CHAPTER 3

Alternatives for Continuing Operations at Sandia National Laboratories, California

This chapter describes the three alternatives the National Nuclear Security Administration (NNSA) has analyzed in detail regarding continuing operations at Sandia National Laboratories, California (SNL/CA). It describes the activities and the level of activities, which will vary depending on the alternative analyzed, at SNL/CA's facilities.

3.1 INTRODUCTION

Council on Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations* [CFR] Parts 1500-1508) require that the Department of Energy (DOE) and other Federal agencies use the review process established by the *National Environmental Policy Act* (NEPA) of 1969, as amended (42 *United States Code* [U.S.C.] §4321 *et seq.*) and the DOE regulations implementing NEPA (10 CFR Part 1021) to evaluate not only the proposed action, but also to identify and review reasonable alternatives to the proposed action, as well as a "no action" alternative. This comprehensive review ensures that environmental information is available to public officials and citizens before decisions are made and before actions are taken.

The proposed action is to continue to operate SNL/CA as a DOE national laboratory. The NNSA developed three alternatives to accomplish this action and to assess environmental impacts of activities at SNL/CA. This chapter examines and compares the three alternatives. For clarity and brevity, the descriptions of the alternatives in the text (Sections 3.2, 3.3, and 3.4) and in the tables (Section 3.6) focus on significant distinguishing features that characterize the variation of activities across alternatives. SNL/CA activity descriptions, by facility, are provided in Chapter 2. All of the activities discussed in Chapter 2 were used in evaluating the impacts of each alternative. The alternatives are defined below:

- No Action Alternative (Section 3.2),
- Planned Utilization and Operations Alternative (Section 3.3), and
- Maximum Operations Alternative (Section 3.4).

These three alternatives represent the range of levels of operation necessary to carry out the DOE mission lines, from the minimum levels of activity that maintain core capabilities (No Action Alternative) to the highest reasonable activity levels that could be supported by current facilities, and the potential expansion and construction of new facilities for specifically identified future actions (Maximum Operations Alternative).

Under the No Action Alternative, ongoing NNSA and interagency programs and activities at SNL/CA would continue operating at planned levels as reflected in current DOE management plans. In some cases, these planned levels include increases over today's operating levels. The No Action Alternative includes any recent activities that have already been approved by the NNSA and have existing NEPA documentation.

The Notice of Intent (NOI) (67 *Federal Register* [FR] 5089) proposed that the No Action and Expanded Operations Alternatives be considered in the Site-Wide Environmental Assessment (SWEA) (see Chapter 14 of the SWEA); however, the Expanded Operations Alternative was dropped and two other alternatives, the Planned Utilization and Operations Alternative and Maximum Operations Alternative, were added to show a broader range of alternatives and respond to internal comments received during the scoping process (Section 1.6.1).

Under the Maximum Operations Alternative, NNSA and interagency programs and activities at SNL/CA would increase to the highest reasonable activity levels, as set forth in this SWEA, that could be supported by current facilities and their potential expansion and construction of new facilities for future actions specifically identified in the SWEA.

The SWEA analyzes the environmental impacts of activities at SNL/CA associated with these three alternatives, as well as activities common to all alternatives including maintenance support and material management.

The DOE's work assignments to SNL/CA are based on using existing personnel and facility capabilities, as described in Chapters 1 and 2. The DOE has examined the various activity levels typical of past SNL/CA operations (generally within the past few years), and assumes that future work descriptions would resemble current and recent activities.

The three alternatives represent the range of operating levels that could be reasonably implemented in the 10-year time frame of the SWEA analysis (2002 to 2012). Many of SNL/CA's ongoing and planned activities do not vary by alternative. The No Action Alternative reflects currently planned activities or projects, some of which may already have NEPA documentation and analysis.

Table 3-1 provides a brief summary of the facilities activity levels evaluated in this SWEA. Table 3-4 (see

Table 3-1. Comparison of Activity Levels at 13 Specific Facilities under the No Action, Planned Utilization and Operations, and Maximum Operations Alternatives

FACILITY	PRIMARY FUNCTION	ACTIVITY TYPE OR MATERIAL	LEVEL OF ACTIVITY	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
Combustion Research Facility (CRF)	Bench-Scale chemistry, physics, and engineering experiments	Research and Development	Workforce/yr	250	300	500
Building 910	Weapons research and development	Research and Development	Workforce/yr	75	94	150
Building 914	Machine shop and test assembly operations	Prototypes and Assemblies	Workforce/yr	22	22	44
Building 916	Advanced materials research and development	Research and Development	Workforce/yr	46	70	91
Building 927	Material control and hardware assembly and testing	Program Support	Workforce/yr	4	6	8
Micro and Nano Technologies Laboratory (MANTL)	Development of Advanced Micro and Nano Technologies	Materials evaluation, synthesis, and processing	Workforce/yr	97	118	194
Chemical and Radiation Detection Laboratory (CRDL)	Detection system research, development, and fabrication	Research and Development	Workforce/yr	8	42	46
Area 8 Facilities	Research, development, and testing	Research and Development	Workforce/yr	25	8	40
Explosive Storage Area	Packaging and storage of explosives	Storage	Kg Capacity	234.2	234.2	234.2
Hazardous and Radioactive Waste Storage Facilities	Waste Management	Collection, packaging, handling, and short-term storage of hazardous, radioactive, and mixed wastes	LLW (kg/yr)	5,308	5,998	8,121
			LLMW (kg/yr)	451	510	690
			Total Hazardous Waste (kg/yr)	90,488	98,833	133,820
LIGA Technologies Facility (LTF)	Research, development, and prototyping	LIGA and LIGA-like devices and systems	Wafers/yr	1,300	1,300	2,600

Table 3-1. Comparison of Activity Levels at 13 Specific Facilities under the No Action, Planned Utilization and Operations, and Maximum Operations Alternatives

FACILITY	PRIMARY FUNCTION	ACTIVITY TYPE OR MATERIAL	LEVEL OF ACTIVITY	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
Distributed Information Systems Laboratory (DISL)	Distributed information systems development and implementation	Research and Development	Workforce/yr	130	180	180
Glass Furnace and Melting Laboratory (part of the CRF)	Glass manufacturing research and development	Pilot scale glass melting tank furnace	Feed Materials (lbs, weekly)	16,800-sand 14,000-crushed recycled glass	16,800-sand 14,000-crushed recycled glass	16,800-sand 14,000-crushed recycled glass

Sources: SNL/CA 2002a; TtNUS 2002a
kg: kilogram
lbs: pounds
LIGA: X-ray lithography, electroforming, and molding
LLMW: low-level mixed waste
LLW: low-level waste
yr: year

Section 3.6) provides an expanded look at the materials used and wastes generated at each facility.

In order to provide comprehensive baseline data from which operational levels could be projected, the NNSA gathered the best-available data representing the facilities' normal levels of operation. In most cases, the base year for data was 2000.

