering complex and made available for other uses. Permanent buildings that are vacated as part of this Proposed Action would also be made available for other uses. If no other uses are identified, these buildings would be demolished. The Proposed Action would not involve any current high-explosives processing or testing facilities. The Weapons Engineering Tritium Facility, located adjacent to the engineering complex, would not be affected.

The No Action Alternative was also considered. Under this alternative NNSA would not construct new buildings and remodel or modify existing buildings. Poor-quality office and laboratory space would continue to be used. ESA operations would continue to be conducted in dispersed facilities; there would be no reduction in the cost of facility maintenance. Expenses for repairs and replacement of aging heating, ventilation, and cooling systems and other building components would increase. As building systems and other components fail and cannot be replaced or repaired, areas of the buildings would be closed. This is not an alternative that meets NNSA's purpose and need for action.

[1] The NNSA is a separately organized agency within the Department of Energy (DOE) established by the 1999 National Nuclear Security Administration Act [Title 32 of the *Defense Authorization Act* for Fiscal Year 2000 (Public Law 106-65)].

The proposed construction sites are located in areas that were once occupied by buildings or structures, are within existing paved parking areas, or are in the areas immediately adjacent to existing buildings and parking areas. No undeveloped areas would be involved. There are several potential release sites in TA-16; however, these areas would be avoided, where possible, or, if affected by the Proposed Action, would be sampled and remediated in accordance with New Mexico Environmental Department requirements before construction. Traffic congestion in the area is not expected to increase, as the Proposed Action would only increase total current traffic by about four percent. There would be adequate parking for University of California (UC) personnel and construction workers. Construction and demolition wastes would be trucked to a licensed commercial landfill or reused for backfilling. Construction, renovation, and demolition activities for the proposed TA-16 engineering complex refurbishment would be expected to produce only temporary and localized air emissions. Once construction is complete, operational emissions may decrease due to increased efficiency with more modern equipment and facilities and to a reduction in some activities. Consolidation of operations under the Proposed Action would have no effects on visual resources, water quality, or adverse health effects on UC employees or construction workers. None of the buildings to be constructed as part of the Proposed Action would be sited over the fault trace or within 50 ft (15 m) of any known active fault. The demolition and remodeling of various buildings could have an adverse effect on some historic structures that are eligible for the National Register of Historic Places. The importance of these buildings to LANL's history is being assessed and a plan would be developed that would include research tools to preserve the historical knowledge and features of these structures.

Cumulative effects of the Proposed Action, along with past, present, and reasonably foreseeable actions, on LANL and surrounding lands are anticipated to be negligible. No increases in LANL operations are anticipated as a result of this action.

1.0 Purpose and Need

1.1 Introduction

The *National Environmental Policy Act of 1969* (NEPA) requires Federal agency officials to consider the environmental consequences of their proposed actions before decisions are made. In complying with NEPA, the United States (U.S.) Department of Energy (DOE), National Nuclear Security Administration (NNSA)[2], follows the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500–1508) and DOE's NEPA implementing procedures (10 CFR 1021). The purpose of an environmental assessment (EA) is to provide Federal decision makers with sufficient evidence and analysis to determine whether to prepare an environmental impact statement (EIS) or issue a Finding of No Significant Impact.

Los Alamos National Laboratory (LANL) is a national security laboratory located at Los Alamos, New Mexico, that comprises 43 square miles (mi^2) (111 square kilometers [km^2]) of buildings, structures, and forested land (Figure 1). It is administered by NNSA for the Federal government and is managed and operated under contract by the University of California (UC). The NNSA must make a decision whether to consolidate and modernize existing engineering facilities of the Engineering Sciences and Applications (ESA) Division, along with associated offices and other support structures, and to construct several new structures to create a "campus-like" cluster of facilities at LANL's Technical Area (TA) 16. This Proposed Action would involve constructing new buildings, remodeling existing buildings, and demolishing or removing older buildings, structures, and transportables; consolidating existing engineering operations and offices; and enhancing utilities and roads, along with security infrastructure, at TA-16. This Proposed Action also would affect operations at some buildings at TA-3, TA-8, and TA-11 (Figure 2). This EA has been prepared to assess the potential environmental consequences of this proposed construction, operational consolidation, and demolition project.

The objectives of this EA are to (1) describe the underlying purpose and need for NNSA action; (2) describe the Proposed Action and identify and describe any reasonable alternatives that satisfy the purpose and need for agency action; (3) describe baseline environmental conditions at LANL; (4) analyze the potential indirect, direct, and cumulative effects to the existing environment from implementation of the Proposed Action, and (5) compare the effects of the Proposed Action with the No Action Alternative and other reasonable alternatives. For the purposes of compliance with NEPA, reasonable alternatives are identified as being those that meet NNSA's purpose and need for action by virtue of timeliness, appropriate technology, and applicability to LANL. The EA process provides NNSA with environmental information that can be used in developing mitigative actions, if necessary, to minimize or avoid adverse effects to the quality of the human environment and natural ecosystems should NNSA decide to proceed with implementing the Proposed Action at TA-16 at LANL.

Ultimately, the goal of NEPA, and this EA, is to aid NNSA officials in making decisions based on an understanding of environmental consequences and taking actions that protect, restore, and enhance the environment.

[2] The NNSA is a separately organized agency within the DOE established by the 1999 National Nuclear Security Administration Act [Title 32, of the Defense Authorization Act for Fiscal Year 2000 (Public Law 106-65)].

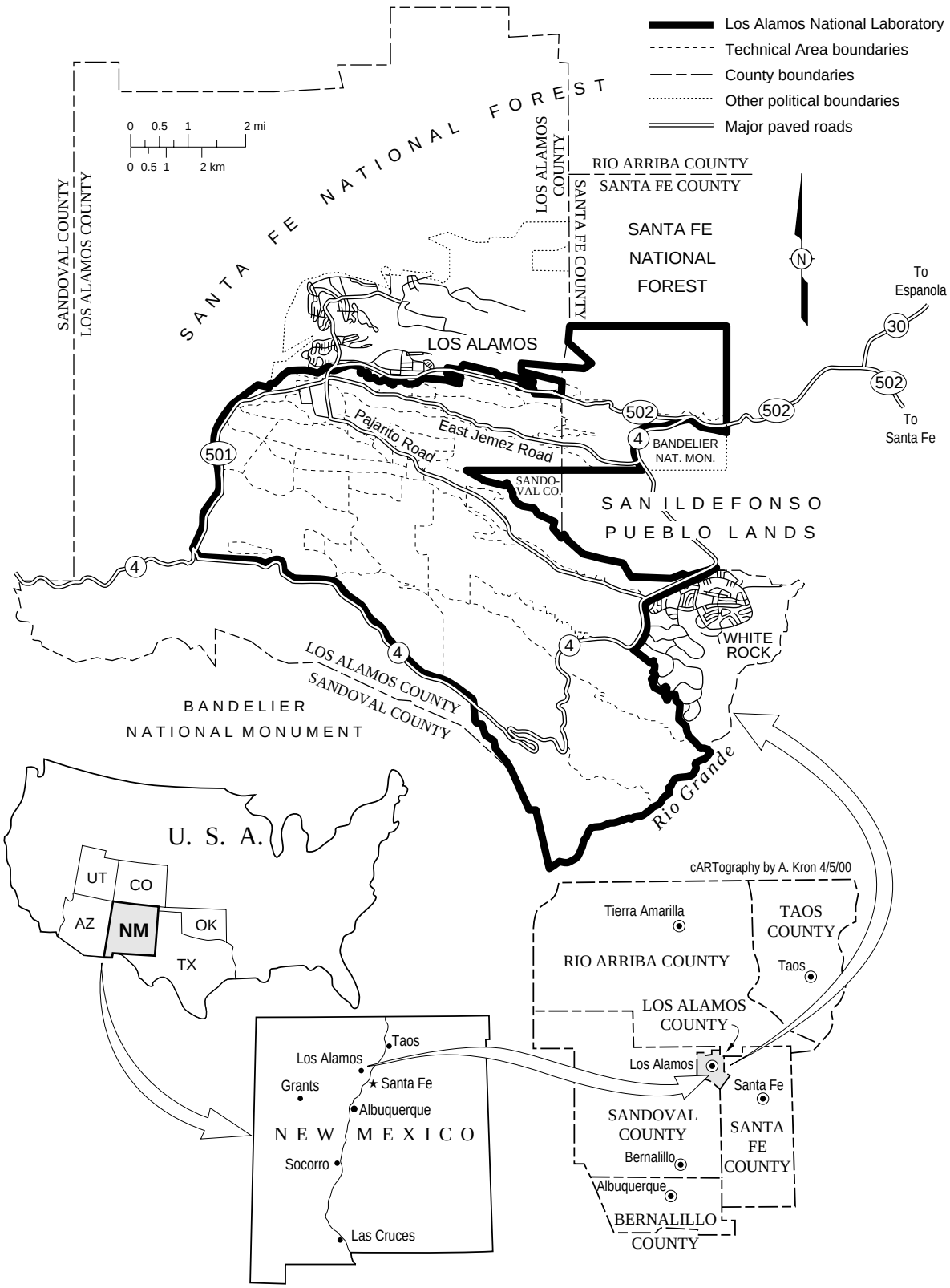

Figure 1. Location of Los Alamos National Laboratory.

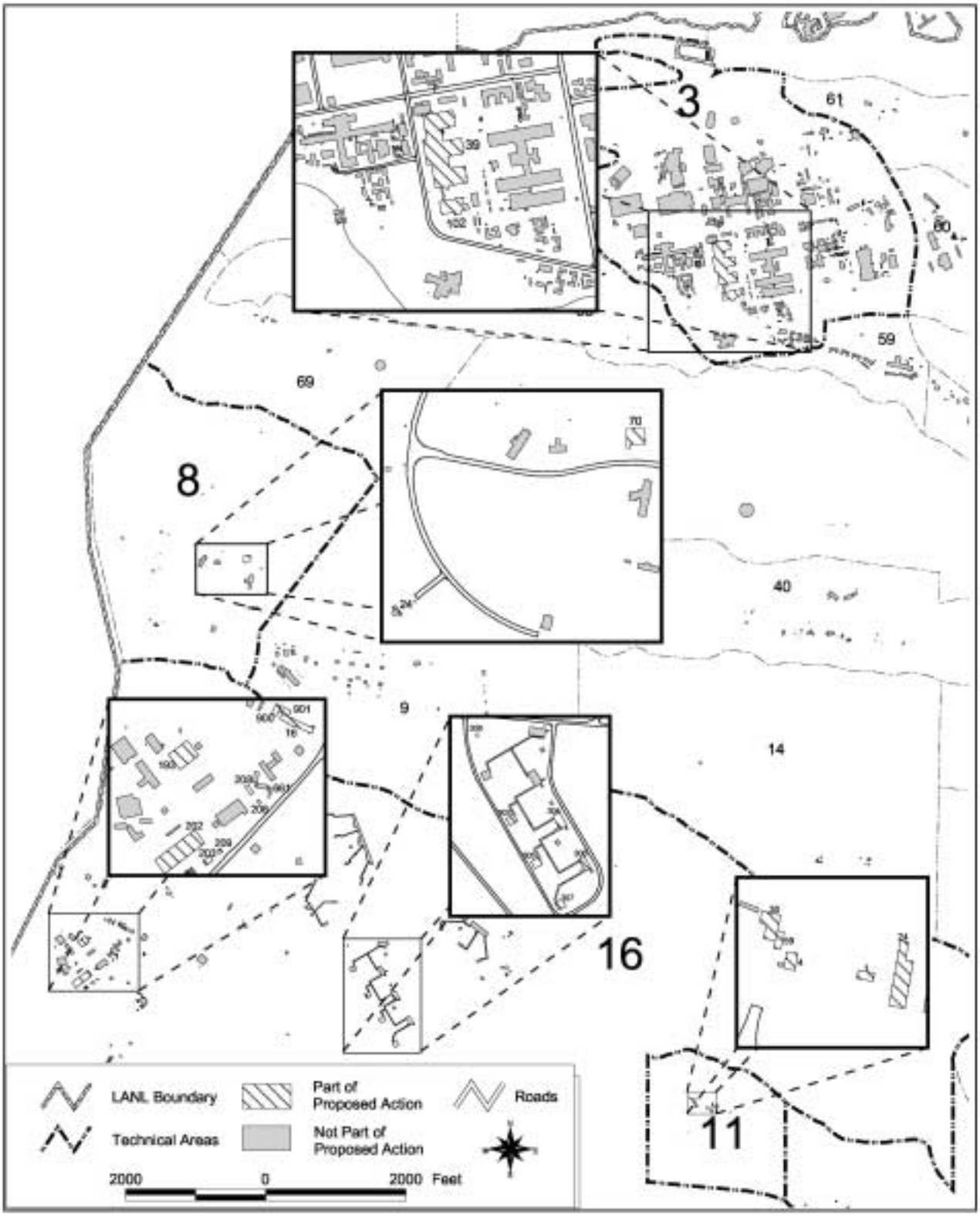

Figure 2. Technical areas at Los Alamos National Laboratory affected by the Proposed Action (inset enlargement not to same scale).

1.2 Background

The U.S. National Security Policy requires NNSA to maintain core intellectual and technical competencies in nuclear weapons and to maintain a safe, and reliable, national nuclear weapons stockpile. NNSA fulfills its national security nuclear weapons responsibilities through the Stockpile Stewardship Program, which involves activities performed at LANL. LANL is one of three national laboratories that support DOE's responsibilities for national security, energy resources, environmental quality, and science. NNSA's national security mission includes the safety and reliability of the nuclear weapons in the stockpile; maintenance of the nuclear weapons stockpile in accordance with executive directives; stemming the international spread of nuclear weapons materials and technologies; developing technical solutions to reduce the threat of weapons of mass destruction; and production of nuclear propulsion plants for the U.S. Navy. The energy resources mission of DOE includes research and development for energy efficiency, renewable energy, fossil energy, and nuclear energy. The DOE's environmental quality mission includes treatment, storage, and disposal of DOE wastes; cleanup of nuclear weapons sites; pollution prevention; storage and disposal of civilian radioactive waste; and development of technologies to reduce risks and reduce cleanup costs for DOE activities. DOE's science mission includes fundamental research in physics, materials science, chemistry, nuclear medicine, basic energy sciences, computational sciences, environmental sciences, and biological sciences and often contributes to the other three DOE missions. LANL provides support to each of these departmental missions, with a special focus on national security.

To carry out its Congressionally assigned mission requirements, NNSA must maintain a safe and reliable infrastructure at each of the national security laboratories. The 1999 Final *Site-Wide Environmental Impact Statement for Continued Operations of the Los Alamos National Laboratory* (SWEIS) (DOE 1999a) discusses each of the previously identified DOE missions in greater detail and analyzes four different levels of operations at LANL that support these missions. The SWEIS identified the various technical areas at LANL, their associated activities, and buildings. The SWEIS also identified emerging actions at LANL (see Section 1.6.3.1 of the SWEIS) and included a discussion of a variety of options for the renovation of infrastructure at LANL's TA-3 that could include the replacement of a number of aging structures either individually or as part of a multi-building effort. Many of the buildings and structures at LANL were built in the mid-1900s after World War II ended. When the SWEIS was finalized in 1999, it was anticipated that one or more building replacements would be needed; the construction would be of office and light laboratory buildings to continue housing the existing types of activities currently pursued at TA-3. Planning for renovations and replacements was still underway and the effects of these actions were not considered in the SWEIS. The replacement of aging structures at other technical areas at LANL was not yet considered in 1999. However, soon thereafter, tighter budget allocations and possible solutions for saving overall costs once again raised the issue of replacing aging structures. Contemplated actions to consolidate activities into grouped facilities at LANL, with an overall reduction in the size of facilities, result from evaluations of the capabilities needed to meet the requirements of mission programs, the cost savings in long-term operating dollars, and the efficiency of operations that consolidation would bring.

The existing ESA facilities at LANL were constructed during the Cold War era when the mission of DOE's predecessor agency was to sustain aggressive system development, nuclear testing, and

stockpile deployment. Today, ESA's primary function is nuclear stockpile stewardship, with certification responsibility for a substantial majority of the nation's active nuclear weapons stockpile. ESA's stockpile stewardship activities currently involve facilities primarily located in buildings and structures at TA-3, TA-8, TA-11, and TA-16. Many of the buildings and structures in the technical areas that support weapons research and development and processing were built in the 1940s and 1950s (Photo 1). Most of these buildings, their activities, and

Photo 1. TA-16 Building 193, built in 1952.

operations, with the exception of the office buildings and buildings and structures with similar support functions, such as the craft shops and storage areas, are described in the SWEIS. NNSA has become aware of structural and systemic problems at ESA facilities at LANL that make it difficult to meet the functional and safety requirements of the operations that these facilities house. The identified problems include the reliability of the major building systems, namely, the electrical, mechanical, and plumbing systems, and the physical condition of the buildings. Not only are many of the buildings' systems required to meet demands that were unforeseen in the 1940s and 50s (such as today's needs for increased electric power and high-speed computer and communication systems), but system components are also failing because of the normal stresses, strains, and general fatigue resulting from operating long beyond their individual design lives. With these component failures, it is becoming increasing difficult to provide replacement parts for equipment that is no longer being manufactured for today's markets. The basic plumbing systems are crumbling from within and can no longer be reliably maintained. The heating, ventilation, and air conditioning (HVAC) systems do not meet current commercial standards for shops and office facilities. Several of the buildings do not have air conditioning, while others are cooled by multiple systems, including through-wall systems (window air conditioners) that have

been installed over the years. These through-wall systems are very noisy, inefficient, and expensive to operate. The electrical distribution system does not function reliably, contains many current code violations (few of which are subject to waivers), and does not include surge protection capabilities needed to protect modern office equipment, especially personal computers. The lighting systems fail to meet current standards for appropriate ergonomic illumination or energy use. There are also multiple deficiencies regarding compliance with *Americans with Disabilities Act* requirements. The ESA facilities were built well before our increased dependence on office electronics occurred. The buildings are not configured to easily handle today's demands for increased power and high-speed communications systems. The buildings also do not facilitate the shifts in the levels of staff and staff operations housed therein that have occurred over the past 40-plus years.

