

No chemical inventories are stored onsite in quantities sufficient to result in hazardous conditions outside the facility boundary or offsite (SNL/CA 2001a).

Illness and injury rates from operations are discussed in the Human Health and Worker Safety section of each alternative.

5.3 NO ACTION ALTERNATIVE

5.3.1 LAND USE AND VISUAL RESOURCES

Implementing the No Action Alternative would not affect the existing land use patterns or visual resources at SNL/CA facilities. Sections 5.3.1.1 and 5.3.1.2 discuss the impact of the No Action Alternative to these resource areas.

5.3.1.1 Land Use

No changes to land use would occur at SNL/CA under the No Action Alternative. The extent of DOE land available for use by SNL/CA, 410 acres, would remain the same. SNL/CA operations would remain consistent with industrial research park uses and would have no foreseeable effects on established land use patterns or requirements. The only changes in the use of specific locations on the site would be using current open spaces to construct new facilities. Construction of the DISL, LTF (Figure 5-4), and Glass Furnace and Melting Laboratory facilities would be consistent with established land use and utilization patterns. Because these facilities would be built within the main campus of the site, filling in empty locations between existing facilities, they would not change the extent of use of the site and accessibility would not be a concern (Figure 5-4). Open areas with paved or landscaped surfaces would remain between these new facilities and existing ones, remaining consistent with the design of the rest of SNL/CA. In addition, the functions of these buildings would be consistent with those surrounding them, thus construction and use of these new facilities would not negate consideration of possible alternative uses of areas adjacent to them.

Under this alternative, the Hazardous and Radioactive Storage Facilities at the site would be modified to increase their efficiency and operability. As these changes would occur to an existing building, there would be no changes or impacts to land use.

5.3.1.2 Visual Resources

The No Action Alternative would not adversely change the overall appearance of the existing landscape, obscure views, increase the visibility of SNL/CA structures, or otherwise detract from the scenic views from SNL/CA or from areas adjacent to the site. New facilities would be placed among existing facilities in areas with common scenic quality. Efforts to incorporate consistent campus-style design would continue and guidance provided by the

Site Visual Quality Guidelines and Landscape Master Plan (Royston *et al.*, 1993) would be followed. The guidance covers building massing, facades, colors, building orientation and entries, traffic circulation corridors, standardized signage, and landscaping. Modifications to the Hazardous and Radioactive Storage Facilities would also follow the guidance, thereby having no impact to visual resources.

5.3.2 GEOLOGY AND SOILS

No impacts to general geology and geologic resources are anticipated. Impacts from geological hazards (seismicity, slope failure) are evaluated below. Risks from contaminated soils are also discussed.

5.3.2.1 Seismology

Strong earthquake ground motion is responsible for producing almost all damaging effects of earthquakes, except for surface-fault rupture. Ground shaking generally causes the most widespread effects, not only because it occurs at considerable distances from the earthquake source, but also because it may trigger secondary effects from ground failure and water inundation. Potential sources for future ground motion at the SNL/CA site include the major regional faults (for example, San Andreas), as well as the local faults including the Greenville, and Las Positas faults (DOE 1992a).

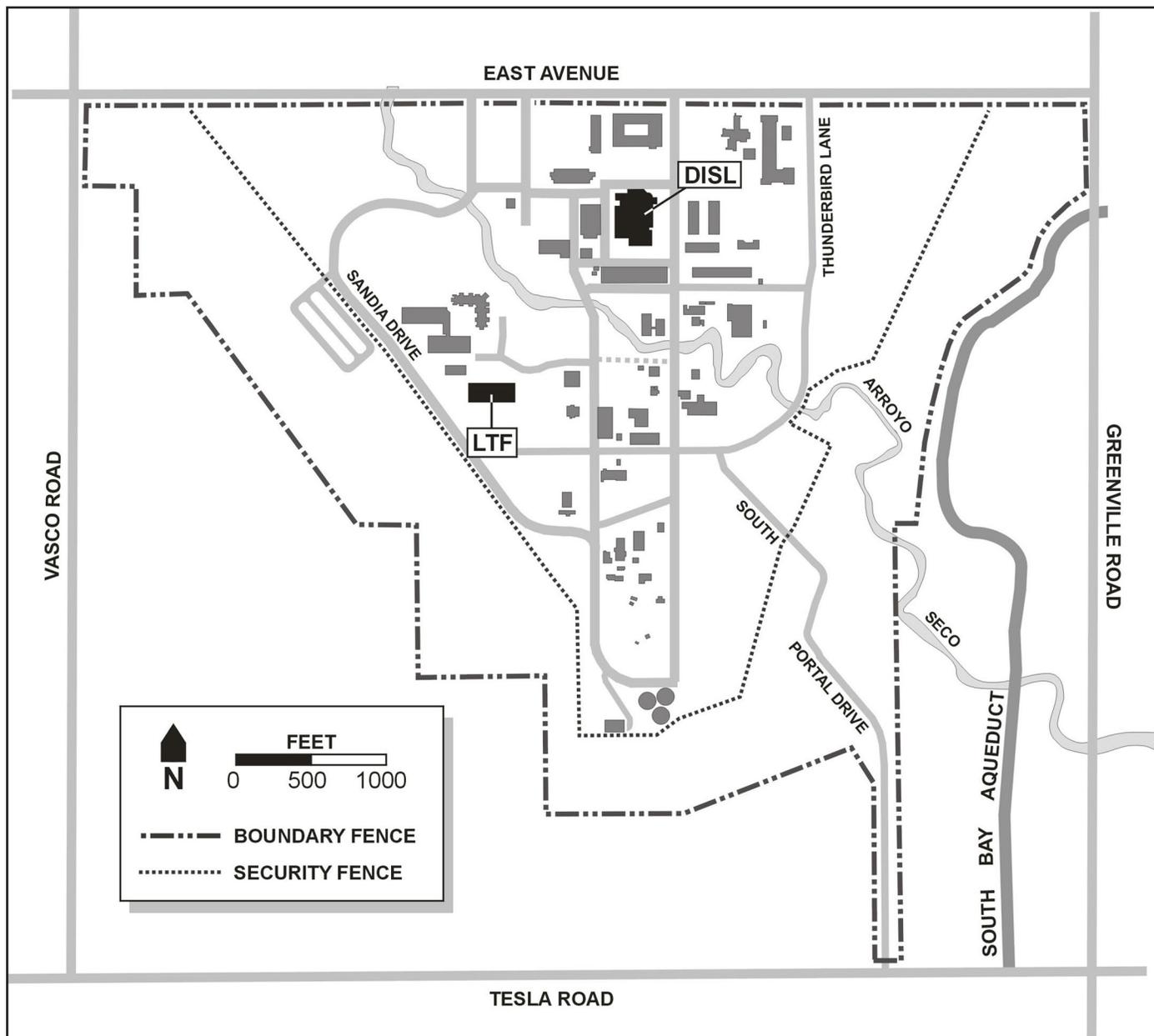
Seismic hazard analyses have been performed for the SNL/CA site. All new buildings and facilities would be built according to established seismic design criteria. Existing facilities continue to be upgraded or replaced to the extent possible (SNL 2001d). Larger earthquakes on more distant faults such as the San Andreas do not significantly affect the hazard estimation for SNL/CA.

