

5.2 IMPACTS FOR THE NO ACTION ALTERNATIVE

The No Action Alternative is the continued operation of the Livermore Site and Site 300, including projects for which NEPA analysis and documentation already exists. Programs and projects would continue at their present levels as described in Section 3.2, but no proposed projects would be added except for those funded, which are those required to maintain the existing infrastructure.

The discussion below follows the order of issues presented in Chapter 4. Each section discusses impacts and mitigation measures as appropriate. These sections also discuss cumulative impacts, both locally and regionally, when applicable. See Chapter 3 and Appendix A, Description of Major Programs and Facilities, for a more detailed discussion of all the projects included in the No Action Alternative.

Cumulative impacts result from impacts of the No Action Alternative in combination with impacts of future development, either in the vicinity or within a regional area appropriate to the resource being analyzed. The Livermore Site cumulative air impacts consider the entire air resource region designated by the BAAQMD. Cumulative impacts discussed in this section analyze impacts that result primarily from implementation of the No Action Alternative at LLNL.

5.2.1 Land Uses and Applicable Plans

This section describes the impacts to land uses and applicable plans under the No Action Alternative. Impacts are analyzed for the Livermore Site and Site 300 based on the methodology presented in Section 5.1.

5.2.1.1 *Relationship with Site Operations*

This section summarizes the relationship between projects described in Section 3.1 for the No Action Alternative and the land use impact analysis. In general, the effect of projects for the No Action Alternative on land use would be related to the planned construction and D&D of facilities as part of projects that have been funded, but not yet executed. Changes to operations would not alter land use. No land acquisitions are included under the No Action Alternative, therefore land use changes would be confined to onsite areas.

5.2.1.2 *Impact Analysis*

Livermore Site

Under the No Action Alternative, new facility construction, upgrades, and D&D activities would occur at the Livermore Site. Many of these projects are already underway. While the types of land uses would not change, some infill and modernization would occur. Figure 5.2.1.2–1 shows the locations of new facilities. Most new facilities would be located in the developed portion of the Livermore Site. Table 5.2.1.2–1 provides the estimated area of disturbance for new facility construction in undeveloped areas.

TABLE 5.2.1.2–1.—Area of Disturbance for New Facility Construction Under the No Action Alternative in Livermore Site Undeveloped Areas

Facility	Location	Estimated Area of Disturbance
East Avenue Security Upgrade	Southern border of Livermore Site between LLNL and SNL/CA	172,000 ft ²
Extend Fifth Street	West side of Livermore Site from Avenue A to West Perimeter Drive	132,000 ft ²
International Security Research Facility	Southwest side of Livermore Site near developed area	64,000 ft ² 54,000 ft ² Parking
Remove and Replace Offices	East side of the Livermore Site east of the drainage retention basin	40,000 ft ²
Total		462,000 ft²

Note: This table only includes those facilities with the potential to disturb soil in the undeveloped zones.

LLNL = Lawrence Livermore National Laboratory; SNL/CA = Sandia National Laboratories, California; ft² = square feet.

New structures would be used for the same types of uses as existing facilities, namely research and development (R&D), which is the existing land use designation for all Livermore Site facilities. Therefore, it would not represent a change in land uses, nor lead to a conflict with existing and approved future land uses adjacent to the site. Although the Livermore Site is on Federal land and not subject to local zoning ordinances, LLNL's R&D activities would be compatible with the MP designation (industrial park) in Alameda County and the I-2/I-3 designations (professional and administrative offices/R&D facilities) in the city of Livermore. No new types of land uses would be introduced in the buffer and perimeter areas. Therefore, no change in the site's compatibility with existing and approved future land uses would result from the No Action Alternative and no additional impacts are expected.

New facilities could have secondary effects on land use due to increased personnel and activity at the site. These effects could include additional traffic, noise, vehicular exhaust emissions, demands for community services, increased consumption of natural resources, effects to wildlife habitat, and increased waste generation. These effects are addressed in the other sections of this chapter.

Site 300

The No Action Alternative at Site 300 would include upgrades and consolidation of existing facilities and a D&D project. No land acquisitions would be included. The types of land uses at Site 300 are not proposed to change, and the open space character of the site would be retained. No major alterations in the types of land uses would result.

Land uses at Site 300 would be compatible with the existing land uses and approved land use designations surrounding the site and with policies regarding open space resources near the site. Because activities under the No Action Alternative represent a continuation of existing land uses, they would be compatible with existing and approved future land uses surrounding the site and no additional impacts are expected to occur.

5.2.1.3 Cumulative Impacts

Livermore Site

The cumulative impact study area with regard to land uses and planning programs for the Livermore Site is defined as that area of Alameda County generally east of Tassajara Road in the city of Dublin and Santa Rita Road in the city of Pleasanton, which encompasses the city of Livermore and eastern unincorporated Alameda County. Large undeveloped open space areas in Alameda County exist in the northern, eastern, and southern portions of the county. A majority of the undeveloped areas is used for agricultural purposes, primarily for grazing and viticulture. Agricultural lands in the South Livermore Valley General Plan Amendment area support an active wine industry.

A continuing land use trend in Alameda County has been the encroachment of residential, commercial, and industrial uses on agricultural and open space areas. Developing planned and proposed residential projects would contribute to the cumulative loss of agricultural land and open space. However, the No Action Alternative would not contribute to the cumulative effect on the loss of agricultural land and open space because the Livermore Site is already committed to R&D land uses and no acquisition of open space or agricultural land would be proposed. Minimal impacts to land use are expected to occur.

Site 300

The cumulative impact study area with regard to land uses and planning programs for Site 300 is defined as that portion of San Joaquin County generally south of Interstate 205 (I-205) that encompasses the city of Tracy and southwestern unincorporated San Joaquin County. Land uses in the area south of I-580 in unincorporated San Joaquin County include agricultural (primarily grazing), commercial recreation, and explosives testing facilities, including Site 300.

The city of Tracy, the border of which is located approximately 2 miles northeast of Site 300, has a developed core of residential and commercial uses, which becomes less dense along the outer boundaries of the city. Industrial and agricultural land uses surround the developed part of the city. In 1998, the city of Tracy annexed the Tracy Hills area southwest of I-580, the area of Tracy that is now closest to Site 300. The Tracy Hills planning area is 6,175 acres. In an effort to preserve agricultural land on the valley floor, the city of Tracy Planning Department is encouraging new development in hillside areas such as Tracy Hills (City of Tracy 1993).

A residential community such as Tracy Hills could be compatible with Site 300, depending on the final design and siting of residences. The city of Tracy also has annexed an area of San Joaquin County that is approximately 2 miles from Site 300 and has planned for residential development in this area. The Tracy General Plan (City of Tracy 1993) provides for a conservation or open space area to be established that would be a buffer zone between Site 300 and any potential new development.

Approved and proposed projects in the southwestern San Joaquin County would contribute to a cumulative loss of open space; however, implementation of the No Action Alternative would not contribute to this cumulative loss of open space because no loss of agricultural land or open space would be proposed. No additional impacts are expected to occur.

5.2.2 Socioeconomic Characteristics and Environmental Justice

This section analyzes the socioeconomic impact associated with implementation of the No Action Alternative. The section organizes the impact analysis by employment, and housing and population, with effects delineated by geographic area (counties and cities) within the ROI. Environmental justice issues are also discussed.

5.2.2.1 Relationship with Site Operations

This section summarizes the relationship between projects described in Section 3.1 for the No Action Alternative and the socioeconomic impact analysis. In general, the effect of projects on socioeconomics is related to the additional employment opportunities and expenditures, provided as a result of design, construction, and operation of projects under the No Action Alternative. For the socioeconomic analysis, indirect effects of these changes are also evaluated. Important parameters for the socioeconomic analysis are shown in Table 5.2.2.1–1.

**TABLE 5.2.2.1–1.—Input Parameters for Socioeconomic Analysis
Under the No Action Alternative**

Parameter	Units	Site	Existing Environment	No Action Alternative
Employment	Number of personnel	LLNL	10,360 (all site workers)	10,650 (all site workers)
		Livermore Site	8,610 (LLNL employees) 17,000 (LLNL employees and indirect)	8,900 (LLNL employees) 17,500 (LLNL employees and indirect)
		Site 300	240 (LLNL employees) 470 (LLNL employees and indirect)	250 (LLNL employees) 490 (LLNL employees and indirect)
Expenditures	Dollars (2001)	LLNL	142 M (Bay Area)	146 M (Bay Area)
Payroll	Dollars (2002)	LLNL	668 M (LLNL employees) 1,100 M (LLNL employees and indirect)	690 M (LLNL employees) 1,130 M (LLNL employees and indirect)

LLNL = Lawrence Livermore National Laboratory; M = million.

5.2.2.2 Impact Analysis

LLNL jobs and expenditures generate indirect jobs in the region. The Regional Input-Output Modeling System (RIMS) II economic model produces two multipliers that are useful for the evaluation of economic effects (BEA 2003). The first multiplier is used to calculate worker earnings and the second calculates employment. These multipliers provide information needed to estimate LLNL's economic impact. Earnings and employment multipliers make possible the identification of not only the direct impacts of an activity on regional income and jobs, but also the indirect effects.

To develop estimates of employment growth, employment projections for the No Action Alternative were based on staffing increases associated with new facilities and initiatives beyond the year 2004. Over the next 10 years, LLNL employment at the Livermore Site is projected to increase by 290 to reach approximately 8,900. Therefore, the No Action Alternative may create an additional 290 direct employment opportunities in Alameda County, generate additional

revenue from increased purchases of goods and services, and create increases in population and subsequent increases in housing demand. The employment projections are conservatively high for purposes of evaluating the maximum potential environmental impacts associated with the additional jobs at LLNL.

As of September 2002, approximately 240 personnel were employed by LLNL at Site 300. Over the next 10 years, Site 300 employment is projected to increase by fewer than 10 employees, therefore, socioeconomic impacts would be minimal.

Employment and Expenditures

Region

The No Action Alternative would provide additional employment opportunities in the region and would increase the payroll at LLNL. Assuming a 300-employee increase in payroll and pay rates proportional with 2002 salaries, the additional payroll generated under the No Action Alternative would be an annual increase of \$22 million (in 2002 dollars) by 2014. A portion of this increased payroll would enter the local economy as the new workers purchase additional goods and services. The effects of increased employment would result in a combined direct and indirect employment increase of approximately 600 jobs within the region. Likewise, the direct and indirect effect of payroll expenditures would result in a \$36 million increase to the regional economy.

In addition, it is anticipated that the No Action Alternative would result in an annual \$4 million increase in expenditures by LLNL within the nine-county Bay Area. Additional goods and services would be required to support the additional activities, facilities, and workers generated under the No Action Alternative.

The additional expenditures by new personnel and by LLNL would generate additional income and employment opportunities within the region as the expenditures filter throughout the economy. However, the additional income and employment opportunities generated under the No Action Alternative would have minimal economic impact within the region, given the large employment and economic basis in the ROI.

Alameda County

Total employment in Alameda County was estimated at 751,680 in 2000 (Association of Bay Area Governments 2001). The No Action Alternative is assumed to generate 290 additional jobs at the Livermore Site. Employment projections for Alameda County suggest that employment opportunities would increase 14.1 percent to reach 857,450 by 2010 (Association of Bay Area Governments 2001). The additional jobs created by the No Action Alternative at the Livermore Site would represent 0.3 percent of the projected increase in employment within the county. This minimal increase in employment, less than a 0.1 percent increase over the 2000 employment level, would have minimal economic impact within the county.

San Joaquin County

Total nonfarm employment in San Joaquin County was estimated at 191,700 in 2001 (EDD 2003). The nonfarm employment was used to eliminate seasonal agricultural employment spikes from the analysis. The No Action Alternative would generate a maximum of 10 additional jobs at Site 300. Employment projections for the county estimate that employment opportunities would increase 22.3 percent to 234,430 by 2010 (SJCOG 2000). The additional jobs created by the No Action Alternative at Site 300 would represent 0.02 percent of the projected increase in employment within the county. This minimal increase in employment, a 0.01 percent increase over the 2001 employment level, would have a negligible economic effect on the county.

Population and Housing

For this analysis, increases in population level and housing demand under the No Action Alternative are projected to be conservatively high in order to determine the maximum reasonably foreseeable impact. It was assumed that someone outside of the ROI would fill each new job, that all new LLNL workers (including LLNL employees, contractors, and Federal employees) would migrate to the region, and that each worker would represent a new household. In reality, a percentage of new workers would already reside in the project region, and some households would shelter more than one LLNL worker. While this method may overestimate potential migration of new workers to the project region, it also allows for the “backfilling” of vacancies left as some workers leave their current jobs in the region to work at LLNL. The geographic distribution of future LLNL worker residences is expected to be similar to the 2002 distribution of employee residences (Table 5.2.2.2–1).

Alameda County

Based on the anticipated geographic distribution of worker residences (Table 5.2.2.2–1), the No Action Alternative would result in a migration of 166 LLNL workers to Alameda County over 10 years. This represents 55.5 percent of the 300 new LLNL personnel. Assuming 2.74 persons per household for the county (Census 2003), the population associated with the additional workforce potentially migrating into the county would be 455 persons. This represents 0.03 percent of the 2000 population within the county. Population projections for the county estimate a 16.8 percent increase by 2010 (Association of Bay Area Governments 2001, Census 2003). The incremental population increase associated with the No Action Alternative would be within growth projections for the county.

Assuming one worker per household, housing demand generated by the additional workforce would be 166 dwelling units over 10 years, raising the total number of housing units occupied by LLNL workers to approximately 6,050 within Alameda County. In 2002, the county had 546,735 housing units. The vacancy rate in the county was 3.0 percent, an estimated 16,620 available units (DOF 2002). Demand for housing associated with the project’s additional personnel assumed to live in Alameda County would represent 1.0 percent of the 2002 vacant housing within the county. Impact to housing within the county is expected to be minimal.

City of Livermore

As seen in Table 5.2.2.2–1, the greatest percentage of new LLNL workers (37 percent, or 111 workers) would reside in Livermore, based on the 2002 pattern of employee residence location. Using the person per household figure of 2.81 for the city (Census 2002b), and assuming one worker per household, the population increase associated with the workforce migrating into the city would be 312 persons. This represents 0.4 percent of the city of Livermore’s 2000 population. Growth projections for the city anticipate a 23 percent increase in the city’s population by 2010 (Association of Bay Area Governments 2001).

TABLE 5.2.2.2–1.—Anticipated Geographic Distribution of Lawrence Livermore National Laboratory Worker Residences Under the No Action Alternative

City	Percent of LLNL Workers ^{a,b}	Number of New Workers Projected to Reside in City ^c
Alameda County		
Livermore	37.0	111
Pleasanton	6.2	19
Castro Valley	4.0	12
Dublin	2.1	6
Oakland	2.1	6
Other Alameda County	4.1	12
Total	55.5	166
San Joaquin County		
Tracy	8.2	25
Manteca	4.8	14
Stockton	2.6	8
Other San Joaquin County	2.9	9
Total	18.5	56
Contra Costa County		
Brentwood	2.7	8
San Ramon	2.7	8
Other Contra Costa County	7.4	22
Total	12.8	38
Stanislaus County		
Modesto	3.2	10
Other Stanislaus County	2.9	9
Total	6.1	19
Counties Outside the ROI		
Total	7.2	22

Source: LLNL 2003ak.

^a Distribution as of September 30, 2002.

^b May not total 100 because figures are rounded off.

^c Calculated based on 300-employee increase. May not total 300 because of rounding.

LLNL = Lawrence Livermore National Laboratory; ROI = Region of Influence.

Assuming each new worker migrating into the city creates a demand for one additional housing unit, a total of 111 units over 10 years would be required under the No Action Alternative. In 2000, the city had a housing supply of 26,610 units and a vacancy rate of 1.8 percent (Census 2002b). This represents 487 available housing units. The current city of Livermore Housing Implementation Program, covering the 3-year period from 2002 through 2004, limits housing unit growth to a maximum of 1.5 percent per year (City of Livermore 2001). As this plan is subject to renewal after 2004, the 1.5 percent housing unit growth rate represents the best available estimate for future growth. Assuming an annual growth rate of 1.5 percent, a total of 5,363 new housing units would be available by the year 2014. The demand for housing in the city associated with new employees would represent 2.1 percent of the projected number of new housing units. Because population growth as a result of the No Action Alternative could be accommodated in the current housing market and housing growth is projected to continue, minimal impacts are anticipated.

City of Pleasanton

Nineteen, or 6.2 percent, new workers employed under the No Action Alternative would reside in Pleasanton, based on the anticipated geographic distribution of personnel (Table 5.2.2.2–1). Using the person –per household figure of 2.73 (Census 2002b), the city of Pleasanton population increase associated with new personnel would be 52 persons. This represents 0.1 percent of the 2000 population of 63,654. This increase would be within growth projections for the city, which project a 22 percent population increase by 2010 (Association of Bay Area Governments 2001).

Housing demand generated by new workers as a result of the No Action Alternative would be 19 housing units over 10 years, assuming one household per new employee. The 2000 housing supply within the city was 23,968 units, with a vacancy rate of 2.7 percent (Census 2002b). This represents an available supply of 657 units. The demand for housing units associated with new workers would represent 2.9 percent of the number of available vacant units in 2000. In addition, there is a projected 18 percent increase in the supply of housing by the year 2010 (Association of Bay Area Governments 2001). Because population growth as a result of the No Action Alternative could be accommodated in the current housing market and housing growth is projected to continue, minimal impacts are anticipated.

San Joaquin County

Based on the anticipated geographic distribution of personal residences of currently employed LLNL workers, 56 of the new workers would reside within San Joaquin County (Table 5.2.2.2–1). Based on the person per household figure of 3.17 in San Joaquin County (Census 2003), the population associated with the new employees would be 178 persons. This represents 0.03 percent of the total population within the county in 2001. County growth projections estimate that the population will rise to 727,800 by the year 2010, a 26.2 percent increase (DOF 2001, Census 2003). The incremental population increase associated with the No Action Alternative would be accommodated within county growth projections.