The NNSA is not revisiting any programmatic decisions previously made in other NEPA documents, such as those addressing weapons complex consolidation and reconfiguration, materials disposition, or waste management. The SWEA includes these programmatic activities in order to provide the NNSA and the public with an overall understanding of the activities at SNL/CA.

Many of the SNL/CA facilities are engaged primarily in activities supporting the DOE's National Security mission. Other facilities are engaged in energy resources and research and development (R&D) efforts, such as materials research, radiochemistry, and health research. The NNSA examined specific activities performed at SNL/CA facilities that relate to issues of known public interest, the DOE mission lines, and the potential for environmental impacts.

3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, ongoing NNSA and interagency programs and activities at SNL/CA would continue operating at planned levels as reflected in current DOE/NNSA management plans for 2002 through 2012. In some cases, these planned levels include increases over today's operating levels. This would also include any recent activities that have already been approved by DOE/NNSA and have existing NEPA documentation. If these planned operations are implemented in the future, they could result in increased activity above present levels. Thus, the No Action Alternative forecasts, over 10 years, the level of activity for facility operations that would implement current management plans for assigned programs.

The CEQ's NEPA implementing regulations (40 CFR Parts 1500-1508) require analyzing the No Action Alternative to provide a benchmark against which the impacts of the activities presented in the other alternatives can be compared. The No Action Alternative analysis includes any approved and interim actions and facility expansion, construction or management plans, where detailed design and associated NEPA documentation were completed by the end of March 2002. The analysis also includes facilities, including new construction (LIGA Technologies Facility [LTF], Distributed Information Systems Laboratory [DISL], and Glass Furnace and Melting Laboratory), several upgrades, and removal of several small structures totaling approximately 15,000

square feet (sq ft) for which NEPA documents have been prepared, decisions made, and funds allocated in the fiscal year 2002 planning year budget (submitted in 2000).

The DOE management plans include continued support of major DOE programs, such as Defense Programs (DP), Nuclear Energy, Fissile Material Disposition, Environmental Management, and Science. They also include projects to maintain existing facilities, capabilities, and projects for which a NEPA determination has been made.

Other plans used to prepare the description of the No Action Alternative include the site development plans for SNL/CA, Programmatic Environmental Impact Statements (PEISs), Presidential Decision Directives (PDDs), and the DOE work for others (WFO) proposals and guidance. Some documents have future projects included for planning purposes; others have been deleted due to lack of funding or other reasons. The activities reflected in this alternative include planned increases in some SNL/CA operations and activities over previous years' levels.

The *Facilities and Safety Information Document* (FSID) (SNL/CA 2002a) and the *Comparison of Parameters to be Used to Analyze SNL/CA Facilities Under the No Action, Planned Operations, and Maximum Operations* document (TtNUS 2002a) provide in-depth information concerning the activities, operations, and hazards of specific SNL/CA facilities. These documents have been used extensively to describe the facility activities in this chapter. The facilities discussed below are also described in detail in the Facility Descriptions following Chapter 2. For most facilities, the base year considered is 2000.

The following sections summarize the activities that would be performed at each of the SNL/CA facilities. Balance of operations (SNL/CA operations not associated with the 13 facilities are described in detail) were included for this alternative and discussed in Section 3.5. Activities common to all alternatives are discussed in Section 2.3.3.

3.2.1 Combustion Research Facility

Under the No Action Alternative, the Combustion Research Facility (CRF) would continue to be used for broad-based research in combustion science and technology. Support activities would include a wide variety of research and development in areas of combustion engines and chambers, combustion chemistry, combustion reactions, industrial and combustion processes and diagnostics and remote sensing. Staffing levels would remain at approximately 250.

3.2.2 Building 910

Building 910 would continue to be used to conduct weapons R&D activities. The facility would conduct science-based engineering and technology in a wide variety of sciences including advanced electronics prototype and development, surface physics, neutron detector research, and telemetry systems. Generally, the activities would focus on electronics and microelectronics prototypes. Materials studied would include ceramics, semiconductors, organic polymers, and metals. Staffing levels would remain at approximately 75.

3.2.3 Building 914

Building 914 would continue to be used to conduct weapons test assembly and machine shop activities. The facility would continue to support SNL/CA's primary mission of ensuring that the United States (U.S.) nuclear weapons stockpile is safe, secure, and reliable. Activities would include prototype machining and hardware generation, mechanical inspection, calibration, and electrical laboratory operations. Staffing levels would remain at approximately 22.

3.2.4 Building 916

Under the No Action Alternative, Building 916 would continue to be used to conduct R&D. Generally the activities would focus on materials studies including chemical and physical properties and characteristics (phases). Materials studied would include ceramics, semiconductors, organic polymers, and metals. Areas of research would include thin film interface science, mechanics, ion implantation, gases in metals, hydrogen storage, plasma, annealing, detectors, science-based modeling, extreme ultraviolet lithography, microsystems, and fluidics. Staffing levels would remain at approximately 46.

3.2.5 Building 927

Building 927 would continue to be used to store nuclear and classified materials, assemble subsystems, conduct system verification, and store equipment. The Explosive Destruction System (EDS) subsystems would continue to be assembled in the facility. No testing with explosives or other hazardous materials would be completed at this location. Staffing levels would remain at approximately 4.

3.2.6 Micro and Nano Technologies Laboratories

Under the No Action Alternative, the Micro and Nano Technologies Laboratories (MANTL) activities would include a wide variety of operations such as micro machining, miniature component fabrication, fuel cell research and development, sensors and signal processing, and extreme ultraviolet lithography. Areas of materials research and development would include characterization, chemistry, composite and lightweight components, engineered materials (welding, brazing, and joining), science-based modeling, and radiography. Specific operations would include materials evaluation, materials synthesis and processing, microsystems processing, and

nanolithography equipment development. Staffing levels would remain at approximately 97.

3.2.7 Chemical and Radiation Detection Laboratory

The Chemical and Radiation Detection Laboratory (CRDL) would continue to be used as a multi-purpose R&D facility. Generally, the facility would support research, development, and fabrication of chemical and radiation detection systems. Activities would involve development of biological/chemical species sensors that detect trace amounts of toxins, viruses, and biological species and protein research. Areas of research and development would include microstructures, radiation detectors, laser-based detectors, and sensor research (nerve agents, drugs, and explosives). Rooms within the CRDL would continue to operate as Centers for Disease Control (CDC) and Prevention registered Biosafety Level 2 laboratories and provide standard chemical, biological, and analytical laboratory capabilities for conducting research in areas of advanced micro-separation technologies, laser-based detection, microelectronic biosensors, biological chemistry, and toxins handling. Staffing levels would remain at approximately 8.

3.2.8 Area 8 Facilities

The Area 8 Facilities would continue to be used to support SNL/CA work. Testing activities would involve material response to high-pressure hydrogen, mechanical stresses, high explosives, vibration, climate variations, temperature variations, and high acceleration stress. Experiments and research in areas of welding, hydrogen fueled engines, and special materials would continue. Data collection activities would support the above testing work. Staffing levels would remain at approximately 25.