A recent study by DOE's National Renewable Energy Laboratory (NREL 1999) showed that it is possible to achieve energy cost savings of up to 63 percent when constructing office and light laboratory buildings in a climate similar to Los Alamos. Additionally, ESA operations occupy more space in LANL buildings than is required for those operations, leading to increased costs over consolidated activities and a loss of employee efficiencies. Operational and routine maintenance costs for the ESA buildings and structures are estimated to be several million dollars per year over those required by newer, more efficient buildings of similar sizes. The operational and maintenance costs for smaller buildings with appropriate square footage needed to support current mission support activities would be reduced even more for greater overall cost savings.

After the May 2000 Cerro Grande Fire burned 47,000 acres (ac) (17,200 hectares [ha])[3] in the LANL area (including 7,650 ac [3,061 ha] within the boundaries of LANL), NNSA instituted a wildfire hazard reduction program at LANL. As part of this program, UC is expediting efforts to move facilities out of canyon areas at LANL, to replace transportable structures with permanent constructed facilities, and to remove facilities that house employees or critical missions support activities from forest interface areas. Many ESA employees are housed in transportables (Photo 2) that are dispersed in remote locations, some of which are in forested areas. This makes these facilities, which are less fire resistant than permanent structures, particularly vulnerable to fire damages, as they are difficult to defend in the event of fire.

1.3 Statement of Purpose and Need for Agency Action

NNSA has assigned a continuing role to LANL in carrying out NNSA's national security mission. To enable LANL to continue this enduring responsibility requires that NNSA maintain the capabilities and capacities required in support of its national mission assignments at LANL. Several of the buildings and structures that house programmatic engineering and support functions that are essential to the overall LANL operations and nuclear weapons work performed for DOE and NNSA are located at TA-3, TA-8, TA-11, and TA-16. These buildings have many identified structural, systemic, and security deficiencies associated with them and some are oversized for the mission activities they house. NNSA needs to correct these problems so that

[3] The number of acres is an estimate based on data derived from the Burned Area Emergency Rehabilitation (BAER) Team report (BAER 2000). Any differences in acres affected among the BAER report, other published sources, and this document are the result of data entry variations or rounding differences and are not intended to indicate significant differences.

the necessary programmatic, management, and support functions housed at LANL can continue to function with a high level of efficiency. Additionally, NNSA also needs to minimize wherever possible the use of energy and the cost of maintaining operations.

Photo 2. Transportables at TA-16 engineering complex.

1.4 Scope of This EA

A sliding-scale approach (DOE 1993) is the basis for the analysis of potential environmental and socioeconomic effects in this EA. That is, certain aspects of the Proposed Action have a greater potential for creating environmental effects than others; therefore, they are discussed in greater detail in this EA than those aspects of the action that have little potential for effect. For example, implementation of the Proposed Action would affect waste disposal resources in the LANL area. This EA, therefore, presents in-depth descriptive information on these resources to the fullest extent necessary for effects analysis. On the other hand, implementation of the Proposed Action would cause only a minor effect on socioeconomics at LANL. Thus, a minimal description of socioeconomic effects is presented.

When details about a Proposed Action are incomplete, as are a few for the Proposed Action evaluated in this EA (for example, the exact amount of waste generation), a bounding analysis is often used to assess potential effects. When this approach is used, reasonable maximum assumptions are made regarding potential emissions, effluents, waste streams, and project activities (see Chapters 2 and 3 of this EA). Such an analysis usually overestimates potential effects. In addition, any proposed future action(s) that exceeds the assumptions (the bounds of

this effects analysis) would not be allowed until an additional NEPA review could be performed. A decision to proceed or not with the action(s) would then be made.

1.5 Public Involvement

NNSA provided written notification of this NEPA review to the State of New Mexico, the four Accord Pueblos (San Ildefonso, Santa Clara, Jemez, and Cochiti), Acoma Pueblo, the Mescalero Apache Tribe, and to over 30 stakeholders in the area on August 24, 2001. In addition, upon release of this draft EA, NNSA will allow for a 21-day review period. Where appropriate and to the extent practicable, concerns and comments will be considered in the final EA.

2.0 Description of Proposed Action and Alternatives

This section discusses the Proposed Action and a No Action Alternative. Section 2.1 describes the Proposed Action for the EA that would allow NNSA to meet its purpose and need for agency action. The No Action Alternative is presented in Section 2.2 as a baseline for comparison with the consequences of implementing the Proposed Action. Alternatives that were considered but dismissed from further analysis in this EA are discussed in Section 2.3, and related actions are discussed in Section 2.4.

TA-16 is composed of an engineering complex adjacent to State Road (SR) 501 and a high-explosive (HE) operational area that occupies the rest of TA-16. The engineering complex contains offices, an exercise facility, a cafeteria, crafts[4] operations and other support activities, and small-scale experimental facilities. Except for some work with items that do not present a fragmentation or blast hazard, work with HE is confined to the area behind a safeguards fence[5] located east of the engineering complex. The existing TA-16 engineering complex is shown in Figure 3.

Figure 3. Aerial view of the existing TA-16 engineering complex in 2000.

[4] Crafts include carpentry, pipefitting, sheet-metal working, and similar activities needed for routine facility maintenance and repair.

[5] Safeguards fences only allow access to personnel trained appropriately for the operational hazards from activities conducted in the restricted area.

2.1 Proposed Action

The Proposed Action is to renovate, construct, and operate offices, laboratories, and shops within the TA-16 engineering complex (Figure 4) where work would be consolidated from other locations at LANL. The Proposed Action would also remove or demolish certain vacated structures that are no longer needed. ESA would vacate approximately 270,000 square feet (ft^2) (81,000 square meters [m^2]) of space in existing buildings.

Figure 4. Conceptual drawing of the proposed TA-16 engineering campus.

The Proposed Action consists of constructing six new buildings (two office buildings, two machine shops, a crafts support building, and a calibration laboratory) and remodeling two other

buildings within the existing TA-16 engineering complex. The Proposed Action also involves modifying or upgrading existing roads, parking, fencing, and utilities within the engineering complex. As construction is completed, the engineering complex would be landscaped. Existing weapons engineering operations, weapons engineering personnel, and support staff from within TA-16 and from other technical areas at LANL would be relocated to the new buildings or to remodeled buildings. Temporary buildings (transportables) that are vacated as part of the relocations would be removed from the engineering complex and made available for other LANL uses or eliminated from use through the LANL excess property program. Permanent buildings that are vacated as part of the Proposed Action would also be made available for other uses. If no other uses are identified, these buildings would be demolished. Table 1 summarizes the buildings that would be involved in the Proposed Action.

Table 1. Buildings Involved in the Proposed Action

Tech Area	Building	Current Use	Planned Use
TA-3	39	Nonradioactive Nonhazardous Materials Machine Shop (Cold Shop) and Standards/Calibration Laboratory	To be vacated.
TA-3	102	Radiological Hazardous Materials Machine Shop (Hot Shop)	To be vacated and decontaminated.
TA-8	24	Storage; Crafts Support	To be vacated.
TA-8	70	Nondestructive Test Facility	To be vacated.
TA-11	1	Storage (bunker)	To be vacated.
TA-11	4, 30, 59	Vibration Testing	To be vacated and placed in stand-by condition.
TA-11	24	Offices	To be vacated.
TA-16	16	Administrative offices	Existing safeguards fence would be moved and reinstalled to exclude TA-16 Building 16. This building would then be used for nonsecure measures and to accommodate uncleared personnel.
TA-16	193	Change House	To be refurbished to accommodate downscaled plastics operations, laser sintering, and storage.
TA-16	200	Offices	Use unchanged; some personnel would relocate to new buildings.
TA-16	202	Gas Transfer System Laboratory and Assembly Area and Access Control	To be refurbished to accommodate nondestructive testing operations from TA-8 Building 70 and the Shock and Vibration Testing Laboratory, including an addition to accommodate a high bay.
TA-16	203	Lumber Storage	To be vacated.
TA-16	206	Paint and Bottle Storage	To be vacated.
TA-16	208	Solvent Storage	To be vacated.
TA-16	209	Guard Station/Safety Office	To be vacated.
TA-16	303	Rest House	To be vacated.
TA-16	304, 305, 306, 307	Plastics	To be vacated.
TA-16	308	Storage	To be vacated.
TA-16	various	Office Transportables	To be vacated and removed from TA-16, made available for uses at other sites, or salvaged.
TA-50	54	Office and Light Lab/Shop	To be vacated.

All phases of the Proposed Action, including construction, operation, and demolition, would be conducted in accordance with LANL's requirements for waste management (LANL 1998). These requirements specify that waste shall be reduced as much as technically and economically

feasible. Waste minimization practices (such as material substitution, source reduction, hazard segregation, recycling, and reuse) would be incorporated into all waste-generating activities. Disposal of wastes would be used only when other options are not safe or are not technically or economically feasible. Wastes would be recycled or salvaged in accordance with LANL's property management process. In the case of construction, a Waste Minimization Plan must be prepared.

Both remodeling and demolition activities could involve structures that are eligible for listing on the National Register of Historic Places. Appropriate compliance with the National Historic Preservation Act would be undertaken and if a treatment plan were necessary this would be negotiated with the State Historic Preservation Officer (SHPO). All construction and demolition actions would then proceed based on the implementation of that treatment plan.

The Proposed Action would not involve any current HE processing or testing facilities. The Weapons Engineering Tritium Facility, located adjacent to the engineering complex, would not be affected by the Proposed Action.

Information that is common to all the construction activities included in the Proposed Action is presented in the following section (2.1.1). The subsections that follow Section 2.1.1 include discussion of the construction of each of the buildings and structures. Operations are discussed in Section 2.1.2, and the demolition actions included as part of the Proposed Action are summarized in Section 2.1.3. The projected schedule for completion of the Proposed Action is described in Section 2.1.4.

2.1.1 Construction

The Proposed Action would be located in TA-16, which is a developed area occupied by about 580 workers representing about 5 percent of UC and subcontractor personnel at LANL. The proposed construction sites are located in areas that were once occupied by buildings or structures, are within existing paved parking areas, or are in areas immediately adjacent to existing buildings and parking areas. No undeveloped (so called "green-field") areas would be involved. A few trees may need to be removed from areas near the periphery of the engineering complex. Within the engineering complex, asphalt would be removed from the construction sites. No construction would be conducted within a floodplain or a wetland.

No building construction is expected to disturb potential release sites[6] (PRSs) (Figure 5); however, asphalt removal, utility corridor excavation, or post construction landscaping could disturb some of these areas. Should a suspect disposal site be disclosed during subsurface construction work, LANL's Environmental Restoration (ER) Project staff would review the site

[6] Potential release site (PRS) — The Environmental Restoration Project Glossary (ER2000-0095) refers to PRSs as potentially contaminated sites at LANL that are identified either as solid waste management units (SWMUs) or areas of concern (AOCs). AOCs are areas at LANL that might warrant further investigation for releases based on past facility waste-management activities. A SWMU is any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released. This includes regulated units (i.e., landfills, surface impoundments, waste piles, and land treatment units) but does not include passive leakage or one-time spills from production areas and units in which wastes have not been managed (e.g., product-storage areas).

and would identify procedures for working within that site area. Soils from PRSs would be returned to the excavated area after disturbance when feasible or would be characterized and disposed of appropriately.

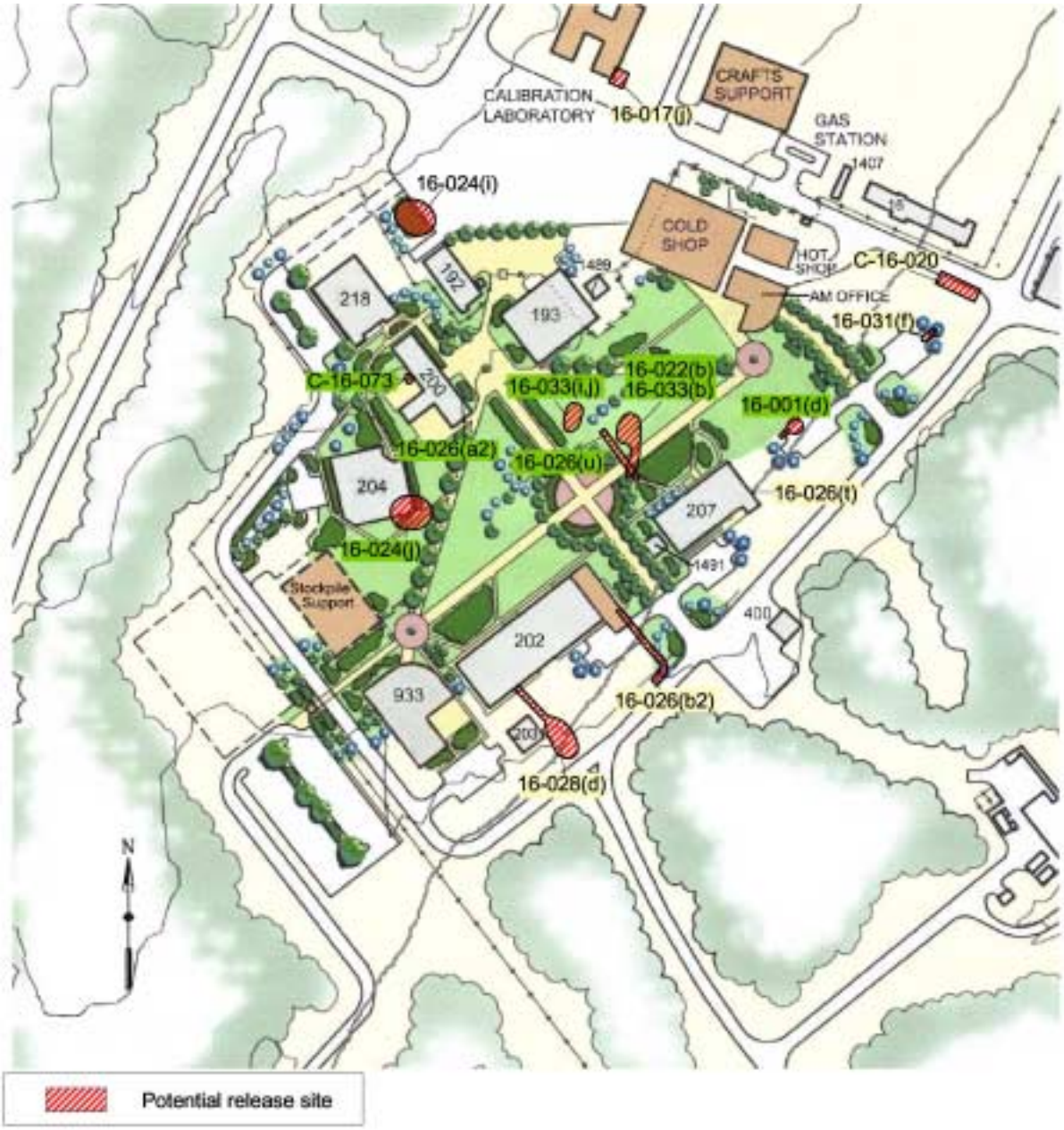

Figure 5. Conceptual design of the Proposed Action with nearby PRSs.

Construction of new buildings and renovation of existing buildings as proposed would be performed using common construction industry methods since the operational uses of these structures do not have potential hazards that would entail unique structural requirements. All new buildings would be constructed in accordance with seismic criteria in current building codes. No buildings would be constructed over known faults or within 50 ft (15 m) of known fault lines.

Each of the new buildings and structures would be designed according to general design criteria for a new facility (LANL 1999). Buildings would be designed with a minimum lifetime expectancy of 30 years of operation. Unless otherwise stated in the facility descriptions below, buildings would typically consist of a concrete slab foundation with a one- to two-story superstructure. The total height of the buildings above ground level would be less than 32 feet (ft) (9.6 meters [m]). Various kinds of spaces would be included in these buildings, such as photocopying rooms, file servers, mail alcoves, building reception areas, locker rooms, visiting staff rooms, equipment receiving areas, shipping and storage spaces, main and satellite telecommunication rooms, mechanical rooms, electrical rooms, large and small conference rooms, break rooms, janitorial storage rooms, restrooms, fire protection areas, elevator lobbies, equipment rooms, stairwell areas, security control points, vaults, and hallway spaces.

Building exteriors (surface finish, roof lines, etc.) would be designed to be architecturally compatible with one another and with other recent buildings in the TA-16 engineering complex. Snow melt and rain water would typically be collected from these buildings by roof drains that would channel the runoff to appropriate release points, such as landscaped areas. Storm water runoff systems would be designed to minimize soil erosion and to minimize contaminant dispersion from nearby PRSs.

Each of the newly constructed or remodeled buildings would be designed with safety and security features appropriate to the work to be performed in that building. These features could include air handling and filtration systems, standby emergency generators, alarms, badge readers, monitoring equipment, emergency lighting, and similar kinds of equipment and systems.

Consistent with DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*, the buildings would be constructed, remodeled, or refurbished according to sustainable design concepts. The design would include features that would allow the structures to operate with improved electric and water use efficiency and would incorporate recycled and reclaimed materials into their construction to the extent possible. For example, construction might incorporate elements made of reclaimed and recycled materials, use low-flow lavatory fixtures to minimize potable water use, and employ natural lighting and energy-efficient lighting fixtures and equipment to reduce electric consumption. The finished landscaping would be designed in compliance with DOE Order N 450.4, *Assignment of Responsibilities for Executive Order 13148, Greening the Government Through Leadership In Environmental Management*. This order establishes new goals and requirements that affirm DOE's approach to improving environmental performance through the use of environmentally and economically beneficial landscaping practices. Guidance in the Federal Register (Volume 60, Number 154, pp. 40837–40841) identifies a framework for these landscape practices on managed federal lands and federally-funded projects. One of the guiding principles focuses on the use of regionally native plants in site design and implementation where cost-effective and to the maximum extent practicable. A native plant species is defined as one that occurs naturally in a particular region, ecosystem, or habitat without direct or indirect human actions.

As noted in Section 2.1, all activities at LANL are required to minimize waste generation. Operational and administrative activities (such as recycling office waste) that would enhance overall LANL waste minimization efforts and efforts to reduce the use of potable water and energy sources would be employed. Every effort would be made to recycle and re-use

construction (and demolition) materials. LANL has existing recycling contracts for the following materials: metal, paper, cardboard, concrete, asphalt, wire, smoke detectors, exit signs, and light bulbs. To the maximum extent possible, construction (and demolition) contractors would be required to segregate these materials for recycling. Waste Minimization Plans would be developed for each construction project.