Housing demand generated by new workers, assuming one LLNL worker per household, in the county would total 56 units over 10 years, raising the total number of housing units occupied by

LLNL workers to approximately 2,020 within San Joaquin County. The 2002 housing supply within the county was 197,279 units, with a vacancy rate of 3.9 percent (DOF 2002). The total number of vacant units was 7,767. County projections estimate a 26 percent increase in the number of housing units within the county by the year 2010 (SJCOG 2000). Because the demand generated by the project would be minimal relative to the number of available and planned units, minimal impacts are anticipated.

City of Tracy

Based on the anticipated geographic distribution of new personnel, 25 new workers could move to the city of Tracy over the next 10 years. Based on the person per household figure of 3.23 for the city of Tracy (Census 2002a), the the next population associated with the No Action Alternative would be 81 persons. This represents 0.1 percent of the 2000 population.

Additional housing demand arising from the No Action Alternative within the city of Tracy would be an additional 25 dwelling units. The housing supply within the city in the year 2000 was 18,087 units (Census 2002a). The vacancy rate for the city was 2.7 percent in 2000, which represents 467 available units. The demand generated by the new workers would represent 5 percent of the existing supply of available vacant housing. In addition, the number of housing units in the city is projected to increase 38 percent by the year 2010 (SJCOG 2000). The housing demand under the No Action Alternative could be accommodated in the current and projected housing supply, and minimal impacts are anticipated.

Environmental Justice

As indicated in Sections 5.2.1, 5.2.4, 5.2.5, 5.2.6, 5.2.7, 5.2.9, and 5.2.10, no discernible adverse impacts to land uses, prehistoric and historic cultural resources, aesthetics and scenic resources, geology and soils, biological resources, water, or noise are anticipated under the No Action Alternative. Thus, no disproportionately high and adverse impacts to minority or low-income communities are anticipated for these resource areas. Potential impacts to other resource areas are discussed below.

As indicated earlier in this section, under the No Action Alternative, 10,650 workers would be required at the Livermore Site and 250 workers would be required at Site 300. The number of housing units affected would be proportional to the changes in worker population. There is no indication that distribution of new workers would result in disproportionately high and adverse impacts to minority or low-income populations.

Within community services, as described in Section 5.2.3, the only notable impact would be to the generation and disposal of nonhazardous solid waste. For the No Action Alternative, it is estimated that 4,600 metric tons per year of solid waste would be generated at the Livermore Site for landfill disposal. At Site 300, nonhazardous solid waste generation would increase to 208 metric tons per year. Any impact to landfill capacity or lifespan would be area-wide, and not result in disproportionately high and adverse impacts to minority or low-income populations.

As presented in Section 5.2.8, the MEI for radiological air emissions at the Livermore Site would be located due east of the NIF, once the NIF becomes operational. The MEI dose under the No Action Alternative would be 0.098 millirem per year, and the population dose would be expected

to be 1.8 person-rem per year. At Site 300, the MEI would be located west-southwest of Firing Table 851. The MEI dose under the No Action Alternative would be 0.055 millirem per year, and the population dose would be 9.8 person-rem per year. Because areas immediately surrounding both LLNL sites have relatively low proportions of minority and low-income populations, there would be no disproportionately high and adverse impacts to these groups.

As presented in Section 5.2.11, traffic near the Livermore Site would increase slightly as a result of the increase in worker population by 290 workers under the No Action Alternative. At Site 300, the impact to traffic due to the addition of 10 workers would be negligible. Transportation of radioactive materials offsite would increase under the No Action Alternative. The collective radiation dose to the population along the transportation route is calculated at 5.0 person-rem per year, corresponding to 0.003 LCFs. No disproportionately high and adverse impacts to minority or low-income communities would be anticipated based on these estimates.

As presented in Section 5.2.12, the projected peak electrical demand at LLNL would be 82 megawatts and the annual total use would be 446 million kilowatt hours. In 2004, the State of California projects the statewide peak demand to be 53,464 megawatts and projects a growth in peak demand of about 2.4 percent per year. LLNL's projected peak demand in 2004 is therefore 0.1 percent of the total State demand. The State of California currently projects an adequate supply/demand balance through the year 2008, but has not made supply projections beyond that year. Any impacts related to LLNL's electricity use would be regional, and would not disproportionately affect minority or low-income populations.

As discussed in Section 5.2.13, waste generation for both routine and nonroutine wastes would be increased under the No Action Alternative. Levels of waste generation are within the capacities for treatment, transportation, or storage either onsite or at waste repositories. There would be no disproportionately high and adverse impacts to minority or low-income populations as a result of this waste generation.

As presented in Section 5.2.14, worker dose due to ionizing radiation would be 90 person-rem per year. The increase from current dose is mainly in new facilities coming online and increased activities in the Superblock. There would be no disproportionately high and adverse impacts to minority or low-income populations as a result of this increased dose.

Areas of soil and groundwater contamination exist at the Livermore Site and Site 300, as presented in Section 5.2.15. Although there is no immediate threat to human health from this contamination, there is localized degradation of groundwater. Appropriate cleanup measures are being implemented with the concurrence of regulators. There would be no disproportionately high and adverse impacts to minority or low-income populations as a result of these actions.

As discussed in Section 5.5, any of the bounding radiological accidents for LLNL would result in less than one LCF. Bounding accident scenarios for chemical, explosive, and biological accidents are unlikely to result in fatalities to the general public. None of these accidents would have disproportionately high and adverse impacts to minority or low-income populations.

Based on the analyses of all the resource areas, the course of operations would not pose disproportionately high and adverse health or environmental impacts on minority and low-income populations.

5.2.2.3 *Cumulative Impacts*

It is assumed that new workers associated with the No Action Alternative would reside in the communities in the same proportion as listed in Table 5.2.2.2–1. More than 220 new hires would reside in these 11 communities, ranging from 111 workers in the city of Livermore to 6 in the cities of Dublin and Oakland. In addition, an estimated 74 workers would be distributed throughout other communities in the Bay Area and central San Joaquin Valley. The No Action Alternative would therefore contribute to the cumulative demand for housing in the region associated with new employment opportunities created by planned and approved projects in the region. However, because vacancy rates are high enough to meet the demand of new employees within Livermore, with the highest concentration of LLNL employees, it is assumed that other parts of the region could meet the housing demand created by the increase in local job opportunities.

5.2.3 *Community Services*

This section analyzes the impacts to community services associated with implementation of the No Action Alternative. The section organizes the impact analysis by site and type of service.

5.2.3.1 *Relationship with Site Operations*

This section summarizes the relationship between projects described in Section 3.1 for the No Action Alternative and the community services impact analysis. In general, the effects of projects under the No Action Alternative on community services are related to additional employment opportunities and changes in floorspace. Employment under the No Action Alternative is detailed in Section 5.2.2. New construction projects, as listed in Section 3.1, would add to floorspace, but D&D projects, as part of an overall laboratory-wide consolidation, would decrease floorspace. Employment parameters are listed in Table 5.2.3.1–1.

TABLE 5.2.3.1–1.—Input Parameters for Community Services Analysis Under the No Action Alternative

Parameter	Units	Site	Existing Environment	No Action Alternative
Employment	Number of personnel	Livermore Site	10,360	10,650
		Site 300	240	250

5.2.3.2 *Impact Analysis*

Livermore Site

Fire Protection and Emergency Services

The No Action Alternative would not affect onsite fire protection and emergency services, or offsite fire protection agencies. The No Action Alternative would result in a 3 percent employment increase and incremental changes in floorspace. Therefore, demands for fire protection and emergency services because of the No Action Alternative would be similar to those under present conditions. The LLNL Fire Department currently provides adequate onsite service. The adequacy of these services would continue to be evaluated on an annual basis, and personnel, equipment, and facilities would be increased or upgraded as necessary.

LLNL interacts infrequently with offsite fire protection agencies. Interaction would remain similar to the current level under the No Action Alternative. Current fire protection and emergency service needs of LLNL do not affect offsite fire protection agencies' ability to provide service within their respective jurisdictions or mutual aid network. Thus, minimal impacts are anticipated.

Police Protection and Security Service

The 3 percent employment increase under the No Action Alternative would not affect onsite security services or offsite police protection agencies. Under the No Action Alternative, demands for security services would remain similar to those under present conditions. The LLNL Safeguards and Securities Department currently provides adequate onsite security protection.

LLNL interacts infrequently with offsite police protection agencies. Under the No Action Alternative, interaction is expected to remain similar to the current levels. Current security needs of LLNL do not affect the ability of offsite police protection agencies to provide service within their respective jurisdictions or emergency response network. Thus, minimal impacts are anticipated.

School Services

Employment at LLNL would increase by approximately 300 under the No Action Alternative; therefore, the number of students associated with this alternative would increase as well. The number of new students is estimated using the current percentage of Livermore residents enrolled in the Livermore Valley Joint Unified School District (19 percent), multiplied by the number of new Livermore residents that would be expected under the No Action Alternative, as discussed in Section 5.2.2. The additional 312 Livermore residents under the No Action Alternative would result in about 60 children expected to enroll in the Livermore Valley Joint Unified School District. Additional students generated from increased employment at LLNL would be expected in the school system incrementally over the next 10 years. Although several district schools are near capacity, there is currently adequate space district-wide (Miller 2003). The 60 student increase represents 0.4 percent of district enrollment. Based on an expected annual enrollment growth rate of 1.5 percent from Livermore's Housing Implementation Plan, the 60 student increase would be 2.2 percent of the total enrollment growth by the year 2014.

Because the district's facilities are adequate to meet current student demand, the addition of 60 students to the existing facilities would result in minimal impact on the district's ability to plan for and provide service within its jurisdiction.

As discussed in Section 5.2.2, the employment of 300 new workers at LLNL under the No Action Alternative would lead to an additional 300 indirect jobs within the ROI. Because of the relatively high proportion of new LLNL workers that would reside in the city of Livermore, some of those additional jobs would likely be created within the community. If the distribution of indirect worker residences were the same as for LLNL workers, 60 students could be added to the Livermore Valley Joint Unified School District in addition to the 60 students projected for LLNL workers, as described above. However, the actual number of students added through indirect jobs would be much less than 60, as many of the additional jobs and worker residences to support LLNL workers residing in Livermore would be created in neighboring communities and other areas throughout the ROI.

Nonhazardous Solid Waste Disposal Services

The No Action Alternative would not result in an adverse impact on the ability of Alameda County to provide solid waste disposal space. The amount of solid waste generated at the Livermore Site for landfill disposal under the No Action Alternative, based on employment increase, would be 4,600 metric tons, or approximately 3 percent more than recent levels. The Altamont Landfill is estimated to have sufficient capacity to receive waste until the year 2038 (Hurst 2003). The current total permitted throughput at the Altamont Landfill is 11,150 tons per day (SWIS 2002). The increase in solid waste under the No Action Alternative would represent less than 0.01 percent of permitted landfill throughput. Therefore, due to the remaining lifespan of this landfill, minimal impacts to solid waste disposal within the county are anticipated.

Site 300

Impacts discussed above for the Livermore Site for fire protection and emergency services, police protection and security services, school services, and nonhazardous solid waste disposal services are also applicable to Site 300. As employment at Site 300 is projected to increase by only 10 employees over current levels, anticipated impacts to community services are minimal.

5.2.3.3 Cumulative Impacts

Livermore Site

The 3 percent employment increase and incremental change in floorspace under the No Action Alternative would result in demands on fire protection and emergency services, as well as police protection and security services that are similar to the current level. LLNL fire protection and security staff currently provides adequate service onsite and current needs do not affect the ability of offsite agencies to provide service within their respective jurisdictions. Therefore, the No Action Alternative would not result in a cumulative impact on either onsite or offsite fire protection and emergency services or police protection and security services.

Employment at LLNL would increase by approximately 300 employees, 111 of which would reside in the city of Livermore. The projected 60 student increase in enrollment within the Livermore Valley Joint Unified School District would contribute to the cumulative demand for school services. As new school capacity would be required for the 2,700 additional students arising from non-LLNL-related increases to the expected population increases in the region projected during the next 10 years, the portion of the student increase attributable to the No Action Alternative (2 percent) would be within extra capacity design criteria.

Under the No Action Alternative, the rate of nonhazardous solid waste generated at the Livermore Site and Site 300 for disposal would be within 3 percent of present levels. Thus, this alternative would not contribute to additional cumulative demand for nonhazardous landfill capacity at the Altamont Landfill or impact operations at the Tracy Material Recovery and Solid Waste Transfer Station.

Site 300

Cumulative impacts discussed above for the Livermore Site for fire protection and emergency services, police protection and security services, and nonhazardous waste disposal services are also applicable to Site 300. However, there would only be an increase of 10 employees at Site 300, therefore there would be no measurable additional strain on the local school systems.

5.2.4 Prehistoric and Historic Cultural Resources

This section analyzes the impacts to cultural resources associated with implementation of the No Action Alternative. The impact analysis is organized by location and type of resource. Steps taken to reduce potential impacts are also discussed, as are the measures to be implemented to ensure compliance with the NHPA.

5.2.4.1 Relationship with Site Operations

This section summarizes the relationship between projects described in Section 3.2 under the No Action Alternative and the analysis of cultural resources. In general, those projects with the potential to impact these resources include construction of new facilities and infrastructure, as well as D&D, rehabilitation, and renovation of existing facilities.

5.2.4.2 Impact Analysis

Livermore Site

The probability of affecting prehistoric resources at the Livermore Site would be very low because: (1) field and archival research have not identified any prehistoric resources; (2) the geomorphic setting of the site makes it unlikely that any such resources exist; and (3) extensive modern horizontal and vertical development has disturbed much of the site. Although no impacts to prehistoric resources would be expected, unrecorded subsurface prehistoric resources still could be inadvertently discovered during construction or other ground-disturbing activities.

The inadvertent discovery of cultural material at the Livermore Site would be addressed as described above. No additional impacts to these resources are expected.

The No Action Alternative would have the potential to impact important historic buildings and structures on the Livermore Site through D&D, rehabilitation, and renovation of existing facilities. However, implementing the Programmatic Agreement (Appendix G) would avoid, reduce, or mitigate any impacts from these actions.

Site 300

Impacts to known prehistoric and historic resources at Site 300 would be unlikely to result from the No Action Alternative. NNSA recognizes the sensitivity of the resources and has established buffer zones to protect them. Implementation of the Programmatic Agreement (Appendix G) and continuation of current management practices would result in protection of these sensitive areas. Although no impacts to known resources would be expected, there is still the possibility that unrecorded subsurface prehistoric or historic resources could be inadvertently discovered during construction or other ground-disturbing activities.

The inadvertent discovery of cultural material at Site 300 would be addressed as described above for the Livermore Site. No additional impacts to these resources are expected.

The No Action Alternative would have the potential to affect important historic buildings and structures on Site 300 through D&D, rehabilitation, and renovation of existing facilities. However, implementing the Programmatic Agreement (Appendix G) would avoid, reduce, or mitigate any impacts from these actions. Therefore, no additional impacts are expected.

5.2.4.3 Cumulative Impacts

The Livermore Valley has undergone tremendous growth and development over the past decade. Because preservation measures such as Section 106 are only initiated when Federal agencies are involved, it is likely that the onset of development has caused the irretrievable loss of cultural resources in the region. Since cultural resources exist at both the Livermore Site and Site 300, future program activities could result in resource loss and add to regional attrition of these resources. Any potential impacts to cultural resources at LLNL would be mitigated through implementation of the Programmatic Agreement (Appendix G), thereby reducing LLNL's contribution to resource attrition.

5.2.5 Aesthetics and Scenic Resources

This section analyzes the potential impacts of the No Action Alternative on aesthetics and scenic resources. The existing aesthetics and scenic resources are discussed in detail in Chapter 4, Section 4.6, of this LLNL SW/SPEIS.

5.2.5.1 Relationship with Site Operations

This section summarizes the relationship between the projects described in Section 3.2 under the No Action Alternative and the analysis of aesthetics and scenic resources. In general, effects to aesthetics and scenic resources would be limited to construction of buildings and infrastructure located in areas visible to public viewing.

5.2.5.2 *Impact Analysis*

Livermore Site

Activities under the No Action Alternative would include improvements to existing buildings and infrastructure, D&D of existing buildings, and construction of new facilities. Development and modifications would largely occur within the developed portion of the site, would be similar in character to surrounding uses, and would be largely screened from public view by the surrounding fencing and trees. Based on previous LLNL landscaping and development practices, it is anticipated that development of these projects at the Livermore Site under this alternative would be largely consistent with the existing character of the site.

Views of the Livermore Site resemble a campus-like or business park-like setting, including buildings, internal roadways, pathways, and open space. Although construction or modifications under the No Action Alternative may alter these views to some degree, these changes would have no impact on the visual character of the site.

Only two projects would be built in areas open to public viewing and would become a part of existing view sheds. These include the International Security Research Facility/Sensitive Compartmented Information Facility near the southwest side of the site near Vasco Road, and the East Avenue Security Upgrade and construction of new entrance gates at each end of the road. The new facilities would be visible from the adjacent residential areas and Vasco Road, which is a designated scenic route by the route element of the Alameda County General Plan (Alameda County 1994). Construction activities for the new facilities and supporting infrastructure would cause a short-term adverse impact on the views from these roads. Similar to other proposed interior development, the new facilities would be similar in size and character to existing structures at the Livermore Site and would be landscaped to be compatible with the surrounding campus-like setting. Therefore, although the facilities would be more visible from the immediate surrounding area, they would not alter the site's overall appearance or character.

The Livermore Site is also visible in the middle ground and background view sheds from the surrounding residential and rural areas and designated scenic routes. Viewers from these areas would not notice a change in the built environment within the site. While viewers in these areas might perceive a slight increase in the built space at the facility because of the two projects described above, the development would occur within a context of similar development and would be indefinite as a result of the viewing distance. Also, the view of the site would often be obscured by intervening topography, vegetation, and structures. The site would remain compatible with local and county scenic resource plans and policies.

Consequently, the changes to the built environment as a result of the No Action Alternative would have no long-term impacts on the visual character of the Livermore Site, views of the site from public viewing areas, or existing view sheds of the surrounding environment. No additional impacts are expected to visual resources.