5.3.2.2 Slope Stability

At SNL/CA, there is generally little potential for slope instability because the site is situated on gently sloping to nearly flat topography. The exception to this is the extreme southern end of SNL/CA. The hillsides surrounding this area consist of moderately to weakly consolidated sand and gravel, and colluvial and alluvial terrace deposits. The Navy Landfill Site hill has extensive evidence of mass movement (DOE 1992a). There is an increased chance of slope failure during wet years at the dry wash surrounding the Navy Landfill Site. Slope failure at this location would have no effect on SNL/CA facilities.

5.3.2.3 Soils

There could be very minor impacts to the soils due to erosion during construction. Approximately 6 acres of soil would be disturbed because of construction activities associated with building the LTF and DISL facilities. Soil erosion controls (for example, silt fences) would be used to minimize soil erosion.



Source: Original

Figure 5-4. Sandia National Laboratories, California Facilities

Sandia National Laboratories, California footprint would remain consistent with the current design.

Soil contamination at SNL/CA occurred as the result of past operations. The cleanup of these soils is performed to a level that meets the health risk-based standards corresponding to the intended future uses of the site. Analyses indicate no significant risk to the general public (SNL/CA 2002b).

As of August 2002, SNL/CA had identified 23 sites with soil contamination from past operations. Because contamination levels pose no threat to human health or the environment, the DOE has proposed no further action for all 23 sites. Twenty of the No Further Action

proposals have been approved by state regulatory authorities. The remaining three sites are part of a long-term monitoring program. The State, NNSA, and SNL/CA would continue to discuss monitoring and potential cleanup activities, as necessary.

Chemical, oil, or hazardous material spills or releases are possible in the future given the variety of materials handled at SNL/CA; however, industry accepted controls are in place to minimize the potential for soil contamination from any SNL/CA operations.

5.3.3 WATER RESOURCES AND HYDROLOGY

5.3.3.1 Groundwater Quality

Under this alternative, SNL/CA would continue to monitor groundwater quality at several sites: the Fuel Oil Spill (FOS), the Navy Landfill, and the Trudell Auto Repair Shop. Past measurements indicate that some contaminants at these sites have periodically exceeded the maximum contaminant levels (MCLs) in Federal drinking water standards (40 CFR Part 141). However, concentrations at these sites continue to decrease over time (SNL/CA 2002b).

5.3.3.2 Groundwater Quantity

SNL/CA does not use groundwater for any portion of its water supply; therefore, no effects to groundwater quantity would be anticipated under the No Action Alternative.

5.3.3.3 Surface Water Quality

During storm events at SNL/CA runoff is carried by sheet flow, storm drains, or open ditches to the Arroyo Seco or the ditch along East Avenue. The ditch along East Avenue eventually flows into the Arroyo Seco.

Pollutants may be picked up by storm water runoff. If rainfall is sufficient, there may be enough runoff to carry the pollutant to the Arroyo Seco before the runoff evaporates or infiltrates into the ground. The amount of runoff is a function of the permeability of the ground surface or material. Under this alternative, the percentage of the site's 410-acre drainage to the Arroyo that is impervious (buildings, roads, parking lots, etc.) (12 percent) would remain the same (SNL/CA 2002b).

The current SNL/CA storm water runoff-monitoring program includes visually monitoring 22 discharge locations onsite during storm events and sampling nine locations. The discharge locations and sampling stations are shown in Figure 4-9. These samples are the best available indicators of what contaminant(s) could reasonably be transported offsite. No regulatory limits have been set for pollutants in storm water runoff. During the most recent sampling, no pollutants were detected at levels that would be a cause for concern. No effects to storm water compliance would be anticipated under this alternative.

Cleanup actions planned, underway, or completed at the ER sites at SNL/CA are intended to remove any potential source of surface water contamination, and the cleanup activities themselves are not expected to negatively affect surface water quality. No overall impact to surface water quality from ER Program activities would be anticipated under the No Action Alternative.

5.3.3.4 Surface Water Quantity

The developed (impervious) area of SNL/CA is estimated to be 49.2 acres. Under the No Action Alternative, only minor net changes in building and parking lot areas would be anticipated. Annual variation in SNL/CA surface runoff would occur with variations in rainfall quantity and intensity and declining capability are a potential concern. However, no overall impact to surface water quantity from activities under the No Action Alternative would be anticipated.

5.3.4 BIOLOGICAL RESOURCES

Impacts to biological resources at SNL/CA as a result of the No Action Alternative would be minimal. Because current operations would continue, the impacts to terrestrial, aquatic, and wetland species, and species would remain negligible. Inventory and management (including compliance with regulations) of the biological resources by SNL/CA would continue to protect the animals, plants, habitats, and protected and sensitive species on SNL/CA.