The new buildings would be heated by natural gas-fired boilers. New refrigeration units would comply with applicable air quality regulations with regard to inventory requirements. Combustion sources such as electrical generators, boilers, water heaters, and furnaces would be registered in compliance with Title 20 of the New Mexico Administrative Code (NMAC), Section 2.72 (20 NMAC 2.72). Onsite utilities (gas, water, sewer, electric, communications, computer networks) would be reconfigured and upgraded for efficient distribution to the existing and new buildings. Whenever possible, utilities would be consolidated into “corridors” that would facilitate maintenance. This integration would require approximately 3,000 ft (900 m) of trenching to establish the corridors. Connections and upgrades to the existing underground utilities would be necessary.

Average water and power use and waste generation amounts in the new facilities would be similar to other modern office and shop buildings. Utility corridors would be established and utilities relocated to provide a consolidated, efficient utility network that can be serviced without major disruption to the engineering complex. Electrical power distribution may need to be upgraded to TA-16 to serve the proposed new and remodeled buildings in the engineering complex; however, no additional electrical power transmission lines are anticipated. Other utility capacities within TA-16 may also need to be upgraded to serve the refurbished engineering complex, although no major changes in utility mains outside TA-16 are anticipated.

Clearing or excavation activities during site construction have the potential to generate dust and to encounter previously buried materials. If buried material or cultural remains were encountered during construction, activities would cease until their significance was determined and appropriate subsequent actions taken. Standard dust suppression methods (such as water spraying) would be used onsite to minimize the generation of dust during construction activities.

Work at the site would require the use of heavy equipment such as cranes, forklifts, cement trucks, and other similar construction equipment. The work would also require the use of a variety of hand tools and equipment. Noise at the site would be audible primarily to the involved workers and to workers housed in the surrounding TA-16 area. Involved site workers would be required to wear appropriate personal protective equipment (PPE), including hearing protection. During the construction phase, space in the immediate vicinity would be available for equipment storage and material staging. To the extent possible, the security fence at TA-16 would be realigned so that construction could take place outside the security area. After construction, the security fence would be relocated so that most of the new buildings would be inside the fence.

Construction work would be planned and managed to ensure that standard worker safety goals are met and that work would be performed in accordance with good management practices, regulations promulgated by the Occupational Safety and Health Administration, and various DOE orders involving worker and site safety practices. Engineering best management practices (BMPs) would be implemented for each construction site as part of a site Storm Water Pollution

Prevention Plan executed under a National Pollutant Discharge Elimination System construction permit. These BMPs may include the use of hay bales, plywood, or synthetic sedimentation fences with appropriate supports installed to contain excavated soil and surface water discharge during construction of each building and structure. After each building and structure is constructed, loose soil and debris that is not part of the landscaping design would be removed from the area.

Parking for personal vehicles within the engineering complex would be eliminated as parking lots on the perimeter of the area are added or upgraded. To minimize effects on traffic, the roads within the engineering complex would be closed as soon as possible and traffic would be diverted to roads on the perimeter of the area. Foot and vehicular traffic would be affected for short periods during delivery of construction materials and by the addition of construction workers in the area. Approximately 80 construction workers would be onsite during the peak construction period, adding approximately 35 vehicles to local roadways during the construction period. These workers would park their personal vehicles either in existing parking lots or in other designated parking areas. In addition, about 3 NNSA and 20 UC workers may perform site inspections and monitor construction and demolition activities during peak activity periods.

Vehicles (such as dump trucks) and heavy machinery (such as bulldozers, drill rigs, dump trucks, cranes, and cement mixer trucks) would be used onsite during the construction phase. These vehicles would operate primarily during the daylight hours and would be left onsite over night. Temporary construction lighting would be directed toward the work area.

Construction materials would be procured primarily from New Mexico suppliers. Construction workers would be drawn primarily from communities across New Mexico.

Site preparation and construction activities would produce a type of waste called “construction and demolition” waste, which is a nonhazardous subcategory of “solid” waste as defined in New Mexico State regulations[7]. Solid waste refers to the regulatory definition of waste in Federal regulation (40 CFR 261.3) and not to its physical state; solid wastes may be solid, liquid, or gaseous. Typically, construction and demolition waste consists of such items as packaging and strapping material, unused pieces of gypsum board, glass, copper wire, broken or bent nails and screws, and empty material containers. Some of these wastes, such as glass and copper wire, are recyclable; they would be sent to offsite recycle facilities. Soil and reclaimed asphalt material and crushed concrete rubble are also classified as construction and demolition waste. These wastes would be staged on Sigma Mesa at the TA-60 storage yards for building debris until they could be reused at LANL or at other offsite locations. Non-reclaimable and non-recyclable construction and demolition waste would be disposed of in the Los Alamos County Landfill or its replacement facility.

If wastes from construction activities (or demolition activities) are mixed with hazardous constituents as defined in 20 NMAC 9.1, they are not categorized as construction and demolition waste but as hazardous waste. Hazardous waste as defined in Federal regulations (40 CFR 261.3) may be either “characteristic” (for example, toxic, flammable, or corrosive) or “listed.” Listed wastes are derived from specific processes listed in 40 CFR 261.32. Proposed

[7] Waste types are defined in more detail in the footnotes in Section 3.2.

construction is not expected to generate any *Resource Conservation and Recovery Act* (RCRA) characteristic or listed hazardous wastes.

Routine maintenance actions would be performed during the operational life of the various buildings and structures. At the end of each facility's useful life, final decontamination and demolition would be performed as needed. Separate NEPA compliance reviews would be performed at that time.

In addition to construction of buildings, the Proposed Action would include changing traffic patterns around the TA-16 engineering complex as well as landscaping the entire engineering complex. Employee recreation areas within the engineering complex may be incorporated into the landscaping plan.

Traffic circulation in the immediate engineering complex would be modified as part of the construction activities in the engineering complex. Personal vehicles of site workers would be restricted to the perimeter of the engineering complex. The interior portion of the engineering complex would be preserved for pedestrian walkways and landscaping. Only a few parking spaces would remain within the interior engineering complex; these would be reserved for authorized vehicles. Parking areas would be added to accommodate about 160 additional vehicles. Most of the roads that would be utilized around the perimeter of the engineering complex already exist. The existing safeguards fence that restricts access to the HE area would be moved approximately 0.25 miles (mi) (0.4 kilometers [km]) southeast of its current location and reinstalled. The security fence on the northeast side of the engineering complex would be realigned to exclude TA-16 Building 16. This building could then be used for work that doesn't require special security measures and to accommodate uncleared personnel. The fences may be realigned in other areas to include or exclude newly constructed buildings. Artificial lighting would be modified to provide adequate lighting for pedestrian walkways inside the campus. Additional lighting may be added to existing perimeter parking areas and newly constructed parking areas. This artificial lighting would be directed downward toward the parking areas.

Existing transportables, concrete pads, asphalt covered areas, and power poles would be removed as part of the Proposed Action. Existing buildings within the engineering complex may be painted or resurfaced to blend with the new construction. Outdoor eating areas and employee recreational areas may be established within the engineering complex. Walkways would be created in the interior engineering complex and the remaining portions of the engineering complex would be landscaped. Low-pressure sprinklers and a drip irrigation system may be required to establish and maintain landscaping.

The following subsections describe construction of each component of the Proposed Action in detail.

2.1.1.1 New Advanced Manufacturing Office Building

The new Advanced Manufacturing (AM) Office Building would have one or two stories with about 20,000 ft^2 (1,800 m^2) of available floor space that would accommodate approximately 60 full-time LANL workers. The building would have a flexible modular floor plan to allow flexibility for future organizational changes that could occur. The basic functional space incorporated into the construction of the office building would be offices for ESA personnel

currently located at TA-3 Building 39, TA-16 Building 193, and TA-50 Building 54. Operations would consist of typical office activities similar to those conducted at the workers' previous locations.

The AM Office Building would probably be constructed in the location shown on the conceptual design (see Figure 4) southwest of TA-16 Building 16. No known PRSs are present within the proposed structure footprint at the construction site (see Figure 5).

Approximately 900 cubic yards (yd^3) (684 cubic meters [m^3]) of solid waste would be generated during construction of the AM Office Building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated two trucks per week over a period of about 10 months would be sufficient to remove this material from the site.

2.1.1.2 New Stockpile Support Office Building

The Stockpile Support Office Building would have one or two stories with about 21,000 ft^2 (1,890 m^2) of available floor space that would accommodate approximately 72 full-time LANL workers. The basic functional space incorporated into the construction of the Stockpile Support Office Building would be offices for ESA personnel currently located in several different buildings and transportables scattered through six technical areas, with the majority located in six buildings or transportables at TA-16 (Buildings 16, 193, 202, and various transportables). Activities in the building would consist of typical office and computer use similar to activities performed in the workers' previous locations.

The Stockpile Support Office Building would probably be constructed, as shown in the conceptual design (see Figure 4), at the southwest end of the proposed engineering complex, southwest of the existing administration buildings (TA-16 Buildings 200 and 204). No known PRSs are present within the identified structure footprints (see Figure 5).

Approximately 900 yd^3 (684 m^3) of solid waste would be generated during construction of the Stockpile Support Office Building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated two trucks per week over a period of about 10 months would be sufficient to remove this material from the site.

2.1.1.3 New Crafts Support Building

The Crafts Support Building would have about 25,000 ft^2 (1,800 m^2) of available floor space that would accommodate approximately 70 full-time LANL workers. The Crafts Support Building would be no more than one story high but would be about 32 ft (9.6 m) in height above ground level to accommodate high bays in the shop area. Typical operations would include administrative activities related to facility work control and shops for carpentry, pipefitting, sheet-metal work, electrical and mechanical work, painting, and similar activities needed for facility maintenance. These operations are the same as those conducted at the workers' previous locations. The basic functional spaces incorporated into the construction of the building would be as follows:

- Offices for ESA and subcontractor personnel (approximately 7,000 ft^2 [630 m^2]) currently located at TA-16 Buildings 202, 203, 209, 224, 225, and 303, TA-8 Building 24, and various transportables.

- Areas for the conduct of various crafts required at TA-16: approximately 1,000 ft^2 [90 m^2] for the electrical shop, 600 ft^2 [54 m^2] for the sheet metal shop, 1,500 ft^2 [135 m^2] for the carpentry shop, 750 ft^2 [67.5 m^2] for the paint shop, 1,000 ft^2 [90 m^2] for the pipefitter shop, and 2,000 ft^2 [180 m^2] for the mechanical shop.

- An exercise facility and change rooms and showers for HE workers that are required to shower each day for safety reasons.

The proposed Crafts Support Building would probably be constructed, as shown in the conceptual design (see Figure 4), northwest of TA-16 Building 16 adjacent to the existing employee parking area on the northeast edge of the engineering complex. No known PRSs are present within the identified structure footprints (see Figure 5).

Approximately 900 yd^3 (684 m^3) of solid waste would be generated during construction of the office building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated two trucks per week over a period of about 10 months would be sufficient to remove this material from the site.

2.1.1.4 New "Cold"[8] Machine Shop

The Cold Machine Shop building would be a one-story building that would be about 30 ft (9 m) high above ground level. It would have about 30,000 ft^2 (2,700 m^2) of available floor space (including a high bay) that would accommodate approximately 75 full-time LANL workers currently located at TA-3 Building 39 (Photos 3 and 4). The machining operations moved to the new shop involve the use of a variety of milling machines, vertical and horizontal lathes, surface grinders, internal and external grinders and saws, laser cutter with welders, welding operations, and measuring equipment. The level of operations would remain the same as that analyzed in the SWEIS (DOE 1999a). Solid waste generation would be similar to that produced by the current TA-3 Building 39 shop, much of which is recycled. After the SWEIS was finalized, in 1999, beryllium operations were transferred from TA-3 Building 39, to TA-3 Building 141, the Beryllium Technology Facility. Therefore, no beryllium machining would be conducted in the Cold Machine Shop. The basic functional spaces incorporated into the construction of the building would be as follows:

- Machining operations areas would include shipping and receiving (700 ft^2 [63 m^2]), fabrication (4,400 ft^2 [396 m^2]), machine tools (5,000 ft^2 [450 m^2]), staff shop (520 ft^2 [46.8 m^2]), storage (4,000 ft^2 [360 m^2]), welding (1,000 ft^2 [90 m^2]), and other small miscellaneous areas.

- Laboratories would include the AM Laboratory (2,200 ft^2 [1,980 m^2]) and the Optics Laboratory (225 ft^2 [20.25 m^2]).

The proposed building would probably be constructed in the location shown in the conceptual design (see Figure 4) north of TA-16 Building 207 and west of the AM Office Building. No PRSs are known to be present at the proposed construction site (see Figure 5).

[8] "Cold" Machine Shop operations refer to machining that does not involve radioactive materials.

Photo 3. Interior of existing Cold Machine Shop at TA-3 Building 39.

Photo 4. TA-3 Building 39, built in 1953.

Approximately 1,200 yd^3 (918 m^3) of solid waste would be generated during construction of the Cold Machine Shop building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated three trucks per week would be sufficient to remove this material from the site over a period of about 10 months.

2.1.1.5 New "Hot"[9] Machine Shop

The Hot Machine Shop building would be a one-story building about 30 ft (9 m) high above ground level. It would have about 7,700 ft^2 (693 m^2) of available floor space that would accommodate approximately 12 full-time LANL workers. The new facility would be divided into a nonuranium support area and a "hot" area where depleted uranium (DU) is handled. The levels of machining operations would be the same as those currently conducted in TA-3 Building 102, which are described in the SWEIS (DOE 1999a). These operations are similar to those of the Cold Machine Shop. Similar equipment is used; similar components and equipment are fabricated. Materials used in these operations include DU and other materials with toxic or pyrophoric[10] characteristics, as well as all those identified for the Cold Machine Shop. The basic functional spaces incorporated into the construction of the building would be as follows:

- offices for ESA personnel currently located at TA-3 Building 102,
- an area for machining operations, including a high bay (2,000 ft^2 [180 m^2]) containing equipment and functional spaces similar to those of the Cold Machine Shop,
- showers, locker and dressing rooms, an inspection lab, mechanical rooms, a radioactive waste storage room, a tool crib, and raw material storage area, and
- air handling and safety systems, including a high-efficiency particulate air (HEPA) HVAC system, vacuum systems, radioactive coolant recirculation system and holding tanks, and a radioactive greywater holding tank.

The proposed Hot Machine Shop building would likely be constructed east of the new Cold Machine Shop (see Figure 4). There are no known PRSs in the vicinity of the proposed construction site (see Figure 5).

Materials appropriate for a DU machining facility would be used for portions of the building. The building would be designed with HEPA filtration and other air handling systems along with other safety systems as appropriate to facilitate the handling of DU by site workers.

Approximately 300 yd^3 (240 m^3) of solid waste would be generated during construction of the office building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated one truck per week over a period of about 7 months would be sufficient to remove this material from the site.

[9] "Hot" Machine Shop operations are those that involve radioactive materials.
[10] Pyrophoric materials are those capable of spontaneously igniting in the presence of oxygen.

2.1.1.6 New Calibration Laboratory

The new Calibration Laboratory building would be a one-story building less than 30 ft (9 m) high above ground level. It would contain about 15,000 ft^2 (1,350 m^2) of available floor space that would accommodate approximately 25 full-time LANL workers. Operations at the proposed new Calibration Laboratory would be the same as those conducted at the workers' previous location in the existing Standards and Calibration Laboratory (TA-3 Building 39), which serves as LANL's central facility for maintaining measurement traceability to national standards. The laboratory maintains standards in a wide variety of physical (e.g., weights), dimensional (e.g., measures), and electrical areas for many calibrations such as the U.S. National Standards maintained by the National Institute of Standards and Technology. The basic functional spaces incorporated into the construction of the building would be as follows:

- offices for ESA personnel currently located at TA-3 Building 39 and
- laboratories with calibration equipment.

The exact location of this building has not been determined but it would probably be constructed northeast of the existing employee parking lot as shown in the conceptual design (see Figure 4). The one possible PRS [16-017 (j)] that would be near the location of this building is shown in the conceptual design (see Figure 5). Should a suspect disposal site be disclosed during subsurface construction work, LANL's ER Project staff would review the site and would identify procedures for working within that site area.

Approximately 650 yd^3 (494 m^3) of solid waste would be generated during construction of the laboratory building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated two trucks per week over a period of about 9 months would be sufficient to remove this material from the site.

2.1.1.7 Remodeling TA-16 Building 202

TA-16 Building 202 (Photo 5) is an existing building on the south side of the TA-16 engineering complex. The building currently houses the existing ESA Gas Transfer System and the ESA laboratory and assembly area, which would remain in the building. The building would be remodeled to accommodate about 20 additional full-time workers (six workers currently located in TA-16 Building 202, four workers from TA-11, and ten workers from TA-8 Building 70) and various equipment to conduct nondestructive testing, shock and vibration tests, and air-bearing and modal testing. Nondestructive testing includes such techniques as radiography, tomography, videography, x-ray fluorescence, infrared imaging, ultrasonics, and other state-of-the-art techniques. Materials used in shock and vibration testing include metals and alloys, beryllium, and DU. Sealed containers of nondispersable uranium oxides, special nuclear materials, and tritium would also be used. The operations would be the same as those conducted in the workers' pervious locations and would use the same materials. These activities were analyzed in the SWEIS (DOE 1999a).

The remodeling of the existing building would encompass about 8,100 ft^2 (2,430 m^2) of floor space. A high bay may be added to the northeast end of TA-16 Building 202 to provide approximately 2,000 ft^2 (180 m^2) of floor space for shock and vibration testing equipment and

Photo 5. TA-16 Building 202.

would be about 30 ft (9 m) high above ground level. Alternatively, the shock and vibration testing operations may be located adjacent to TA-16 Building 207. The current shops and ESA offices in TA-16 Building 202 would be relocated to the new Crafts Support Building and other facilities. The basic functional spaces incorporated into the construction and remodeling of the building would be as follows:

- offices for about 20 ESA personnel currently located at TA-11 and TA-8 Building 70,
- shock and vibration testing/fixture storage bay area (approximately 2,000 ft^2 [180 m^2]) of new floor space housing five shakers,
- air-bearing and modal testing laboratory (in existing floor space), and
- nondestructive testing laboratory (in existing floor space).

Approximately 320 yd^3 (243 m^3) of solid waste would be generated during construction of the building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated two trucks per week over a period of about 6 months would be sufficient to remove this material from the site.