Site 300

Activities under the No Action Alternative would include improvements to existing buildings and infrastructure. Development and modifications would largely occur within the developed

portion of the site in the General Services Area (GSA) and would be similar in character to surrounding uses. Based on previous LLNL landscaping and development practices, it is anticipated that the development of these projects at Site 300 under this alternative would be largely consistent with the existing character of the site. One project would occur outside the developed portion of Site 300. The Wetlands Enhancement Project would be located in low-lying areas not visible to the public. This project would involve modification of wetland areas to be more conducive to California red-legged frog habitat, with no change to the view shed for workers at Site 300. Consequently, there would be no negative impacts to the visual character of the site.

Views of Site 300 resemble a campus-like or business park-like setting in the GSA, and natural undeveloped areas everywhere else. Although construction or modifications under the No Action Alternative might alter these views to some degree, these changes would have no impacts on the visual character of the site.

Site 300 is visible from Tesla Road, Corral Hollow Road, and the Carnegie State Vehicular Recreation Area. Tesla Road is designated as a scenic route by the scenic route element of the Alameda County General Plan (Alameda County 1994). When approaching Site 300 from the west on Tesla Road, views of the site consist of rolling hillsides. No structures or landscaping on Site 300 are presently visible from this roadway, and no construction or upgrade activities are proposed in the southwest corner of the site.

In general, views of Site 300 from Corral Hollow Road are limited due to distance and intervening topography and consist primarily of buildings and infrastructure in the GSA. Changes proposed at Site 300 would either occur in the interior of Site 300, which is not visible from the surrounding area; would have minor effects on aesthetics such as modification of existing facilities or utility upgrades; or would occur in the GSA where such changes would be consistent with the existing visual character of the site. Construction and facility improvement activities in the GSA would be visible from Corral Hollow Road and would have short-term visual impacts. However, these activities would be obscured by intervening topography, fencing, vegetation, or structures, and would be temporary.

Views of Site 300 from the Carnegie State Vehicular Recreation Area consist primarily of undeveloped hillsides. Due to the large size of the site, the few construction and maintenance activities planned for the interior of the site would not be visible from the recreation area and would not change the middle ground and background views of the site. Overall, Site 300 would remain compatible with local and county scenic resource plans and policies.

Consequently, no impacts of Site 300 would occur to the built environment as a result of the No Action Alternative, to views of the site from public viewing areas, or to existing view sheds of the surrounding environment.

5.2.5.3 *Cumulative Impacts*

There are no planned projects in the vicinity of the Livermore Site and Site 300 that, in combination with LLNL activities, would have an adverse impact on existing view sheds or the

surrounding environment. Under the No Action Alternative, there would be no cumulative impacts to aesthetics and scenic resources in the region.

5.2.6 Geology and Soils

This section analyzes the impacts to geology and soils associated with the implementation of projects described in Section 3.2 under the No Action Alternative. The impact analysis is organized by geologic resources, topography and geomorphology, and geologic hazards.

5.2.6.1 Relationship with Site Operations

Under the No Action Alternative, there are future facilities at the Livermore Site that would generally be located in the undeveloped areas (Figure 5.2.6.1–1) and are assessed for potential soils disturbance impacts. These facilities are listed in Table 5.2.1.2–1. In general, any future development in the developed area at the Livermore Site would generally involve areas where soils have already been disturbed and therefore would not involve any impacts to soils.

At Site 300, one future project would be included under the No Action Alternative with potential for disturbing undeveloped soils. Under the Site 300 Wetlands Enhancement Project, artificial wetlands near Buildings 801, 827, 851, and 865 totaling approximately 0.62 acres created by surface water runoff would be terminated. These wetlands would be replaced by enhancing wetland habitat in other locations. Approximately 1.09 acres would be disturbed as part of this project.

5.2.6.2 Impact Analysis

Geologic Resources

Livermore Site

No known aggregate, clay, coal, or mineral resources would be adversely affected by the No Action Alternative. None of the activities under the No Action Alternative would take place near or upon any known or exploitable mineral resources, unique geologic outcrops, or other unique geologic features. No impacts to farming or grazing are expected.

Under the No Action Alternative, several facilities would be built in the undeveloped areas at the Livermore Site. Table 5.2.1.2–1 presents these facilities along with the estimated amount of land that would be disturbed by their construction. A total of 462,000 square feet would be disturbed as a result of construction under the No Action Alternative.

As discussed in Section 4.8, fossils were discovered in the peripheral parts of the excavation for the NIF. The fossil localities were found 20 to 30 feet below the present surface. Under the No Action Alternative, the potential would exist for the inadvertent excavation of fossils within this depth range during construction. Should any buried materials be encountered, LLNL would evaluate the materials and proceed with recovery in accordance with the requirements of the *Antiquities Act*.

Site 300

No known aggregate, clay, coal, or mineral resources would be adversely affected by the No Action Alternative. None of the activities that would proceed under the No Action Alternative are near or on any known or exploitable mineral resources, unique geologic outcrops, or other unique geologic features. None of the activities would affect farming or grazing. Under the No Action Alternative, the Site 300 Wetlands Enhancement Project and the connection to the Hetch Hetchy aqueduct would be completed at Site 300. The termination of water flow to the 0.62 acres of wetlands would result in the drying of the soils at the associated locations, but no disturbance would occur. Enhancement of wetland habitat at Mid Elk Ravine and the seep at the former Super High Altitude Research Project (SHARP) Facility would involve the disturbance of 1.09 acres of soils. There would be no impacts to any known or exploitable mineral resources or unique geologic features.

Several vertebrate fossil deposits have been found on Site 300 and in the vicinity of Corral Hollow. The fossil finds are generally widely scattered, and no significant invertebrate or botanical fossil localities have been identified on Site 300 or in the surrounding area (Hansen 1991). Under the No Action Alternative, there are no projects involving the disturbance of those areas, therefore, there would be no impacts to any known fossil deposits.

Topography and Geomorphology

Livermore Site

The No Action Alternative would not include project work that would impact the topography or geomorphology of the Livermore Site, and no construction or excavation projects are planned that would alter these features of the landscape. As only the best management practices would be employed to minimize erosion associated with ongoing operations, no additional impacts are expected.

Site 300

The No Action Alternative would not include project work that would impact the topography or geomorphology of Site 300. No construction or excavation projects are planned that would alter these features of the landscape. As only the best management practices would be employed to minimize erosion associated with ongoing operations. No additional impacts are expected.

Geologic Hazards

The geologic hazards associated with the Livermore region are part of the character of that region. The hazards exist regardless of the presence of human activities, buildings, or facilities. Therefore, there is no difference in the geologic hazards among the alternatives. Potentially strong earthquakes ground motion sources at Livermore Site and Site 300 are discussed briefly below. Detailed discussion is presented in Section 4.8 and Appendix H and includes the major regional fault zones as well as local faults.

The information on geologic hazards is part of the input to the design, engineering, and operation of the LLNL facilities. The risks from geologic hazards are associated with the potential for releases from these facilities of hazardous or radioactive materials due to spills, fires, or explosions resulting from earthquakes or landslides. The discussion of the facilities and the risks from geologic hazards are presented in Section 5.5, Appendix A, and Appendix D.

Livermore Site

The local faults in the Livermore Valley region are the main seismic hazard to the Livermore Site. The Livermore Site Seismic Safety Program recently performed a new assessment of the geologic hazards at the Livermore Site. Although new data and methodologies were used, the most recent study reports essentially the same results as previous studies for the prediction of the peak ground acceleration. Appendix H, Seismicity, presents the results of these seismic hazard analyses and the evaluation of structures. Maximum horizontal peak ground accelerations at the Livermore Site for return periods of 500, 1,000, and 5,000 years are 0.38 *g*, 0.65 *g*, and 0.73 *g*, respectively. The unit *g* is equal to the acceleration due to the gravity of the Earth or 9.8 meters/second/second (32 feet/second/second). The technical basis for these peak ground accelerations values is provided in Appendix H. These peak ground accelerations are evaluated along with other factors to determine the level of ground motion facilities would experience during earthquakes.

A large earthquake on the Greenville Fault is projected to produce the maximum ground-shaking intensities in the Livermore area with a Modified Mercalli (MM) intensity ranging from strong (MM VII) to very violent (MM X). The MM IX level is associated with damage to buried pipelines and partial collapse of poorly built structures (City of Livermore and LSA 2002). Design and location requirements for new facilities, including waste management facilities, must take into account distance from active faults and the ground shaking to be expected within certain probabilities. The level of active seismicity results in the classification of the area as Seismic Risk Zone 4, the highest risk zone in the California Building Code (City of Livermore and LSA 2002). Adverse impacts to proposed structures, related infrastructure, and surrounding communities could occur from hazardous materials release and/or structural failure of buildings and facilities following a major seismic event.

Site 300

A seismic hazard analysis of Site 300 produced peak acceleration estimates of 0.32 *g*, 0.38 *g*, and 0.56 *g* for return periods of 500, 1,000, and 5,000 years, respectively, for the Building 854 Complex near the western boundary of the site, and 0.28 *g*, 0.34 *g*, and 0.51 *g* for the Building 834-836 Complex near the eastern boundary (TERA Corp. 1983). A recent seismic hazard analysis of the Livermore Site (see Appendix H) and surrounding area described the Corral Hollow-Carnegie Fault zone as potentially active and calculated its contribution to seismic risk as just below that for the Calaveras Fault and greater than any other faults in the region. The Elk Ravine Fault was not considered active in that analysis.

There is a potential for surface faulting at Site 300. Buildings 899A and 899B at the pistol range could experience ground deformation during a major earthquake occur on the Carnegie Fault. However, these two structures contain no hazardous or radiological materials and have very low

occupancies. A greater number of facilities are located near the Elk Ravine Fault, however, that fault is not considered active.

Additionally, potential exists for seismically induced landslides at Site 300 due to the presence of landslide deposits and relatively steep slopes. The potential for slope instability is greater on northeast-facing slopes underlain by the Cierbo Formation. Buildings 825, M825, 826, M51, 847, 851A, 851B, 854, 855, and 856 are located on old landslides deposits. The potential for ground deformation at these buildings is considered to be moderate to high.

A landslide could result in spills, fire, explosions, or burial of facilities within its path. The hazards and impacts of spills, fire, and explosions, regardless of cause are discussed in Section 5.5 and Appendices A and D. The impacts of burial of materials due to a landslide would be similar to spills and the firing of explosives at these facilities. These facilities have material limits under which they work on batches of materials. The working limits for explosives are close to the amounts detonated at the firing sites. The spread of materials into the environment when the explosives are detonated would be similar to the amount of materials that would be buried in a landslide.

5.2.6.3 *Cumulative Impacts*

SNL/CA projects approximately 100 acres of soil disturbance in connection with their activities and future facilities. A large portion of the disturbance would occur within areas that are already developed. The soils in the vicinity of the LLNL are capable of supporting agriculture. While there is a large amount of undeveloped land in Alameda County, continuing development in the immediate vicinity of the LLNL would contribute to the cumulative loss of agricultural land. The projects associated with the No Action Alternative would not contribute to the overall loss of agricultural land because the LLNL has been committed to R&D/industrial use instead of agriculture for decades.

5.2.7 **Biological Resources**

This section analyzes the potential impacts of the No Action Alternative on biological resources, including vegetation, wildlife, protected and sensitive species, and wetlands. The current operations and existing biological resources are discussed in detail in Appendices E and F and summarized in Chapter 4, Section 4.9, of this LLNL SW/SPEIS.

5.2.7.1 *Relationship with Site Operations*

This section summarizes the relationship between projects described in Section 3.1 for the No Action Alternative and the ecological impact analysis. In general, the effect of No Action Alternative projects on biological resources would occur primarily in areas that have been previously disturbed at the Livermore Site and Site 300 by construction, maintenance, wildfire prevention, and security activities.

5.2.7.2 *Impact Analysis*

Vegetation

Livermore Site

Under the No Action Alternative at the Livermore Site, approximately 462,000 square feet (10.6 acres) of land disturbance would occur, consisting mainly of building construction, facility upgrades, and operational modifications (Section 5.2.6.3). This equates to approximately 1.6 percent of undeveloped land for new construction. The following projects would be constructed in undeveloped areas: the East Avenue Closure, the Extension of Fifth Street, the International Security Research Facility, and a general office building as noted in Table 5.2.1.2–1. Some of the new facilities that would be constructed in the previously developed areas of the Livermore Site include the BSL-3 and Edward Teller Education Center. A complete list of projects is provided in Appendix A, Section A.1.5.

The No Action Alternative would affect vegetation principally by clearing land for construction projects. Activities include building construction, upgrading existing buildings, road and parking lot repairs, modification of site energy management, and other activities. Projects under the No Action Alternative would occur on land that currently does not support vegetation, that has been landscaped, or that supports an early successional plant community indicating the presence of recent land disturbance. Therefore, the impacts of the No Action Alternative on vegetation would be minimal.

Site 300

The No Action Alternative would affect vegetation at Site 300 principally by clearing land for infrastructure modernization (e.g., new or upgraded facilities; grading and maintaining fire trails; storm drainage system maintenance; culvert maintenance and replacement; termination of surface water releases at several facilities). New facility construction would support the Site 300 Revitalization Project, the Wetland Enhancement Project, and Response Training Center. Under the Site 300 Revitalization Project, vegetation would not likely be disturbed since only distribution of water from the Hetch Hetchy aqueduct infrastructure that has already been built remains under this project. Components of the Response Training Center that might impact biological resources have already been completed. These activities would occur primarily on previously disturbed land occupying less than 350 acres. Areas where buildings and related infrastructure are present do not support vegetation, have been landscaped, or support an early successional plant community indicative of recent land disturbances. Approximately 1.86 acres of disturbance of vegetation would also occur during construction of the Wetland Enhancement Project, which is further discussed in Section 5.2.7.3 and Appendix E, Section E.2.2. The impact of the No Action Alternative on Site 300 vegetation would be minimal.

Prescribed burning would continue to be conducted annually as a means of wildfire control on approximately 2,000 acres. Burning typically would begin at the end of May and last several weeks, though this schedule depends on the length of the growing season and amount of rainfall (LLNL 2003q). Native grassland communities on Site 300 occur almost exclusively in areas with annual prescribed burning (Appendix E, Figure E.1.1.3–1), and researchers have previously

noted that frequent fire is required to establish and maintain grasslands dominated by native grasses in lowland California (Barry 1972, BioSystems 1986a, Heady 1972). These annual prescribed burns may have an additional beneficial impact by reducing the presence of certain invasive plants, such as yellow starthistle (Lass et al. 1999, Pollak and Kan 1998).

Tritium Levels in Vegetation and Commodities

LLNL has historically released tritium to the air during routine operations and, occasionally, by accident. Tritium is the only radionuclide released from LLNL activities that occurs in detectable concentrations in vegetation and foodstuffs. In 2001, tritium was measured quarterly in vegetation at 18 fixed locations in the Livermore Valley, San Joaquin County, and Site 300. This monitoring was performed in support of an NNSA commitment to determine if there is a measurable buildup of radionuclides in the environment (LLNL 2002w).

LLNL tritium impacts on vegetation in the Livermore Valley remained minimal in 2001. In the Livermore Valley, the maximum potential dose from ingested tritium is based on the conservative assumptions that an adult's diet consists exclusively of leafy vegetables with the measured tritium concentrations, as well as meat and milk from livestock fed on grasses with the same concentrations. Nevertheless, based on these extremely conservative assumptions, the maximum potential dose from ingestion of vegetables, milk, and meat for 2001 for the Livermore Valley is 0.0069 millirem per year (LLNL 2002w).

With the exception of vegetation from previously identified sites of contamination, the tritium levels at Site 300 were below the limits of detection and comparable to those observed in previous years. The areas where tritium is known to be present in the subsurface soil are well delineated and localized. The calculated maximum potential annual ingestion dose from vegetation, based on the maximum value of 73,000 picocuries per liter, is 1.3 millirem. This dose, based on the conservative modeling assumptions described above, is theoretical, but nevertheless small, because vegetation at Site 300 is not allowed to be harvested for consumption by people or used as feed for livestock (LLNL 2002w).

In 2001, 12 bottles of wine produced in the Livermore Valley, 6 bottles of California wines from outside the Livermore Valley, and 4 bottles of wine from European vineyards were analyzed for tritium. All the wine tritium concentrations were far below drinking water limits. The highest tritium concentration in Livermore Valley wine (70 picocuries per liter) represents only 0.35 percent of the California drinking water standard (20,000 picocuries per liter). Based on the conservative assumption that wine is consumed at the same rate as the average consumption of water (370 liters per year or about 1 liter per day), the annual dose that corresponds to the highest detected 2001 Livermore Valley tritium concentration in wine is 1.7×10^{-3} millirems. For a hypothetical individual consuming 1 liter per week using the median tritium values from the three sampling areas, the annual doses from Livermore, Europe, and California wines would be 1.3×10^{-4} millirem, 1.1×10^{-4} millirem, and 3.7×10^{-5} millirem, respectively (LLNL 2002w).

The LLNL contribution to tritium exposure levels in the Livermore Valley has trended downward by approximately one order of magnitude as evidenced by the decline in the dose to the site-wide MEI at the Livermore Site between 1990 and 2001 (Appendix B, Table B.4.10.1–2). A similar trend was noted for tritium released in air during the same period

(Table 4.10.5–1). In general, the median tritium concentrations in plant water for vegetation at the Livermore Site and Site 300 show a similar downward trend between 1988 and 2001, when one sampling location at the Livermore Site and two sampling locations at Site 300 were excluded where tritium contamination has been identified (LLNL 2002w).

Under the No Action Alternative, it is anticipated that tritium impacts on vegetation and wine might increase slightly as Tritium Facility activities at the Livermore Site would increase. Tritium emissions would increase from approximately 30 curies in 2002 to 210 curies per year for the foreseeable future. In addition, Site 300 and NIF would begin to use tritium. However, any increase in tritium impacts on vegetation and wine may be difficult to detect due to the historically low levels currently being recorded and operational safeguards that are in place.

Wildlife

Livermore Site

The No Action Alternative would result in the clearing of 552,000 square feet of vegetation with a commensurate loss of wildlife habitat at the Livermore Site for proposed projects on land that has been previously disturbed. Any impacts to animals would be minimal and some displaced animals may be able to occupy adjacent habitat.