5.3.5 CULTURAL RESOURCES

The No Action Alternative would have no impacts to cultural resources due to: the apparent lack of prehistoric and Native American resources and historic archaeological sites, the nature of the buildings and structures present, and compliance with applicable regulations and established procedures for the protection and conservation of cultural resources located on lands administered by the DOE.

Buried archaeological sites could be impacted during construction or other ground-disturbing activities. Under the No Action Alternative, these activities would include construction of the LTF and DISL facilities. However, compliance with regulations and procedures would address impacts to any cultural resources discovered during the construction of these facilities, either avoiding, reducing, or mitigating the potential impacts. Some maintenance activities that require ground disturbance could also result in the discovery of buried archaeological sites, but again, compliance with regulations and procedures would address any impacts.

5.3.6 AIR QUALITY

Under the No Action Alternative, ongoing DOE and interagency programs and activities at SNL/CA would continue and several new facilities would contribute to projected emission increases.

During July 2000 to June 2001, sources of criteria pollutant emissions from SNL/CA included 10 permitted natural gas-fueled boilers in six buildings within the facility. Table 5-1 presents natural gas usage during CY 2000 from each of the buildings with permitted boilers.

Table 5-1. Natural Gas Fuel Usage at Sandia National Laboratories, California during Calendar Year 2000

Building	Natural Gas Usage (thousand cubic feet)
907	13,345
910	7,254
912	4,952
916	5,535
927	1,907
940, 941, 942, 943	25,754
968	8,941

Source: SNL/CA 2002a

The No Action Alternative would include 28 nonexempt emission sources:

- 10 boilers
- 1 degreaser
- 1 spray booth
- 8 backup generators
- 1 electroplating operation
- 1 mixer (Glass Furnace and Melting Laboratory)
- 6 miscellaneous sources

Table 5-2 presents emissions attributed mainly to these sources, and other minor sources located throughout SNL/CA as well. SNL/CA criteria pollutant emissions are less than one percent of the Bay Area emissions.

The SNL/CA toxic air contaminant inventory for the period July 2000 to June 2001 included 12 significant pollutants from 18 permitted sources. Methyl alcohol was the maximum reported toxic pollutant based upon a 5-year average emission rate (Table 5-3). SNL/CA air

toxic emissions with Bay Area air toxic emissions are less than one percent of those for the Bay Area.

Construction activities at SNL/CA could have short-term adverse impacts due to emissions of criteria air pollutants from construction worker traffic and construction equipment and from fugitive dust from earth-moving activities. Fugitive dust during construction could exceed particulate matter less than 10 microns in diameter (PM₁₀) concentration standards if no dust control measures were implemented. However, engineered controls, such as the application of water or chemical dust suppressants and seeding of soil piles and exposed soils, would minimize fugitive dust. It is expected that PM₁₀ concentrations will be within all applicable standards.

Table 5-4 estimates construction-related carbon monoxide (CO) emissions for one typical project. It is expected that CO emissions will be within all applicable standards.

The estimated number of daily commuter vehicles to SNL/CA during fiscal year (FY) 2001 was 700 to 1000. This number represents the No Action Alternative level of commuter traffic. Future emissions are expected to decrease because new vehicles will have lower emission rates and more stringent inspection and maintenance programs. In addition, the BAAQMD vehicle buy-back program designed to remove 1981 and earlier model vehicles from the road will contribute to the overall reduction in commuter vehicle emissions.

Total carbon monoxide emissions for the No Action Alternative are shown in Table 5-5. Total carbon monoxide emissions for the No Action Alternative are 30 tons per year less than the 2000 baseline, well below the 100-tons per year incremental increase above baseline that would require a conformity determination. In addition, the total carbon monoxide emissions for the No Action Alternative were found to be less than 1 percent of the maintenance area's emissions of carbon monoxide.

Table 5-2. Criteria Pollutant Emission Rates for the No Action Alternative (kilograms per year)

Pollutant	No Action Alternative	Bay Area ^a	Percent Contribution from SNL/CA
	Emission Year ^b		
	2000/2001	2000	
Particulates	NA	57,900,000	NA
Volatile Organic Compounds	1,656	179,000,000	< 1
Sulfur Dioxide	NA	29,100,000	NA
Nitrogen Dioxide	3,311	214,000,000	< 1
Carbon Monoxide	300 to 400	995,000,000	< 1

Sources: SNL/CA 2002b

^aBay Area Air Quality Management District (BAAQMD) inventory is reported annually for period July to June^bAll Bay Area wide emissions except particulates are based on an average summer day multiplied by 365 days. Bay Area particulate emissions are based on an average winter day multiplied by 365 days

NA: not available/not applicable

SNL/CA: Sandia National Laboratories, California

Table 5-3. Air Toxic Emission Rates for the No Action Alternative (kilograms per year)

Pollutant	No Action Alternative	Bay Area ^a	Percent Contribution from SNL/CA
	Emission Year ^b		
	1996 to 2001 ^(b)	1999	
1,1,1-trichloroethane	121.15	58,968	< 1
1,4-dioxane	2.61	771	< 1
Ammonia	115.8	1,406,160	< 1
Benzene	0.31	28,577	< 1
Carbon tetrachloride	0.15	1,406	< 1
Formaldehyde	3.22	81,648	< 1
Methyl alcohol	170.5	276,696	< 1
Methylene chloride	40.67	49,896	< 1
Perchloroethylene	45.72	371,952	< 1
Toluene	9.32	335,664	< 1
Trichloroethylene	13.86	21,773	< 1
Xylene	2.96	276,696	< 1

Sources: TTNUS 2002a; SNL/CA 2002b

^aBay Area Air Quality Management District (BAAQMD) inventory is reported annually for period July to June^bBased on 5-year average emission rate (1996 through 2001)

SNL/CA: Sandia National Laboratories, California

Table 5-4. Estimated Carbon Monoxide Emissions Associated with LIGA Technologies Facility Construction Activities