No PRSs would be affected by the proposed work. While there are two PRSs from old outfalls, [16-026(b2)] and [16-028(d)], in the vicinity of this building (see Figure 5), they would not be affected by constructing the high bay, upgrading the utilities, or remodeling.

2.1.1.8 Remodeling TA-16 Building 193

TA-16 Building 193 (see Photo 1) is an existing building on the west side of the TA-16 engineering complex (see Figure 4). Approximately 10,000 ft^2 (900 m^2) of available floor space would be remodeled to accommodate downscaled plastics operations and storage from TA-16 Buildings 303, 304, 305, 306, 307, and 308 and laser sintering operations currently located at TA-16 Building 54. Laser sintering operations would be the same as are currently conducted at TA-16 Building 54. Plastics operations in the remodeled building would be the same activities as are currently conducted in the existing Plastics Shop but would be smaller in scale. The Plastics Shop performs operations such as silicone and polyurethane foam fabrication, injection molding, compression molding, thermoset casting, filament winding, and adhesive kit preparation. Materials used include polyurethane, epoxy, silicone, and polyamide resins; curing agents/catalysts; mold releases; solvents; and inert fillers. Equipment needed to perform these operations includes molds, mixing vessels, curing and vacuum ovens, autoclaves, hoists/cranes, injection molding machines, compression presses, roll mills, and filament winders. These activities were analyzed in the SWEIS (DOE 1999a).

The operations currently in TA-16 Building 193 (office space, computer services, a change room, and an exercise facility) would be moved either to the new Craft Support Building or other buildings before remodeling of TA-16 Building 193 begins. Only a small laboratory that performs nondestructive testing would remain in the building. The basic functional spaces incorporated into the remodeled section of the building would be as follows:

- offices for up to 15 ESA personnel currently located at TA-16 Buildings 303, 304, 305, 306, 307, and 308,
- approximately 1,400 ft^2 (126 m^2) to house ovens and autoclaves,
- approximately 1,000 ft^2 (90 m^2) of ventilated space for production of plastics containing isocyanates,
- approximately 1,200 ft^2 (108 m^2) for laser sintering currently located at TA-16 Building 54,
- approximately 1,200 ft^2 (918 m^2) for parts finishing,
- a chemical storage area of about 1,200 ft^2 (918 m^2), and
- areas for other equipment such as a filament winder, roll mills, and vacuum press.

There is no known PRS present within the identified structure footprint (see Figure 5). Approximately 100 yd^3 (76 m^3) of solid waste would be generated during construction of the office building. This waste would be disposed of at the Los Alamos County Landfill or other replacement landfill. An estimated one truck per week over a period of about 6 months would be sufficient to remove this material from the site.

2.1.2 Operations

ESA operations that would be consolidated in the TA-16 engineering complex as part of the Proposed Action are currently conducted in various facilities in TA-3, TA-8 (Photo 6), TA-11 (Photo 7), and TA-50 and other areas of TA-16. The SWEIS (DOE 1999a) analyzed these operations as part of the total LANL operations. Therefore, these operations will not be analyzed

Photo 6. TA-8 Building 70.

Photo 7. Testing facilities at TA-11.

again in this document, although any operational effects due to co-locating activities close to one another are included in the Chapter 3 effects analyses. Since the SWEIS was finalized, all of the other operations involved in the Proposed Action have been operating at, or below, the levels projected in the SWEIS (LANL 2001a). Operations are expected to continue at or below the levels analyzed in the SWEIS (DOE 1999a) after the operations are consolidated in the TA-16 engineering complex.

In addition to relocating some existing equipment as part of the Proposed Action, UC may purchase new operational equipment. New, more efficient equipment is expected to provide additional safety and environmental controls and to reduce energy and resource use.

Under the Proposed Action, some operations that use radioactive materials would be consolidated in the TA-16 engineering complex. Relocation of these operations would not require Environmental Protection Agency (EPA) pre-approval under 40 CFR 61 Subpart H (the National Emission Standard for Hazardous Air Pollutants [NESHAP] for Radiation [Rad NESHAP]). UC would implement stack and exhaust monitoring as needed at the new locations.

As discussed earlier in this EA, beryllium machining is no longer conducted in TA-3 Building 39. Therefore, no beryllium machining would be conducted in the new Cold Machine Shop after the cold machining operations are transferred to TA-16.

Equipment to conduct the ESA operations involved in the Proposed Action would either be moved from the existing facilities to the new or remodeled buildings in the TA-16 engineering complex or new more efficient equipment would be purchased. Environmental controls to protect workers and the environment would be established to control emission and exposures as effectively as, or more effectively than, the controls in the existing facilities where these operations are currently conducted. The quantity of waste generated would be reduced as much as technically and economically feasible by using material substitution, good housekeeping, hazard segregation, recycling, and reuse.

2.1.3 Demolition

Temporary buildings, such as transportables, would be removed from TA-16 and made available for other uses elsewhere at LANL or would be disposed of through the existing LANL salvage program. Removal of some existing transportables would take place in the early stages of the construction phase and would continue over the life of the construction phase. After ESA vacates permanent buildings, they would be made available for other uses under the LANL property management program (starting in about fiscal year [FY] 03). If no further uses are identified, the buildings would be scheduled for demolition. Demolition would probably not occur immediately as these are not high-hazard buildings. The schedule for demolition of buildings and structures is dependent upon a number of factors, including completion of any required regulatory compliance actions. Schedules would also be dependent upon funding and staffing needs. Based on current experience, it is likely to be five or more years before decontamination and demolition begins. These activities would continue for the foreseeable future (defined for the purposes of this EA as 10 years beyond the point when these actions are initiated).

All vacated buildings would be regularly inspected for potential hazards to workers, the public, or the environment. If hazards are identified, appropriate maintenance or repair work would be conducted in accordance with LANL procedures. Inspections, and maintenance as necessary, would continue until building demolition begins.

The proposed demolition would involve several major work elements. Before any demolition, surfaces and fixtures would be tested or sampled to determine if contamination is present and in what quantities. Based on the sampling results, the buildings to be demolished would then be divided into contaminated and uncontaminated zones. Physical barriers would be established between work areas to protect workers and manage wastes and emissions. Workers would remove contaminated materials before demolition of uncontaminated areas begins. Asbestos is present in most of the buildings being considered for demolition or renovation. The asbestos would be removed according to established industry and regulatory procedures. Asbestos wastes generated during renovation and demolition activities are regulated under the NESHAP for Asbestos (40 CFR 61, Subpart M) and would be managed in accordance with all applicable regulations. Air emissions generated during asbestos removal activities would be controlled by use of containment tents (such as plastic drapes) and of HEPA-filtered particulate collection devices, as necessary. Similar methods of containment would be used for removal and demolition of materials and structures that are contaminated with radioactive or hazardous materials. As wastes are removed, they would be packaged and managed according to established LANL procedures.

After contaminated materials are removed, general demolition of the remaining materials and structural elements would begin. Demolition of uncontaminated and decontaminated structures would be performed using standard industry demolition processes. After roof and walls are removed, concrete foundations and paved areas would be removed. A variety of equipment and techniques may be used in the demolition process. Typical equipment used in demolition include front-end loaders, bulldozers, wrecking balls, and pneumatic hammers, as well as various hand tools (as in the case of removal of windows, copper wiring, etc). Materials removed in the demolition process would be segregated to the extent feasible to facilitate recycling, salvage, and waste management. Dust suppression would be conducted as necessary and best available control measures (BACMs), such as spraying with water or chemical dust suppressants. The application of specific BACMs would be determined on a case-by-case basis. After demolition is completed and waste and recycled materials are removed from the site, the area would be recontoured and revegetated or landscaped as appropriate.

Appropriate personal protection measures, such as the use of PPE (gloves, hard hats, steel-toed boots, eye shields, and ear plugs or covers), monitoring of hazards and worker exposures, and engineered controls would be a routine part of the demolition activities required to protect worker health and safety. In addition, UC staff can provide site-specific hazard training as needed. A Waste Minimization and Pollution Prevention Plan would be prepared as part of the Proposed Action to address waste issues for the demolition of the vacated buildings. As already discussed, building demolition materials would be recycled and reused to the extent practicable. All waste requirements for demolition-generated wastes would be met.

All wastes generated would be disposed of properly according to waste type. About 30,000 yd^3 (22,800 m^3) of uncontaminated building debris would be generated. In addition, about 147 yd^3

(111.5 m^3) of hazardous waste (HE-contaminated, photo-chemical-contaminated, and lead) would be produced; and about 120 yd^3 (91.2 m^3) of asbestos would be generated. Wastes would be managed through the LANL waste management program. Solid waste would be disposed of at the Los Alamos County Landfill or its replacement facility; hazardous waste would be shipped offsite to commercial facilities for treatment and disposal; low-level radioactive waste would be disposed of within Area G, TA-54, at LANL. Asbestos waste would be shipped offsite for disposal at a specifically permitted disposal facility. Refrigeration units to be replaced would be subject to the proper requirements (40 CFR 82) for evacuation and disposal of ozone-depleting substances (refrigerants).

Several PRSs are located near the existing buildings (see Figure 5). They are discussed above by building if they might be effected during building construction or modification. Other PRSs that are in the area but not directly associated with the buildings are discussed in Section 3.

After buildings were demolished, the concrete slabs and other building debris would either be crushed onsite or moved to the TA-16 concrete crushing site. The crushed concrete would be used for fill and other activities at LANL. Clean fill dirt would be placed on top, and the entire area would be landscaped.

2.1.4 Schedule

Table 2 outlines the projected schedule for the Proposed Action. The final schedule would depend on the availability of funding.

Table 2. Projected Chronology of Proposed Action Construction and Operations

Start Date	Activity	Predecessor
FY02	Design, site preparation, and construction of Crafts Support Building	
FY02	Design, site preparation, and construction of Cold Machine Shop	Removal of asphalt and small parking area north of TA-16 Building 193
FY02	Design, site preparation, and construction of Advanced Manufacturing Office Building	
FY03	Operations begin at Crafts Support Building	1) Construction of Crafts Support Building 2) Transfer of crafts and work control personnel and equipment from various permanent buildings and transportables to new Crafts Support Building 3) Closing HE change rooms and showers in TA-16 Building 193
FY03	Operations begin at Cold Machine Shop	1) Construction of Cold Machine Shop 2) Transfer of ESA Cold Machine Shop equipment from TA-3 Building 39 to new Cold Machine Shop building
FY03	Operations begin at Advanced Manufacturing Office Building	1) Construction of Advanced Manufacturing Office Building 2) Transfer of ESA personnel from TA-3 Building 39, TA-50 Building 54, TA-16 Building 193, and other locations to new Advanced Manufacturing Office Building
FY03	Design, site preparation, and construction of Stockpile Support Office Building	
FY03	Operations begin at Stockpile Support Office Building	1) Construction of Stockpile Support Office Building 2) Transfer of ESA personnel from TA-16 Building 16, TA-16 Building 193, TA-16 Building 202, and other TA-16 buildings and transportables to new Stockpile Support Office Building

Table 2 cont.

Start Date	Activity	Predecessor
FY03	Design, site preparation, and remodeling of TA-16 Building 202 with new high bay for Nondestructive Testing and Shock and Vibration Testing	
FY03	Operations begin at remodeled TA-16 Building 202	1) Remodeling of TA-16 Building 202 with new high bay 2) Construction of new Stockpile Support Office Building and Crafts Support Building 3) Transfer of personnel from TA-16 Building 202 to new Stockpile Support Office Building 4) Transfer of personnel and equipment from TA-11 and TA-8 Building 70
FY03	Place TA-11 Shock and Vibration Testing facility in cold standby status	1) Remodel TA-16 Building 202 2) Transfer of personnel from TA-11
FY03	Remodel TA-16 Building 193 for Plastics operations	1) Construction of Stockpile Support Crafts Support Building and Advanced Manufacturing Office Building and transfer TA-16 Building 193 personnel and equipment to the new buildings 2) Closing of HE change rooms and showers in TA-16 Building 193 3) Transfer of exercise facility to the Crafts Support Building, personal computer workshop to the Stockpile Support Office Building, and offices to other available buildings
FY03	Begin Plastics operations and laser sintering in TA-16 Building 193	1) Remodeling of TA-16 Building 193 2) Transfer of personnel and equipment from TA-16 Buildings 54, 303, 304, 305, 306, 307, and 308 to TA-16 Building 193
FY04	Design, site preparation, and construction of new Hot Machine Shop	
FY04	Operations begin at new Hot Machine Shop	1) Construction of new Hot Machine Shop 2) Transfer of ESA personnel and equipment from TA-3 Building 102 to new Hot Machine Shop
FY05	Design, site preparation, and construction of new Calibration Laboratory	
FY05	Operations begin in new Calibration Laboratory	1) Construction of new Calibration Laboratory 2) Transfer of ESA calibration personnel and equipment to new Calibration Laboratory
FY03–FY06 and beyond	Determination that vacated buildings have no further use; demolition or salvage of buildings with no determined use	1) Construction of new or modified facilities to receive the operations and personnel housed in the facilities to be vacated 2) Transfer of personnel and operations to new or modified facilities
FY03–FY06 and beyond	Utility and infrastructure replacements and upgrades	
FY03–FY06 and beyond	Landscaping	Construction of various facilities, utilities, and infrastructure

2.2 No Action Alternative

The No Action Alternative provides a description of current conditions to compare to the potential effects of the Proposed Action. This alternative must be considered even if DOE is under a court order or legislative command to act [10 CFR 1021.32 (c)]. Under the No Action Alternative DOE would not construct new buildings or remodel or modify existing buildings for

the functions described in the Proposed Action—nor would DOE demolish the buildings that currently contain those functions. Poor-quality office and laboratory space would continue to be used and the effectiveness of current staff and the ability to recruit and retain qualified employees would remain problematic. ESA operations would continue to be conducted in dispersed facilities; there would be no reduction in the cost of facility maintenance. No disturbance of existing TA-16 building sites would occur. There would be no construction or demolition debris requiring disposal. Utility usage would remain essentially the same. Expenses for repairs and replacement of aging HVAC systems and other building components would increase. As building systems and other components fail and cannot be replaced or repaired, areas of the buildings would be closed. Areas of buildings or entire structures that are deemed unsuitable for continuous human occupancy would be abandoned in place. All buildings, including vacated buildings, would be regularly inspected. Any building exhibiting hazards to workers, the public, or the environment would be subject to appropriate repair or remediation in accordance with LANL maintenance procedures.

2.3 Alternatives Considered but Dismissed

2.3.1 Use of Other Existing Space

UC staff at the LANL Space Management Office have determined that no comparable space is available at this time that could house the ESA functions with the necessary security and other requirements. Office spaces for small numbers of personnel are available at scattered locations both within LANL and within Los Alamos town site; however, this fragmented approach to housing ESA personnel would further negatively affect productivity and may increase operating costs. The ability to provide adequate security could likely not be met through this method of space procurement. This alternative was considered to be unreasonable as it would not meet NNSA's need to act and was not analyzed further in this EA.

2.3.2 Renovation of Existing Buildings and Structures without Construction of New Buildings or Demolition of Outmoded Buildings and Structures

Correcting all identified problems, inefficiencies, and inadequacies of the existing ESA facilities would not meet NNSA's purpose and need for action. Modifications to existing facilities are expensive, inefficient, and would fall short of meeting operations and security requirements. The existing spaces are too large and some of the existing equipment is outmoded and is no longer suitable for the ESA mission. Renovating buildings does not change the size or cost of maintenance or resolve the issues of ESA personnel: 1) housed in transportables that are vulnerable to fire and 2) dispersed in remote locations that make communication and cooperative work difficult. The ability of engineers to reconfigure the buildings to meet current needs within their existing footprints would also be difficult and costly. New HVAC, plumbing, electrical, and other building systems would have to be installed to replace the existing systems that are failing. Performing renovations of this nature and magnitude while the buildings are occupied would result in work slowdowns or require temporary relocation of some workers.

The overall effort required to retrofit the existing buildings to meet all current building design and safety codes, needs and requirements of operations, and security needs would be prohibitively difficult and expensive. The costs and time expenditures would be much greater

than the cost and time required to plan and build new structures to house the programmatic, management, and support functions needed by UC.

In any event, there are not enough permanent buildings within the engineering complex that could be remodeled to consolidate the operations from TA-3, TA-11, TA-8, and outlying areas of TA-16. Therefore, these operations could not be co-located and NNSA's purpose and need would not be met.

This alternative was considered to be unreasonable and was not analyzed further in this EA.

2.4 Related Actions

2.4.1 Final Site-Wide Environmental Impact Statement for the Continued Operation of the Los Alamos National Laboratory

The Final LANL SWEIS (DOE 1999a), dated January 1999, was issued in February of that year. A Record of Decision (ROD) was issued in September 1999, and a Mitigation Action Plan was issued in October 1999. As already noted in this EA, the SWEIS included the information that more than half of LANL facilities are aging and are in poor, fair, or failing conditions. An analysis of the effects of replacing these facilities was not included in the SWEIS (DOE 1999a).

The SWEIS included an analysis of effects for operations of the existing ESA operations at levels that were very slightly greater than are currently being forecast as needed in the foreseeable future. The analysis of effects is therefore bounding of the operations as they would be conducted if the Proposed Action's construction and renovations were to occur and operations were consolidated from around LANL into the refurbished TA-16 engineering complex. This EA tiers from the SWEIS and a re-analysis of the operations will not be provided in this EA. Any points of difference from the effects attributable to consolidation of activities will, however, be included in the Chapter 3 analysis of effects within this EA.

2.4.2 Demolition of Vacated Buildings

The demolition of vacated buildings and removal of trailers and transportables are ongoing at LANL. Demolition activities are individually evaluated for NEPA compliance purposes. Various buildings and structures at LANL, other than those involved in the Proposed Action, have been categorically excluded from the need to prepare either an EA or an EIS. Others, such as TA-3 Building 43, which houses the existing Administration Building, have been the subject of EAs and EISs. Future demolition of vacated buildings may occur if NNSA decides to replace various aging buildings. These actions would be subject to separate NEPA compliance reviews.

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3.0 Affected Environment and Environmental Consequences

This chapter describes the natural and human environment that could be affected by the Proposed Action and the No Action Alternative and the potential environmental consequences of those actions. Based on the Proposed Action description, environmental resources that may potentially be affected as a result of implementing the Proposed Action have been considered. Environmental issues were identified and either addressed in this section or not, based on the "Sliding Scale Approach" discussed earlier in this EA (Section 1.4). Table 3 identifies the subsection where potential environmental issues are discussed or notes why they are not addressed in this document.