Site 300

The No Action Alternative would result in minimal clearing of vegetation with little loss of wildlife habitat at Site 300 for the Site 300 Revitalization Project, the Wetland Enhancement Project, and the Response Training Center. Both the Site 300 Revitalization Project and Response Training Center have been completed relative to components that might impact biological resources. Some loss of less mobile animals, such as reptiles and small mammals, could occur during construction of the Wetland Enhancement Project. Any impacts to the animal populations would be very small and some displaced animals would be able to occupy adjacent habitat.

Protected and Sensitive Species

This section discusses species listed as endangered, threatened, or proposed under the Federal *Endangered Species Act* and *California Endangered Species Act* affected by the No Action Alternative as well as unaffected species with similar status or indicated as species of concern. Additionally, species protected by the *Migratory Bird Treaty Act* and certain rare plants listed by the California Native Plant Society found at Site 300 are also discussed. The discussion for Site 300 is more detailed than that for the Livermore Site, which has been more disturbed. The species discussed include those for which information exists. Mitigation measures for listed species discussed below may be modified as a result of subsequent consultation with the USFWS and California Department of Fish and Game (CDFG).

Livermore Site

Under the No Action Alternative, LLNL would continue to fulfill its obligation to maintain Arroyo Las Positas (previously modified to handle a 100-year flood event) and onsite tributaries

for flood capacity. The focus of the Las Positas Maintenance Project is to allow the function and needs of onsite drainage capacity of the arroyo to be met in a timely and consistent manner without overlooking the preservation and habitat conservation requirements pertaining to the federally threatened California red-legged frog (LLNL 1998a, USFWS 1997, DOE 2002j, USFWS 2002e). For further details of the Arroyo Maintenance Project and ongoing consultation with the USFWS for this project, see Appendix E, Section E.2.1.

No California red-legged frogs have been identified in 1,800 feet of Arroyo Seco within the Livermore Site boundaries from the Vasco Road bridge to the East Avenue culvert (LLNL 2003ab). However, this segment of Arroyo Seco could be used by populations of that species in the vicinity of the site. A separate Biological Assessment has been prepared to assess the impacts of the proposed Arroyo Seco Management Plan and was submitted to the USFWS in August 2003.

Formerly designated critical habitat for the California red-legged frog at the Livermore Site is shown in Chapter 4, Figure 4.9.3–1. Construction of new structures proposed under the No Action Alternative (e.g., BSL-3 Facility and the Edward Teller Education Center) at the Livermore Site would not be in formerly designated critical habitat for the California red-legged frog or areas where this species typically occurs. Other operations would not be anticipated to result in the loss of formerly designated critical habitat for this species.

In 1997, bullfrogs were noted in the southern sediment basin, a sediment trap south of the Drainage Retention Basin. A bullfrog management program, coordinated with the USFWS, was initiated to minimize the adverse impact of this invasive species, which is a predator of the California red-legged frog (DOE 2002j, USFWS 2002e). See Appendix E for further discussion.

Measures to protect the California red-legged frog during Las Positas Maintenance Plan high-bank mowing and pruning activities would continue. These previously approved USFWS measures (LLNL 1998a, USFWS 1998) include:

- The site wildlife biologist would survey project sites for California red-legged frogs prior to work being initiated.
- Areas identified as having California red-legged frogs would be marked with LLNL special-status species flags, tape, or other visible demarcations. A map would be disseminated to the project crew with the sensitive frog location exclusion zones clearly outlined.
- All vegetation cutting and removal in these areas would be performed in a manner that would not directly impact frogs.
- Vegetation cutting within 50 feet of the frog pool in Reach 1 and the two pools in Reach 2 would be performed using rotary tools and to a height of at least 24 inches. All vegetation cutting within this area would be performed by a qualified wildlife biologist.

Measures to protect the California red-legged frog during Las Positas Maintenance Plan dredging activities in the Las Positas Arroyo and elsewhere would continue. These previously-approved USFWS measures (LLNL 1998a, USFWS 1998) include:

- The site wildlife biologist would survey project sites for California red-legged frogs prior to work being initiated.
- Areas identified as having California red-legged frogs would be marked with LLNL special-status species flags, tape, or other visible demarcations.
- Prior to the project impact activity, these areas would be searched and any frogs found would be collected (by a USFWS-approved biologist) and placed in a ponded enclosure until the annual maintenance procedures of dredging, etc., have been completed; then they would be returned to the arroyo at or near the location where they were collected.
- Prior to new construction or security buffer maintenance activities, construction sites would be surveyed by the site wildlife biologist for California red-legged frogs prior to work being initiated.

In addition to the California red-legged frog management activities discussed above, there are various measures taken at the Livermore Site to protect birds covered by the *Migratory Bird Treaty Act*. The white-tailed kite, a California species of special concern, is known to nest at the Livermore Site. Therefore, construction activities are avoided to the extent practical near active white-tailed kite nests until young are fledged. All trees identified for removal are inspected for active bird nests in order to comply with the *Migratory Bird Treaty Act*.

Site 300

Affected Species

The No Action Alternative would affect three federally listed or proposed species (California red-legged frog, California tiger salamander, and Alameda whipsnake) and rescinded critical habitat for the California red-legged frog and Alameda whipsnake. The first affected species is the California red-legged frog, a federally listed threatened species. Formerly designated critical habitat for the California red-legged frog and its breeding and nonbreeding locations at Site 300 are shown in Figure 4.9.3–3. Proposed termination of surface water releases for an artificial wetland at Building 865 would affect this species, because it has been a known breeding location for 6 years. However, the elimination of these wetlands that were the result of past cooling tower discharges and are now maintained through irrigation with potable water that would return this part of Site 300 closer to its ecological state prior to the discharges and irrigation. Termination of water to a small, artificially maintained wetland at Building 801 would eliminate a potential breeding site for this frog species, although no California red-legged frogs occur at this site. Elimination of very small wetlands associated with the cooling towers at Buildings 851 and 827 would eliminate two low quality habitat locations for the California red-legged frog where frogs have not been observed for the past 6 years. Appendix E, Section E.2.2.6, provides further details on potential impacts of this project and mitigation measures taken to minimize those impacts. Proposed termination of surface releases at Buildings 865, 851, and 827 was coordinated with USFWS. Approval was received contingent upon implementation of mitigation measures in a recent Biological Assessment and related biological opinion (Jones and Stokes 2001, USFWS 2002b). This proposed termination could start as early as 2004 (LLNL 2003ab).

Grading of fire trails disturbs sediment that could directly affect California red-legged frog habitat suitability. However, the use of best management practices could reduce adverse effects to this species by minimizing erosion of fire trails into drainages as discussed in Appendix E, Section E.2.2.6 (Jones and Stokes 2001). Two such practices may include the use of native grasses to reseed disturbed areas that are prone to erosion, and selective installation of erosion control fabrics in areas where applicable.

LLNL is proposing to mitigate the 0.62-acre artificial wetlands at Buildings 801, 865, 851, and 827, removed by continued operations at Site 300 under the No Action Alternative, by enhancing selected areas and increasing breeding opportunities for the California red-legged frog. These designated areas would be managed and protected for the California red-legged frog and California tiger salamander. A minimum of 1.86 acres of wetland habitat would be enhanced and managed for the California red-legged frog and California tiger salamander. Potential mitigation sites for enhancement include the wetlands at the seep at the SHARP Facility and the Mid Elk Ravine. This mitigation measure has been previously addressed in a recent Biological Assessment and related Biological Opinion (Jones and Stokes 2001, USFWS 2002b) (see Appendix E, Section E.2.2.9, for more information).

The second affected species is the California tiger salamander, a federally listed proposed threatened species (68 FR 28649). Chapter 4, Figure 4.9.3–4, shows wetland locations where this species has been observed at Site 300. Grading of fire trails typically occurs mid through late spring. Mortality to individuals is unlikely to occur. Although proposed storm drainage and culvert improvement activities could result in direct mortality of California tiger salamanders, proposed mitigations for the California red-legged frog contained in a recent biological assessment and related biological opinion would greatly minimize the potential for such adverse impacts (Jones and Stokes 2001, USFWS 2002b). Appendix E, Section E.2.2.6, provides further details on mitigation measures taken to minimize impacts of the No Action Alternative on this species.

The third affected species is the Alameda whipsnake, a federally listed threatened species. Figure 4.9.3–5 shows critical habitat and potential habitat for the Alameda whipsnake at Site 300. Grading of fire trails as well as prescribed burns in grasslands adjacent to Alameda whipsnake habitat in sage scrub and rock outcrops have the potential to affect this species. However, a biological assessment and related biological opinion address mitigations that would minimize the potential for adverse effects from these proposed activities (Jones and Stokes 2001, USFWS 2002b). Fire trail maintenance and prescribed burns are annual activities that would continue during the 10-year period covered by this LLNL SW/SPEIS. Section E.2.2.6 provides further details on measures taken to minimize impacts of the No Action Alternative on this species.

Unaffected Species

Activities under the No Action Alternative would not affect the following federally listed endangered, threatened, and candidate species: the large-flowered fiddleneck, the San Joaquin kit fox, and the valley elderberry longhorn beetle. The large-flowered fiddleneck is federally listed as endangered and state listed as endangered (CDFG 2002b). Additionally, a portion of Site 300 has been designated as critical habitat for the large-flowered fiddleneck (Figure 4.9.3–2). Activities included in the No Action Alternative would not affect the large-flowered fiddleneck population at Site 300. The large-flowered fiddleneck population near the Drop Tower would

continue to receive protection by maintaining the fence, controlling access, and prohibiting activities that could adversely affect the population.

LLNL has an ongoing monitoring program for the large-flowered fiddleneck at Site 300. This monitoring program would be continued. Additionally, research is being conducted on the natural and experimental populations of the large-flowered fiddleneck to develop techniques to control the cover of exotic annual grasses while developing techniques to restore native perennial grasslands and preserve (or increase) population levels of this plant. The research activities also monitor the status of three other rare plants at Site 300:

- The big tarplant that is extremely rare throughout its range.
- The diamond-petaled poppy, which was presumed extinct and rediscovered in 1993.
- The gypsum-loving larkspur, which is on the California Native Plant Society watch list indicating it is a rare, but with a wide enough distribution so as not to be threatened at this time (LLNL 2002dj).

The 2002-2003 rare plant monitoring program replaced the gypsum-loving larkspur with the round-leaved filaree. Included in this monitoring program is research to determine to what extent burn frequency affects the spread of one-sided bluegrass (LLNL 2002dj). Section E.2.2 provides further details on why these species would not be affected under the No Action Alternative.

The San Joaquin kit fox is federally listed as endangered and state listed as threatened. Protocol level surveys were conducted for this species in 1991, and hundreds of project-specific surveys have been conducted at the site since 1993. No kit fox were recorded at Site 300 in 1991 nor have they been observed there in subsequent surveys, including one in 2002 (Jones and Stokes 2001, CSUS 2003). However, kit fox were observed in nearby properties in the 1990's (Sproul and Flett 1993). A comprehensive mitigation and monitoring plan was developed for this species (LLNL 1992a).

Elderberry bushes are habitat for the federally listed valley elderberry longhorn beetle. The valley elderberry longhorn beetle is federally listed as threatened. In May 1997, USFWS issued Site 300 a biological opinion for pruning elderberry shrubs along the edge of a fire trail in the southeast corner of the site for three separate time periods. One pruning occurred in May/June 1997, and no beetles or evidence of beetles were detected (Jones and Stokes 2001). However, during surveys in 2002, 10 exit holes considered to be from valley elderberry longhorn beetles were found in elderberry plants. Additionally, six adult beetles were observed in a canyon just north of Elk Ravine, with two of the adults clearly exhibiting identifying characteristics of the valley elderberry longhorn beetle (Arnold 2002). No facility construction activities would be allowed to occur within a 300-foot radius of known locations of elderberry bushes without prior consultation with the USFWS. Because of these protective measures, valley elderberry longhorn beetle would not be adversely affected.

The California linderiella fairy shrimp, a Federal species of concern, occurs at Site 300. During a 2001-2002 wet season survey, this branchiopod species was found in a vernal pool (FS-04) in the northwest part of Site 300 (Condor Country Consulting 2002). However, because proposed

projects under the No Action Alternative would not affect this seasonal pool, the California linderiella fairy shrimp would not be adversely affected.

The willow flycatcher, a California-listed endangered species was observed for the first time at Site 300 during a constant effort mist netting survey in Elk Ravine in 2003 (LLNL 2003ac). The willow flycatcher would not likely be adversely affected since it was observed in a part of Elk Ravine not affected by continuing operations at Site 300.

Many migratory bird species have been observed at Site 300 (see Table 4.9.1–1). Construction activities would be coordinated with LLNL wildlife biologists to ensure that nests are protected as applicable to the *Migratory Bird Treaty Act*.

The following existing practices would be continued to benefit multiple species:

- The employee awareness program on biological mitigation measures would continue for LLNL employees and contract personnel working at Site 300 in areas where special status species are present.
- The use of rodenticides and other rodent control measures at Site 300 would be minimized to the extent practicable.
- Vehicle traffic would also be confined to existing roads (paved and unpaved) to the extent possible.
- To maintain and promote habitat diversity, the livestock grazing exclusion and annual controlled burning program on Site 300 would continue.
- Fire roads and disked areas would be maintained in the same locations to the extent possible. After evaluation, where possible, duplicate roads paralleling other roads would be eliminated.
- Herbicide use would remain limited to areas around buildings and other facilities, or eliminated, to the extent practicable.
- Consistent with current construction practices, all food-related trash items such as wrappers, cans, bottles, and food scraps would be disposed of in a closed container or removed from the construction site.
- The monitoring program for the San Joaquin kit fox described in the 1992 LLNL EIS/EIR would be continued (LLNL 1992a).
- Sites designated for new construction would be surveyed for the presence of various species or their nests or dens that are protected under Federal and State of California laws, with avoidance or other mitigative measures implemented as deemed appropriate.

Wetlands

Livermore Site

Proposed new construction of buildings under the No Action Alternative would occur in upland areas, so that land clearing would not be anticipated to have direct or indirect impacts on wetlands. New construction projects would include best management practices to avoid runoff that could affect wetlands. Wetlands along Arroyo Las Positas would be impacted if discharged treated water from the environmental restoration program is terminated; such termination is being considered under the No Action Alternative (LLNL 2001ap). Future actions involving these wetlands may require coordination with the U.S. Army Corps of Engineers (USACE), such as ongoing efforts to develop a water management plan for an 1,800-foot segment of Arroyo Seco within Livermore Site boundaries from the Vasco Road bridge to the East Avenue culvert (LLNL 2001ap). Additionally, the State of California has a no net loss policy regarding wetlands, including artificial wetlands (CERES 2002).

Site 300

There are 8.61 acres of wetlands at Site 300 of which 4.39 acres were found to meet criteria for jurisdictional wetlands subject to USACE regulation under Section 404 of the *Clean Water Act* (Jones and Stokes 2002c). Other than the Wetland Enhancement Project, new construction under the No Action Alternative would have minimal direct or indirect impacts on wetlands.

Under the No Action Alternative, artificial wetlands (totaling 0.62 acres) that have been created by surface water runoff near Buildings 801, 827, 851, and 865, would be terminated. A Section 404 permit would be required from the USACE for dredge and fill permit and a Section 401 certification or waiver will need to be obtained from the Regional Water Quality Control Board. Proposed mitigation measures for this action involve the protection and enhancement of a minimum of 1.86 acres of wetland habitat (Jones and Stokes 2001, USFWS 2002b).

5.2.7.3 *Cumulative Impacts*

Under the No Action Alternative, approximately 552,000 square feet (12.7 acres) of terrestrial habitat at the Livermore Site would be disturbed due to proposed construction activities. No terrestrial habitat would be eliminated at Site 300. SNL/CA is managing its section of the Arroyo Seco to enhance California red-legged frog habitat and developing a 30-acre wildlife preserve on the east side of the facility. The incremental effect of the No Action Alternative on biological resources within the area would be positive, particularly in the long term, when taken in the context of continuing conversion of wildlife habitat for agricultural, residential, and commercial and industrial use in the Livermore Valley and near Site 300.

5.2.8 Air Quality

5.2.8.1 Nonradiological Air Quality

Relationship with Site Operations

The No Action Alternative will involve some changes at both the Livermore Site and Site 300, but for the most part, it is a continuation of current activities. Facility upgrades, D&D activities, and new facility construction are normal during any 10-year period. Therefore, potential air quality impacts of planned activities associated with the No Action Alternative should be considered in relation to current activity levels, as a means to assess and compare planned actions and bound impacts to the air resources. The general parameters that will be used in the analyses of potential air quality impacts are listed in Table 5.2.8.1–1.

TABLE 5.2.8.1–1.—Summary of Input Parameters for Air Quality Analysis Under the No Action Alternative

Parameter	Units	Site	Existing Environment	No Action Alternative
Daily Vehicle Traffic	1,000 vehicles	Livermore	22.0	22.6
		Site 300	0.5	No change
Air emission sources and facility status	-	Livermore	The Livermore Site is rated as a mid-sized facility, subject to offset requirements for nonattainment pollutants POC and NO _x . The site's controls on POC and NO _x sources are rated good by the BAAQMD. The Livermore Site is not rated as a major source for HAPs under NESHAP.	No change
		Site 300	Site 300 is a small source per definition of the SJVUAPCD and also a nonmajor source for HAPs under NESHAP.	No change

BAAQMD = Bay Area Air Quality Management District; NESHAP = National Emission Standards for Hazardous Air Pollutants; HAP = hazardous air pollutant; NO_x = oxides of nitrogen; POC = precursor organic compounds; SJVUAPCD = San Joaquin Valley Air Pollution Control District.

Impact Analysis

Modifications to Facilities or Operations

As described in Section 3.2, the No Action Alternative encompasses not only the continuation of many LLNL activities, but also planned facility and infrastructure improvements and the completion of construction and operation of recently approved facilities with existing NEPA documentation.