1-Year construction Activity (assumes 21-work day months or 252 days)	Total Annual Hours of Operation	Equipment Emission Factors ^a	Estimated Total Annual Carbon Monoxide Emissions (total pounds per year)	Estimated Total Annual Carbon Monoxide Emissions (total tons per year)
Assumptions for Diesel Vehicles Emissions				
7 Diesel Units (trucks for transportation of materials to site throughout life of construction phase)	3,528 (or 2 hours per day each for 252 days)	0.11	388	0.194
8 Diesel Units (dozers, backhoes, graders, dump trucks to grade and lay foundation)	800 (or 5 hours per day each for 20 days)	0.11	88	0.044
6 Diesel Units (forklifts, crane, front end loader, other equipment for construction of buildings)	10,584 (or 7 hours per day each for 252 days)	0.11	1,164	0.582
Total Diesel units (21)	14,912	N/A	1,640	0.82

Table 5-4. Estimated Carbon Monoxide Emissions Associated with LIGA Technologies Facility Construction Activities

1-Year construction Activity (assumes 21-work day months or 252 days)	Total Annual Hours of Operation	Equipment Emission Factors ^a	Estimated Total Annual Carbon Monoxide Emissions (total pounds per year)	Estimated Total Annual Carbon Monoxide Emissions (total tons per year)
Assumptions for Gasoline Vehicles Emissions				
24 Light Gasoline units (worker personal vehicles, snack wagons, light commercial vans)	6,048 (or 1 hour per day each for 252 days)	0.48	2,903	1.451
2 Hand tampers	160 (or 4 hours per day each for 20 days)	0.48	77	0.38
Total Gas units	6,208	N/A	2,980	1.49
Total Estimated Carbon Monoxide Emissions during LIGA Technologies Facility Construction Phase			4,620 pounds	2.31 tons

Source: DOE 2001f

Note: Distributed Information Systems Laboratory construction would produce similar emissions

^aCarbon Monoxide (CO) emission factors are based on the Environmental Protection Agency (EPA) National Vehicle and Fuel Emission Laboratory (Ann Arbor, Michigan) average emission rates for idling vehicles. CO emissions for light-duty trucks are estimated at 219 grams per hour, for heavy-duty gas vehicles at 245 grams per hour, and for heavy-duty diesel vehicles at 50 grams per hour. Calculations are based on a conversion factor of 0.035 ounce per gram (grams x 0.035) divided by 16 (ounces per pounds.) times hour's operation divided by 2,000 (pounds per ton) to obtain tons per year.

Table 5-5. Carbon Monoxide Emissions from Sandia National Laboratories, California under the No Action Alternative (Tons per Year) and Calendar Year 2000 (Baseline)

Stationary Sources	Mobile Sources	Construction Activities	Total
No Action Alternative			
0.4	184	6.9 ^a	191.3
Baseline			
0.4	214	6.9 ^a	221.3

Source: EPA 1995

Notes: Mobile Source Emission Factors assumptions include the baseline (calendar year [CY] 2000) 24.77 grams per mile, the No Action Alternative (CY 2005) 21.29 grams per mile, 1,000 vehicles, 30 mile trip, average speed 35 miles per hour.

^aAssumed three typical construction projects each year (2.31 tons per project).

As a result, the NNSA has concluded that no conformity determination is required for the No Action Alternative.

5.3.7 INFRASTRUCTURE

Descriptions of important infrastructure services (such as maintenance), utilities (such as electricity), and facilities are provided in the *SNL Sites Comprehensive Plan FY 2001-2010* (SNL 2001d). Potential incremental changes to SNL/CA services, utilities, and facilities were reviewed for each alternative. The analysis focused on incremental changes to site-wide utility demands.

Most SNL/CA facilities do not meter utility use. However, annual site-wide utility demands are known and were used, in part, to make projections (TtNUS 2002a).

Table 5-6 projects the utility usage for the No Action Alternative. Water use would range from 50 to 60 million gallons per year (MGY). SNL/CA would generate 12 to 19 M gal of wastewater per year. Projected utility consumption rates likely would fluctuate annually due to weather. With the addition of the LTF, the DISL and the Glass Furnace and Melting Laboratory electricity and natural gas usage at SNL/CA would increase by 14,000 MWh and 35 M ft³ per year, respectively (FY 2000, Table 4-6).

Under the No Action Alternative, current infrastructure is capable of accommodating facility requirements and no major additional infrastructure facilities are proposed. Buildings, services, communications, maintenance programs (including upgrades, repairs, and limited renovations), roads, material storage, and waste storage

**Table 5-6. Annual Sandia National Laboratories, California
Utility Usage and Capacities under the No Action Alternative**

Utility	No Action Alternative	System Capacity	Usage as Percent of Capacity
Water Use	50 to 60 M gal	922 M gal	5 to 6
Wastewater Discharge	12 to 19 M	81 M gal	15 to 23
Electrical Use	36,934 MWh	239,000 MWh	15
Natural Gas Use	94 M ft ³	430 M ft ³	22

Source: TtNUS 2002a
ft³: cubic feet
gal: gallon
M: million
MWh: megawatt hour

activities would remain compatible with system requirements. SNL/CA maintains an active decontamination and decommissioning (D&D) program that identifies and removes from active service outdated or substandard facilities. An overall reduction in the number of active facilities would reduce the overall impacts to SNL/CA infrastructure. Specific details on these systems and programs are presented in the *SNL Sites Comprehensive Plan FY 2001-2010* (SNL 2001d).

5.3.8 TRANSPORTATION

No additional impacts to transportation would occur under the No Action Alternative. SNL/CA commuter traffic would remain at 700 to 1,000 vehicles per day. Approximately one to three hazardous material shipments (outbound) per week would be expected. Waste shipments would remain at 76 per year. Table 5-7

shows the No Action Alternative transportation-related activities would remain the same as FY 2000.

5.3.9 WASTE GENERATION

The No Action Alternative would not cause major changes in the types of waste streams generated onsite. Waste generation levels at SNL/CA would remain constant or slightly increase. However, existing waste minimization and pollution prevention measures would control the extent of the waste generation increase. Waste projections would not exceed existing waste management capacities.