3.2.9 Explosive Storage Area

The Explosive Storage Area would continue to support the R&D work performed at SNL/CA on a variety of energetic compounds. The Explosive Storage Area would receive, handle, package, transport on-site, and store explosives.

3.2.10 Hazardous and Radioactive Waste Storage Facilities

The Hazardous Waste Storage Facility would receive, handle, package, store (short-term), and ship hazardous, toxic, and nonhazardous chemical wastes. The facility is a *Resource Conservation and Recovery Act* (RCRA), Part B-permitted facility that would support waste generators throughout SNL/CA. Activities would include preparing wastes for offsite transportation for recycling, treatment, or disposal at licensed facilities. The facility would operate one shift. Modifications to the existing facility to improve flexibility and operational efficiencies would be completed. Quantities of RCRA hazardous waste managed (see Section 3.6, Table 3-4) would be 23,395 kilograms (kg) per year. Total hazardous wastes managed are presented in Section 3.6, Table 3-4.

The Radioactive Waste Storage Facility, also a Part B-permitted facility, would continue to serve as a centralized facility for receipt, characterization, compaction, treatment, repackaging, certification, and storage of low-level waste (LLW) and low-level mixed waste (LLMW). SNL/CA does not manage or generate transuranic (TRU) waste. SNL/CA does not manage or generate high-level waste. Annual quantities of radioactive waste managed (see Section 3.6, Table 3-4) would be 5,308 kg for LLW and 451 kg LLMW. The facility would operate one shift. Total wastes by waste type are presented in Section 3.6, Table 3-4.

3.2.11 LIGA Technologies Facility

The LTF would operate microfabrication processes involving x-ray lithography, electrodeposition, and replication. Activities would focus on research and development, and prototyping of LIGA and LIGA-like micro devices necessary to meet defense program objectives. The facility would provide process and process-support clean room, functional areas, and laboratory environments essential to LIGA and LIGA-like part and device microfabrication, assembly, aging, and testing. The LTF would be equipped with specialized tools and equipment used exclusively for LIGA and LIGA-like processing. The LTF would produce approximately 1,300 wafers per year. The current staffing located throughout SNL/CA would increase by 20 employees.

3.2.12 Distributed Information Systems Laboratory

DISL operations would focus on a wide variety of technologies including secure networking, high-performance

LIGA–What is it?

LIGA is an acronym derived from *Lithographie, Galvanoformung,* and *Abformung,* which mean electroforming and molding, respectively. This technology allows for defining high aspect ratio structures in nickel. The process consists of exposing a sheet of film bonded to a wafer using X-ray lithography. The film is then developed and the exposed material is removed. Nickel is then electroplated up in the open areas of the film. The nickel over-plate is removed by polishing, leaving high aspect ratio nickel parts. The film is removed, and the nickel parts may remain anchored to the substrate or be released. The actual X-ray lithography is done at the Stanford linear accelerator or Lawrence Berkeley National Laboratory.

distributed computing, visualization and collaboration technologies, and design and manufacturing of productivity environments. Laboratory activities would consist of connecting off-the-shelf hardware components into multi-structural, multimedia, multi-purpose networks, models, and information systems. The DISL would be staffed with 130 employees.

3.2.13 Glass Furnace and Melting Laboratory

The Glass Furnace and Melting Laboratory would conduct studies in glass manufacturing processes. Research and development would focus on increasing production efficiency, improving product quality, and maintaining industry competitiveness. The facility would use a pilot-scale glass melting tank furnace. Research would include a wide variety of activities including measurement of process parameters using laser-based techniques, imaging of the combustion process using laser sheets, studying of the physical and chemical changes of sand and molten glass, testing of furnace performance under different operating conditions, testing of product quality under different operating conditions, and monitoring furnace wear. The furnace would handle 14,000 pounds (lbs) of glass weekly. The Glass Furnace and Melting Laboratory would be staffed with 12 employees. To support proposed operations, an additional natural gas line would be installed.

3.3 PLANNED UTILIZATION AND OPERATIONS ALTERNATIVE

The Planned Utilization and Operations Alternative includes all operations and activities identified in the No Action Alternative. In general, over 10 years, land uses would change and planned facility operations for many facilities would increase in support of SNL/CA's assigned missions. Land use changes would include improving Arroyo Seco (see Table 3-2), creating a 30-acre wildlife reserve, designating 93 acres for future construction (including approximately 25 acres for soil management), identifying 122 acres as undesignated, and establishing an easement agreement with land owners along SNL/CA's western boundary (single-family residences) and some new construction. Onsite soil management of clean dirt/fill from Arroyo Seco improvement, storm water projects, and construction projects would begin.

Infrastructure improvements and construction activities would include General Plant Projects such as upgrades to the water distribution system, upgrades to the storm water runoff areas, and renovating Building 916 (SNL 2001c).

New construction would include a 5,000- sq ft badge office in the northwest corner of the SNL/CA site (8 acre location within the 93 acres designated as future construction).

This alternative addresses the same facilities described in Section 3.2 for the No Action Alternative. This alternative differs from the No Action Alternative in that operations could increase 13 percent site-wide over the next 10 years. Balance of operations would increase proportionally as discussed in Section 3.5. Activities common to all alternatives are discussed in Section 2.3.3. The following sections describe the activities that would occur at specific facilities because of implementing assignments under the Planned Utilization and Operations Alternative.

3.3.1 Combustion Research Facility

Under the Planned Utilization and Operations Alternative, the CRF activity level would increase by an estimated 20 percent in areas of broad-based research in combustion science and technology. The increases would include a wide variety of R&D in combustion engines and chambers, combustion chemistry, combustion reactions, industrial and combustion processes and diagnostics, and remote sensing. The staff would increase from 250 to 300 persons over the next 5 years.

3.3.2 Building 910

Building 910 would continue to be used to conduct weapons R&D activities. The facility would increase activities in weapon system instrumentation, fusion energy, surety design engineering, electronics prototyping, and microsystems engineering. Generally, the types of materials studied (ceramics, semiconductors, organic polymers, and metals) would remain the same. However, the level of activity would increase by an estimated 25 percent. The staff would increase from 75 to 94 persons over the next 5 years.

3.3.3 Building 914

Building 914 would continue to be used to conduct weapons test assembly and machine shop activities. The activities would be the same as those discussed in the No Action Alternative. The staff would remain at 22 persons over the next 5 years.

3.3.4 Building 916

Under the Planned Utilization and Operations Alternative, Building 916 would continue to be used to conduct materials chemistry R&D. An estimated 53 percent increase in activities would occur in materials studies including ceramics, semiconductors, organic polymers, and metals. Other areas of increased research would include thin film interface science, ion implantation, gases in metals, hydrogen storage, plasma, detectors, science-based modeling, extreme ultraviolet lithography, microsystems, and fluidics. The staff would increase from 46 to 70 persons over the next 5 years.