Table 3. Potential Environmental Issues

Environmental Category	Applicability	Subsection
Waste Management	Yes	3.2.1
Air Quality	Yes	3.2.2
Cultural Resources	Yes	3.2.3
Visual Resources	Yes	3.2.4
Transportation, Traffic, and Infrastructure	Yes	3.2.5
Geologic Setting	Yes	3.2.6
Water Quality	Yes	3.2.7
Human Health	Yes	3.2.8
PRSs	Yes	3.2.9
Noise	Yes	3.2.10
Socioeconomic	Yes	3.2.11
Land Use	No. Land uses and land use designations as a result of the Proposed Action would not change or be affected.	N/A
Ecological Resources	No. The proposed project would be located within previously disturbed and developed land or adjacent to disturbed areas within an industrialized area of LANL. The building sites are adequately distant from potential habitat for areas designated as sensitive habitat for Federally listed threatened and endangered species so that there are no special protective restrictions regarding site activities.	N/A
Environmental Justice	No. Populations that are subject to Environmental Justice considerations are present within 50 mi (80 km) of Los Alamos County; potential effects of this project would be localized within a 10-mi (16-km) radius. Populations nearest to the construction site and within this radius are not predominantly minority and low-income populations.	N/A

3.1 Regional Setting

The Proposed Action would be located within the area of Los Alamos County that includes LANL. LANL comprises a large portion of Los Alamos County and extends into Santa Fe County. LANL is situated on the Pajarito Plateau along the eastern flank of the Jemez Mountains and consists of 49 technical areas. The Pajarito Plateau slopes downward towards the Rio Grande along the eastern edge of LANL and contains several fingerlike mesa tops separated by relatively narrow and deep canyons.

Commercial and residential development in Los Alamos County is confined primarily to several mesa tops lying north of the core LANL development, in the case of the Los Alamos town site, or southeast, in the case of the communities of White Rock and Pajarito Acres. The lands surrounding Los Alamos County are largely undeveloped wooded areas with large tracts located

to the north, west, and south of LANL that are administered by the Department of Agriculture, Santa Fe National Forest, and the Department of the Interior (DOI), National Park Service, Bandelier National Monument; and to the east by the DOI, Bureau of Land Management.

The TA-16 engineering complex falls entirely within the Experimental Engineering Planning Area described in the Comprehensive Site Plan 2000 (LANL 2000). The plan designates this site and the surrounding area as "High Explosives R&D" and "Administration" land uses. It is the administrative center of TA-16 and has been continuously used since the early days of the Manhattan Project. Lands west of SR 501 (West Jemez Road) are in the Santa Fe National Forest. Bandelier National Monument lies approximately 0.6 mi (1 km) away south of SR 4. The general public uses both SR 4 and SR 501.

Detailed descriptions of LANL's natural resources environment, cultural resources, socioeconomics, waste management, regulatory compliance record, and general operations are described in detail in the SWEIS (DOE 1999a). Additional information is available in the most recent annual Environmental Surveillance Report (LANL 2001b) and the *Special Environmental Analysis for the Department of Energy, National Nuclear Security Administration, Actions taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2000). These documents may be found in the LANL library and are also available at the Public Reading Room 1619 at Central Avenue, Los Alamos, NM.

3.2 Potential Environmental Issues

This section addresses the issues listed in Table 3. The first part of each subsection describes the resources potentially affected by the Proposed Action. The second part analyzes the anticipated effects of implementing the Proposed Action on that resource. The third part of the subsections describe the anticipated effects of implementing the No Action Alternative on the resources.

3.2.1 Waste Management

3.2.1.1 Affected Environment

LANL generates solid waste[11] from construction[12], demolition, and facility operations. These wastes are managed and disposed of at appropriate solid waste facilities.

[11] Solid waste, as defined in 40 CFR 261.2 and in 20 NMAC 9.1, is any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

[12] As defined in 20 NMAC 9.1, construction and demolition debris means materials generally considered to be not water soluble and nonhazardous in nature, including, but not limited to, steel, glass, brick, concrete, asphalt roofing materials, pipe, gypsum wallboard, and lumber from the construction or destruction of a structure as part of a construction or demolition project, and includes rocks, soil, tree remains, trees, and other vegetative matter that normally results from land clearing. If construction and demolition debris is mixed with any other types of solid waste, whether or not originating from the construction project, it loses its classification as construction and demolition debris. Construction and demolition debris does not include friable, category I non-friable, or category II non-friable asbestos or liquids, including, but not limited to, waste paints, solvents, sealers, adhesives, or potentially hazardous materials. Construction and demolition debris that is not also hazardous waste as defined by RCRA is regulated as a solid waste by the State of New Mexico as well.

Both LANL and Los Alamos County use the same solid waste landfill located within LANL boundaries on DOE land. The Los Alamos County Landfill also accepts solid waste from other neighboring communities. The Los Alamos County Landfill receives about 52 tons per day (47 metric tons per day), with LANL contributing about 8 tons per day (7 metric tons per day), or about 15 percent of the total.

Based on discussions with the Los Alamos County Solid Waste Manager (Bachmeier 2001), the current plan is to close the Los Alamos County Landfill by June 30, 2004. The current Los Alamos County Landfill would be capped and monitored and a portion of the site could be used as a transfer station. The recycling center at the landfill could continue to operate. Several existing landfills within New Mexico could be used after 2004 for waste disposal of LANL-generated solid wastes.

Hazardous waste[13] regulated under RCRA is transported to TA-54 at LANL for proper management, which is carried out in accordance with applicable laws, regulations, and DOE Orders. RCRA-regulated and non-RCRA-regulated hazardous wastes may be treated and then both types of waste are disposed of offsite at various commercial disposal sources. The disposal sites are audited for regulatory compliance before being used by UC for the disposal of such waste. Hazardous waste disposal sites currently used by UC are located across the U.S. Potential disposal locations for hazardous waste that could be produced by LANL remodeling and demolition activities are shown in Table 4.

Table 4. Potential Offsite Disposal Locations for Hazardous Waste

	Type of Hazardous Waste					mi/km from Los Alamos
Location	Asbestos	Lead	Beryllium	HE-contaminated waste	Photo-chemicals	
Mountainair, NM	X					130/209
Phoenix, AZ	X					550/880
Albuquerque, NM		X				90/144
Henderson, CO			X			380/608
Kettleman Hills, CA			X			965/1,544
Lake Charles, LA				X		1,253/2,005
Fernley, NV					X	1,080/1,728

Dedicated pipelines to the Sanitary Wastewater System plant at TA-46 deliver sanitary liquid wastes from TA-16 and other technical areas at LANL. The plant has a design capacity of 600,000 gallons (2.27 million liters) per day and, in 2000, processed about 90.15 million gallons of treated wastewater and sewage, an average of about 246,817 gallons (0.94 million liters) per day (LANL 2001a).

[13] Hazardous waste, as defined in 40 CFR 261.3, which addresses RCRA regulations, and by reference in 20 NMAC 4.1, is waste that meets any of the following criteria: a) waste exhibits *any* of the four characteristics of a hazardous waste: ignitability, corrosivity, reactivity, or toxicity; b) waste is specifically *listed* as being hazardous in one of the four tables in Subpart D of the CFR; c) waste is a mixture of a *listed* hazardous waste item and a nonhazardous waste; d) waste has been *declared* to be hazardous by the generator.

Low-level radioactive waste (LLW)[14] from LANL operations is disposed of at LANL, TA-54 Area G or is shipped to appropriate permitted facilities. The existing Hot Machine Shop is estimated to generate annually about

- 500 kilograms (kg) (1,111 pounds [lb] or 180 cubic feet [ft^3]) of compactable trash,
- 630 kg (1,400 lb or 40 ft^3) of DU chips and turnings, and
- 180 to 270 ft^3 of miscellaneous radioactively contaminated material.

DU waste may be managed solely as a radioactive waste or as a mixed waste depending on various factors[15]. DU waste is transported to TA-54 where it is managed either as LLW or mixed LLW[16] and is stored and disposed of at appropriate facilities in accordance with appropriate laws, regulations, and DOE Orders.

The existing Hot Machine Shop waste also includes radiologically-contaminated water from showers, mop water, and coolant. At the present time, radiologically-contaminated water from the Hot Machine Shop, TA-3 Building 102, is transported to the Radiological Liquid Waste Treatment Facility (RLWTF) at TA-50 by dedicated waste disposal lines. Currently there are no radiologically-contaminated water lines from TA-16 to TA-50 and the waste from TA-16 is transported by tanker truck or is placed in sealed containers and taken to TA-54. During 2000, the RLWTF released about 4.9 million gallons (13,415 gallons per day or 50,844 liters per day) of treated radioactive liquid waters, compared to 9.3 million gallons (25,462 gallons per day or 96,501 liters per day) projected by the SWEIS ROD (DOE 1999b).

3.2.1.2 Proposed Action

The Proposed Action would not require establishment of any new waste treatment, storage, or disposal facilities. As previously discussed in the Proposed Action description in Section 2.1, the engineering complex consolidation activities would be designed, constructed, and operated to incorporate, to the maximum extent practical, waste minimization practices required by LANL's Laboratory Implementing Requirement (LIR) for General Waste Management (LANL 1998).

Construction

The Proposed Action would generate solid waste from construction that would be disposed of at the Los Alamos Country Landfill or other New Mexico solid waste landfills in accordance with

[14] LLW is radioactive waste that is not high-level waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e(2) of the *Atomic Energy Act* [AEA] of 1954, as amended), or naturally occurring radioactive material (DOE Order 435.1).

[15] Waste that consists solely of DU that is also source, special nuclear, or byproduct material as defined by the AEA is typically not a hazardous or mixed waste – even if it exhibits a hazardous characteristic. However, if DU waste is mixed with hazardous waste, regardless of the status of the DU relative to its AEA characterization, the mixture would generally be categorized as a mixed waste. Lastly, waste DU that is not source, special nuclear, or byproduct material as defined by the AEA, is generally categorized as a mixed waste because it is both radioactive and exhibits a hazardous characteristic.

[16] Mixed LLW is LLW that is also a RCRA hazardous waste or is combined with a RCRA hazardous waste.

the waste minimization plan. Table 5 identifies estimated waste types generated by construction activities and includes estimated bounding quantities, effect on traffic, and potential disposal locations. Construction solid waste is estimated at 5,270 yd^3 (4,023 m^3).

Table 5. Estimated Waste Source, Quantity, Traffic Effect, and Disposal Location: Construction Phase

Source	Quantity yd^3 (m^3)	Traffic (truck/week)	Start Date	Duration	Potential Disposal Location
Advanced Manufacturing Office Building	900 (684)	2	FY02	10 months	Los Alamos Landfill or Replacement Facility
Stockpile Support Office Building	900 (684)	2	FY03	10 months	Los Alamos Landfill or Replacement Facility
Crafts Support Building	900 (684)	2	FY02	10 months	Los Alamos Landfill or Replacement Facility
Cold Machine Shop	1200 (918)	3	FY02	10 months	Los Alamos Landfill or Replacement Facility
Hot Machine Shop	300 (240)	1	FY04	7 months	Los Alamos Landfill or Replacement Facility
Calibration Laboratory	650 (494)	2	FY05	9 months	Los Alamos Landfill or Replacement Facility
Shock and Vibration Testing Laboratory	220 (167)	1	FY03	6 months	Los Alamos Landfill or Replacement Facility
Renovation of TA-16-193	100 (76)	1	FY03	6 months	Los Alamos Landfill or Replacement Facility
Renovation of TA-16-202	100 (76)	1	FY03	6 months	Los Alamos Landfill or Replacement Facility

The waste quantities shown in Table 5 have been developed from preliminary estimates and from similar post-project knowledge and are expected to bound the actual waste amounts generated. The estimates would be refined as additional information becomes available during the development of the project design.

Operations

Waste from operations that would be consolidated in the TA-16 engineering area under the Proposed Action would generally be the same types and quantities as are generated in the facilities where these operations are currently located. No new radioactive or other wastewater or hazardous waste streams would be generated.

Under the Proposed Action, use of the sanitary sewer system in vacated buildings would be discontinued and the sanitary sewer system would be expanded in the consolidated engineering complex to include the newly constructed buildings. The total volume of sanitary waste generated, treated, and disposed of at LANL would remain unchanged.

Demolition

The Proposed Action would require managing and disposing of wastes from demolition activities. No new solid waste landfills or hazardous waste treatment, storage, or disposal facilities would need to be established to manage these wastes.

As part of the decontamination and demolition program, a waste characterization study would refine the estimates of the types and volumes of waste that would be generated by these activities. Not all waste types would be present in all buildings. The volume of solid waste from demolition activities is estimated to be approximately 30,000 yd^3 (22,800 m^3). Most of the waste would be uncontaminated building debris. The TA-16-300-series buildings that may be demolished are likely to be HE-contaminated. Sampling would be done to verify the presence or absence of HE contamination. No other buildings are expected to be HE-contaminated, but there would be hazardous waste generated from demolishing buildings with lead-based paints and from buildings contaminated with photochemicals (including silver components). Lead and silver contaminated items are RCRA designated "characteristic" hazardous waste constituents. Hazardous wastes would be identified and removed from buildings scheduled for demolition before general structural demolition begins. The wastes would be managed and disposed of offsite through the existing LANL waste management program.

Asbestos-contaminated waste would be disposed of offsite. In addition, LLW would probably be generated during demolition of TA-3 Building 102. This waste would be disposed of at LANL TA-54. Disposal of these wastes would not require new facilities and the date of closure of existing facilities would not be appreciably advanced.

Table 6 identifies estimated waste types and bounding volumes generated by demolition activities and potential disposal locations. Transportation needs are also shown in Table 6.

Table 6. Estimated Waste Type, Quantity, Traffic Effect, and Disposal Location: Demolition

Type/Source	Quantity yd^3 (m^3)	Traffic (truck/week)	Duration	Potential Disposal Location
Uncontaminated building debris	30,000 (22,800)	10	36 months	Los Alamos Landfill or Replacement Facility
Asbestos building components	120 (91.2)	1	6 months	Mountainair, NM, or Phoenix, AZ
Lead-based paint	1 (0.76)	1	1 day	Albuquerque, NM
Photo-chemicals (silver*) from TA 8-70	1 (0.76)	1	1 day	Fernley, NV
HE-contaminated material from demolished TA-16 300-line buildings	145 (110)	1	6 months	Lake Charles, LA
LLW from TA-3-102 (Hot Machine Shop)	10 (7.6)	1	2 weeks	LANL, Area G, TA-54

3.2.1.3 No Action Alternative

There would be no additional waste generation under the No Action Alternative as there would be no construction or demolition wastes generated. The construction and demolition waste shipments to other landfills or recycling centers would not occur.

3.2.2 Air Quality

3.2.2.1 Affected Environment

Air quality is a measure of the amount and distribution of potentially harmful pollutants in ambient[17] air. Air surveillance at Los Alamos includes monitoring emissions to determine the air

[17] Ambient air is defined in 40 CFR 50.1 as "that portion of the atmosphere external to buildings, to which the public has access." It is defined in NMAC Title 20, chapter 2, part 72, as "the outdoor atmosphere, but does not include the area entirely within the boundaries of the industrial or manufacturing property within which the air contaminants are or may be emitted and public access is restricted within such boundaries."

quality effects of LANL operations. UC staff calculate annual actual LANL emissions of regulated air pollutants and reports the results annually to the New Mexico Environment Department (NMED). The ambient air quality in and around LANL meets all EPA and DOE standards for protecting the public and workers (LANL 2001b). Both EPA and NMED regulate nonradioactive air emissions. Some actions relevant to construction operations and demolition require notifications or registration to the EPA or NMED. All demolition actions, as well as installation of ignition sources (such as boilers and generators), require UC to notify NMED.

LANL is considered a major air emission source under the State of New Mexico Operating Permit program as it emits more than 100 tons per year of certain nonradioactive substances. Specifically, LANL is a major source of nitrogen oxides, emitted primarily from the TA-3 steam plant boilers. Combustion units are the primary point sources of criteria pollutants (nitrogen

oxides, sulfur oxides, particulate matter, and carbon monoxide) emitted at LANL. Mobile sources, such as automobiles and construction vehicles, are additional sources of nonradioactive air emissions; however, mobile sources are not regulated by NMED. NMED does not regulate dust from construction except that BMPs must be used for dust suppression. Annual dust emissions from daily windblown dust are generally higher than construction-related dust emissions. Landscaping, excavating, paving of parking areas, and construction activities are not considered stationary sources of regulated air pollutants under the New Mexico air quality requirements; these activities are not subject to permitting under Title 20 of the NMAC, Sections 2.70 and 2.72. Radioactive air emissions are regulated by EPA under 40 CFR 61, Subpart H (Rad NESHAP). In 2000, independent auditors completed a report of LANL's 1999 compliance status with the Rad NESHAP. The independent audit found that in 1999, LANL was in compliance with the Rad NESHAP requirements of the Clean Air Act.

Under the State's permit requirements listed in 20 NMAC 2.72, standby emergency generators operating less than 500 hr/yr are exempt from permitting; however, a notification to the State is required. Therefore, hours of generator use are metered to qualify for this exemption.

Asbestos is present in most of the older LANL buildings being considered for demolition or remodeling. Asbestos removal involves such techniques as the use of plastic barriers and HEPA filtration to mitigate airborne emissions. UC is required to provide advance notice of demolition and major renovations at LANL to NMED, to take steps to mitigate airborne emissions, and to ensure proper packaging and disposal of asbestos and asbestos wastes (40 CFR 61).

3.2.2.2 Proposed Action

Construction, renovation, and demolition activities for the proposed TA-16 engineering complex refurbishment would be expected to produce only temporary and localized air emissions and the effects on air quality would also be temporary and localized. There would be no long-term degradation of regional air quality. Proposed operations at the new TA-16 engineering complex already exist in various LANL locations and would be consolidated in a single location within the new engineering complex. Operational emissions may decrease due to increased efficiency with more modern equipment and facilities and due to a reduction in the scope or level of some operational activities.

Construction

The Proposed Action would include construction of new buildings and remodeling of existing buildings. Construction and earth-moving activities, including landscaping, paving of parking areas, and soil contouring, associated with the Proposed Action would temporarily increase localized particulate (dust) emissions at the construction sites during the construction phase.