Wastes from existing operations are considered to be derived from mission-related work. New operations are discussed separately in order to show the maximum likely existing operational increases. Nonoperations wastes are generated from special programs and facility support.

**Table 5-7. Annual Sandia National Laboratories, California
Transportation Activities under the No Action Alternative**

Activity	FY 2000	No Action Alternative
Paved and unpaved road	6.2 miles	6.2 miles
Pedestrian mall	4 acres	4 acres
Paved service areas	5.5 acres	5.5 acres
Paved service parking	12.7 acres	12.7 acres
Material (Annual Shipments Radioactive, Chemical, and Explosives)	33 trips	33 trips
Waste (includes hazardous and radioactive)	76 shipments	76 shipments
Sanitary Waste	52 shipments	52 shipments
Site-Related Traffic - Total Daily traffic	700 to 1,000 vehicles	700 to 1,000 vehicles
Sandia National Laboratories, California Weekly Hazardous Materials Transports (excluding waste)	1 to 3 outbound shipments per week (Total of 33)	1 to 3 outbound shipments per week (Total of 33)
Supplier Weekly Hazardous Material Transports	1 to 3 inbound shipments per week (Total of 100)	1 to 3 inbound shipments per week (Total of 100)

Source: TtNUS 2002a

Waste generation levels for special program waste, such as for new construction, are derived separately.

5.3.9.1 Radioactive Wastes

Existing Operations

Under the No Action Alternative, SNL/CA potentially would generate LLW and LLMW. However, SNL/CA would not generate any TRU waste or high-level waste. Site-wide average annual radioactive waste projections are presented in Table 5-8. Projections for radioactive waste generation at specific facilities from new and existing operations are shown in Table 5-9.

Under the No Action Alternative, SNL/CA anticipates no increase in generation of LLW from existing operations over the next 10 years. LLMW generation would remain constant for all operations through 2012. New operations would not generate LLW and LLMW. There would be sufficient management capacity to accommodate anticipated radioactive wastes. LLW and LLMW would be shipped offsite for final disposal.

New Operations

SNL/CA anticipates no LLW and LLMW would be generated from new operations annually over the next 10 years.

Balance of Operations (Includes Maintenance and Decommissioning and Decontaminating)

SNL/CA anticipates 5,110 kg per year of LLW and 451 kg per year of LLMW would be generated from balance of operations annually over the next 10 years. There would be sufficient management capacity to accommodate projected radioactive wastes. Maintenance and D&D wastes are not expected to impact SNL/CA waste management operations.

Current Capacity

The total radioactive waste generated per year requiring offsite disposal at licensed/approved facilities would not exceed the existing storage and handling capacities at the Radioactive Waste Storage Facility. Projections indicate that radioactive waste throughput would remain constant. SNL/CA routinely ships radioactive waste to various

Table 5-8. Average Annual Radioactive Waste Generation under the No Action Alternative (in Kilograms)

All Waste	Unit	5-Year Average (1996 through 2000)	No Action Alternative
LLW			
Existing Operations	kg	NR	198
New Operations	kg	NR	0
Balance of Operations	kg	NR	5,110
SNL/CA Total LLW	kg	5,308	5,308
Percent Change		0%	0%
LLMW			
Existing Operations	kg	NR	0
New Operations	kg	NR	0
Balance of Operations	kg	NR	451
SNL/CA Total LLMW	kg	451	451
Percent Change		0%	0%
Total All Radioactive Waste			
Existing Operations	kg	NR	198
New Operations	kg	NR	0
Balance of Operations	kg	NR	5,561
SNL/CA Total All Radioactive Waste	kg	5,759	5,759
Percent Change		0%	0%

Sources: SNL/CA 2002b; TtNUS 2002a

CY: calendar year

kg: kilograms

LLW: low-level waste

LLMW: low-level mixed waste

NR: not reported

Table 5-9. Average Annual Generation by Specific Sandia National Laboratories, California Facilities under the No Action Alternative (in Kilograms)

Facility	Calendar Year 2000			No Action Alternative		
	LLW	LLMW	Hazardous ^a	LLW	LLMW	Hazardous ^a
Existing Facilities						
Combustion Research Facility (CRF)	0	0	2,444	0	0	2,444
Building 910	15	0	15,432	15	0	15,432
Building 914	0	0	1,741	0	0	1,741
Building 916	1.5	0	596	1.5	0	596
Building 927	0	0	4,182	0	0	4,182
Micro and Nano Technologies Laboratory (MANTL)	0	0	7,109	0	0	7,109
Chemical and Radioactive Detection Laboratory (CRDL)	13	0	1,169	13	0	1,169
Area 8 Facilities	168	0	814	168	0	814
Explosive Storage Area (ESA)	0	0	0	0	0	0
Hazardous and Radioactive Waste Storage Facility	0	0	0	0	0	0
Subtotals Existing Facilities	198	0	33,487	198	0	33,487
New Facilities						
LIGA Technologies Facility (LTF)	0	0	0	0	0	2,964
Distributed Information Systems Laboratory (DISL)	0	0	0	0	0	0
Glass Furnace and Melting Laboratory (part of the CRF)	0	0	0	0	0	50
Subtotals New Facilities	0	0	0	0	0	3,014
Totals All Facilities	198	0	33,487	0	0	36,501

Sources: SNL/CA 2002b; TtNUS 2002a

^aIncludes RCRA Hazardous, California Toxic, TSCA, and biohazardous (MWMA)

LLW: low-level waste

LLMW: low-level mixed waste

RCRA: *Resource Conservation and Recovery Act*TSCA: *Toxic Substance Control Act*MWMA: *Medical Waste Management Control Act*

offsite governmental and commercial treatment and disposal facilities. All waste is shipped to meet regulatory requirements. Based on these projections and continued operations at specific facilities under the No Action Alternative, the radioactive waste generation impacts would continue to be minimal.