Table 3-2. Summary of Improvements to Arroyo Seco by Priority

Improvement Task	Activity
1	The project would install a new 8″ gravity sewer line along East Avenue crossing the arroyo between the box culvert and road and terminate at the manhole just upstream of the flow monitoring station on Sandia property. A pump station would be installed immediately downstream of the flow monitoring station and 6″ force main crossing East Avenue to West Perimeter Drive and terminate at the existing LLNL manhole approximately 20 feet north of the LLNL arroyo crossing. The existing sewer line crossing structures would be demolished and the channel would be restored.
2	A wing wall on west side of the East Avenue box culvert would be installed. The protruding rebar would be removed. Under the toe of an existing asphalt storm drain outfall apron located on the east bank large boulders would be placed.
3	Concrete debris that was placed in the arroyo as erosion control effort would be removed. The streambed would be graded to fill any holes and eliminate any rough transitions in the channel.
4	The concrete apron associated with the sewer line crossing would be removed and a grouted rock apron extending down the channel bank and along the channel bottom would be installed. The apron would function as a splash curtain for a storm drain outlet at this location.
5	The stream bank would be stabilized by removing a pine tree on the north bank and the bank would be graded.
6	The eroded area downstream of security grate would be filled with riprap. The riprap would extend approximately 30 feet downstream.
7	The eroded area at pedestrian bridge wing wall would be repaired by grading the up-slope areas to direct runoff to a field located southeast of the bridge. The wing wall would be cut back approximately 6 feet to remove the exposed footing. The channel slope around the wing wall would be regraded.
8	The storm drain outlet between C Street and pedestrian bridge would be repaired by grading the existing slope back to create a small inset bench with a slight depression. The existing erosion gully would be filled with riprap and compacted fill. The culvert would be trimmed back to the bank. Riparian trees would be planted on the inset bench.
9	At the C Street Bridge, erosion and scour holes caused by hydraulic jump and high velocity flows would be repaired. Bioengineering solutions would not be feasible at this location because of high velocities. Other tasks would include installing an engineered drop structure, removing the security grate, and abandoning the sewer line and concrete blocks in streambed.
10	The concrete debris from streambed between C Street and A Street would be removed. Rock would be used to provide grade control.
11	The storm drain outlet between C Street and A Street would be repaired by creating a small inset bench and planting with riparian trees.
12	The erosion and scour holes at the A Street Bridge crossing would be repaired by installing an engineered drop structure.
13	The storm drain outlet upstream of A Street would be repaired by creating small inset bench and planting with riparian trees.
14	The storm drain outlet downstream of land bridge would be repaired by creating small inset bench and planting with riparian trees.
15	The land bridge and two 4-ft culverts would be removed. A small inset floodplain would be created using compacted fill, coir wrap, and rock.
16	An engineered drop structure at the Thunderbird Lane Bridge would be constructed to prevent future erosion and resulting structural problems.
17	The abandoned concrete structure and steel posts within streambed in wetland area located upstream of Thunderbird Lane Bridge would be removed.
18	The surface drainage problems (site-wide) would be corrected by installing curbs, catch basins, and storm water detention facilities.
19	An inset floodplain between A Street and Thunderbird Lane would be graded to reduce the velocity of flow during storm events.
20	An inset floodplain adjacent to wetland area upstream of Thunderbird Lane would be graded to reduce the velocity of flow during storm events.

Source: GMA 2002a

3.3.5 Building 927

Under the Planned Utilization and Operations Alternative, Building 927 activities would increase by 50 percent. All areas identified in the No Action Alternative would increase. EDS subsystems would be assembled in the facility. No testing with explosives or other hazardous materials would occur at this location. The staff would increase from 4 to 6 persons over the next 5 years.

3.3.6 Micro and Nano Technologies Laboratory

Under the Planned Utilization and Operations Alternative, the MANTL activities would increase in micro machining, miniature component fabrication, fuel cell research and development, sensors and signal processing, and extreme ultraviolet lithography. An estimated 22 percent increase in materials R&D would include characterization, chemistry, composite and lightweight components, engineered materials (welding, brazing, and joining), and science-based modeling. The staff would increase from 97 to 118 persons over the next 5 years.

3.3.7 Chemical and Radiation Detection Laboratory

The CRDL would continue to be used as a multipurpose R&D facility. Generally, the facility would support research, development, and fabrication of chemical and radiation detection systems. Small increases in microstructures (LIGA) and radiation detector testing would be expected. A large increase within the CRDL CDC-registered Biosafety Level 2 laboratories that provide standard chemical, biological, and analytical laboratory capabilities for conducting research in areas of advanced micro-separation technologies, laser-based detection, microelectronic biosensors, biological chemistry, and toxins handling would be expected. The staff would increase from 8 to 42 persons over the next 5 years.

3.3.8 Area 8 Facilities

The Area 8 Facilities would continue to support SNL/CA work. Testing activities would involve high-pressure hydrogen, mechanical, high explosives, vibration, climate, temperature, high acceleration, and EDS. Experiments and research in areas of welding, hydrogen fueled engines, and special materials would continue. Data collection activities would support the above testing work. A decrease in staffing associated with the EDS work would occur.

3.3.9 Explosive Storage Area

The Explosive Storage Area activities would remain the same as under the No Action Alternative. Under the Planned Utilization and Operations Alternative, the Explosive Storage Area explosive storage capacity would remain the same.

3.3.10 Hazardous and Radioactive Waste Storage Facilities

Activities at the facilities would remain the same as under the No Action Alternative. The facilities would operate one shift. Annual quantities of (total) hazardous waste managed (see Section 3.6, Table 3-4) would be 98,833 kg. Annual quantities of radioactive waste managed (see Section 3.6, Table 3-4) would be 5,998 kg for LLW and 510 kg LLMW managed. Other wastes by waste types are presented in Section 3.6, Table 3-4.

3.3.11 LIGA Technologies Facility

The LTF would support R&D, and prototyping of LIGA and LIGA-like micro devices. Activities at the LTF would be similar to those under the No Action Alternative. No increase would be anticipated. The LTF would produce 1,300 wafers per year.

3.3.12 Distributed Information Systems Laboratory

The DISL would support the DOE's Science-Based Stockpile Stewardship and Management Program through development and implementation of distributed information systems. Activities at the DISL would be similar to those under the No Action Alternative. The staff would increase by 50 persons.

3.3.13 Glass Furnace and Melting Laboratory

Activities at the Glass Furnace and Melting Laboratory would be similar to those under the No Action Alternative. No increase would be anticipated.

3.4 MAXIMUM OPERATIONS ALTERNATIVE

The Maximum Operations Alternative includes all operations and activities identified in the Planned Utilization and Operations Alternative. In general, implementation of assignments would result in the highest reasonable foreseeable activity levels that could be supported by current facilities (with two shifts) and the potential expansion and construction of new facilities.