Demolition

The Proposed Action also involves demolition of buildings determined to be of no further use to LANL operations. Demolition would also be a potential temporary source of increased particulate emissions. Effects of demolition activities on air quality would be distributed over a period of several years.

Demolition activities associated with buildings, such as TA-3 Building 102, which is contaminated with radionuclides, would be evaluated for potential requirements, such as emissions monitoring and prior approval by EPA, under the Rad NESHAP. Asbestos is present in most of the buildings being considered for demolition or renovation. Emissions from asbestos and asbestos wastes generated during renovation and demolition activities would be stringently controlled and emissions would be negligible. As noted in Section 2.1.3, BACMs would be used to control particulate dust emissions. BACMs would be selected and applied based on the particular demolition under consideration.

Waste transport and construction vehicles, such as dump trucks, bulldozers, and cranes, would also produce temporary and localized emissions of air pollutants. These emissions would be expected to be similar to those from other recent construction actions, such as the construction of the Strategic Computing Complex and the Nonproliferation and International Security Center buildings, and from recent demolition activities at LANL.

Operations

The Proposed Action would involve the relocation of existing operations from other areas of LANL. Air emissions would not increase and, in some cases, air emissions would decrease because of use of more efficient equipment facilities and to a reduction in activities. No effects on air quality are expected.

Vehicle use associated with operation of the engineering complex would result in negligible localized increases in some nonradioactive air emissions. There would be no change in overall LANL vehicle emissions since there is no increase in LANL personnel attributed to the Proposed Action.

3.2.2.3 No Action Alternative

There would be no change in air quality effects associated with implementing the No Action Alternative. Buildings would be maintained to the extent necessary to prevent airborne releases of asbestos or other materials that could pose a risk to workers, the public, or the environment.

3.2.3 Cultural Resources

3.2.3.1 Affected Environment

Cultural resources include any prehistoric sites, buildings, structures, districts, or other places or objects considered to be important to a culture or community for scientific, traditional, religious, or any other reason. They combine to form the human legacy for a particular place (DOE 1999a). To date, over 2,000 archaeological sites and historic properties have been recorded at LANL.

The criteria used for evaluating cultural resources depends upon their significance as sites eligible for listing to the National Register of Historic Places (NRHP) as described in the *National Historic Preservation Act* (16 United States Code 470). These determinations of significance are met by evaluating each cultural resource based on it meeting any one or more of the following criteria:

Criterion A association with events that have made a significant contribution to the broad pattern of our history,

Criterion B association with the lives of persons significant in our past,

Criterion C illustration of a type, period, or method of construction; for its aesthetic values or for its representation of the work of a master; or if it represents a significant and distinguished entity whose components may lack individual distinction, and

Criterion D it has yielded, or may be likely to yield, information important in prehistory or history.

Only one prehistoric site is located in the area of the Proposed Action. This site is an Archaic Period lithic scatter. There are also numerous structures in TA-3, TA-8, TA-11, and TA-16 that have been identified as historic or potentially historic structures. Thirty-eight Manhattan Project and Cold War era properties (1943–1963) are located within the proposed area of consolidation and refurbishment at TA-3, TA-8, TA-11, and TA-16. Initial field visits have been conducted, and the buildings and structures listed in Table 7 have been reviewed for eligibility for inclusion on the NRHP. The table is organized by building number, and lists building name, date built, and recommended NRHP eligibility status. Some of the properties were not determined to be eligible for listing on the NRHP but have architectural features or instrumentation of interest to the history of explosives research and development at LANL. Other buildings at LANL are also Manhattan Project and Cold War era properties. A Cultural Resource Management Plan is being prepared for LANL that will include a management strategy of historic and prehistoric properties.

3.2.3.2 Proposed Action

The planned consolidation and refurbishment of the TA-16 engineering complex would not affect the recorded prehistoric archaeological site. The demolition and remodeling of various buildings would have an adverse effect on NRHP-eligible historic structures. The primary effect would be the loss of NRHP-eligible properties through demolition or remodeling. Many of these buildings were constructed in the 1950s. The importance of these buildings and others to LANL's history is being assessed. Various buildings are considered eligible for the NRHP under Criteria A, B, or C. An NRHP eligibility assessment for these structures would be completed

Table 7. Listing of Buildings Affected by the Proposed Action

Bldg Number	Bldg Name	Date Built	Eligibility Yes/No	Not eligible but of interest/Additional documentation required	Proposed Action (Modified, Possible Demolition, or Cold Standby)	Effect on NRHP-eligible historic buildings
TA-3-39	Main Technical Shop	1953	Yes		Possible Demolition	Yes
TA-3-102	Technical Shop Addition	1957	Yes		Possible Demolition	Yes
TA-8-24	Flash X-ray Research & Development	1950	Yes		Possible Demolition	Yes
TA-8-70	Laboratory/Office Bldg	1960	Yes		Possible Demolition	Yes
TA-11-1	Control Bldg/Storage Bldg	1944	Yes		Possible Demolition	Yes
TA-11-4	Control Bldg for Bldg 30	1944	Yes		Cold Standby	No
TA-11-24	Shop/Office Bldg	1956	No		Possible Demolition	Not Applicable
TA-11-30	Vibration Test Bldg	1959	Yes		Cold Standby	No
TA-11-59	Amplifier Bldg (addition to TA-11-30 and is considered part of TA-11-30)	Early 1980s	Yes (associated with TA-11-30)		Cold Standby	No
TA-16-16	Original Cafeteria/Office Space	1945	No	Photograph	No Change	Not Applicable
TA-16-193	Change House	1952	Yes		Modified	Yes
TA-16-202	Shops	1952	Yes		Modified	Yes
TA-16-203	Lumber Storage	1952	No		Possible Demolition	Not Applicable
TA-16-206	Paint & Bottle Storage	1952	No	Photograph	Possible Demolition	Not Applicable
TA-16-208	Solvent Storage Bldg	1952	No	Photograph	Possible Demolition	Not Applicable
TA-16-209	Guard Station/Safety Office	1952	No	Photograph	Possible Demolition	Not Applicable
TA-16-303	Rest House w/ working Bay	1953	No	Photograph	Possible Demolition	Not Applicable
TA-16-304	HE Process Bldg/Plastics Bldg	1953	No		Possible Demolition	Not Applicable
TA-16-305	Rest House w/ working Bay/ Plastics Bldg	1953	No	Photograph	Possible Demolition	Not Applicable
TA-16-306	HE Process Bldg/Plastics Bldg	1953	Yes		Possible Demolition	Yes
TA-16-307	Rest House w/ working Bay/Plastics Bldg	1953	No	Photograph	Possible Demolition	Not Applicable
TA-16-308	Detonator Storage	1953	No	Photograph	Possible Demolition	Not Applicable
SUMMARY			**11**	**8**		**8**

and sent to the New Mexico SHPO for concurrence. Also, the Advisory Council on Historic Preservation would be notified of any adverse effects. NRHP-eligible properties that could be adversely affected by the Proposed Action are identified in Table 7. Adverse effects to NRHP-eligible properties would have to be resolved before implementing the Proposed Action.

Because the demolition of National Register-eligible Manhattan Project and Cold War era buildings would be an adverse effect to the property under Section 106 of the *National Historic Preservation Act of 1966* (as amended) and 36 CFR Part 800.5, "Assessment of Adverse Effects," a treatment plan to resolve these adverse effects would be negotiated between the SHPO and NNSA. One treatment plan would cover all of the eligible buildings affected by the Proposed Action. The treatment plan for the affected buildings could include a combination of the following elements: archival large-format photos, existing architectural blueprints, preparation of as-built drawings, preparation of detailed reports on buildings' histories, and interviews with past and present workers. Not all elements would necessarily be applied to all of the eligible buildings. Changes to the treatment plan could result from negotiations with the SHPO over the resolution of the adverse effects.

A Memorandum of Agreement between NNSA and the SHPO for resolution of adverse effects would be prepared following SHPO concurrence on the NRHP eligibility assessment and would implement the treatment plan and proceed parallel with this EA. The Advisory Council on Historic Preservation would be notified of the Memorandum of Agreement and would have an opportunity to comment.

3.2.3.3 No Action Alternative

The effect of the No Action Alternative on cultural resources is that potentially historic structures would not be demolished and would continue to be used in their current fashion. As portions of buildings or entire structures were deemed to no longer be suitable for continuous human occupancy, those buildings or portions of buildings would be abandoned. The structures would deteriorate with no or minimal maintenance. This type of deterioration is also considered an adverse effect under Section 106.

3.2.4 Visual Resources

3.2.4.1 Affected Environment

The visual environment of LANL is described in the SWEIS (DOE 1999a). The natural setting of the Los Alamos area is panoramic and scenic. The mountain landscape, unusual geology, varied plant communities, and archaeological heritage of the area create a diverse visual environment. Portions of the viewshed underwent substantial changes as a result of the Cerro Grande Fire. The fire burned large areas of the mountain slopes that form the principal scenic background in the Los Alamos area. The resulting landscape is both more stark and less uniform than before the fire (DOE 2000).

Much of the development within LANL is austere and utilitarian. Overcrowded conditions have often resulted in an unplanned, visually discordant assembly of temporary and permanent structures. Much of the development has occurred out of the public's view. The most visible developments are a few tall structures, facilities at high, exposed locations, and those beside

well-traveled, publicly accessible roads. The extremely dense mixed development in areas such as TA-3 has been identified as an adverse visual effect (DOE 1999a).

The Proposed Action would be implemented within LANL's Experimental Engineering Planning Area (TA-16). This area is starkly industrial in appearance.

3.2.4.2 Proposed Action

The Proposed Action would have some local short-term adverse effects and long-term beneficial effects on the viewscape as a result of the construction and demolition. Consolidation of operations under the Proposed Action would have no effects on visual resources. The Proposed Action is consistent with goals for architectural and landscaping upgrades identified in LANL's Comprehensive Site Plan 2000 (LANL 2000). The proposed engineering complex is generally not visible from public roads; the proposed buildings would be similar in height to existing buildings. The visual effects of the Proposed Action would be confined to the immediate area of the current engineering complex.

Short-term adverse visual effects would occur during the construction period. These effects involve staging and use of construction vehicles and erecting construction fences. Since the existing engineering complex is highly industrial in appearance, these effects would be minor. Occasional fugitive airborne dust from soil disturbance may temporarily obscure local views for short periods of time.

In the long term, the area would experience a beneficial effect. The proposed campus setting of the engineering complex would remove many temporary buildings, incorporate buildings of similar style, and include unifying landscaping. The industrial character of the existing architecture would be reduced.

Demolition activities would generally result in the same local, short-term adverse effects as would occur during the construction phase. Overall, the removal of buildings would enhance the visual characteristics of the areas of TA-3, TA-8, and TA-16 where they are currently located. Removal of TA-3 Buildings 39 and 102 would reduce the architectural inconsistencies that exist in that area. Depending on the extent to which other buildings are removed from TA-8 and certain areas of TA-16, removal of buildings in those areas could increase the area that is returned to more natural conditions.

3.2.4.3 No Action Alternative

Under the No Action Alternative, the existing building appearance and configuration would be retained and would continue to contribute to the adverse visual environment of TA-3 and of the TA-16 engineering complex. No beneficial visual resources effects would occur. Additional adverse visual effects could result over time from deteriorating structures.

3.2.5 Transportation, Traffic, and Infrastructure

3.2.5.1 Affected Environment

SR 501 provides public access to TA-16. It connects SR 4 along the south side of LANL with SR 502 in Los Alamos town site. SR 501 is classified as an arterial road in the Comprehensive Site Plan (LANL 2000); it can be closed or access restricted temporarily for reasons of safety and

security. SR 501 is one of four main access roads into LANL and the Los Alamos town site. A short access road into TA-16 leads from SR 501 into a parking lot and security checkpoint. Anchor Ranch Road provides secondary restricted access between TA-16 and SR 501 at TA-69, about a mile from Diamond Drive intersection and near the Camp May Road intersection. Anchor Ranch Road is behind the security fence between TA-16 and TA-69. A recent study counted vehicles and estimated that SR 501 carries 4,000 vehicles per day at the entrance to the TA-16 engineering complex and 6,500 vehicles per day at the Anchor Ranch Road intersection (LANL 2001c). There are no sidewalks along either SR 501 or Anchor Ranch Road. There is ample paved parking for private vehicles driven by personnel currently working in the TA-16 engineering complex outside the security fence. TA-16 currently is adequately served with electric, natural gas, steam, water, sewer, and telecommunications utilities.

3.2.5.2 Proposed Action

The proposed consolidated TA-16 engineering complex would continue to be served primarily by SR 501 while Anchor Ranch Road would continue to provide secondary restricted site access. The net increase in site population over the period of the Proposed Action would be approximately 150 persons and would result in at most a 4 percent increase in total current traffic volumes and little or no increase in traffic congestion on SR 501 (Fox 2001). Approximately 80 construction workers would be engaged during the peak construction period. This would result at most in a temporary 2 percent increase in total traffic volumes and would not add materially to traffic loads on SR 501. Vehicle circulation and new parking would be located around the edges of the refurbished area yielding space for walkways and landscaping between the buildings.

Operation of the new buildings is expected to use less water and electricity than older buildings of comparable size and function because of the construction design, the use of energy-efficient lighting and equipment, and the use of water-conservation measures incorporated in the building and landscape features. Existing transmission lines and water and sewer mains that serve the TA-16 engineering complex have sufficient capacity to accommodate the consolidated and refurbished engineering complex.

3.2.5.3 No Action Alternative

Under the No Action Alternative, new circulation roads, parking lots, and utility corridors would not be constructed in the TA-16 central area. Existing utilities would be maintained and repaired as required. No additional daily trips would be generated along SR 501.

3.2.6 Geologic Setting

3.2.6.1 Affected Environment

The Jemez Mountains volcanic field is located in northern New Mexico at the intersection of the western margin of the Rio Grande Rift and the Jemez Lineament (Figure 6) (Gardner et al. 1986, Heiken et al. 1996). The Jemez Lineament is a northeast-southwest trending alignment of young volcanic fields ranging from the Springerville volcanic field in east-central Arizona to the Raton volcanic field of northeastern New Mexico (Heiken et al. 1996). The Jemez Mountains volcanic field is the largest volcanic center along this lineament (ERP 1992). Volcanism in this volcanic field spans a roughly 16-million-year period beginning with the eruptions of numerous basaltic lava flows. Various other eruptions of basaltic, rhyolitic, and intermediate composition lavas and

ash flows occurred sporadically during the next 15 million years with volcanic activity culminating in the eruption of the rhyolitic Bandelier Tuff at 1.79 and 1.23 million years ago (Self and Sykes 1996). All of LANL property is within this volcanic field and is sited along the western edge of the Rio Grande Rift. Most of the bedrock immediately underlying LANL is composed of Bandelier Tuff.

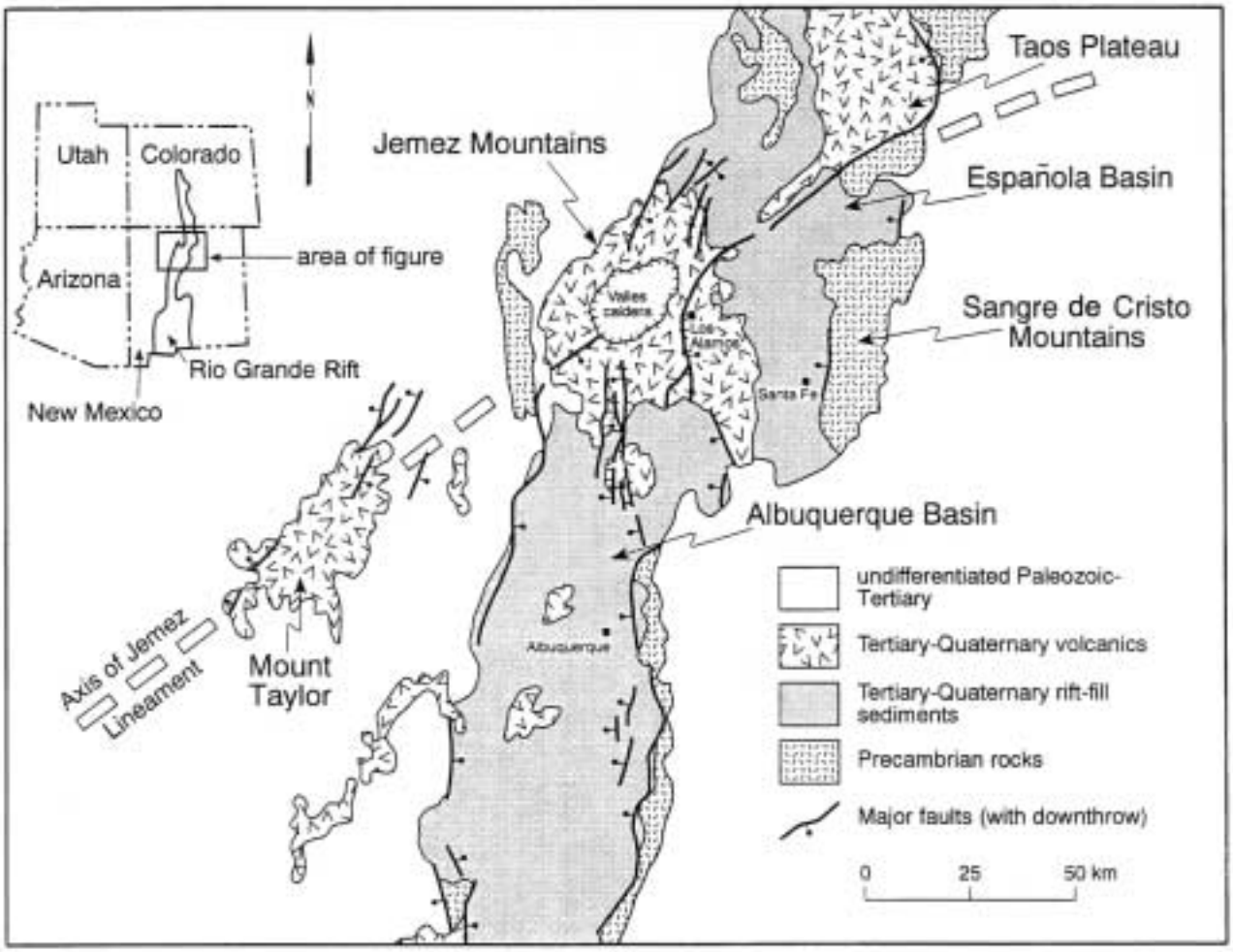

Figure 6. Generalized geologic map of the Rio Grande Rift in the vicinity of the Jemez Mountains volcanic field. From Self and Sykes (1996).