5.3.9.2 Hazardous Waste

Existing Operations

The No Action Alternative total hazardous waste generation would remain constant for existing facilities, with no changes for wastes generated annually. Under the No Action Alternative, SNL/CA anticipates 36,501 kg per year of hazardous waste generated by existing operations through 2012 (Table 5-9). There would be sufficient management capacity to accommodate anticipated existing

operations total hazardous wastes. Projections for all operations by waste type are presented in Table 5-10.

New Operations

SNL/CA anticipates annual generation of 3,014 kg of hazardous waste by new operations over the next 10 years. The majority of the additional waste would be due to the full implementation of LIGA wafer production operations (Table 5-9, 2,964 kg). New SNL/CA operations would increase the annual total hazardous waste at the site by 3.5 percent (Table 5-10).

Balance of Operations

During maintenance and D&D (as outlined in Section 2.3.3), SNL/CA would produce hazardous waste each year. SNL/CA would continue to generate TSCA waste, primarily PCBs and asbestos that are removed from trans-

Table 5-10. Average Annual Hazardous Waste Generated under the No Action Alternative by Waste Type (in kilograms)

All Waste	Unit	5-Year Average (1996 through 2000)	No Action Alternative
RCRA Hazardous Waste			
Existing Operations	kg	NR	8,659
New Operations ^a	kg	NR	779
Balance of Operations	kg	NR	13,957
SNL/CA Total RCRA Hazardous	kg	22,616	23,395
Percent Change		0%	+3.4%
California Toxic Waste			
Existing Operations	kg	NR	9,922
New Operations ^a	kg	NR	893
Balance of Operations	kg	NR	15,992
SNL/CA Total California Toxic	kg	25,914	26,807
Percent Change		0%	+3.4%
TSCA			
Existing Operations	kg	NR	14,695
New Operations ^a	kg	NR	1,323
Balance of Operations	kg	NR	22,365
SNL/CA Total TSCA	kg	38,383	39,706
Percent Change		0%	3.3%
Biohazardous Waste (includes MWMA)			
Existing Operations	kg	NR	211
New Operations ^a	kg	NR	19
Balance of Operations	kg	NR	340
SNL/CA Total Biohazardous	kg	551	580
Percent Change		0%	+3.3%
Total All Hazardous Waste			
Existing Operations	kg	NR	33,487
New Operations ^a	kg	NR	3,014
Balance of Operations	kg	NR	52,654
SNL/CA Total All Hazardous waste	kg	87,464	90,488
Percent Change		0%	3.5%

Sources: SNL/CA 2002b; TtNUS 2002a

^aNew operations include LTF, DISL, and Glass Furnace and Melting Laboratory

CY: calendar year

kg: kilograms

RCRA: Resource Conservation and Recovery Act

TSCA: Toxic Substances Control Act

MWMA: Medical Waste Management Act

NR: not reported

formers and buildings. Projected hazardous waste quantities for these activities are included in Table 5-10 as balance of operations. This work would directly affect the quantity of TSCA waste requiring disposal.

Under the No Action Alternative, the balance of operations would generate 52,654 kg out of a total of 90,488 kg annually of all hazardous waste.

Under the No Action Alternative, four buildings, totaling approximately 15,000 gsf (an estimated 100 tons or 100,000 kg of construction debris) would be demolished.

Current Capacity

The total hazardous waste generated per year requiring offsite disposal at licensed/approved facilities would not exceed the existing storage and handling capacities at the Hazardous Waste Storage Facility. Projections indicate that an increase of 3.5 percent of hazardous waste generation would occur. SNL/CA routinely ships hazardous waste to various offsite commercial disposal facilities. All waste is shipped in less than one year to meet regulatory requirements. Based on these projections and continued operations at specific facilities under the No Action Alternative, the hazardous waste generation impacts would be minimal.

5.3.9.3 All Other Wastes

SNL/CA operations also involve four additional waste management activities discussed below.

Biohazardous (includes Medical Waste Management Act) Waste

Under the No Action Alternative, biohazardous waste generation would increase to 580 kg per year (see Table 5-10). The existing waste handling capabilities would be adequate to accommodate this waste. Additional offsite impacts would be minimal, because offsite disposal capacity would continue to be sufficient.

Construction Waste

The construction of the LTF, DISL, and the Glass Furnace and Melting Laboratory would generate 60 tons, 140 tons, and 8 tons of construction debris, respectively. Since a typical roll off container handles 20 tons of debris, the expected construction waste would be minimal. No additional offsite impacts would occur, because offsite disposal capacity would be sufficient.

Municipal Solid Waste

Site-wide solid waste generation trends at SNL/CA would generally remain a function of total building area and the number of employees. Under the No Action Alternative, an estimated 247.5 metric tons is anticipated. No appreciable onsite impacts to disposal facilities would

occur because existing waste handling capabilities are already in place.

Wastewater

Wastewater would range from approximately 12 to 19 M gal) annually compared to 15 million gallons in CY2000. Sufficient disposal capacity would be available (see Table 5-6).

5.3.10 NOISE

The No Action Alternative consists of the background noise levels presented for the affected environment in Section 4.12 Noise and operational contributions from the following activities:

- LIGA Technologies Facility (LTF)
- Distributed Information Systems Laboratory (DISL)
- Glass Furnace and Melting Laboratory in the CRF
- D&D projects

The acoustical environment in and around SNL/CA may be impacted during construction of these proposed facilities.

Construction activities would generate noise produced by heavy construction equipment, trucks, and power and percussion tools. In addition, construction-related traffic would increase along regional transportation routes. The noise levels would be representative of levels at industrial park sites.

Relatively high and continuous levels of noise in the range 93 to 108 dBA would be produced by heavy equipment operations during the site preparation phase of construction. However, after this time, heavy equipment noise would become more sporadic and shorter in duration. The noise from trucks, power tools, and percussion would be sustained through most of the building construction and equipment installation activities. Construction noise levels would gradually decrease to the ambient background noise levels as construction neared completion, after which ambient background noise levels would return to preconstruction levels (55 to 65 dBA).