Land use changes, infrastructure improvements, and construction activities (including upgrades) would be the same as the Planned Utilization and Operations Alternative (see Section 3.3).

New construction would include the projects identified in the Planned Utilization and Operations Alternative plus two additional projects. Building 916 (42,000 sq ft) would be replaced with a building twice the size (84,000 sq ft). A new 16,000-sq-ft facility similar to the existing

CRDL would be constructed for R&D. Up to 100,000 sq ft of structures determined to be beyond useful life would be removed over the next 10 years.

This alternative addresses the same facilities described in Section 3.2 for the No Action Alternative. This alternative differs from the Planned Utilization and Operations Alternative in that operations would increase to the highest reasonably foreseeable levels over the next 10 years. Balance of operations would increase proportionately as discussed in Section 3.5. Activities common to all alternatives are discussed in Section 2.3.3. The following sections describe the activities that would occur at specific facilities because of implementing assignments under the Maximum Operations Alternative.

3.4.1 Combustion Research Facility

The CRF would continue to be used for broad based research in combustion science and technology. Two shifts would support a wide variety of R&D in combustion engines and chambers, combustion chemistry, combustion reactions, industrial and combustion processes and diagnostics and remote sensing. Activity levels would increase as staffing doubled from 250 to 500 persons.

3.4.2 Building 910

Building 910 activities would increase in areas of weapons R&D. The facility would increase science-based engineering and technology activities in a wide variety of sciences including advanced electronics prototype and development, surface physics, neutron detector research, and telemetry systems. Additional activities that focus on electronics and microelectronics prototypes would increase. Materials studies involving ceramics, semiconductors, organic polymers, and metals would increase. Staffing would increase from 75 to 150 persons.

3.4.3 Building 914

Building 914 would increase weapons test assembly and machine shop activities. The facility would support SNL/CA's primary mission of ensuring that the U.S. nuclear weapons stockpile is safe, secure, and reliable. Increased activities would include prototype machining and hardware generation, mechanical inspection, calibration, and electrical laboratory operations. A second shift would increase staffing from 22 to 44.

3.4.4 Building 916

Under the Maximum Operations Alternative, Building 916 would continue to be used to conduct R&D. Generally, the activities focused on materials studies including chemical and physical properties and characteristics (phases) would expand. The number of materials studies would increase in areas of ceramics, semiconductors, organic polymers, and metals. Research would increase including thin film interface science, mechanics, ion implantation, gases in metals, hydrogen storage, plasma, annealing, detectors, science-based modeling, extreme ultraviolet lithography, microsystems, and fluidics. A second shift would increase staffing from 46 to 91. A larger building replacing Building 916 would be necessary.

3.4.5 Building 927

Building 927 would continue to be used to store nuclear and classified materials, assemble subsystems, conduct system verification, and store equipment. No testing with explosives or other hazardous materials would be completed at this location. Staffing levels would increase from 4 to 8 persons.

3.4.6 Micro and Nano Technologies Laboratory

MANTL activities would increase in a wide variety of operations including micro machining, miniature component fabrication, fuel cell research and development, sensors and signal processing, and extreme ultraviolet lithography. Materials R&D would increase and include characterization, chemistry, composite and lightweight components, engineered materials (welding, brazing, and joining), science-based modeling, and radiography. Specific operations would increase including materials evaluation, materials synthesis and processing, microsystems processing, and nanolithography equipment development. A second shift would increase staffing from 97 to 194.

3.4.7 Chemical and Radiation Detection Laboratory

The CRDL operations would increase slightly above the Planned Utilization and Operations Alternative and continue to be used as a multi-purpose R&D facility. Generally, the facility would support research, development, and fabrication of chemical and radiation detection systems. Increases in activities would involve development of biological/chemical species sensors that detect trace amounts of toxins, viruses, and biological species and protein research. Areas of research and development would expand and include microstructures, radiation detectors, laser-based detectors, and sensor research (nerve agents, drugs, and explosives). Rooms within the CRDL would continue to operate as CDC registered Biosafety Level 2 laboratories and provide standard chemical, biological, and analytical laboratory capabilities for conducting research in areas of advanced micro-separation technologies, laser-based detection, microelectronic biosensors, biological chemistry, and toxins handling. CRDL staffing would increase to 46 persons.

3.4.8 Area 8 Facilities

The Area 8 Facilities activities would continue to support SNL/CA work, but would increase testing activities involving high-pressure hydrogen, mechanical, high explosives, vibration, climate, temperature, and high acceleration. Experiments and research in areas of welding, hydrogen fueled engines, and special materials would continue. Data collection activities would support the above testing work. Area 8 staffing would increase to 40 persons.

3.4.9 Explosive Storage Area

The Explosive Storage Area activities would remain the same as under the No Action Alternative. Under the Maximum Operations Alternative, the Explosive Storage Area explosive storage capacity would remain the same (234.2 kg).

3.4.10 Hazardous and Radioactive Waste Storage Facilities

Activities would remain the same as under the No Action Alternative. The facility would operate two shifts. Annual quantities of (total) hazardous waste managed would be 118,465 kg. Annual quantities of radioactive waste managed (see Section 3.6, Table 3-4) would be 8,121 kg for LLW and 690 kg LLMW. Other wastes by waste types are presented in Section 3.6, Table 3-4.

3.4.11 LIGA Technologies Facility

The LTF would support R&D, and prototyping of LIGA and LIGA-like micro devices. Activities at the LTF would be similar to those under the No Action Alternative; the facility would operate two shifts and produce 2,600 wafers per year.

3.4.12 Distributed Information Systems Laboratory

The DISL would support DOE's Science-Based Stockpile Stewardship and Management Program through development and implementation of distributed information systems. Activities at the DISL would be similar to those under the No Action Alternative. No increase would be anticipated.

3.4.13 Glass Furnace and Melting Laboratory

Activities at the Glass Furnace and Melting Laboratory would be similar to those under the No Action Alternative. No increase would be anticipated.

3.5 BALANCE OF OPERATIONS

For completeness of analysis, the NNSA also gathered information on the balance of operations at SNL/CA. Information regarding other facilities, site support services, site-wide water and utility use, site-wide waste generation, hazardous chemicals purchased, process wastewater, and radioactive dose data were incorporated into the analysis. Balance of operations activities include many R&D activities and routine operations; infrastructure, administrative, and central services for SNL/CA; traffic flow adjustments to existing onsite roads in predisturbed areas, including road realignment and widening; facility maintenance and refurbishment activities; and environmental, ecological, and natural resource management activities. Some routine refurbishment, renovation, and small-scale removal of specific surplus facilities and closures will continue at SNL/CA regardless of alternative.

The SWEA considers balance of operations and their effects on environmental conditions under the three alternatives. Balance of operations activities involve little or no toxic materials, are of low hazard, and are usually categories of actions excluded from analysis by DOE's NEPA regulations (10 CFR Part 1021). Because of this, potential environmental impacts from the balance of operations are not described in detail but evaluated collectively.