The geologic structure of the area is dominated by the north-south trending Pajarito Fault system. The Pajarito Fault system forms the western structural boundary of the Rio Grande Rift, along the western edge of the Española Basin, and the eastern edge of the Jemez Mountains volcanic field. The Pajarito Fault system consists of three major faults and numerous secondary faults with vertical displacements ranging from 80 ft to 400 ft (24 m to 120 m). Estimates of the timing of the most recent surface rupturing paleoearthquakes along this fault range from 3000 to 24,000 years ago (Gardner et al. 2001).

The existing TA-16 engineering complex is located atop approximately 50 ft (15 m) of alluvium and fill material that fills a narrow (about 1,000-ft- [305-m-] wide) sedimentary basin bounded on two sides by faults (a feature known as a graben). This graben is bounded by, and parallel to,

the Pajarito Fault (which is parallel to, and just west of, SR 501) and a secondary fault, F2, (Gardner et al. 2001) located in the eastern portion of the project area (Figure 7). This secondary fault trends northeast-southwest under existing Buildings 207, 203, 208, and 16 at TA-16 and has a minimum vertical displacement of 30 ft (9 m). Vertical displacement on this fault could be as much as 80 ft to 100 ft (24 m to 31 m) (Gardner et al. 2001). Since the entire proposed TA-16 engineering complex lies within the Pajarito Fault Zone, within a part of the fault zone that is dominated by secondary faults or distributed ruptures, this area has a generally higher potential for seismic surface rupture, relative to locations farther removed from the Pajarito Fault Zone

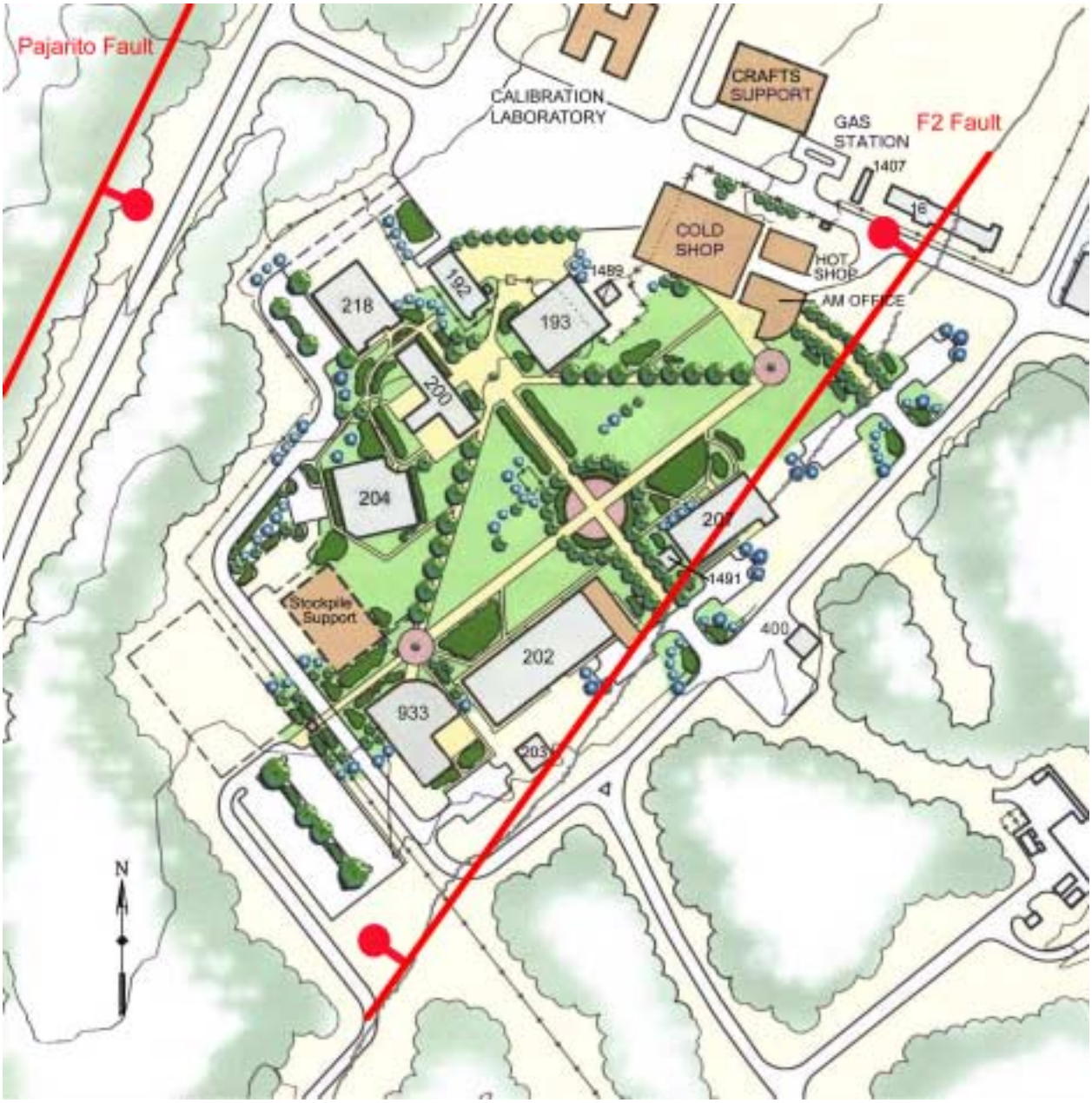

Figure 7. Conceptual drawing of the proposed TA-16 engineering complex showing the approximate locations of the Pajarito and F2 faults (Gardner et al. 2001). Ball and bar on down-thrown side of fault.

(Gardner et al. 2001). However, probabilistic analysis of 1 in 10,000 year seismic events suggests that significant seismic events are only expected to occur along, or on, the main trace of the Pajarito Fault (Gardner et al. 2001) west of SR 501. Even though probabilities are low, the Pajarito Fault Zone must be considered active or "capable" in the definitions of 10 CFR 100 Appendix A. The LANL Seismic Hazards Program recommends that siting new facilities over the trace of a potentially active fault should be avoided (Gardner et al. 1999).

There is also a fault (F7) beneath Building 39 in TA-3 (Figure 8). This building, along with the Hot Machine Shop (TA-3 Building 102), is located within the Diamond Drive Graben of the Pajarito Fault Zone (Gardner et al. 1999). The operations within these two buildings are proposed to be moved to TA-16 as part of the Proposed Action.

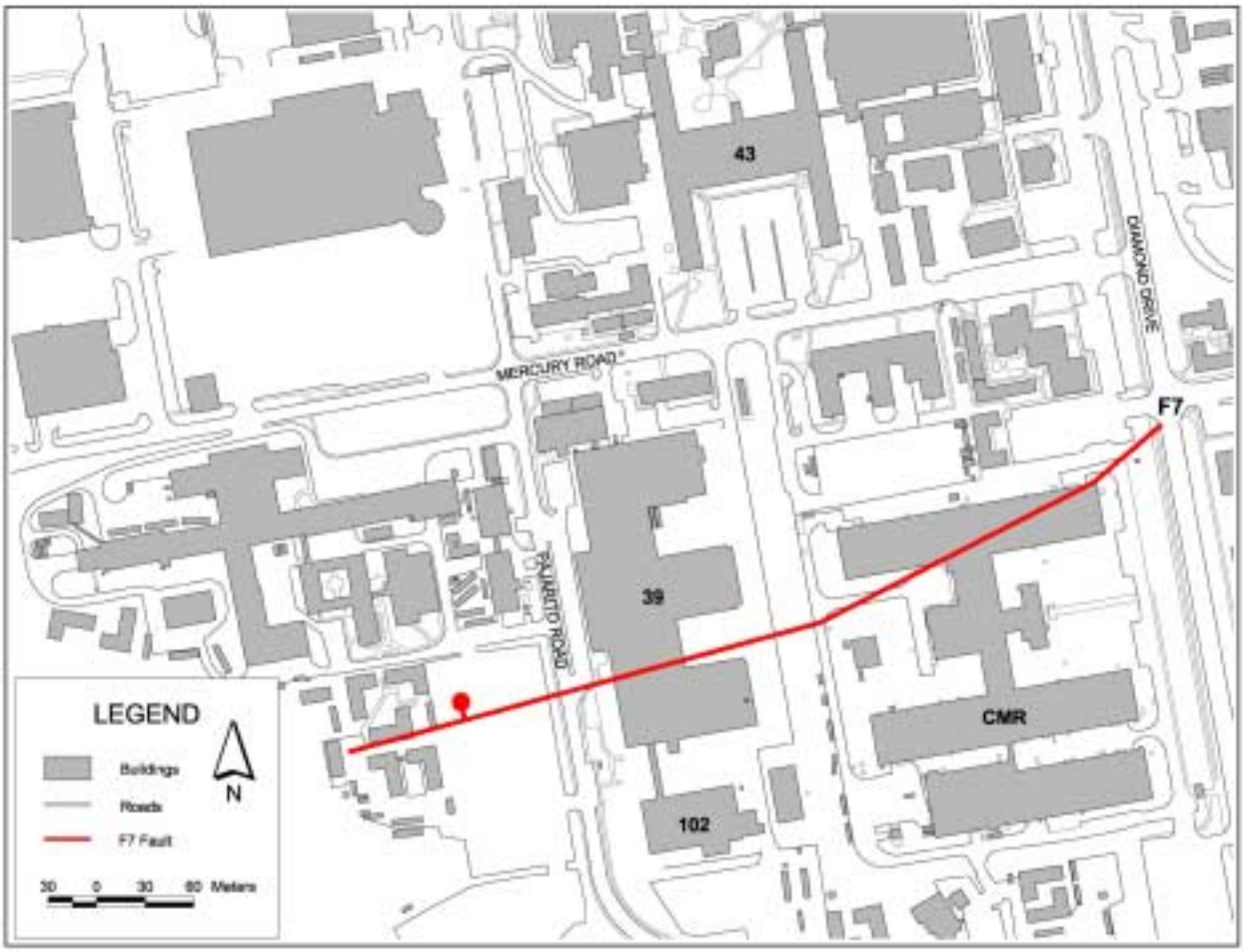

Figure 8. Location of Fault F7 beneath Building 39 in TA-3 (Gardner et al. 1999). Bar and ball on down-thrown side of fault.

3.2.6.2 Proposed Action

None of the new buildings to be constructed as part of the Proposed Action would be sited over the fault trace or within 50 ft (15 m) of any known active fault. Existing facilities proposed for remodeling, especially those that are situated over the trace of Fault F2 (see above), may require

additional structural reinforcements to meet current building codes with respect to seismic hazards.

3.2.6.3 No Action Alternative

Under the No Action Alternative, operations would not be consolidated in the TA-16 engineering complex and various operations would continue in buildings that do not meet the seismic hazard standards that apply to new construction. If operations in these facilities are not relocated as part of the Proposed Action, NNSA would evaluate the seismic hazards and would implement mitigation measures as necessary. The existence of Fault F2 (Gardner et al. 2001) under TA-16 Buildings 207, 203, 208, and 16 and Fault F7 (Gardner et al. 1999) under TA-3 Buildings 39 and 102 would continue to pose a risk to these buildings. Probabilistic analysis of 1 in 10,000 year events indicate that surface rupture would only become a notable hazard on the main trace of the Pajarito Fault (Gardner et al. 2001 and references therein).

3.2.7 Water Quality

3.2.7.1 Affected Environment

Data and analysis of LANL surface and groundwater quality samples taken from test wells indicate that LANL operations and activities have affected the surface water within LANL boundaries and some of the alluvial and intermediate perched zones in the LANL region. Details on the surface and groundwater quality can be found in the annual LANL Environmental Surveillance and Compliance Report (LANL 2001b).

Radiation (gross alpha, gross beta, and gross gamma) and radionuclide levels in surface waters are generally below and close to analytical detection limits and well within drinking water and public dose standards. Metals in surface water samples are typically below applicable standards when the samples are filtered before analysis. However, metal concentrations exceeding drinking water standards are relatively widespread when samples are not filtered. Plutonium concentrations exceed regional comparison values in several sediment samples. In general, while some sediment samples exceed regional comparison value concentrations for metal, most of these metals may occur naturally in the sediments. The exception to this is selenium in sediments from upper Los Alamos Canyon, which far exceeds regional comparison concentrations (DOE 1999a).

In the regional acquifer, which serves LANL and Los Alamos County, drinking water standards were met for all radionuclides in all samples collected from 1990 through 1994. Trace amounts of tritium, plutonium, americium, and strontium have been detected, however, but not in the potable water supply wells. Organic compounds have also been detected in samples from test wells at TA-49, and nitrate has been detected down-canyon from the Bayo Wastewater Treatment Plant in Pueblo Canyon on the north side of LANL. Contaminants also have been detected in alluvial and intermediate perched groundwater (DOE 1999c). There are no permitted outfalls within the existing engineering complex. Most buildings, however, have roof drains that empty into the environment.

3.2.7.2 Proposed Action

The water quality in this area would not be affected by the Proposed Action. New facilities will be designed using pollution prevention processes that lead to minimal waste generation. BMPs

would be employed during construction to restrict surface water movement and minimize soil erosion that could degrade surface water quality. Post-construction landscaping would also serve to protect surface and groundwater quality.

No new wastewater or hazardous waste streams would be generated by the Proposed Action. However, use of the sanitary sewer system in the buildings to be vacated would be discontinued and a reconfiguration of the sanitary system would be made in the TA-16 engineering complex. Water quality would not change as a result of operations of the new or renovated buildings in the engineering complex.

Removal of asphalt in some areas would decrease surface water runoff and would increase surface water infiltration. Establishment of some new asphalt parking areas would have the reverse effect. The net increased infiltration is not expected to have any adverse effects on groundwater quality.

3.2.7.3 No Action Alternative

There would be no effects to water quality under the No Action Alternative. No increased infiltration because of asphalt removal would occur.

3.2.8 Human Health

3.2.8.1 Affected Environment

This section considers the health of LANL workers and non-UC construction or demolition workers. These two categories are considered in this EA because each category of worker would either be involved in the routine operation of the proposed rehabilitated engineering complex, work on the construction of new buildings, remodeling of existing buildings, demolition of vacated buildings and structures, or could be affected by potential accidents at the new TA-16 engineering complex. Members of the public are not considered because they are not likely to be affected by routine operations, construction or demolition activities, or any potential accident scenarios that could result from the Proposed Action.

The health of LANL workers is routinely monitored depending upon the type of work performed. Health monitoring programs for LANL workers consider a wide range of potential concerns including exposures to radioactive materials, hazardous chemicals, and routine workplace hazards. In addition, LANL workers involved in hazardous operations are protected by engineering controls and required to wear appropriate PPE. Training is also required to identify and avoid or correct potential hazards typically found in the work environment and to respond to emergency situations. Because of the various health monitoring programs and the requirements for PPE and routine health and safety training, LANL workers are generally considered to be a healthy workforce with a below average incidence of work-related injuries and illnesses.

UC staff monitor environmental media for contaminants that could affect non-UC workers or members of the public. This information is reported to regulatory agencies, such as the NMED and to the public through various permits and reporting mechanisms and it is used to assess the effects of routine operations at LANL on the general public. For detailed information about environmental media monitoring and doses to the public, see LANL's Environmental

Surveillance Report for 2000 (LANL 2001b). For those persons that work within the boundaries of LANL as subcontractors or construction workers and could be exposed to radioactive or other hazardous materials, their exposures are monitored in the same manner as LANL workers. In addition, site-specific training and PPE requirements would also apply to these workers.

3.2.8.2 Proposed Action

Construction, remodeling, and demolition work planned under the Proposed Action would not be expected to have any adverse health effects on LANL workers. LANL workers would not be directly involved in the construction, remodeling, or demolition of buildings and structures, parking areas, road upgrades, or the movement of fencing and utilities but they would be active in management, site inspections, and utility hook-ups. Approximately three NNSA and 20 LANL workers would perform site inspections and monitor construction and demolition activities during periods of peak activity. Applicable safety and health training and monitoring, PPE, and work-site hazard controls would be required for these workers.

The Proposed Action is not expected to result in an adverse effect on the health of construction workers. Approximately 80 peak-period construction workers, including approximately 35 construction vehicles, would be actively involved in potentially hazardous activities such as heavy equipment operations, soil excavations, and building construction. Potentially serious exposures to various hazards or injuries are possible during the construction phase of the Proposed Action. Adverse effects could range from relatively minor (e.g., respiratory irritation, cuts, or sprains) to major (e.g., lung damage, broken bones, or fatalities). To prevent serious injuries, all site construction contractors are required to submit and adhere to a Construction Safety and Health Plan (Plan). This Plan is reviewed and approved by UC staff before construction activities can begin. Following approval of this Plan, UC and NNSA site inspectors would routinely verify that construction contractors are adhering to the Plan, including applicable federal and state health and safety standards. Adherence to an approved Plan, use of PPE and engineered controls, and completion of appropriate hazards training are expected to prevent adverse health effects on construction workers.

Demolition work could begin during the construction phase but would likely occur over the next ten or more years after the construction phase is completed. Approximately 80 peak-period demolition workers would be actively involved in the same potentially hazardous activities as would construction workers. In addition, exposures to radioactive debris, beryllium, asbestos, uranium, HE, and hazardous chemicals could also pose a potential health hazard to these workers. Adherence to the Plan, use of PPE and engineered controls, and completion of appropriate hazards training are expected to prevent adverse health effects on construction workers. Engineered controls and hazard control plans to protect worker health and safety would be a routine part of construction activities.

Improvements in facilities and operations planned under the Proposed Action are expected to have a beneficial effect during operation of the facilities on the health of UC and subcontractor workers. Applicable safety and health training and work-site hazard controls would be required for these workers and for any hazardous operations they would perform. The health effects of hazardous operations planned under the Proposed Action have been analyzed in detail in the SWEIS (DOE 1999a). In particular, worker health hazards are possible from exposure to electrical fields, paint, pyrophoric metal, metal work, saws and lathes, and other physical hazards

associated with crafts work. Machining of toxic (e.g., uranium) and nontoxic (e.g., copper) metals pose respiratory, disease, and potential cancer risks. Exposures to various chemicals used in the fabrication of plastics can also cause injury.