Table 5-11 presents peak attenuated noise levels expected during construction. At a distance of approximately 1,700 ft from the source, peak attenuated noise levels from most construction equipment are within the background range of typically quiet outdoors and residential areas.

Construction activities could affect the occupational health of workers, but measures are in effect to ensure that hearing damage to workers does not occur. These measures include regulations contained within the

**Table 5-11. Peak Attenuated Noise Levels (dBA)
Expected from Operation of Construction Equipment**

Source	Peak Noise Level	Distance from Source						
		15 m (50 ft)	30 m (100 ft)	61 m (200 ft)	100 m (400 ft)	305 m (1000 ft)	518 m (1,700 ft)	762 m (2,500 ft)
Heavy Trucks	95	84 to 89	78 to 83	72 to 77	66 to 71	58 to 63	54 to 59	50 to 55
Dump trucks	108	88	82	76	70	62	58	54
Concrete mixer	108	85	79	73	67	59	55	51
Jackhammer	108	88	82	76	70	62	58	54
Scraper	93	80 to 89	74 to 82	68 to 77	60 to 71	54 to 63	50 to 59	46 to 55
Bulldozer	107	87 to 102	81 to 96	75 to 90	69 to 84	61 to 76	57 to 72	53 to 68
Generator	96	76	70	64	58	50	46	42
Crane	104	75 to 88	69 to 82	63 to 76	55 to 70	49 to 62	45 to 48	41 to 54
Loader	104	73 to 86	67 to 80	61 to 74	55 to 68	47 to 60	43 to 56	39 to 52
Grader	108	88 to 91	82 to 85	76 to 79	70 to 73	62 to 65	58 to 61	54 to 57
Dragline	105	85	79	73	67	59	55	51
Pile driver	105	95	89	83	77	69	65	61
Forklift	100	95	89	83	77	69	65	61

Source: DOE 2000e.
ft: foot/feet

Contractor Industrial Hygiene Program (DOE Order 5480.10) and *Occupational Noise Exposure* (29 CFR Part 1910.95).

Worker protection against effects of noise exposure is provided when the sound levels exceed those shown in Table 5-12 when measured on the A scale of a standard sound level meter at slow response. When workers are subjected to sound exceeding those listed in Table 5-11, administrative or engineered controls are used. If such controls fail to reduce sound levels adequately, personal protective equipment (for example, ear plugs) is provided and used to reduce sound levels to within the levels presented in Table 5-11.

5.3.11 HUMAN HEALTH AND WORKER SAFETY

Implementation of the No Action Alternative would result in the human health and worker safety impacts described in the following sections for normal operations and accident conditions.

5.3.11.1 Radiological Health Effects

Radiation can cause a variety of health effects in people. The major effects that environmental and occupational radiation exposures could cause are delayed cancer fatalities, which are called latent cancer fatalities (LCFs) because the cancer can take many years to develop and cause death.

To relate a dose to its effect, DOE has adopted a dose-to-risk conversion factor of 0.0004 latent cancer fatality per

Table 5-12. Permissible Noise Exposure

Duration Per Day, Hours	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
½	110
0.25 or less	115

Source: 29 CFR Part 1910

Note: When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered rather than the individual effect of each. Exposure to impulsive or impact noise should not exceed 140 decibel (dB) peak sound pressure level. dBA: decibel, A-weighted sound levels

person-Roentgen equivalent, man (rem) for workers and 0.0005 latent cancer fatality per person-rem for the general population (NCRP 1993). The factor for the population is slightly higher, due to the presence of infants and children who are believed to be more sensitive to radiation than the adult worker population.

DOE uses these conversion factors to estimate the effects of exposing a population to radiation. For example, in a population of 100,000 people exposed only to background radiation (0.3 rem per year), DOE would calculate 15 LCFs per year caused by radiation (100,000 persons ×

0.3 rem per year \times 0.0005 latent cancer fatality per person-rem).

Calculations of the number of LCFs associated with radiation exposure might not yield whole numbers and, especially in environmental applications, might yield values less than 1. For example, if a population of 100,000 were exposed to a dose of 0.001 rem per person, the collective dose would be 100 person-rem, and the corresponding number of LCFs would be 0.05 (100,000 persons \times 0.001 rem \times 0.0005 LCF per person-rem).

Vital statistics on mortality rates for 1997 (CDC 1998) indicate that the overall lifetime fatality rate in the United States (U.S.) from all forms of cancer is about 23.4 percent (23,400 fatal cancers per 100,000 deaths).

In addition to LCFs, other health effects could result from environmental and occupational exposures to radiation; these include nonfatal cancers among the exposed population and genetic effects in subsequent generations. Previous studies have concluded that these effects are less probable than fatal cancers as consequences of radiation exposure (NCRP 1993). Dose-to-risk conversion factors for nonfatal cancers and hereditary genetic effects (0.0001 per person-rem and 0.00013 per person-rem, respectively) are substantially lower than those for fatal cancers. This SWEA presents estimated effects of radiation only in terms of LCFs because that is the major potential health effect from exposure to radiation. Estimates of nonfatal cancers and hereditary genetic effects can be estimated by multiplying the radiation doses by the appropriate dose-to-risk conversion factors for these effects.

DOE expects minimal worker radiological health impacts from the SNL/CA activities under the No Action Alternative. The values for the No Action Alternative were calculated assuming the number of radiation workers and their average annual radiation dose would be the same as the average values for the past 3 years (Table 5-13). Table 5-13 presents estimated radiation doses for the collective population of workers who would be directly involved in implementing the alternatives as well as LCFs likely attributable to these doses.

The estimated number of LCFs listed in Table 5-13 for the No Action Alternative can be compared to the projected number of fatal cancers from all causes. Population statistics indicate that cancer caused 23 percent of the deaths in the U.S. in 1997 (CDC 1998). If this percentage of deaths from cancer continues, 23 percent of the U.S. population would contract a fatal cancer from all causes. Thus, in the population of 1,000 workers, 230 persons would be likely to contract fatal cancers from all causes. Under the No Action Alternative, the incremental impacts from SNL/CA operations would be small.