Facility and infrastructure renovations (e.g., replacement of ductwork and roofs, installation of seismic and physical security upgrades, and repairs and modifications to roads) and new facility construction are normal during any 10-year period. The projected level for these activities under the No Action Alternative would remain on par with current levels, and LLNL would continue to include standard measures for controlling pollution as part of every design and construction project. With the mitigation measures in place, impacts will be similar to current levels.

Standard mitigation measures related to construction activities include the following:

- Fugitive emissions must be controlled in accordance with stringent air district requirements (discussed in Section 5.1.8.1), which include measures such as water spraying of disturbed areas and covering exposed piles of excavated material.
- LLNL contractors must complete a project-specific task identification process list and project-specific safety plan for all projects. The task identification process lists typical construction hazards and concerns and is used by subcontractors to help identify potential topics to be addressed in their project-specific safety plans.

The LLNL Environmental Protection Department, Hazards Control Department and Plant Engineering staff review all design and provide guidance on construction projects, review the task identification process list prior to commencing construction, and routinely inspect construction work sites to ensure adherence to project-specific requirements.

The No Action Alternative would include the construction and operation of planned and approved facilities. These include administrative and staff offices, a conference center, and training facilities. Together, these would increase the developed area by about 1.5 percent. Space utilization would not differ appreciably from current allocations. In fact, many of the activities to be housed within new structures are ongoing activities that would be relocated and/or consolidated. Activity relocations would be reviewed for compliance with air permit requirements in relation to their new settings. Where activities would require new air permits or modifications to existing air permits, these would be secured prior to construction or operation.

The planned activities at the Livermore Site would result in some additional fuel use. Natural gas is used in boilers, and diesel fuel is used in generators. Both are tested periodically. Several criteria and toxic air contaminants are emitted from fuel combustion. Oxides of nitrogen are a concern locally as a contributor to ozone formation. The increased fuel use anticipated under the No Action Alternative would result in an incremental increase in oxides of nitrogen emissions, 0.32 tons annually, which would be less than 2 percent of the oxides of nitrogen emissions from this source category under current operating conditions.

Because fuel combustion sources are recognized as potentially significant sources of criteria pollutant emissions, LLNL has enacted standard measures to mitigate emissions from this source category (LLNL 2001s). These include the following:

- Fuels must meet the requirements of the *Clean Air Act Power Plant and Industrial Fuels Use Act*, and applicable DOE orders, and would continue to require that construction equipment and vehicles be inspected daily for leaks of fuel, engine coolant, and hydraulic fluid.
- Contract specifications for boilers require adherence to the American Society of Heating, Refrigerating and Air Conditioning Engineering, Inc., for energy efficiency, and compliance with efficiency standards is tested in accordance with American Society of Mechanical Engineers methods.

Decommissioning/Decontamination and Demolition

The No Action Alternative would include the planned removal of 234,443 gross square feet of excess and legacy facilities at the Livermore Site and 20,202 gross square feet at Site 300, as part of a campaign to reduce the amount of active nonassignable space and optimize the use of existing space. This rate would be similar to that of recent years, and LLNL would continue to employ standard measures to control pollution from D&D activities, and comply with air district requirements to limit fugitive dust emissions. Air emissions and air quality impacts would be similar to existing conditions.

A major concern with demolition of older structures is the disturbance of asbestos containing materials (ACM). For those projects that may involve the disturbance of ACM, LLNL would continue to require that subcontractors be appropriately certified and employ engineering controls, devices, and work practices to isolate the source of asbestos and prevent fiber migration. These include the use of physical barriers (e.g., plastic sheeting) to separate asbestos work areas, keeping the asbestos work area at a negative pressure relative to adjacent areas, and using exhaust fans and vacuum cleaners with high-efficiency particulate air (HEPA) filters for asbestos control and cleanup. Specific requirements related to asbestos removals are detailed in the *Environment, Safety & Health (ES&H) Manual* (LLNL 2001t). LLNL also requires that the air district be notified of pending asbestos-related renovation and maintenance work, and planned asbestos-related demolition work above thresholds.

Support Personnel and Vehicular Activity

Planned activities associated with the No Action Alternative involve a projected increase in workforce, adding approximately 290 employees at the Livermore Site by 2014 and possibly 10 employees at Site 300, with corresponding increases in vehicular activity, primarily workers commuting to and from the sites.

Impacts of workforce commute on air quality would be lessened through transportation demand management. A large employment center holds more opportunities for alternatives to the single-employee commute. LLNL has a transportation systems management program that provides and promotes alternative, environmentally responsible options for employee commuting, assists LLNL in complying with transportation-related *Clean Air Act* legislation, and resolves congestion-management issues. LLNL is committed to continuing this program that provides (LLNL 2001s):

- A pre-tax benefit program for transit and vanpool commuters, which enables employees to set aside a fixed amount of their pre-tax salary each month to reduce transportation costs
- Participation in the BAAQMD's and San Joaquin Valley Unified Air Pollution Control District's (SJVUAPCD's) "Spare the Air" programs
- Active participation in meetings with transportation planners from Livermore, Dublin, Pleasanton, other large employers, local school districts, and community outreach programs to mitigate transportation-related air pollution and congestion-management issues

- Participation in DOE’s Clean Cities Coalition to increase availability and use of alternative-fueled vehicles for LLNL employees

The additional workforce would include some relocated employees, new to the Bay Area air basin. Activities of the relocated population would contribute to air emissions associated with the commute to the workplace and secondarily from the additional energy consumption, other vehicular use, and goods and services that would be required to support the additional, relocated population. The jobs that would be created under the No Action Alternative at LLNL would represent a very small fraction (less than 1 percent) of the projected increase in employment within Alameda County over the 2000 to 2010 timeframe as described in Section 5.1.2 (Association of Bay Area Governments 2001). The air quality impact of this population growth would be on the same order as that of the growth rate, and this would be well within the projections developed by the Association of Bay Area Governments, Metropolitan Transportation Commission, and BAAQMD, and employed in the clean air plan.

Cumulative Impacts and Conformity

The parameters used to evaluate air quality impacts of the No Action Alternative are listed in Table 5.2.8.1–1. Table 5.2.8.1–2 presents the calculated maximum carbon monoxide concentrations, which would remain within 20 to 30 percent of ambient standards. Projected air pollutant emission rates associated with increased fuel combustion in boilers and engines, and the increased vehicular activity associated with increased workforce under the No Action Alternative are provided in Table 5.2.8.1–3.

Total emissions are also provided in Table 5.2.8.1–3 for comparison with significance levels. As discussed in Section 5.1.8, annual and daily significant emission levels are established by local air districts in response to local air quality concerns. A project that generates criteria air pollutant emissions in excess of significance levels would be considered to have a significant air quality impact and stringent mitigation would be required. By evaluating project emissions as a whole, including motor vehicle emissions, this affords the air district has a greater level of control over a project, i.e., it is not limited to source permitting.

Rules for conformity also consider total project emissions. These rules were established under the Federal *Clean Air Act* and pertain specifically to Federal actions. The underlying basis for the conformity demonstration is to preclude actions that would generate growth in air pollutants to a degree that is inconsistent with the local clean air plan, and thereby frustrate regional efforts to attain and maintain the air quality standards. Within the Bay Area, conformity applies to projects that generate emissions of precursor organic compounds, oxides of nitrogen, or carbon monoxide in excess of 100 tons per year; such projects would be required to fully offset or mitigate the emissions caused by the action (BAAQMD 1999). A conformity review will be conducted and reported in the Final LLNL SW/SPEIS for projects at the central Livermore Site and Site 300 covered by the EIS.

Total emissions associated with the No Action Alternative would be a small fraction of significance levels. Consequently, activities associated with the No Action Alternative would not result in an adverse impact to air resources.

TABLE 5.2.8.1–2.—Projected Maximum Carbon Monoxide Concentrations Associated with Increased Traffic Conditions in the Environs of the Livermore Site Under the No Action Alternative

	Existing Environment	No Action Alternative
Traffic Assessment ^a		
Peak hourly background traffic through intersection	3,757	3,757
Additional traffic related to alternative	-	62
Total traffic through intersection	3,757	3,819
Maximum One-Hour Concentrations (ppm)		
Near-roadway CO concentration ^b from:		
Background traffic	1.1	0.66
Increased traffic from alternative	-	0.012
Estimated background concentration ^c	3.9	3.5
Total - traffic plus background	5.0	4.2
% of state ambient air quality standard ^d	25	21
Maximum Eight-Hour Concentrations (ppm)		
Near-roadway CO concentration from:		
Background traffic ^c	0.75	0.46
Increased traffic from alternative ^c	-	0.008
Estimated background concentration	2.0	1.7
Total - traffic plus background	2.7	2.2
% of state ambient air quality standard ^d	30	25

^a Peak hourly traffic is estimated to be 10 percent of the total daily traffic passing through the intersection of Vasco and Patterson Pass Roads. This value (10 percent) is recommended by the air district for use when hourly values are not available. Local traffic patterns are discussed in Section 4.13.2.

^b Concentrations are assessed for locations 25 feet from roadway for the year 2004 (existing environment) and year 2014 (No Action Alternative). Assessment methodology is discussed in Section 5.1.8.1, and follows BAAQMD CEQA Guidelines (1999). Emission factors and ambient concentrations of carbon monoxide are expected to decline over time through 2010 due to improved emission controls on newer vehicles and reformulated gasoline.

^c Background carbon monoxide is defined as that part of the ambient CO concentration that is not attributable to traffic sources from a nearby street or intersection. It is calculated according to procedures recommended by BAAQMD (1999).

^d National one-hour ambient air quality standard is 35 ppm; more restrictive state standards, 20 ppm, is used. National and state eight-hour ambient air quality standard is 9 ppm.

BAAQMD = Bay Area Air Quality Management District; CEQA = *California Environmental Quality Act*; CO = carbon monoxide; ppm = parts per million.

The No Action Alternative would also result in increased electrical use, which cumulatively contributes to greater demand and some additional air pollution. LLNL and DOE commitments to energy conservation, load management, and increased use of renewable energy sources (discussed in Appendix O, Section O.4.3) would help to offset this impact.

5.2.8.2 Radiological Air Quality

This section analyzes the No Action Alternative radiological air quality impacts due to normal releases from ongoing site operations such as R&D and waste management. Impacts in terms of dose related to the Livermore Site and Site 300 are discussed in this section. Health impacts are discussed in Section 5.2.14.2.

Relationship With Site Operations

This section summarizes the relationship between projects described in Section 3.2 for the No Action Alternative and radiological air quality. As noted previously, the dose that would result from exposure to routine air emissions from these projects is used to quantify the impacts. The important incremental impact to the baseline emissions for the No Action Alternative would be due to the addition of NIF operations and increased releases from Building 331.

Impact Analysis

Livermore Site

Annual tritium releases from the Building 331 Tritium Facility would increase to a level of 210 curies per year, still well within historical levels (see Chapter 4, Figure 4.10.5–1). Up to 30 curies of tritium per year could be released during NIF maintenance activities, when equipment is opened up or its contents exposed to air (LLNL 2003d). Activated gases created by NIF experiments with fusion yield, nitrogen-13 (67.8 curies) and argon-41 (26.2 curies), would be released from NIF and would be short-lived nuclides that would affect the site-wide MEI externally by way of air immersion.

The location of the site-wide MEI would change from existing environment due to NIF releases. The NIF MEI dose (as a result of airborne effluents from that facility only) would be about 0.041 millirem per year, at a location due east of the NIF stack, along the eastern site boundary. Conservatively adding the existing environment dose and the increase in Tritium Facility dose at the Credit Union to the NIF airborne effluent dose at this location would result in a No Action Alternative dose estimated at 0.098 millirem per year, 1 percent of the NESHAP limit.

The component of population dose from routine NIF releases would be 0.27 person-rem per year. Adding this dose to the Livermore population dose and the population dose due to the Tritium Facility releases would result in a No Action Alternative dose of 1.8 person-rem per year. The dose to the worker population was estimated by compositing the worker dose from the important contributing sources to the site-wide MEI dose, i.e., NIF and Tritium Facility, and the largest other sources of tritium, i.e., Building 612 Yard and outside Building 331. The No Action Alternative worker population dose would be 0.14 person-rem per year. Section 5.2.14 describes the relationship between these doses and health effects.

Minimal impacts on radiological air quality are expected from the No Action Alternative at the Livermore Site.

Site 300

The important incremental impact to the existing environment emissions under the No Action Alternative is from 20 milligrams per year (194 curies) of tritium released during explosives experiments. Such experiments have historically been performed at Site 300, although none were performed during 2001 (LLNL 2003i). The baseline year of 2001 for Site 300 normal release was chosen because the site-wide MEI dose from that year's operations were greater than those of 2002. Firing Tables B812 and B850 will not be used for tritium experiments. Firing Table B851 is the only open-air facility that would use tritium. The site-wide MEI location is 1,530

yards west-southwest of Firing Table B851. This location corresponds with the closest site boundary to any individual firing table.

Explosives experiments result in the releases being dispersed as a gaseous cloud (SNL 2002). Although the annual release quantity limits are known, the sizes of each of the experiments to be performed over the period covered by this LLNL SW/SPEIS are not. A single set of cloud parameters, e.g., cloud height, was thus defined that simulates the baseline results. The meteorology during each of these experiments is also unknown a priori. The CAP88-PC program, which models the release as continuous, is useful because it considers all possible meteorological conditions. This method is considered conservative. The resulting annual exposure calculated in the model corresponds to the mean exposure from the possible meteorological conditions. The CAP88-PC computer program was used to calculate the incremental No Action Alternative release of tritium. The dose to the site-wide MEI, which is the sum of the 2001 and incremental release dose, is 0.055 millirem per year, less than 0.6 percent of the NESHAP limit. The resulting population dose of 9.8 person-rem per year. The dose to the worker population would be 0.005 person-rem per year.

Minimal impacts on radiological air quality are expected under the No Action Alternative at Site 300.

Cumulative Impacts

No adverse impacts on radiological air quality are expected under the No Action Alternative. Other than background radiation sources, there are no other known contributors to concentrations of radionuclides in air within 50 miles of the Livermore Site or Site 300. Therefore, there are no cumulative radiological air quality impacts.

5.2.9 Water

This section analyzes impacts to water resources associated with implementation of the No Action Alternative.

5.2.9.1 *Relationship with Site Operations*

This section summarizes the relationship between projects described in Section 3.2 under the No Action Alternative and the water impact analysis. The No Action Alternative would cause increases in water use, impervious surfaces and runoff, and use of materials that are potential contaminants due to construction and operation of projects.

5.2.9.2 *Impact Analysis*

Livermore Site

Surface Water

The addition of new buildings and roads under the No Action Alternative would increase impervious surfaces at the Livermore Site. An increase in surface runoff would occur as a result of increased impervious surface areas. However, because Livermore Site soils are highly

permeable and abundant uncovered acreage remains for groundwater recharge, the impact of the reduction in recharge surface area under the No Action Alternative would be minimal.

Surface water resources could be degraded by contaminant releases during construction of some facilities under the No Action Alternative. Contaminant sources could include construction materials; hydraulic fluid, oil, and diesel fuel; and releases from transportation or waste-handling accidents. LLNL stormwater pollution prevention plans have been devised to identify pollutant sources that could affect the quality of industrial stormwater discharges and to describe implementation practices to reduce pollutants in these discharges. In the event of a hazardous spill, necessary equipment to implement cleanup is available, and personnel are trained in proper response, containment, and cleanup of spills. Further guidance on response to hazardous material spills is provided in the ES&H Manual.

In 2002, the Livermore Site used approximately 1.2 million gallons of water per day from the San Francisco Hetch Hetchy Aqueduct system and the Alameda County Flood and Water Conservation District, Zone 7 (DOE 2003b). Under the No Action Alternative, water use is expected to be 1.37 million gallons per day. This increase would be due to the water requirements of the NIF and Terascale Simulation Facility. Buildings and activities in addition to the NIF and Terascale Simulation Facility projected under the No Action Alternative would have a minimal effect on water consumption.

Compliance with an approved erosion and sedimentation control plan during construction would prevent impacts to surface water from construction-induced erosion.

Surface water monitoring would continue under the No Action Alternative in accordance with DOE guidelines to ensure remediation of contamination already present and detection of any hazardous materials in the future. Stormwater monitoring would continue in accordance with NPDES requirements. Wastewater monitoring would continue as discussed in Section 4.14.4. Because of the extensive monitoring program and capability to divert potentially contaminated wastewater, no impacts to the Livermore Water Reclamation Plant (LWRP) or downstream receiving surface waters would be expected.

Because no activities projected under the No Action Alternative would occur within the 100-year floodplain, other than Arroyo Las Positas Maintenance Project, which is covered under an environmental assessment (DOE/EA-1272) (DOE 1998b), no impacts to the floodplain would be expected. None of the No Action Alternative projects would contribute significant amounts of surface water runoff to cause substantial flooding because the 100-year base flood event is contained within all channels. Due to the high infiltration rates and lack of appreciable floodplains on the Livermore Site, hydrologic impacts under the No Action Alternative would be minimal. No facilities would be located in either the 100-year or 500-year floodplain, therefore no impact from flooding would be expected. Impacts to surface water would be minimal.

Groundwater

Currently, the following contaminants exist above drinking water standards in groundwater at the Livermore Site: trichloroethylene, perchloroethylene, 1,1-dichloroethylene, chloroform, 1,2-dichloroethylene, 1,1-dichloroethane, 1,2-dichloroethane, trichlorotrifluoroethane (Freon 113),

trichlorofluoromethane (Freon 11), and carbon tetrachloride. LLNL removes contaminants from groundwater and unsaturated zones (soil vapor) at the Livermore Site through a system of 27 treatment facilities located throughout the 6 hydrostratigraphic units containing contaminants of concern. In 2002, almost 248 million gallons of groundwater were removed and treated, yielding approximately 146 kilograms of volatile organic compounds (VOCs). Remediation activities have been successful in containing the VOC plume at the southwest corner of the site. This area is of concern because the plume has migrated offsite, toward a residential area. Groundwater monitoring would continue under the No Action Alternative to ensure that remediation of contamination already present continues to be effective and that contaminant fate and transport is fully understood. Groundwater quality should continue to improve because extracted groundwater would be collected and treated at the treatment facilities.