Although all of the hazardous activities performed at TA-3, TA-8, TA-11, and TA-16 and analyzed in the SWEIS would continue to be performed under the Proposed Action, the relocation of these activities into remodeled or new and modern facilities would reduce the potential for worker exposures and injuries or illnesses. Improvements in ventilation controls, storage and transport of hazardous materials, use of automated and remotely operated equipment, and other process improvements would effectively reduce worker health and safety risks below the risk levels that currently exist in operating facilities at TA-16.

3.2.8.3 No Action Alternative

Under the No Action Alternative, the potential for injuries to UC workers, construction workers, demolition workers, and members of the public would not occur from the construction of the proposed buildings. No exposures to hazardous or radioactive materials would occur as a result of demolition activities. Existing facilities would continue to be used to perform hazardous operations and to house workers. Because of the age of existing facilities and the difficulties in meeting current health and safety codes and standards, the needs for additional controls would likely increase gradually over time. Therefore, it is expected that either more safety measures would need to be put into effect or the existing facilities would need to be vacated over time.

3.2.9 Potential Release Sites

3.2.9.1 Affected Environment

There are 16 PRSs in the vicinity of the proposed TA-16 engineering complex according to the LANL ER Program database. These are described in Table 8.

Table 8. Potential Release Sites in the Vicinity of the Proposed TA-16 Refurbishment

PRS #	Description	Status
16-001(d)	Dry well connected to Building 16-208	Abandoned
16-017(j)	Former site of HE magazine	Demolished
16-022(b)	Underground storage tank for gasoline at 16-105	Removed
16-024(i)	Former site of HE magazine	Removed in 1961
16-024(j)	Former site of HE magazine	Removed in 1951
16-026(u)	Former oil/water separator in 16-195	Potentially contaminated soil
16-026(a2)	16-200	Active storm water drain/outfall
16-026(b2)	Industrial or sanitary waste line at 16-202	Inactive
16-026(t)	Storm drain line east side Building 16-207	Active, no further action proposed
16-028(d)	Former industrial outfall at 16-202	Now serves only as roof drain
16-031(f)	Abandoned waste line at chlorination station	Removed in 1992
16-033(b)	Underground storage tank for gasoline at 16-105	Removed
16-033(i)	Underground storage tank for gasoline at 16-105	Removed
16-033(j)	Underground storage tank for gasoline at 16-105	Removed
C-16-020	Building 22 site, building moved to ice rink in 1961	Area of concern, not state regulated
C-16-073	Underground storage tank for fuel for an emergency generator	Location uncertain

3.2.9.2 Proposed Action

The Proposed Action could disturb PRS 16-017(j) listed in Table 8 if the New Calibration Laboratory is sited in the location shown in Figure 5. Other PRSs could be disturbed depending upon exact siting of other buildings, utilities, and other construction activities. These PRSs would be sampled and remediated in accordance with NMED requirements, if expected to be disturbed by construction activities, related utility excavation work, or other project activities before ground disturbance commenced at these locations.

3.2.9.3 No Action Alternative

There would be no change in the disposition of the PRSs as a result of the No Action Alternative. They would remain in place until further investigation and remediation would occur in accordance with ER Project priorities, funding, and scheduling.

3.2.10 Noise

3.2.10.1 Affected Environment

Noise is defined as unwanted sound. Sound is a form of energy that travels as invisible pressure vibrations in various media, such as air. The auditory system of the human ear is particularly sensitive to sound vibrations. Noise is categorized into two types: *steady-state noise,* which is characterized as longer duration and lower intensity, such as a running motor, and *impulse or effect noise,* which is characterized by short duration and high intensity, such as the detonation of HE. The intensity of sound is measured in decibel (dB) units. In sound measurements relative to human auditory limits, the decibel scale is modified into an A-weighted frequency scale (dBA).

Noise measured at LANL is primarily from occupational exposures. These measurements generally take place inside buildings and are made through the use of personal noise dosimeters and other noise monitoring instruments. Occupational exposure data are compared against an established occupational exposure limit (OEL). At LANL, the OEL is administratively defined as noise to which a worker may be exposed for a specific work period without probable adverse effects on hearing acuity. The OEL for both steady-state and impulse or effect noise is based on U. S. Air Force Regulation 161-35, Hazardous Noise Exposure, which has been adopted by DOE. The maximum permissible OEL for steady-state noise is 84 dBA for each 8-hour work period. The OEL for impulse and effect noise is not fixed because the number of effects allowed per day varies depending on the dBA of each effect. DOE also requires that Action Levels (levels of exposure to workplace hazards that are below the OEL but require monitoring or the use of PPE) be established for noise in the workplace. Action Levels at LANL for steady-state noise and impulse and effect noise are 80 dBA and 140 dBA for each 8-hour day, respectively.

Environmental noise levels at LANL are measured outside of buildings and away from routine operations. These sound levels are highly variable and are dependent on the generator. The following are typical examples of sound levels (dBA) generated by barking dogs (58), sport events (74), nearby vehicle traffic (63), aircraft overhead (66), children playing (65), and birds chirping (54). Sources of environmental noise at LANL consist of background sound, vehicular traffic, routine operations, and periodic HE testing. Measurements of environmental noise in and around LANL facilities and operations average below 80 dBA.

The averages of measured values from limited ambient environmental sampling in Los Alamos County were found to be consistent with expected sound levels (55 dBA) for outdoors in residential areas. Background sound levels at the White Rock community ranged from 38 to 51 dBA (Burns 1995) and from 31 to 35 dBA at the entrance of Bandelier National Monument (Vigil 1995). The minimum and maximum values for the County ranged between 38 dBA and 96 dBA, respectively. Ambient noise levels in the vicinity of the Proposed Action are affected primarily by operation of light vehicles (personal vehicles, delivery vans, etc.) and routine operations conducted in crafts and machine shops and office space that currently exist in TA-16 and by vehicle operation and recent construction work at TA-3.

3.2.10.2 Proposed Action

The Proposed Action would result in limited short-term increases in noise levels associated with various construction, remodeling, and demolition activities. Following the completion of these activities, noise levels would return to existing levels. Noise generated by the Proposed Action is not expected to have an adverse effect on either short-term construction workers or LANL workers. Based upon a number of factors, such as attenuation factors, noise levels should return to background levels within about 200 ft (66 m) of the noise source (Canter 1996).

The construction of new office space, the remodeling of existing space, and the demolition of some buildings would require the use of heavy equipment for clearing, leveling, construction, and demolition activities. Heavy equipment such as front-end loaders and backhoes would produce intermittent noise levels at around 73 to 94 dBA at 50 ft (15 m) from the work site under normal working conditions (Canter 1996, Magrab 1975). Construction truck traffic would occur frequently but would generally produce noise levels below that of the heavy equipment. The finishing work within the building structures would create noise levels slightly above normal background levels for office work areas. Noise levels may go up to around 80 dBA at the work site if light machinery is used in this stage of construction (Canter 1996). Workers would be required to have hearing protection if site-specific work produced noise levels above the LANL action level of 80 dBA for steady-state noise. Sound levels would be expected to dissipate to background levels within TA-3, TA-8, TA-16, and along West Jemez Road and should not be noticeable by members of the public or disturb local wildlife. Traffic noise from commuting construction workers would not be expected to noticeably increase the present traffic noise level on Diamond Drive or East and West Jemez Roads during rush hour. The vehicles of construction workers would remain parked during the day and would not contribute to the background noise levels during this time. Therefore, noise levels are not expected to exceed the established OEL.

No adverse effects on workers, the public, or the environment would be expected from noise levels generated by routine operations under the Proposed Action. After construction, remodeling, and demolition activities are completed, noise levels would return to background levels. Once the new and remodeled facilities become operational, noise generated by building operations would be similar to noises encountered around typical office buildings, crafts and machine shops (such as ventilation fans and testing of back-up power and emergency response systems), operating power equipment, and light vehicle traffic.

3.2.10.3 No Action Alternative

Under the No Action Alternative, ambient noise levels would remain unchanged in the vicinity of TA-3, TA-8, TA-11, and TA-16. Potential noise from construction, remodeling, and demolition activities associated with the Proposed Action would not occur, but ongoing routine operations, vehicle traffic, and construction activities from other projects in the vicinity of TA-3 and TA-16 would continue to generate noise. However, the environmental noise levels in and around facilities or operations at LANL would be expected to remain below 80 dBA on average.

3.2.11 Socioeconomic

3.2.11.1 Affected Environment

LANL operations in north-central New Mexico have a notable and positive influence on the economy of north-central New Mexico. FY00 procurements in northern New Mexico for LANL were 346 million dollars. The total funding for LANL was $1.3 billion in FY98, yielding a total economic effect of about $3.8 billion or about 30 percent of the total economic activity in the region. Total personal income effect was $1.11 billion in FY98 or about 26 percent of personal income in the Los Alamos, Santa Fe, and Rio Arriba counties combined. In effect, nearly one of every three jobs in the region, or about 30,000 positions, was created or supported by LANL. Approximately 80 percent of the jobs created indirectly by LANL in the region occurred in the trade, finance, insurance, real estate, and services sectors (DOE/AL 1999).

3.2.11.2 Proposed Action

This project would not have a long-term effect on socioeconomic conditions in this area. The additional revenue generated by the construction projects would be limited in duration. Refurbishment of the TA-16 engineering complex would include construction of six buildings and remodeling of two others, along with work on roads, parking, landscaping and utilities, and also some demolition. Approximately 70 million dollars would be spent for this project on design, oversight, and construction contracts. Most materials would be purchased in New Mexico. There would be no increase in the number of UC employees as a result of this project, and the additional 80 peak construction jobs would be filled by existing employees in the regional work force, which includes mostly Los Alamos, Rio Arriba, and Santa Fe counties. Because these temporary jobs would be filled by existing regional work force, there would be no effect on area population or increase in the demand for housing or public services in the region. Construction would begin in 2002 and last for about five years.

3.2.11.3 No Action Alternative

There would be no socioeconomic benefits as a result of the construction or operation of these facilities under the No Action Alternative. Construction of these facilities would not occur and there would be no related revenues generated for the local economy.

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4.0 Accident Analysis

Potential accidents associated with the Proposed Action and alternatives are most likely to occur during either construction or demolition activities. No fatalities are likely to result from any likely accident scenarios.

Hazards for the Proposed Action can be grouped into operational hazards, construction hazards, and transportation hazards. All proposed facilities for the TA-16 engineering complex consolidation are classified as low-hazard facilities ("low" hazard on the basis of DOE Order 5481.1B and DOE EM Standard 5502-94, *Hazard Baseline Documentation* [DOE 1994], as implemented by LIR 300-00-05.2, Facility Hazard Categorization [LANL 2001d]) covered under the nonnuclear authorization basis, LIR 300-00-07.2, Nonnuclear Facility Safety Authorization. A potential accident at a low-hazard facility would be expected to result in only localized consequences. These consequences could include permanent injury or death to workers in the immediate area where the accident occurs. Workers in adjacent workspaces (uninvolved workers) would not be affected.

Operational hazards of the Proposed Action have been previously assessed in the LANL SWEIS (DOE 1999a) at the current locations of those operations. As there would be no substantial changes (such as in quantities of hazardous materials at risk) in operations from implementing the Proposed Action, the potential outcomes of accidents involving operations-related hazards are bounded by the operational hazard analyses in the SWEIS. This EA tiers from the broader scope of analyses in the SWEIS.

Generally, reduced inventories and more efficient processes at the proposed TA-16 engineering complex would lessen the threat of exposure or injury from hazardous or radioactive materials. Centrally locating different sources of waste would increase the density of waste sources. This concentration could increase the potential for exposure or injury to workers or members of the public if an accident were to occur. Inventories of hazardous or radioactive materials, however, would always be maintained at a low-hazard category. Therefore, effects would be limited to the immediate area of the accident.

Construction and Demolition Hazards. To estimate the potential number of fatalities that might occur from construction-related activities of the Proposed Action, the estimated number of workers was compared to recent risk rates of occupational fatalities. The average fatality rate in the U.S. is 3.9 deaths per 100,000 workers per year (Saltzman 2001). No deaths (0.003) would be expected from implementing the Proposed Action on average each year from construction- or demolition-related activities from causes that include falls, exposure to harmful substances, fires and explosions, and being struck by objects, equipment, or projectiles.

Transportation Hazards. Transportation hazards can be associated with construction, operations, or demolition. Construction activities would involve the transport of building materials to TA-16 and construction waste from TA-16. Of the different types of transportation occupations nationwide, truck drivers experience the highest fatality rate (26 deaths per 100,000 full-time workers per year) (Saltzman 2001), including all types of trucks. However, for the Proposed Action, long-distance hauling would not occur, and high speeds would occur only infrequently, if at all. Therefore, no transportation related fatalities are expected.

Consolidating ESA facilities and operations would generally result in a reduction in transport of materials, hazardous and otherwise, because the required processing capabilities would be consolidated. Ignoring any special training or mitigation of accidents that might occur at LANL, the chance of a fatality occurring to a driver of a medium or heavy truck hauling hazardous waste is about three in one million (2.7×10^{-6} per driver per year) based on 1993 nationwide statistics (NSC 1994). Therefore, no transportation fatalities are expected.

5.0 Cumulative Effects

Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes them. These effects can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7).

The TA-16 engineering complex consolidation was not considered in the SWEIS (DOE 1999a). The cumulative effect analysis in the SWEIS, however, documents the regional effect of the expanded operations alternative and provides context for this EA. This section considers the Proposed Action and possible effects on resources in context to any ongoing or reasonably foreseeable future actions. Resources dismissed from further cumulative effects consideration include land use, transportation, infrastructure, visual, noise, health effects, water, air, geology, and PRSs for reasons discussed in the following paragraphs. Cultural resources and waste volumes are discussed further in this section. This analysis concludes that there would not be cumulative effects on cultural resources, waste management, or other aspects of the environment.

The only current project in the vicinity of TA-16 is the construction and operation of the new Emergency Operations Center (EOC). Moreover, use of the forest areas west and south of LANL and Los Alamos County for recreation, habitat management purposes, and timber production (only within the Santa Fe National Forest) would likely remain unchanged. Land use ownership by the Forest Service and Park Service adjacent to TA-16 precludes the prospect of urban development anywhere near TA-16 in the foreseeable future. There are no parcels near TA-16 identified for land transfer. Consequently there would be no other future construction or operational activities that would contribute to cumulative effects on land use, transportation, infrastructure, visual, noise, health effects, water, air, geology, and PRSs at TA-16 or adjacent areas.

The only current project that could contribute to cumulative effects would be construction of the EOC. Construction of the EOC would involve about 40 construction workers during peak periods. During normal operations only three or four full-time LANL workers would occupy the EOC. Therefore, traffic on SR 501 is not expected to increase noticeably due to this construction or other proposed development. There would be no additional sources of air or water emissions and no need to increase the capacity of utility systems. Construction of the EOC would produce about 1,000 yd^3 (760 m^3) of nonhazardous construction waste. In combination with other LANL constriction projects, the construction waste can be disposed of in existing sanitary landfills and is not expected to require construction of any new landfills. Noise and visual effects resulting from construction of the EOC would be temporary and minor and are not likely to occur at the same time as construction activities at the TA-16 engineering complex.

The one Archaic Period archaeological site located in the area of the Proposed Action would not be affected and, therefore, there are no cumulative effects on archaeological sites. However, the Proposed Action would result in the demolition or remodeling of several structures including some buildings that are eligible for the NRHP. There are a number of actions taking place at LANL that affect historic structures and it is likely that over the next several years, many of the historic buildings at LANL would be demolished. Many of the buildings at LANL are Manhattan Project and early Cold War era structures that are important aspects of the Los

Alamos story. Examples of buildings that are under consideration for demolition activities include the Omega West facility (TA-2), the Manhattan Project detonator buildings at TA-6, the Ice House (TA-41), several structures at TA-21 related to early thermonuclear weapons, the Hollow at TA-15 where the Rex accelerator was located, several buildings at TA-33 associated with early gun development, and the Van de Graff accelerator (TA-3). Hundreds of buildings are on the LANL excess property list or may be proposed for demolition over the next several years, including most of the permanent buildings that date to the early Cold War era (1947–63). A small number of these buildings may have reuse potential; this potential must be considered as part of NNSA's management of historic properties. In response to these factors, NNSA and UC are preparing a cultural resources management plan (CRMP) in accordance with the mitigation action plan set forth in the SWEIS ROD. This management plan, which is due to be completed by the end of 2002, will address the rapid attrition of historic buildings and will establish a framework for identifying historic properties with exceptional importance in LANL's history. Since the Proposed Action would occur over several years, mitigation measures in the form of documentation or building reuse would be considered in light of the CRMP. Preservation or reuse would not be precluded under the CRMP. Therefore, the Proposed Action is not expected to result in a cumulative adverse effect on historic resources at LANL.

Waste generation at LANL during the next 10 years, both from decontamination and demolition of buildings and through environmental restoration efforts, could be large. Construction and demolition wastes would be recycled and reused to the extent practicable. Existing waste treatment and disposal facilities would be used according to specific waste types. Solid wastes would be disposed of at the Los Alamos County Landfill or other appropriate permitted solid waste landfills. Demolition wastes would similarly be disposed of at appropriate permitted facilities. No aspect of the Proposed Action or other planned actions would result in NNSA establishing a new disposal facility or expanding an existing one.

6.0 Agencies Consulted

A final assessment report regarding historical structures at TA-16 is in progress and will be submitted to the NNSA for subsequent transmittal to the SHPO. The initial recommendations contained in Table 7 will need official concurrence from the SHPO, and any adverse effects to Register-eligible properties will have to be resolved prior to the commencement of ESA's five-year plan. The Advisory Council on Historic Preservation would be notified of the adverse effect to any historic property. Because the demolition of a historic building is an adverse effect to the property, a plan for mitigation of the adverse effect would have to be negotiated between the SHPO and the NNSA. This plan can include activities such as archival large-format photos, compiling existing drawings, preparing a current set of as-builts, preparing a detailed report on the history of the building, and conducting interviews with persons who work or worked in the building. The plan could include these various actions but not all would necessarily be applied to every building affected. This work would have to be completed before any demolition work on the buildings affected.

NNSA has determined that no consultation with the U.S. Fish and Wildlife Service regarding the potential effect of the Proposed Action on federally protected threatened or endangered species or their critical habitat is necessary as there would be no effect to these sensitive species or their critical habitat from the Proposed Action.

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