Table 5-13. Estimated Radiological Dose and Health Impacts to Sandia National Laboratories, California Workers for the No Action Alternative (Based on 3-Year Average)

Health Impact	No Action Alternative
Collective involved worker dose (person-rem)	0.85 ^a
Estimated increase in number of latent cancer fatalities	3.4×10^{-4}

Sources: DOE 1999d, 2000d, 2001g, TtNUS 2002a

^aSNL/CA involved worker dose estimated at 11 percent of SNL lab-wide totals in Table 4-15. Any increase in estimated radiation doses would be a result of the increase in the number of radiation workers and not the result of different exposure mechanisms or levels.

rem: Roentgen equivalent, man

5.3.11.2 Occupational Health and Safety

Table 5-14 provides estimates of the number of total reportable cases (TRCs) and lost workday cases (LWCs) that could occur under the No Action Alternative. The projected injury rates are based on average historic SNL/CA injury rates over a 3-year period from 1999 through 2001 (SNL 2001, 2002a). These rates were then multiplied by the projected employment levels for each alternative to calculate the number of TRCs and LWCs under each of the alternatives.

The TRC value includes work-related death, illness, or injury that resulted in loss of consciousness, restriction from work or motion, transfer to another job, or required medical treatment beyond first aid. The data for LWCs represent the number of workdays beyond the day of injury or onset of illness that the employee was away from work or limited to restricted work activity because of an occupational injury or illness.

5.3.12 SOCIOECONOMICS

The implementation of the No Action Alternative would result in no changes to the demographic characteristics, economy, and community services in the ROI, as discussed below.

Table 5-14. Estimated Occupational Safety Impacts to Sandia National Laboratories, California Workers for the No Action Alternative

Worker Safety Parameters	No Action Alternative
Workforce	1,043 – 1,317
Total recordable cases of accident or injury	43 – 54
Lost workday cases	10 – 13

Sources: SNL 2001i, 2002a

5.3.12.1 Demographic Characteristics

The No Action Alternative would not likely result in any noticeable change in existing demographic characteristics within the ROI (Section 4.14.3). Overall expenditures and employment at SNL/CA should remain relatively constant over the next 10 years, which, in turn, would tend to maintain demographic characteristics within the ROI.

5.3.12.2 Economic Base

The No Action Alternative would not likely result in any noticeable change in the existing economic base within the ROI (Section 4.14.3) because employment levels and research and development (R&D) activities are assumed to remain the same as current levels. Additionally, the No Action Alternative would have no effect on the amount of expenditures for goods and services in the local and regional economy. Overall expenditures and employment should remain relatively constant.

5.3.12.3 Housing and Community Services

The No Action Alternative would not likely result in any noticeable change in existing housing and community services within the ROI (Section 4.14.3). Overall expenditures and employment at SNL/CA should remain relatively constant, which, in turn, would tend to maintain housing availability, value, and levels of service. Contributory effects from other industrial and economic sectors within the ROI should reduce or mask SNL/CA's current proportional impact.

5.3.13 ENVIRONMENTAL JUSTICE

The No Action Alternative would have no discernible adverse impacts to land use and visual resources, water resources, biological resources, cultural resources, air quality, infrastructure, transportation, waste generation, noise, or socioeconomics. Thus, no disproportionately high and adverse impacts to minority or low-income communities would be anticipated.

As presented in Section 5.3.11, SNL/CA operations would have minimal potential to adversely affect human health for offsite residents or onsite workers. Thus, no disproportionately high and adverse impacts to minority or low-income communities would be anticipated for this resource area.

Based on the analyses of all the resource and topic areas, impacts that would result during the course of normal operations would not pose disproportionately high and adverse health or environmental impacts on minority and low-income populations. Table 5-15 provides a brief summary of potential impacts to each resource or topic area.

5.4 PLANNED UTILIZATION AND OPERATIONS ALTERNATIVE

5.4.1 LAND USE AND VISUAL RESOURCES

The Planned Utilization and Operations Alternative would include the No Action Alternative plus several additional actions and would not affect existing land use patterns or visual resources at SNL/CA. Sections 5.4.1.1 and 5.4.1.2 discuss impacts to these resource areas from the Planned Utilization and Operations Alternative.

5.4.1.1 Land Use

No impacts would occur to land use patterns at SNL/CA under this alternative. The extent of DOE land available for use by SNL/CA, 410 acres, would remain the same as for the No Action Alternative. SNL/CA operations would remain consistent with industrial research park uses and would have no foreseeable effects on established land use patterns or requirements.

This alternative differs from the No Action Alternative in that improvements would be made to Arroyo Seco. These improvements would meet a number of needs, mainly correcting the effects of past erosion, protecting the SNL/CA site from future erosion and flooding, and improving channel stability and the wildlife habitat. These improvements would occur directly along the arroyo channel and would not change current land use plans. As part of the improvements to Arroyo Seco, storm water drainage infrastructure throughout the site would be improved, but this also would not change any land use at the site. Thirty acres along the arroyo in the east buffer zone would be managed as a wildlife reserve.

Under the Planned Utilization and Operations Alternative, a Grant of Easement and Agreement would be made with the landowner concerning the land along the SNL/CA western boundary. Activities by the landowner would be subject to the agreement, limitations, and disclosures.

Under this alternative, 93 acres of open space adjacent to East Avenue and existing facility areas would be reserved for future construction of offices, facilities, support buildings, associated infrastructure, paved areas (parking areas, services areas, and sidewalks), roads, and for onsite soil management (see Figure 5-5). Onsite soil management would involve placing dirt/fill from the Arroyo Seco improvement, storm water projects, and construction projects in 25 of the 93 acres of open space. Locating future construction projects near existing facilities would minimize effects to land use. Construction in these areas would be consistent with established land use patterns at SNL/CA.

Under this alternative, 122 acres of open space would be identified as undesignated. Construction of the new