Groundwater resources could be degraded by contaminant releases during construction of some facilities under the No Action Alternative. Contaminant sources could include construction materials; spills of hydraulic fluid, oil, and diesel fuel; and releases from transportation or waste-handling accidents. The potential for spills of hazardous materials to impact groundwater largely depends on the depth to groundwater where the spill occurs. LLNL would follow prevention and mitigation steps outlined in the spill response chapter of the ES&H Manual in the event of a hazardous material spill. Because the minimum depth to groundwater at the Livermore Site is approximately 30 feet and employees are trained in spill response procedures, spills would likely be cleaned up before they reach the water table.

Impacts to groundwater from leaking underground storage tanks would not be expected since LLNL complies with all underground storage tank regulations which enforce the use of tank and piping primary and secondary containment, detection and monitoring systems, and corrosion protection.

No negative impacts to groundwater at the Livermore Site are expected from operations under the No Action Alternative, because there would be no discharges to groundwater. Impacts to groundwater quality from surface water recharge would be minimal because LLNL would continue to comply with NPDES requirements.

Site 300

Surface Water

Under the No Action Alternative, construction of buildings and roads would contribute incremental additions to impervious surfaces. There would be no noticeable impact to groundwater recharge because Site 300 is largely undeveloped and not covered by impervious surfaces. Stormwater monitoring would continue in accordance with NPDES requirements. Water use is expected to continue at 0.35 million gallons per day under the No Action Alternative.

Stormwater monitoring would continue in accordance with NPDES requirements. Surface water resources could be degraded by contaminant releases during construction of new facilities. Contaminant sources could include construction materials, spills of oil and diesel fuel, and releases from transportation or waste-handling accidents. LLNL would follow mitigation steps

outlined in the Spill Prevention Control and Countermeasures (SPCC) Plan in the event of a spill of petroleum products. Hazardous material spill response procedures are outlined in the ES&H Manual.

Compliance with an approved erosion and sedimentation control plan during construction would prevent impacts to surface water from construction-induced erosion.

None of the No Action Alternative projects would contribute significant amounts of surface water runoff to cause substantial flooding. The 100-year base flood event would be contained within all channels except along Corral Hollow Road near the GSA, where parts of the road would be inundated during the 100-year event. Due to the high infiltration rates and lack of appreciable floodplains at Site 300, hydrologic impacts under the No Action Alternative would be minimal. However, due to the steep slopes, high runoff velocities within channels could occur during a storm. No facilities would be located in these areas; therefore, no impact from flooding would be expected.

Groundwater

Groundwater contaminants of concern at Site 300 include VOCs (mainly trichloroethylene), tritium, depleted uranium, explosive compounds, nitrate, and perchlorate. By fall 1999, after 8 years of treatment, the eastern GSA offsite trichloroethylene plume had been restricted to the Site 300 property. Before treatment, the plume had extended more than a mile down the Corral Hollow stream channel in the direction of the city of Tracy. Under the No Action Alternative, groundwater quality would continue to improve with ongoing remediation activities at Site 300.

Groundwater resources could be degraded by contaminant releases during construction. Contaminant sources could include construction materials; spills of hydraulic fluid, oil, and diesel fuel; and releases from transportation or waste handling accidents. LLNL would follow mitigation steps outlined in the SPCC Plan, in the spill response chapter of the ES&H Manual in the event of an oil or hazardous material spill. The potential for spills of hazardous materials to affect groundwater largely depends on the depth to groundwater where the spill occurs. Depths to groundwater in the areas where activities are expected under the No Action Alternative vary from approximately 50 to 180 feet. Because the minimum depth to groundwater at Site 300 in areas where activities are expected under the No Action Alternative is approximately 50 feet and employees are trained in spill response procedures, spills would likely be cleaned up before they reach the water table.

Impacts to groundwater from leaking underground storage tanks would not be expected since LLNL complies with all underground storage tank regulations which enforce the use of tank and piping primary and secondary containment, detection and monitoring systems, and corrosion protection.

No negative impacts to groundwater at Site 300 would be expected from operations under the No Action Alternative because there would be no discharges to groundwater. Potential impacts to groundwater quality from surface water recharge would be minimal because LLNL would continue to comply with NPDES requirements. Groundwater use would continue as described in

Section 4.11, and no impacts to groundwater availability would be expected under the No Action Alternative.

5.2.9.3 Cumulative Impacts

Livermore Site

The San Francisco Public Utilities Commission provides water to 2.4 million people in San Francisco, San Mateo, Santa Clara, and Alameda counties, including the Silicon Valley business district. To maintain a reliable water system, the San Francisco Public Utilities Commission initiated regional and local water projects in 2003 to upgrade and repair Hetch Hetchy System facilities. These projects will ensure stability in the case of a seismic event, sufficient water supply for an increasing population, and high quality drinking water that meets all regulatory requirements. The improvements scheduled to be complete by 2016.

San Francisco Bay Area water use is expected to increase by 64 million gallons per day by the year 2030. This is approximately a 25 percent increase over current water usage. The Livermore Site is projected to use 1.37 million gallons per day under the No Action Alternative. This is 0.4 percent of the projected total Hetch Hetchy water supply. Livermore currently uses 0.5 percent of the Hetch Hetchy water supply. Livermore's future contribution to the cumulative Hetch Hetchy water use would remain proportional to current use.

Because much of the land surrounding the Livermore Site is zoned for low-density activities such as grazing, vineyards, and rural residential, and the large residential parcel to the west of the Livermore Site is basically fully developed (see Chapter 4, Figure 4.2.1.1–1), it is expected that most of the surrounding undeveloped land will not be converted to impervious surfaces in future years. Therefore, cumulative impacts on surface water quality and groundwater recharge from increases in impervious surfaces are expected to be minimal.

With the exception of the Livermore Site VOC plumes, no other known contaminant plumes exist in the surrounding area that could cause a cumulative degradation of groundwater quality. Other sources of groundwater contamination in Livermore are described in Section 5.2.15.3. Groundwater quality at SNL/CA, located directly south of the Livermore Site, has improved through completion of remediation that began in 1984 on a 59,000-gallon diesel fuel spill. Similarly, groundwater quality should continue to improve in the Livermore Site vicinity with ongoing remediation at water treatment facilities.

Site 300

Site 300 currently receives water from onsite wells and should receive water from the Hetch Hetchy water supply system by early 2004. Water consumption rates have declined steadily since 1992, down to 25.3 million gallons per year in 2002. The new water system capacity is estimated to be 648,000 gallons per day, with the capability of expanding to 1.2 million gallons per day. Under the No Action Alternative, Site 300 would use 0.1 percent of the Hetch Hetchy water supply. Given the low population and rural character of the area, an indiscernible increase in water use under the No Action Alternative, and the eventual Hetch Hetchy supply, no cumulative impacts to water availability for Site 300 and vicinity would be expected.

The land surrounding Site 300 is designated as general agricultural, recreation, conservation, and wind resource areas (see Figure 4.2.1.2–1). Most of this land is agricultural, however, property immediately east of the site is occupied by a company that packages and stores fireworks. The Carnegie State Vehicular Recreation Area, southwest of the site, is used for off-highway vehicles. Aside from the vehicle recreation area, which likely contributes to sediment runoff during rainstorms, the cumulative impact on surface water quality from activities in surrounding areas would be minimal. Because the area is largely undeveloped and expected to continue in that manner, no cumulative impacts to groundwater recharge would be expected.

Groundwater contamination at Site 300 has been restricted to within the site boundary and groundwater quality is improving through remediation activities. Because these plumes are the only known groundwater contamination in the Site 300 vicinity, no cumulative impacts to groundwater quality would be expected.

5.2.10 Noise

This section presents noise impacts resulting from implementation of the No Action Alternative. The analysis is organized by noise-generating LLNL activities, such as construction, modifications to and removal of facilities, traffic noise, and impulse noise.

5.2.10.1 *Relationship with Site Operations*

Activities associated with the No Action Alternative (Section 3.2) would contribute to noise generation, either directly or indirectly. These noise-generating activities include:

- **Construction Activities and Equipment**—Demolishing, excavating, grading, and building that can result in intermittent noise levels generally higher than background.
- **Operating Equipment**—A variety of machinery and equipment items that generate noise during routine operations including heating, ventilating, and air-conditioning (HVAC) equipment; cooling towers; motors; pumps; fans; generators; and air compressors.
- **Traffic**—The Livermore Site generates about 22,000 vehicle trips per day (counting each vehicle to enter and exit the Livermore Site) and an additional 500 trips per day are generated by Site 300.
- **Explosives Testing**—Explosives testing results in short-burst, impulse-type noise.

The general parameters that will be used to characterize activities with potential to characterize community noise levels are listed in Table 5.2.10.1–1.

5.2.10.2 *Impact Analysis*

As described in Section 3.2, the No Action Alternative would encompass continued operation of many current LLNL activities, but also include planned facility and infrastructure improvements, the completion of several construction projects, additional staffing, operation of planned facilities, and several building removals.

Modifications to Facilities or Operations

Facility and infrastructure renovations and new facility construction are ongoing activities at the Livermore Site and Site 300. The projected level for these construction activities under the No Action Alternative would remain on par with current levels. The impact of these activities would not generally be noticeable beyond the site boundary, owing to the relatively large spatial area of the Livermore Site and perimeter buffer zone. Intervening roadways between Livermore Site, Site 300, and community areas would reduce the impact of onsite generated noise.

Planned new facilities associated with the No Action Alternative would be primarily offices and laboratories, and would not introduce any machinery or equipment that would differ from the current HVAC equipment, cooling towers, motors, pumps, fans, generators, air compressors, and loudspeakers. Noise from this equipment would not be noticeable beyond the site boundary.

At most, during peak activity levels, a person located 100 feet from a noisy construction site would not be exposed to more than 82 A-weighted decibels (dB[A]), for only limited periods of maximum activity. This level is comparable to a pneumatic drill or vacuum cleaner (City of Livermore and LSA 2002) and is not expected to be objectionable or to conflict with compatibility guidelines. Impacts are expected to be minimal.

Traffic Noise

The No Action Alternative would result in a slight increase in heavy-duty vehicle activity related to shipments of materials and waste. This equipment is associated with noise levels of 81 to 87 dB(A) at 50 feet. Although intermittent, because they traverse roads outside the site, they are nearer to community receptors and more likely to be noticeable to the offsite community than operations conducted well within the site. As stated in Chapter 4, Section 4.12, vehicles serving LLNL are subject to requirements that they be properly muffled to reduce noise impacts, and their activities are limited to times that are both less noticeable and less objectionable.

Planned activities associated with the No Action Alternative would involve a projected increase in the workforce, adding approximately 290 employees at the Livermore Site by the year 2014, and possibly 10 employees at Site 300, and a corresponding increase in vehicular activity (approximately 3 percent above current levels), primarily workers commuting to and from the sites. The additional traffic would add slightly to ambient noise levels. To help alleviate this impact, LLNL is committed to continue promoting and expanding its Transportation Systems Management Program to aid in providing viable alternatives to employee commuting, thereby reducing traffic congestion and noise (LLNL 2001s).

Impulse Noise

LLNL would continue explosives research testing under the No Action Alternative at both the Livermore Site, within the Building 191 High Explosives Application Facility; and at Site 300, within the Contained Firing Facility and on open firing tables. The number of blasts and intensity would not change; therefore, impacts would be the same as under current operations. LLNL would continue to use blast forecasting as a tool to determine if explosive tests would adversely affect the surrounding community and to restrict operations when peak-impulse noise levels are

predicted to exceed the 126-dB[A] level in populated areas. LLNL would also continue to perform meteorological monitoring to provide necessary input data for blast forecasting (LLNL 2001s).

Decommissioning, Decontamination, and Demolition

The No Action Alternative would include removal of 234,443 gross square feet of excess and legacy facilities at the Livermore Site and 20,202 gross square feet at Site 300. This rate would be similar to that of recent years and, with the relatively large spatial area and perimeter buffer zone, noise from these activities would not be discernible in offsite areas.

5.2.10.3 Cumulative Impacts

As stated, planned activities associated with the No Action Alternative would include a projected increase in the workforce, adding 290 employees at the Livermore Site and possibly 10 employees at Site 300. Although the jobs that would be created under the No Action Alternative at LLNL represent a very small fraction (less than 1 percent) of the projected increase in employment within Alameda County over the 2000-2010 timeframe (Association of Bay Area Governments 2001), as described in Section 5.1.2, the additional workforce would include some relocated employees new to the Bay Area. Activities and services to support the relocated population would contribute to local noise levels, both short-term in areas of increased construction activities, and long-term, associated with increased development, density of population and commercial activities, and vehicular traffic and congestion.

Local noise ordinances and restrictions on allowable noise levels, as stated in terms of land use compatibility guidelines for community noise environments, discussed in Chapter 4, Section 4.12.1.2, would limit the impact of additional noise sources on the local community. The city of Livermore is currently working on several elements of its General Plan, and may consider additional restrictions based on key findings related to noise (City of Livermore and LSA 2002). With Livermore's anticipated growth in the future, noise levels are expected to increase due to potential increases in Livermore's current key noise sources: construction activity, development, vehicular activity, and rail and aviation operations. Noise levels from potential mixed-use and infill development in Livermore, especially in the downtown, could exceed noise level guidelines as a result of land use incompatibilities.

5.2.11 Traffic and Transportation

Traffic congestion and collective dose and LCFs to the general population from radiological shipments were analyzed. The estimate of traffic congestion is based on the change in employment under the No Action Alternative compared to current operations. Radiological consequences were calculated using DOE transportation models as described in Section 5.1.11. Appendix J of this LLNL SW/SPEIS details the methodology and important inputs for radiological transportation analysis.

5.2.11.1 Relationship with Site Operations

Section 3.2 describes the projects under the No Action Alternative. These projects, when combined with current LLNL operations, would result in increased radiological transportation.

Although not every individual shipment was accounted for, the larger and more important shipment campaigns analyzed would result in approximately 260 shipments of special nuclear material, 61 shipments of LLW and MLLW, 5 tritium shipments, and 13 TRU waste shipments per year. See Appendix J, Section J.5.2, for more details. These values are considerably larger than for current operations (see Appendix J, Section J.5.1) due to shipment campaigns analyzed under previous national programmatic EISs, but only now beginning to be implemented.

5.2.11.2 *Impact Analysis*

Livermore Site

Under the No Action Alternative, LLNL employment would rise by approximately 300 workers. This 3 percent increase over current operations with 10,350 workers would not have any impact on local traffic. There would be minimal construction under this alternative as well. No Action Alternative projects with large construction activities (such as the NIF and the Terascale Simulation Facility) would be completed before the period of analysis for this LLNL SW/SPEIS. Other No Action Alternative construction projects would be small and, in total, would be much less than the current magnitude of construction. However, the level of radiological transportation would increase under the No Action Alternative.

Radiological shipments under the No Action Alternative would include shipments of the following:

- Special nuclear material approved under the *Programmatic Environmental Impact Statement for Stockpile Stewardship and Management (SSM PEIS)* (DOE 1996a) and the *Surplus Plutonium Disposition Environmental Impact Statement* (DOE 1999c)
- TRU waste to the Waste Isolation Pilot Plant (WIPP) under *Waste Isolation Pilot Plant Final Supplemental Environmental Impact Statement* (DOE 1997e)
- Shipments of tritium for high-energy density physics target fill and the test readiness program targets for the NIF
- Shipments of LLW under the *Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE 1997f)
- Several other smaller shipment campaigns

Table 5.2.11.2–1 presents the collective dose to the general population from these shipments. The number of LCFs for the No Action Alternative would be much less than one (4×10^{-3}) per year. See Appendix J, Section J.8, of this LLNL SW/SPEIS for calculations of LCFs.

TABLE 5.2.11.2–1.—Collective Dose to the General Public from Radioactive Shipments Under the No Action Alternative

Shipment Type	Collective Dose (person-rem per year)			
	Along Route	Sharing Route	At Stops	Total
LLW	7.0×10^{-2}	0.86	0.38	1.3
TRU waste	5.4×10^{-2}	0.65	0.30	1.0
Materials ^a	0.21	2.3	1.1	3.6
Total No Action	0.33	3.8	1.8	5.9
Current operations	8.6×10^{-2}	0.98	0.46	1.5

^aNonwaste radioactive materials, including special nuclear materials, tritium, and other materials used in the LLNL mission.
LLW = low-level waste; TRU = transuranic.

Site 300

Under the No Action Alternative, there would be minimal changes in traffic and transportation at Site 300, compared to current operations and no incremental impacts expected from current conditions as described in Chapter 4.

5.2.11.3 Cumulative Impacts

Traffic congestion in the Tri-Valley Area is very heavy and will likely increase due to growth in the area. Any increases in LLNL employment under the No Action Alternative would, however small, contribute to this congestion. Given the negligible contribution of the No Action Alternative and current LLNL traffic to the overall congestion problem, detailed analysis of the cumulative traffic impacts is not warranted. However, LLNL's contribution to radiological impacts in the vicinity of LLNL is not a small percentage of overall radiological impacts. Therefore, this cumulative impacts analysis focuses on collective dose from radiological transportation. The analysis considers LLNL radiological transportation cumulative with SNL/CA radiological transportation.

NNSA performed a RADTRAN 5 analysis for 3.5 miles of highway in the Livermore area where all radiological shipments would converge. For conservatism, the shipments were comprised of the larger set of shipments in the Proposed Action resulting in 6.1×10^{-2} person-rem per year and those from SNL/CA resulting in 1.2×10^{-3} person-rem per year. The resulting collective dose is 6.2×10^{-2} person-rem per year, corresponding to 4×10^{-5} LCFs per year. The No Action Alternative cumulative impacts would be less than these values. More information on the calculation is presented in Appendix J, Section J.7. Minimal impacts would be expected as a result of these doses.

5.2.12 Utilities and Energy

This section discusses the potential impacts of the No Action Alternative on utilities and energy supplies. Utility and energy usage are discussed separately for the Livermore Site and Site 300. LLNL-leased properties (i.e., Almond Avenue, Graham Court, Patterson Pass, and Arroyo Mocho Pump Station) are considered part of the Livermore Site in assessing utility and energy impacts.