In general, balance of operations equals site-wide totals minus selected facilities contributions. The No Action Alternative consists of conditions at SNL/CA in 2000 (baseline) while the Planned Utilization and Operations Alternative and the Maximum Operations Alternative were increased by 13 percent and 53 percent above the No Action Alternative, respectively. These increases are related to projected staffing increases.

The *Environmental Information Document* (EID) (SNL/CA 2002b), FSID (SNL/CA 2002a), and *Comparison of Parameters to be Used to Analyze SNL/CA Facilities under the No Action, Planned Operations, and Maximum Operations* (TtNUS 2002a) provide information concerning site-wide and facility specific information. These documents have been extensively used in the defining of balance of operations data and are not cited repeatedly.

3.6 DATA USED TO ANALYZE ALTERNATIVES

Table 3-3 summarizes operational data for specific facilities. Table 3-4 presents data used in performing impact analyses in Chapter 5 by resource area (see the FSID for data regarding typical chemical and radioactive material inventories).

Table 3-3. Comparison of Data Used to Analyze Specific Facilities under the No Action, Planned Utilization and Operations, and Maximum Operations Alternatives

FACILITY NAME	CATEGORY	ACTIVITY TYPE OR MATERIAL	UNITS (per year)	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
Chemical and Radiation Detection Laboratory (CRDL)						
Operational Parameters	Waste	LLW	kg	13	68	75
		LLMW	kg	0	0	0
		Total Hazardous	kg	1,169	6,135	6,719
	Wastewater		gallon	77,100	404,775	443,325
	Facility Staffing		employee	8	42	46
	Expenditures		dollar	1.7 M	10.5 M	13.4 M
	Electrical Use		megawatt-hour	2,259	11,857	12,986
	Natural Gas Use		thousand cubic foot	8,941	8,941	8,941
Area 8 Facilities						
Operational Parameters	Waste	LLW	kg	168	67	336
		LLMW	kg	0	0	0
		Total Hazardous	kg	814	326	1,628
	Wastewater		gallon	Not measured[a]	Not measured[a]	Not measured[a]
	Facility Staffing		employee	25	8	40
	Expenditures		dollar	10.8 M	2.4 M	21.6 M
	Electrical Use		megawatt-hour	720	288	1,440
	Natural Gas Use		thousand cubic foot	0	0	0
Explosive Storage Area						
Operational Parameters	Explosive Material	Storage Capacity	kg	234.2	234.2	234.2
	Waste	LLW	kg	0	0	0
		LLMW	kg	0	0	0
		Total Hazardous	kg	0	0	0
	Wastewater		gallon	Not measured[a]	Not measured[a]	Not measured[a]
	Facility Staffing		employee	No staffing	No staffing	No staffing
	Expenditures		dollar	10.8 M	2.4 M	21.6 M
	Electrical Use		megawatt-hour	Minimal	Minimal	Minimal
	Natural Gas Use		thousand cubic foot	0	0	0

Table 3-3. Comparison of Data Used to Analyze Specific Facilities under the No Action, Planned Utilization and Operations, and Maximum Operations Alternatives

FACILITY NAME	CATEGORY	ACTIVITY TYPE OR MATERIAL	UNITS (per year)	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
Building 916						
Operational Parameters	Waste	LLW	kg	1.5	2.3	3
		LLMW	kg	0	0	0
		Total Hazardous	kg	596	912	1,192
	Wastewater		gallon	31,000	47,430	62,000
	Facility Staffing		employee	46	70	91
	Expenditures		dollar	12.3 M	18.1 M	24.6 M
	Electrical Use		megawatt-hour	3,464	5,291	6,928
	Natural Gas Use		thousand cubic foot	5,535	5,535	5,535
Building 927						
Other Parameters	Waste	LLW	kg	0	0	0
		LLMW	kg	0	0	0
		Total Hazardous	kg	4,182	6,273	8,364
	Wastewater		gallon	Not measured[a]	Not measured[a]	Not measured[a]
	Facility Staffing		employee	4	6	8
	Expenditures		dollar	1.2 M	1.9 M	2.4 M
	Electrical Use		megawatt-hour	145	218	290
	Natural Gas Use		thousand cubic foot	1,907	1,907	1,907
Micro and Nano Technologies Laboratory (MANTL)						
Operational Parameters	Waste	LLW	kg	0	0	0
		LLMW	kg	0	0	0
		Total Hazardous	kg	7,109	8,673	14,218
	Wastewater		gallon	120,337	146,811	240,674
	Facility Staffing		employee	97	118	194
	Expenditures		dollar	30.1 M	35.4 M	60.2 M
	Electrical Use		megawatt-hour	5,440	6,637	10,880
	Natural Gas Use		thousand cubic foot	25,754	25,754	25,754

Table 3-3. Comparison of Data Used to Analyze Specific Facilities under the No Action, Planned Utilization and Operations, and Maximum Operations Alternatives

FACILITY NAME	CATEGORY	ACTIVITY TYPE OR MATERIAL	UNITS (per year)	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
Chemical and Radiation Detection Laboratory (CRDL)						
Operational Parameters	Waste	LLW	kg	13	68	75
		LLMW	kg	0	0	0
		Total Hazardous	kg	1,169	6,135	6,719
	Wastewater		gallon	77,100	404,775	443,325
	Facility Staffing		employee	8	42	46
	Expenditures		dollar	1.7 M	10.5 M	13.4 M
	Electrical Use		megawatt-hour	2,259	11,857	12,986
	Natural Gas Use		thousand cubic foot	8,941	8,941	8,941
Area 8 Facilities						
Operational Parameters	Waste	LLW	kg	168	67	336
		LLMW	kg	0	0	0
		Total Hazardous	kg	814	326	1,628
	Wastewater		gallon	Not measured[a]	Not measured[a]	Not measured[a]
	Facility Staffing		employee	25	8	40
	Expenditures		dollar	10.8 M	2.4 M	21.6 M
	Electrical Use		megawatt-hour	720	288	1,440
	Natural Gas Use		thousand cubic foot	0	0	0
Explosive Storage Area						
Operational Parameters	Explosive Material	Storage Capacity	kg	234.2	234.2	234.2
	Waste	LLW	kg	0	0	0
		LLMW	kg	0	0	0
		Total Hazardous	kg	0	0	0
	Wastewater		gallon	Not measured[a]	Not measured[a]	Not measured[a]
	Facility Staffing		employee	No staffing	No staffing	No staffing
	Expenditures		dollar	10.8 M	2.4 M	21.6 M
	Electrical Use		megawatt-hour	Minimal	Minimal	Minimal
	Natural Gas Use		thousand cubic foot	0	0	0

Table 3-3. Comparison of Data Used to Analyze Specific Facilities under the No Action, Planned Utilization and Operations, and Maximum Operations Alternatives

FACILITY NAME	CATEGORY	ACTIVITY TYPE OR MATERIAL	UNITS (per year)	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
Hazardous and Radioactive Waste Storage Management Facilities						
Operational Parameters	Waste	LLW	kg	Minimal	Minimal	Minimal
		LLMW	kg	Minimal	Minimal	Minimal
		Total Hazardous	kg	Minimal	Minimal	Minimal
	Wastewater		gallon	Not measured[a]	Not measured[a]	Not measured[a]
	Facility Staffing		employee	10-12	11-14	20-24
	Expenditures		dollar	Not Reported	Not Reported	Not Reported
	Electrical Use		megawatt-hour	62 M	70 M	124 M
	Natural Gas Use		thousand cubic foot	0	0	0
LIGA Technologies Facility (LTF)						
Operational Parameters	Waste	LLW	kg	0	0	0
		LLMW	kg	0	0	0
		Total Hazardous	kg	2,836-2,964	2,836-2,964	5,672-5,928
	Wastewater		gallon	30,000	30,000	60,000
	Facility Staffing		employee	20	20	40
	Expenditures		dollar	2.5 M	2.5 M	5 M
	Electrical Use		megawatt-hour	10,000	10,000	10,000
	Natural Gas Use		thousand cubic foot	5,000	5,000	5,000
Distributed Information Systems Laboratory (DISL)						
Operational Parameters	Waste	LLW	kg	0	0	0
		LLMW	kg	0	0	0
		Total Hazardous	kg	0	0	0
	Wastewater		gallon	0	0	0
	Facility Staffing		employee	130	180	180
	Expenditures		dollar	20M	20M	20M
	Electrical Use		megawatt-hour	2,500	2,500	2,500
	Natural Gas Use		thousand cubic foot	0	0	0

Table 3-3. Comparison of Data Used to Analyze Specific Facilities under the No Action, Planned Utilization and Operations, and Maximum Operations Alternatives

FACILITY NAME	CATEGORY	ACTIVITY TYPE OR MATERIAL	UNITS (per year)	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
Glass Furnace and Melting Laboratory						
Operational Parameters	Waste	LLW	kg	0	0	0
		LLMW	kg	0	0	0
		Total Hazardous	kg	50	50	50
	Glass Furnace emissions	NOX	lbs/hour peak	1	1	1
		SO_2	lbs/hour peak	1	1	1
		PM_{10}	lbs/hour peak	0.7	0.7	0.7
		CO	ppmv	0.3	0.3	0.3
		VOCs	ppmv	<1	<1	<1
	Wastewater		gallon	5,200	5,200	5,200
	Facility Staffing		employee	12	12	12
	Expenditures		dollar	2.1M	2.1M	2.1M
	Electrical Use		megawatt-hour	2,000	2,000	2,000
	Natural Gas Use		thousand cubic foot	30,000	30,000	30,000

Source: SNL/CA 2002a, TtNUS 2002a
[a]Although the wastewater flows are not measured at certain facilities, the quantities are captured in the site-wide quantities in Table 3-4.
<: less than
kg/year: kilograms per year
lb/hour peak: pounds per hour peak
LLMW: low-level mixed waste
LLW: low-level waste
M: million
NA: not applicable/not available
NOX: nitrogen oxides
PM_{10}: particulate matter smaller than 10 microns in diameter
ppmv: parts per million by volume
SO_2: sulfur dioxide
Total Hazardous: includes *Resource Conservation and Recovery Act* (RCRA) hazardous, California toxic, *Toxic Substance and Control Act* waste, and biohazardous.
VOCs: volatile organic compounds

Table 3-4. Comparison of Parameters Used to Analyze Sandia National Laboratories, California under the No Action, Planned Utilization and Operations, and Maximum Operations Alternative

RESOURCE AREA	UNITS	FY 2000[a]	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
LAND USE					
Total Acreage	acre	410	410	Same as No Action	Same as No Action
DISL Construction	acre	NA	4	Same as No Action	Same as No Action
LTF Construction	acre	NA	2	Same as No Action	Same as No Action
Hazardous Waste Storage Facility Modifications	acre	NA	Within Existing Footprint	Same as No Action	Same as No Action
Biological Area Set Aside (Reserve)	acre	NA	No changes	30	Same as Planned
Soil Management	cy/yr	NA	Not Part of This Alternative	4,000 to 5,000	Same as Planned
New Badge Office Complex	acre	NA	Not Part of This Alternative	8	Same as Planned
Removal of Structures	ft^2	NA	20,000	Same as No Action	No Action Plus 100,000
Identifying Areas as "Undesignated"	acre	NA	Not Part of This Alternative	122	Same as Planned
Identifying Areas as "Future Construction" (including Soil Management)	acre	NA	Not Part of This Alternative	93 (approximately 25 acres for soil management)	Same as Planned
New Building Similar to CRDL	acre	NA	Not Part of This Alternative	Not Part of This Alternative	2
New Building as Replacement for Building 916	acre	NA	Not Part of This Alternative	Not Part of This Alternative	4
INFRASTRUCTURE					
Utilities (Annual Basis)					
Water Use (Potable)	gal/yr	53 M	50 to 60 M	56.5 to 67.8 M	76.5 to 91.8
Sanitary Sewer Discharge	gal/yr	15 M	12 to 19M	13.6 to 21.5 M	18.4 to 29.1 M
Natural Gas Use	ft^3/yr	59 M	94 M	94 M	94 M
Electrical Use	MWh/yr	22,434	36,934	39,850	48,800
Balance of Operations	NA	Supports 1,100 Workforce	Same as FY 2000	No Action Plus 13 Percent	No Action Plus 53 Percent

Table 3-4. Comparison of Parameters Used to Analyze Sandia National Laboratories, California under the No Action, Planned Utilization and Operations, and Maximum Operations Alternative

RESOURCE AREA	UNITS	FY 2000[a]	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
GEOLOGY AND SOILS					
Solid Waste Management Units	Number	23 (20-NFA) 3–Long Term Monitoring	Same as FY 2000	Same as FY 2000	Same as FY 2000
Soil Removed[b]	cy/yr	NA	Not Part of This Alternative	4,000 to 5,000	Same as Planned
New Material, Backfill, Stone, etc.[b]	cy/yr	NA	Not Part of This Alternative	3,000 to 6,000	Same as Planned
Onsite Soil Managed	cy/yr	NA	Not Part of This Alternative	3,000 to 4,000	Same as Planned
WATER RESOURCES AND HYDROLOGY					
Water Use	gal/yr	53 M	50 to 60 M	56.5 to 67.8 M	76.5 to 91.8 M
Irrigation Water Use	gal/yr	16-17 M	16 to 17 M	16 to 17 M	16 to 17 M
Impervious Surface	acre	49.2	49.2	76.9	76.9
BIOLOGICAL AND ECOLOGICAL RESOURCES					
Improvement	NA	NA	No changes	20 Improvement Tasks	Same as Planned
Disturbance of California red-legged frog critical habitat	acre	NA	No changes	37	Same as Planned
CULTURAL RESOURCES					
Cultural Resources Located in all Areas of Potential Effect	acre	NA	No changes	No Changes	No Changes
AIR QUALITY					
Permitted Emission Sources	number	18	28	30 to 32	57
Nonradioactive Emissions Rates (excluding the Glass Furnace)					
Nitrogen Oxides	kg/yr	4,000	4,000	4,520	6,120
Carbon Monoxide (CO)	kg/yr	300 to 400	300 to 400	339 to 452	459 to 612
Particulate Matter	kg/yr	NA	NA	NA	NA
Sulfur Dioxide	kg/yr	NA	NA	NA	NA
Nonradioactive Emissions Rates (Glass Furnace design parameters)					
Nitrogen Oxides	lbs/hr	0	0.3 to 1.5	0.3 to 1.5	0.3 to 1.5