5.2.12.1 *Relationship with Site Operations*

This section summarizes the relationship between projects described in Section 3.1 for the No Action Alternative and the utilities and energy analysis. In general, the effects of projects for the No Action Alternative on utilities and energy analyses are related to water consumption, sewage discharges, electricity consumption, and fuel consumption resulting from design, construction, and operation of projects under the No Action Alternative.

5.2.12.2 *Impact Analysis*

Water Consumption

Livermore Site

In 2002, the Livermore Site used approximately 212 million gallons of water. As the NIF (110,000 gallons per day) and the Terascale Simulation Facility (60,000 gallons per day) become operational, water use at the Livermore Site would increase by 30 percent to approximately 276 million gallons per year (LLNL 2003an). Accordingly, peak water use would increase from 1.2 million gallons per day to approximately 1.37 million gallons per day. The capacity of the Livermore Site domestic water system in the year 2002 was approximately 2.88 million gallons per day. Because the Livermore Site domestic water system has adequate capacity to meet future water demands under this alternative, impacts would be minimal.

Site 300

Average water consumption at Site 300 is 67,900 gallons per day (LLNL 2003aq). No changes in square footage at Site 300 are planned under this alternative; therefore, the current water use at Site 300 is considered to be representative of future consumption rates for the No Action Alternative. No additional impacts are expected.

Sewer Discharges

Livermore Site

The LWRP currently receives a total of approximately 6.5 million gallons of effluent per day. The capacity of this facility is 8.5 million gallons of effluent per day, which is expected to be sufficient for inflow treatment for the foreseeable future. The Livermore Site discharges approximately 216,400 gallons per day (3.3 percent of the volume received by the LWRP) to the sanitary sewer system based on 2002 estimates.

Under the No Action Alternative, sewer discharge would increase by 3.5 percent over the existing environment to approximately 224,000 gallons per day based on the projected increase in square footage and personnel at the Livermore Site. Impacts from this 3.5 percent increase in sewer discharges from the Livermore Site would be minimal.

Site 300

Site 300 sanitary sewage generated outside the GSA is disposed of through septic tanks and leach fields or cesspools at individual building locations. Sanitary sewage generated within the GSA is piped into an asphalt-membrane-lined oxidation pond east of the GSA at an average rate of 2,100 gallons per day.

Currently, Site 300 discharges approximately 2,100 gallons of sewage per day. No changes in square footage at Site 300 are planned under this alternative; therefore, current discharges are considered to be representative of future rates for the No Action Alternative. No offsite sewage treatment is conducted for Site 300 wastes and no new impacts are expected.

Electricity Consumption

Livermore Site

The projected peak electrical demand at LLNL would be 82 megawatts under the No Action Alternative. Growth at the Livermore Site would result in increased electricity consumption. Electricity consumption at the Livermore Site averages approximately 321 million kilowatt-hours per year and has remained stable over the past 5 years. With the added loads from the NIF and the Terascale Simulation Facility, electric power consumption is expected to increase by 39 percent to approximately 446 million kilowatt-hours per year. The LLNL distribution system and existing capacity for the utilities to supply energy on both a total and a peak load basis would adequately meet the projected increase in consumption, but may limit future development at the site.

Site 300

Electricity consumption at Site 300 is approximately 16.3 million kilowatt-hours per year and has remained stable over the past 5 years (LLNL 2003aq). No changes to Site 300 square footage are planned under this alternative; therefore, current electrical power consumption at Site 300 is considered to be representative of future consumption rates for the No Action Alternative. Therefore, no additional impacts are expected.

Fuel Consumption

Livermore Site

Natural gas consumption for the Livermore Site averages 12,900 therms per day. Consumption rates are expected to increase to approximately 23,300 therms per day as the NIF and Terascale Simulation Facility become operational (LLNL 2003b). The No Action Alternative projects an additional 1.5 percent increase to 23,600 therms per day in natural gas consumption based on the projected increase in gross square footage of developed space at LLNL in the foreseeable future. This would result in minimal additional impact.

No change in diesel fuel or unleaded gasoline is anticipated. Diesel fuel and unleaded gasoline use would remain at 72,200 gallons per year and 451,800 gallons per year, respectively.

Site 300

Site 300 fuel oil consumption is approximately 16,600 gallons per year (LLNL 2003aq). No changes in the gross square footage at Site 300 are planned under this alternative; therefore, current fuel oil consumption is considered to be representative of future consumption rates for the No Action Alternative.

5.2.12.3 Cumulative Impacts**Water Consumption****Livermore Site**

The No Action Alternative together with other development in the Hetch Hetchy service area would increase demand for and consumption of water. For example, the population in Alameda County is projected to increase by about 17 percent by the year 2015 (DOF 2001). Residential, commercial, industrial, and other uses in Alameda County are expected to increase proportionally. Other counties in the Hetch Hetchy service area would experience similar growth. This population growth in the Hetch Hetchy service area in conjunction with the 30 percent increase in water use at the Livermore Site would constitute a cumulative impact upon water resources and supply systems.

Site 300

Current water use at Site 300 is considered to be representative of future consumption rates for the No Action Alternative. However, development in the vicinity of Site 300 would increase demand for and consumption of water. Population in San Joaquin County is projected to increase 30 percent by the year 2015 (DOF 2001). Residential, commercial, industrial, and other uses in San Joaquin County are expected to increase proportionally. This growth would constitute a substantial cumulative impact on groundwater resources. Similarly, population growth in the Hetch Hetchy service area would constitute a cumulative impact upon water resources in the area.

Sewer Discharges**Livermore Site**

The No Action Alternative, together with other developments in the area, would increase demand for sewage services. Population in Alameda County is projected to increase by about 17 percent by the year 2015 (DOF 2001). Residential, commercial, industrial, and other uses in Alameda County are expected to increase proportionally. The LWRP currently receives a total of approximately 6.5 million gallons of effluent per day. While existing LWRP capacity of 8.5 million gallons per day is expected to be sufficient for inflow treatment for the next 10 years, sewage treatment facility improvements are being planned in the region. Population growth would constitute a cumulative impact on sewage systems in the area.

Site 300

Because Site 300 sewer discharge and treatment programs are mostly self-contained, no cumulative impact is expected as a result of the No Action Alternative.

Electricity Consumption***Livermore Site***

The No Action Alternative, together with other developments in the area, would increase electric power demand. Population in Alameda County is projected to increase by about 17 percent by the year 2015 (DOF 2001). Residential, commercial, industrial, and other uses in Alameda County are expected to increase proportionally. This population growth in conjunction with the 39 percent increase in demand for electrical power at the Livermore Site could constitute an adverse cumulative impact on electric power resources in the area. Currently, electric utilities provide approximately 10,605 million kilowatt-hours per year of electricity to Alameda County (CEC 2001). However, more than 10,000 megawatts of new electric generation capacity is planned in the Pacific Gas and Electric (PG&E) service area. Additional generating capacity is planned throughout the State of California and surrounding states (CEC 2000). Expanded electric transmission capability is also planned in the region. If implemented as planned, these additions would provide sufficient capacity to meet Alameda County electrical energy needs for the next 10 years, thus any negative impacts would be mitigated.

Site 300

Current electric power consumption at Site 300 is considered to be representative of future consumption rates for the No Action Alternative. However, the population in San Joaquin County is projected to increase 30 percent by the year 2015 (DOF 2001). Residential, commercial, industrial, and other electric power uses in San Joaquin County are expected to increase proportionally. This growth could constitute a substantial cumulative impact on electric power resources in the area. Currently, electric utilities provide approximately 5,106 million kilowatt-hours per year of electricity to San Joaquin County (CEC 2001). However, more than 10,000 megawatts of new electric generation capacity is planned in the PG&E service area. Additional generating capacity is planned throughout the State of California and surrounding states (CEC 2000). Expanded electric transmission capability is also planned in the region. If implemented as planned, these additions would provide sufficient capacity to meet San Joaquin County electrical energy needs for the next 10 years and mitigate the impact of growth in the region.

Fuel Consumption***Livermore Site***

The No Action Alternative, together with other developments in the PG&E service area, would increase the demand for natural gas. Population in Alameda County is projected to increase by about 17 percent by the year 2015 (DOF 2001). Residential, commercial, industrial, and other uses in Alameda County are expected to increase proportionally. This population growth could constitute an adverse cumulative impact on natural gas supply systems. However, PG&E's

transmission capacity is approximately 130 percent of the demand for natural gas in its service area (CPUC 2001). As required by the California Public Utilities Commission, PG&E uses a 15-year planning horizon for gas transmission and storage capacity and a 10-year planning horizon for local gas distribution systems. Accordingly, PG&E plans to provide sufficient capacity to meet Alameda County needs for the next 10 years. Therefore, any impacts would be mitigated.

Site 300

Current fuel oil consumption at Site 300 is considered to be representative of future consumption rates for the No Action Alternative. However, the population in San Joaquin County is projected to increase 30 percent by the year 2015 (DOF 2001). Fuel oil use in San Joaquin County is expected to increase as the population increases, but at a lower rate. This growth could constitute an adverse cumulative impact on fuel oil supplies in the county. However, overall fuel oil use in the State of California has declined substantially as air quality regulations concerning greenhouse gas emissions become more stringent. Consequently, fuel oil delivery systems within San Joaquin County have large amounts of excess capacity. This excess capacity is sufficient to meet San Joaquin County requirements for the next 10 years. Therefore, any impacts would be mitigated.

5.2.13 Materials and Waste Management

5.2.13.1 Materials Management

This section provides an overview of management responsibilities regarding receipt, transfer, and shipment of radioactive, controlled, and hazardous materials under the No Action Alternative. Appendices A, B, D, M, and N include descriptions of programs and buildings associated with the use of these materials, which historically has resulted in both their planned and inadvertent releases to the environment.

The consequences of using radioactive, controlled, and hazardous materials are discussed in the sections associated with the affected media. For example, releases to the air associated with use of radioactive materials are discussed in Section 5.2.9 and releases affecting vegetation are discussed in Section 5.2.8. The workplace use of these materials and associated occupational exposures are discussed in Section 5.2.14.

Relationship with Site Operations

Several new operations are currently in the planning stages at LLNL. However, they were considered outside of the scope of the existing conditions for this LLNL SW/SPEIS because they had not yet reached operational status. New operations are defined as programmatically planned projects with implementation schedules that will take place in the future, such as the NIF. The No Action Alternative would include all new operations, D&D projects, and other activities identified in Section 3.1. In general, material usage at LLNL would increase consistent with a 3 percent increase in LLNL operations above the existing conditions.

Waste minimization and pollution prevention techniques would be expected to offset a portion of the projected increase. Average maximum quantities would likely remain constant as material storage space remains constant; however, average quantities would be expected to increase to

meet demand. Under the No Action Alternative, material projections used for analysis would not exceed existing material management capacities.

Impact Analysis

The No Action Alternative would not cause any major changes in the types of materials used onsite. Material usage at LLNL would increase consistent with a 3 percent increase in laboratory operations over existing conditions. Waste minimization and pollution prevention techniques would offset a portion of the projected increase. Average maximum quantities would likely remain constant as material storage space remains constant; however, average quantities would increase to meet demand. Under the No Action Alternative, material projections used for analysis would not exceed existing material management capacities.

Existing Operations

Under the No Action Alternative, total hazardous material usage would increase for existing facilities. Average quantities would increase by an estimated 3 percent above current conditions. Annually, approximately 171,000 to 192,000 chemical containers, ranging from 210-liter (55-gallon) drums to gram-quantity vials, would be used or stored at LLNL.

Annually, for the Livermore Site, approximately 70,000 gallons of liquids would be managed under the No Action Alternative with an estimated storage capacity of 227,000 gallons. Approximately 1.4 million pounds of solids would be handled with a storage capacity of 2.4 million pounds. Solid material storage would not be expected to fluctuate because metals (e.g., lead used for shielding) are less likely to be consumed and more likely to be reused and reclaimed. Regardless, there would be sufficient capacity to accommodate anticipated operations. Approximately 1.1 million cubic feet of mostly industrial gases (argon, helium, hydrogen, oxygen, nitrogen) would be used annually with a storage capacity of 71.6 million cubic feet. Projections for specific hazardous chemicals for existing Livermore Site operations and Site 300 operations are presented in Tables 5.2.13.1–1 and 5.2.13.1–2, respectively. Additional details are provided in Appendix B.

Increases in overall radioactive materials and explosive materials based on current administrative limits are expected; however, no new material storage facilities would be built as a result of these projected increases. Detailed safety documentation would be required in most cases prior to implementation of increased inventories of these controlled materials. For a discussion of potential accidents, materials limits, and materials-at-risk, see Section 5.5, Bounding Accident Scenarios. Under the No Action Alternative, radioactive material and explosive material requirements would not exceed existing material management capacities (TtNUS 2003); therefore, no additional impacts are expected.

New Operations

LLNL anticipates hazardous material usage rates to increase for the foreseeable future. The majority of the increase would be due to the full implementation of NIF and BSL-3 operations (Table 5.2.13.1–3). New LLNL operations would account for approximately 70,000 gallons of liquids and approximately 20,000 standard cubic feet of industrial gases. Materials expected to support other projects, including D&D projects, are described in Tables 5.2.13.1–3 and

5.2.13.1–4. For new facilities, no additional impacts would be expected since each of the new facilities would be designed to handle expected quantities.

Under the No Action Alternative, several construction projects, D&D projects, renovation projects, and new operations would begin. Site material usage would increase slightly because of the new operations. See Appendices A and B of this LLNL SW/SPEIS for more information.

Cumulative Impacts

The ROI for materials management involves LLNL and its facilities, as presented in Chapter 4 of this LLNL SW/SPEIS.

The ROI for cumulative impacts is larger than that presented in Chapter 4 and considers the contributions of LLNL (Livermore Site and Site 300), SNL/CA, NNSA, local projects and activities, and the State of California. NNSA assessed cumulative impacts by combining the potential effects of the No Action Alternative with the effects of other past, present, and reasonably foreseeable activities in the ROI. The No Action Alternative was chosen to assess and present a bounding scenario of potential cumulative effects. This approach allowed a conservative analysis or a maximum estimation of cumulative impacts (see Section 5.3.13.1).

5.2.13.2 Waste Management

This section provides an overview of management responsibilities for generation, storage, treatment, and disposal of radioactive, hazardous, mixed, and other wastes, including biohazardous and D&D wastes at LLNL under the No Action Alternative. Appendices B, M, and N include descriptions of wastes and facilities associated with use, generation, and management of these wastes.

The consequences of managing radioactive and hazardous wastes are discussed in the sections associated with the affected media. For example, releases affecting vegetation are discussed in Section 5.2.7, Biological Resources, and releases (treatment processes) to the air associated with use of radioactive materials are discussed in Section 5.2.8, Air Quality. The workplace use of these materials and associated occupational exposures are discussed in Section 5.2.14, Human Health and Safety.

TABLE 5.2.13.1–4.—Listing of Materials in Use with Decontamination and Decommissioning Construction, Upgrades, and Other Improvements Under the No Action Alternative^{a, b, c}

Material Usage Description
Acoustical ceiling, acoustical insulation, acrylic, additives, adhesives, asphalt, bonding agent, carpet and padding, caulking, ceramic, cleaners, concrete, coolants, fillers, glazing, glues, gypsum wallboard, insulating paints, insulation, joint compounds, latex, metal ceiling, oils, paints, pipes, primer, putties, quarry and conductive tile, reducers, roofing materials, roofing materials, sealants, sealer, soil, solder, solvents, spackling, sprayed fireproofing, structural metals, tile grout, tubes, wallpaper supplies, waterproofing, wiring, and wood finishing.

Source: TtNUS 2003.

^a Examples of D&D projects include Buildings U325, 222S, 514, cleanup of 292.

^b Examples of Construction projects include routinely remove and replace offices throughout LLNL.

^c Examples of Upgrades include Biological Safety and Security Laboratory project covering Buildings 132N, 151, 154, 235, 241 (for BSL level 1 and 2), Buildings 190, 281, 432, 435, 446 (for BSL level 1 and 2), Building 132S (for BSL level 1 and 2), Buildings 153 and T1527 (for BSL level 1 and 2), reroofing a series of buildings, Building 332 ductwork replacement, Site 300 Revitalization, Site 300 Wetlands Enhancement, East Avenue, Superblock Security Upgrade, Engineering Technology Complex Upgrade, building utilities, seismic, other road upgrades, site utilities upgrades.

D&D = decontamination and decommissioning.

Relationship with Site Operations

Several new operations are currently in the planning stages at LLNL; however, they were considered outside the scope of the existing conditions for this LLNL SW/SPEIS because they had not yet reached operational status. New operations are defined as programmatically planned projects with defined implementation schedules that will take place in the future, such as the NIF. The No Action Alternative would include all new operations, D&D projects, and other activities, including permit modifications, identified in Section 3.1. In general, waste generation at LLNL would increase, consistent with a 3 percent increase in LLNL operations above the existing conditions.

Waste minimization and pollution prevention techniques would be expected to offset a portion of the projected increase assessments. Under the No Action Alternative, waste generation projections used for analysis would not exceed existing waste management capacities.

Impact Analysis

Under the No Action Alternative, ongoing NNSA and interagency programs and activities at LLNL would continue operating at planned levels as reflected in current NNSA management plans for 2004 through 2014 (e.g., recent Class 1 and Class 2 Permit Modification submittals). The Decontamination and Waste Treatment Facility (DWTF) use would increase by implementing planned permit modifications as identified below. In some cases, projected waste generation levels would include increase over current waste generation levels (e.g., NIF contributions). These would include increases for any recent activities that have already been approved by NNSA and have existing NEPA documentation (e.g., BSL-3 contributions). If these planned operations are implemented in the future, they could result in increased activity above present levels. Under the No Action Alternative, the level of activity would increase RHWM operations as defined in Section 5.1.13.2, that would implement current management plans for assigned programs such as RCRA closure of Building 514. The No Action Alternative analysis includes any approved and interim actions and facility expansion, construction or management plans, where detailed design and associated permit documentation were completed. The analysis

also includes new construction such as BSL-3, several upgrades, building modifications, and removal of structures totaling approximately 234,000 square feet.