Table 3-4. Comparison of Parameters Used to Analyze Sandia National Laboratories, California under the No Action, Planned Utilization and Operations, and Maximum Operations Alternative

RESOURCE AREA	UNITS	FY 2000[a]	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
AIR QUALITY					
Carbon Monoxide	ppmv	0	<10	<10	<10
Particulate Matter	lbs/hr	0	0.25 to 0.5	0.25 to 0.5	0.25 to 0.5
Sulfur Dioxide	lbs/hr	0	0.35	0.35	0.35
Volatile Organic Compounds	ppmv	0	<1	<1	<1
Radioactive Emissions		None	None	None	None
CONSTRUCTION-RELATED CARBON MONOXIDE EMISSIONS[c]					
DISL, LTF, Hazardous Waste Storage Facility[d]	tons/yr	NA	2.3	Same as No Action	Same as No Action
New Badge Office	tons/yr	NA	Not Part of This Alternative	2.3	Same as Planned
Building 916 Replacement and New Building Similar to CRDL	tons/yr	NA	Not Part of This Alternative	Not Part of This Alternative	4.6
Soil Hauling, Inbound Material Haulings and Related Improvement Tasks[b,e]	tons/yr	NA	Not Part of This Alternative	2.25	Same as Planned
TRANSPORTATION (Normal Operations)					
Material (Annual Shipments Radioactive, Chemical, and Explosives)	trip (one way)	33	33	37	50
Waste (Includes Hazardous and Radioactive)	shipment	76	76	86	116
Sanitary Waste	shipment	52	52	59	80
Site-Related Traffic - Total Daily traffic	vehicle	700 to 1,000	700 to 1,000	791 to 1,130	1,071 to 1,530
SNL/CA Weekly Hazardous Materials Transports (Excluding Waste)	outbound shipment	1 to 3 (Total of 33)	1 to 3 (Total of 33)	1 to 3 (Total of 37)	1 to 3 (Total of 50)
Supplier Weekly Hazardous Material Transports	inbound shipment	1 to 3 (Total of 100)	1 to 3 (Total of 100)	1 to 3 (Total of 113)	1 to 3 (Total of 150)
Soil Transports[a,c]	shipment	NR	Not Part of This Alternative	2,000 to 2,500 over 10 Years	Same as Planned
Incoming Material (Rock, Soil, Concrete)[a]	shipment	NR	Not Part of This Alternative	1,500 to 3,000 over 10 Years	Same as Planned
Paved and Unpaved Roads	mi	6.2	6.2	9.7	9.7
Pedestrian Malls	acre	4	4	6.24	6.24

Table 3-4. Comparison of Parameters Used to Analyze Sandia National Laboratories, California under the No Action, Planned Utilization and Operations, and Maximum Operations Alternative

RESOURCE AREA	UNITS	FY 2000[a]	NO ACTION ALTERNATIVE	PLANNED OPERATIONS ALTERNATIVE	MAXIMUM OPERATIONS ALTERNATIVE
TRANSPORTATION (Normal Operations)					
Paved Service Areas	acre	5.5	5.5	8.6	8.6
Paved Parking Areas	acre	12.7	12.7	19.8	19.8
WASTE GENERATION (Site-Wide includes Balance of Operations)					
Radioactive Waste					
LLW	kg/yr	5,288[f]	5,308	5,998	8,121
LLMW	kg/yr	451[f]	451	510	690
Chemical Waste					
RCRA Hazardous Waste	kg/yr	22,616[f]	23,395	25,556	34,602
TSCA (PCBs and Asbestos)	kg/yr	38,383[f]	39,706	43,372	43,372
Biohazardous	kg/yr	551[f]	580	623	843
California Toxic Waste	kg/yr	25,914[f]	26,807	29,282	39,648
Total Hazardous	kg/yr	87,464[f]	90,488	98,833	118,465
Municipal Solid Waste	metric tons	247.5	247.5	279.7	378.7
NOISE					
SNL/CA Estimated Noise		CNEL L_d 7-am to 7 pm	CNEL L_d 7-am to 7 pm	CNEL L_d 7-am to 7 pm	CNEL L_d 7-am to 10 pm
SOCIOECONOMICS					
Employment	Workforce	1,100	1,043 – 1,317	1,222 – 1,496	1,657 – 1931
Operating Budget	dollar	131 M	131 M	170 M	262 M

Source: TtNUS 2002a

[a]FY 2000 data were used as a baseline unless otherwise stated in Chapter 5.

[b]The Arroyo Seco and Habitat improvement projects were assumed to be spread over the next 10 years since regulatory agency approvals may require a phased approach. Since estimates included deliveries of trees, plants, pipes, and other materials (mulch, hay, seed, top soil, etc.) new material quantities were doubled.

[c]Assumed to be one-year projects excluding soil hauling, which was assumed to continued for 10 years.

[d]Assumes Hazardous Waste Storage Facility-related emissions are very small.

[e]To bound the analysis, soil hauling assumes total offsite management although current planning includes onsite soil management.

[f]Large quantities in FY 2000 include removal of Building 913.

<: less than

CNEL L_d: community noise equivalent-level-day

CO: carbon monoxide

CRDL: Chemical and Radiation Detection Laboratory

cy: cubic yards

DISL: Distributed Information Systems Laboratory

ft^2: square feet

ft^3/yr: cubic feet per year

FTEs: full-time equivalent

FY: fiscal year

gal: gallon

gal/yr: gallons per year

kg/yr: kilograms per year

lbs/hr: pounds per hour

LLMW: low-level mixed waste

LLW: low-level waste

LTF: LIGA Technologies Facility

M: million

mi: mile

MWh/yr: megawatt-hours per year

NA: not applicable/not available

NFA: No Further Action

NR: Not Reported

PCBs: polychlorinated biphenyls

ppmv: parts per million per volume

RCRA: *Resource Conservation and Recovery Act*

SNL/CA: Sandia National Laboratories, California

TBD: to be determined

TSCA: *Toxic Substances Control Act*

yr: year

This page intentionally left blank.