Other plans used to prepare the description of the No Action Alternative include the site development plans for LLNL, Programmatic EISs, and Part B Permit modifications and guidance. Some documents have future projects included for planning purposes; others have been omitted because of schedule constraints or because the projects were not at the point of decisionmaking, or other reasons. The activities reflected in this alternative include planned increases in some LLNL operations and activities over previous years' levels.

Implementation of the No Action Alternative would not cause any major changes in the types of waste streams generated onsite. Waste generation levels for the foreseeable future at LLNL would remain essentially consistent with recent generation quantities experienced during 1993 through 2002. Annually, any increase would be consistent with increases from new operations and normal fluctuations as previously noted. Waste minimization and pollution prevention techniques would be expected to offset projected increases. Onsite waste handling capacities are four to five times expected waste volumes. Waste projections used for analysis would not exceed existing offsite waste management disposal capacities. Wastes associated with existing operations, new operations, and special operations are presented below, including other wastes. The No Action Alternative would include several new operations, D&D projects, and other activities, including permit modifications and RCRA closures. Appendix B provides additional details on waste management activities under each of the alternatives. The No Action Alternative would include the following:

- Generation of routine waste quantities presented in Table 5.2.13.2–1
- Generation of nonroutine waste quantities presented in Table 5.2.13.2–1
- Generation of wastes associated with new operations presented in Table 5.2.13.2–2
- Recently approved and ongoing permit modifications

No additional waste storage, treatment, handling capacity, regulatory requirements, or security requirements would be needed.

Existing Operations

For projection purposes, routine waste generation data for 1993 through 2002 were considered a reasonable range for existing facilities/ operations; an average of these years was used. The amount of waste generated from existing operations anticipated would reflect proportional increases in LLNL activity levels over the foreseeable future. The waste quantities projected represent a site-wide aggregate of quantities for each type of waste category. Table 5.2.13.2–1 presents existing operations estimated annual (routine) waste generation quantities by waste category.

TABLE 5.2.13.2–1.—Routine and Nonroutine Operations Waste Generation Quantities Under the No Action Alternative and Existing Conditions

Waste Type	Annual Quantities			
	Existing Conditions ^a		No Action Alternative ^b	
	Routine	Nonroutine	Routine	Nonroutine
LLW	170 m ³ /yr	480 m ³ /yr	200 m ³ /yr	630 m ³ /yr
MLLW	67 m ³ /yr	44 m ³ /yr	61 m ³ /yr	72 m ³ /yr
Total Hazardous ^c	440 metric tons	880 metric tons	390 metric tons	1,500 metric tons
TRU	35 m ³ /yr	4.2 m ³ /yr	50 m ³ /yr	55 m ³ /yr
Mixed TRU	2.6 m ³ /yr	0 m ³ /yr	1.7 m ³ /yr	0 m ³ /yr
Sanitary solid	4,700 metric tons	Included in Routine	4,800 metric tons	Included in Routine
Wastewater	300,000 gal/day	Included in Routine	310,000 gal/day	Included in Routine

Source: DOE 2002s, LLNL 2002o, LLNL 2002x.

^a Based on average quantities since 1992 and one standard deviation.

^b For routine wastes based on average quantities since 1992 and one standard deviation, expected increase in activity levels, and new operations contributions. No margin was added for nonroutine.

^c Total hazardous includes RCRA hazardous, state regulated, and *Toxic Substances Control Act*.

gal/day=gallons per day; m³/yr= cubic meters per year; LLW = low-level waste; MLLW = mixed low-level waste; RCRA = *Resource Conservation and Recovery Act*; TRU = transuranic.

New Operations

New operations wastes, including project-specific information, are considered to be derived from mission-related work. The waste, quantities projected represent a site-wide aggregate of quantities for each type of waste category. Table 5.2.13.2–1 includes new operations and additions to the estimated annual (routine) waste generation quantities by waste category. Table 5.2.13.2–2 presents qualitative and quantitative waste information by project.

Special (Nonroutine) Operations

Special (nonroutine) wastes result from special, limited duration construction projects such as those considered separate from facility operations. Special, limited duration project wastes include those generated from construction, demolition, D&D, and environmental restoration. The amount of waste generated is anticipated to reflect proportional increases in LLNL activity levels over the next 10 years. The waste quantities projected represent a site-wide aggregate of quantities for each type of waste category. Table 5.2.13.2–1 presents estimated annual (nonroutine) waste generation quantities by waste category.

All Other Wastes

LLNL operations would also involve the five additional waste management activity areas discussed below under the No Action Alternative.

Biohazardous (includes Medical Waste Management Act) Waste

In 2002, several hundred kilograms of biohazardous wastes were disposed of at an approved offsite facility. Under the No Action Alternative, biohazardous waste generation would increase by 3 percent. The existing waste handling capabilities would be adequate to accommodate this waste. Offsite disposal capacity would continue to be sufficient.

Construction and Decontamination and Decommissioning Waste

To bound impacts, this analysis assumed the construction of 100,000 to 200,000 square feet of new facilities, including specific projects listed in Table 5.2.13.2–2. This would generate 200 to 400 metric tons of construction debris. Approximately two-thirds of wood, concrete, asphalt, soil, metal, and cardboard would be diverted for recycling or reuse (LLNL 2002cc). The existing waste handling capabilities would be adequate to accommodate the remaining waste. Offsite disposal capacity would continue to be sufficient.

Assuming all 255,000 square feet of excess facilities would be removed to bound impacts, D&D would generate approximately 1,530 metric tons of debris, 600 metric tons per 100,000 square feet. Only 350 metric tons would be LLW, MLLW, and hazardous waste (Bisanni 2003). Approximately two-thirds of the debris would be diverted, recycled, or reclaimed (LLNL 2002cc). The existing waste handling capabilities would be adequate to accommodate this waste. Offsite disposal capacity would continue to be sufficient.

Environmental Restoration Waste

Site-wide environmental restoration waste generation trends at LLNL would generally remain a function of treatment units, the number of wells, and the number of hours of operation. Existing waste handling capabilities are already in place.

Explosive Wastes

The Explosive Waste Treatment Facility would handle 2,500 to 3,300 pounds per year. The Explosive Waste Storage Facility would store 5,500 to 6,500 pounds (gross) per year. This represents a 3 percent increase over existing conditions. No additional capacity would be required.

Wastewater

Wastewater would increase to approximately 310,000 gallons per day. The current capacity of 1.69 million gallons per day would be adequate to accommodate this waste. Offsite disposal capacity would continue to be sufficient.

Cumulative Impacts

The ROI for waste management involves LLNL and its facilities as presented in Chapter 4 of this LLNL SW/SPEIS.

The ROI for cumulative impacts is larger than that presented in Chapter 4 and considers the contributions of LLNL (Livermore Site and Site 300), SNL/CA, NNSA activities, local projects and activities, and the State of California. The NNSA assessed cumulative impacts by combining the potential effects of the Proposed Action with the effects of other past, present, and reasonably foreseeable activities in the ROI. The Proposed Action was chosen to assess and present a bounding scenario of potential cumulative effects. This approach allowed a conservative analysis for a maximum estimation of cumulative impacts.

5.2.14 Human Health and Safety

5.2.14.1 Nonradiological Health Impacts

Operations at LLNL involve a wide range of activities that have the potential for exposure of involved and noninvolved workers to hazardous materials or conditions. These hazards include non-ionizing radiation, chemicals, biological agents, and industrial hazards. Evaluation of occupational protection issues considered existing ES&H programs that specifically address worker and general population protection measures implemented to control, reduce, or eliminate operational hazards. Appendix C presents a detailed description of LLNL ES&H programs implemented to monitor and ensure that all sectors of the local environment are protected. Hazardous chemicals to which involved and noninvolved workers could be potentially exposed, under the No Action Alternative, at the Livermore Site and Site 300, are listed in Tables 5.2.13.1–1 and 5.2.13.1–2.

Relationship with Site Operations

Section 3.2 describes projects under the No Action Alternative. When combined with current operations, these projects would result in small increases in chemical inventories. There would also be an increase in construction and demolition activities associated with site facility expansion and renovation due to new missions and facility demolition and removal activities. These activities would represent an increase in potential injuries associated with construction safety hazards.

Impact Analysis

Under the No Action Alternative, major changes in the types of occupational, toxic, or physical hazards encountered by site personnel would not be expected. Under the No Action Alternative, an approximate 3 percent site-wide increase in average chemical inventories would be expected. Under this alternative, 11 construction projects, 7 D&D projects, 6 renovation projects and 4 new operations would begin. Site material usage would be expected to increase slightly as a result of the four new operations. However, as the mix of site missions shifts from chemical to mechanical processes, the proportional increase in chemical inventories associated with new operations would be lessened.

During the course of routine operations, the potential exists for some personnel to be exposed to chemical, biological, and physical hazards. The LLNL Integrated Safety Management System (ISMS) minimizes the occurrence and mitigates the consequences of these exposures by identifying and analyzing potential hazards during the planning stages of work activities. Site workers conduct work in accordance with established site-wide programs as well as project-specific programs. Site-specific integration work sheets, facility safety plans, and standard operating procedures are prepared to supplement activities not covered by site safety plans or the LLNL ES&H Manual (LLNL 2000i). As hazards are identified, appropriate control measures are developed for implementation during the performance of work. Workplace monitoring provides data for the characterization of hazards and provides information on personnel exposures (LLNL 2003k). Personnel exposure monitoring data for 2001 indicating the potential for personnel exposures are presented in Appendix C.

Overall site usage of toxic substances and physical hazards would increase under the No Action Alternative as activity levels increase at existing facilities and as new facilities are constructed and begin operation. However, this would not represent an adverse impact. Under the No Action Alternative, the use of additional quantities of chemicals would result in a slight increase in worker exposures. Facility improvements and additions would result in improved control measures for handling hazardous chemicals and controlling physical hazards. Worker exposure to hazardous chemicals would be minimized by the use of improved facilities for handling toxic chemicals and controlling physical hazards. Continued application of site ES&H and ISMS principles would result in minimal impacts to workers and the public.

Tables 4.15.1.2–3 and 4.15.1.2–4 summarize the maximum and average quantities of hazardous chemicals stored at LLNL facilities. At the Livermore Site, the FY2001 chemical inventory indicated average quantities to be 60,902 gallons of liquids, 1.4 million pounds of solids/gases, and 19.4 million cubic feet of compressed gases. Under the No Action Alternative, these quantities would increase by 9,700 gallons and 29,000 pounds, and would decrease by 8.86 million cubic feet, respectively. Projected maximum and average quantities of hazardous chemicals stored at the Livermore Site and Site 300 for the No Action Alternative are presented in Tables 5.2.13.1–1 and 5.2.13.1–2. The corresponding FY2002 quantities for Site 300 are 56,000 gallons of liquids, 42,000 pounds of solids/gases, and 387,000 cubic feet of compressed gases, which would increase by 300 gallons, 1,300 pounds, and 6,100 cubic feet, respectively (TtNUS 2003). Physical hazards such as noise, electrical shock, and workplace injuries/illnesses could also increase under the No Action Alternative.

Employees at Site 300 conduct work in accordance with established site-wide ISMS programs as well as Site 300-specific programs. Site-specific integration work sheets, facility safety plans, and standard operating procedures are prepared to supplement activities not covered by site safety plans or the LLNL ES&H Manual (LLNL 2000i). The No Action Alternative projects are assumed to result in an approximate 3 percent increase in usage of hazardous chemicals. However, this would not increase worker exposure because these projects would include improved facilities for handling toxic chemicals and controlling physical hazards.

Based on the assumption that the increase in the facility footprint associated with the No Action Alternative represents an increase in chemical inventory, worker exposures would slightly increase.

Using the 2001 personnel exposure data, due to the downward trend, the following results would be expected for the peak workforce year during the 10-year period ending in 2014:

- 330 measurable results out of 1,391 analyses from personnel sampling
- 33 results in excess of OSHA Permit Limit Exposure (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV), not corrected for respiratory protection

Corrected for the use of respiratory protection, no personnel exposures above DOE action levels, OSHA PELs, or ACGIH TLV would be expected.

Site injury and illness data for the 7-year period ending in 2002 indicate a decrease from 1996 levels; i.e., recordable case rate of 6.9 in 1996 versus 3.0 in 2002. A slight increase in recordable case rates occurred in 1997 and 1998; in 2000, lost/restricted workday case rates were higher than 1999, 2001, and 2002. Additional information is presented in Appendix C. Using the 2002 injury and illness data as bounding, due to the downward trend, the following results would be expected for the reasonably foreseeable workforce year under the No Action Alternative.

- 237 recordable cases
- 71 lost or restricted workday cases
- No fatalities would be expected

The overall decrease from 1996 to 2002 demonstrates the effectiveness of the ES&H program (LLNL 2002ck, LLNL 2003u). This success is also due in part to the implementation of the ISMS. Although an increase in construction, demolition, and renovation activities would occur under the No Action Alternative, these activities would not have a significant impact on site injury and illness rates.

Facility upgrades and continued implementation of site ES&H program components would significantly reduce the risk of personnel exposures. Workplace and personnel monitoring data indicate the effectiveness of the current program (LLNL 2002bk). Several proposed projects would increase levels of protection for both workers and the general public. These include the Building 151 Upgrade, Building 331 renovation and modification, and Building 332 ductwork replacement.

Ongoing and planned D&D activities would reduce overall site hazards by removing chemical and physical hazards from the workplace. Facilities to undergo D&D would include the U235 cooling tower and Building 514.

The planned infrastructure improvements, such as roof replacements, facility renovations and facility and system upgrades, would improve the overall safety. The planned structural and seismic upgrades would result in improved facilities and work areas. Facility roof replacement would provide protective measures for sensitive facility components and increase the protection of potentially hazardous areas from exposure to the environment. Electrical and ventilation upgrades would increase facility control features and reduce the risk of hazardous energy events. Therefore, the overall impact of these activities would be beneficial. Assuming the improved safety system in Building 514 reduces accidents, this could result in a reduction of impacts.

Cumulative Impacts

The occupational health and safety of workers at LLNL is site-specific and would not be affected by other activities occurring within the area. Cumulative effects for workers would be the same as those presented above in the No Action Alternative impact analysis.

5.2.14.2 Radiological Health Impacts

This section analyzes the No Action Alternative radiological health impacts from ongoing operations (e.g., R&D, waste management) and facilities under construction (e.g., the NIF). Impacts to workers are given in terms of number of cancer fatalities resulting from employment activities in the worker population. No Action Alternative radiological health impacts to the public from normal releases for the same operations are also described. These impacts are given in terms of the probability of the site-wide MEI contracting a fatal cancer from these operations. The number of fatal cancers expected in the general population from LLNL operations is also described.

Relationship With Site Operations

This section summarizes the relationship between projects described in Section 3.2 for the No Action Alternative and radiological health impacts from normal site operations. The No Action Alternative dose will increase as new and increased operations come on line. The maximum doses and health effects over this timeframe are presented here. The number of cancer fatalities to workers and the general public from exposure to these operations is used to quantify the impacts.

Impact Analysis

Workers

The dose to involved workers, i.e., workers who are directly exposed to radiation in the performance of their jobs, would be 90 person-rem per year. This dose includes 1.43 person-rem per year from the Advanced Materials Program and 15 person-rem per year from the NIF. Most of the remainder of this dose would be from operations in Building 332. Workers would be exposed to an increased risk of cancer as a result of occupational exposure to radiation over an extended period (calculated value of 0.054 fatalities per year of operation). Note that radiation exposure in all radiologically controlled areas are kept as low as reasonably achievable (ALARA) through facility and equipment design and administrative controls.

The dose to noninvolved workers, i.e., exposure to normal site radiological emissions not directly related to performance of their jobs, would be approximately 0.15 person-rem per year (see Section 5.2.8.2). Over 95 percent of this dose is from Livermore Site operations. No cancers (calculated values of 8.9×10^{-5} LCFs per year of operation) are expected among noninvolved workers.

General Public

The No Action Alternative health impacts to the hypothetical offsite site-wide MEI at the Livermore Site and Site 300 are calculated from the radiation dose described in Section 5.2.8.2 (emissions to the atmosphere) plus the radiation dose from neutrons penetrating the roof of the NIF. This is described in Appendix M of this LLNL SW/SPEIS. The dose to the public from LLNL air emissions would be due to exposure, either directly from the plume or through deposition and subsequent inhalation and ingestion. The dose to the site-wide MEI from neutrons

produced at the NIF is a result of exposure to these neutrons (and the gamma rays produced) after they collide with the molecules in the air and scatter to the ground (skyshine).

The No Action Alternative dose to the Livermore Site site-wide MEI would be 0.30 millirem per year (0.10 from air effluents, mainly tritium, and 0.2 from skyshine). Such doses are limited by DOE O 5400.5, “Radiation Protection of the Public and the Environment.” This order limits doses caused by all pathways of release of radiation or radioactive material to 100 millirem per year for prolonged exposure (DOE 1993a). The probability of a LCF to the site-wide MEI would be 1.8×10^{-7} per year of exposure. The No Action Alternative site-wide MEI dose from Site 300 operations would be 0.055 millirem per year, less than 0.6 percent of the NESHAP standard. The probability of a LCF to this hypothetical individual would be 3.3×10^{-8} per year of exposure.

The population dose from all LLNL operations would be 12 person-rem per year. The skyshine dose from the NIF is not included in the population dose estimate; skyshine is important near the Livermore Site boundary to a hypothetical individual continuously located at the site boundary (i.e., the site-wide MEI). It is less important to the general population whose exposure to it would be either transitory or nonexistent. No LCFs (calculated value of 0.007 LCFs per year of operation) to the public would result from exposure to Livermore Site operations.

Cumulative Impacts

There is a possibility that an individual worker would contract a fatal cancer sometime during that worker’s lifetime as a result of extended occupational exposure under the No Action Alternative (calculated value of 0.054 fatalities per year of operation).

No adverse impacts to the general population would occur under the No Action Alternative. Other than background radiation sources, there are no other known contributors to concentrations of radionuclides near the Livermore Site or Site 300. Therefore, there would be no cumulative radiological impacts.

5.2.15 Site Contamination

The following section analyzes impacts to contaminated soils and sediments, and groundwater under the No Action Alternative. For the purpose of this LLNL SW/SPEIS, soils and sediments discussed below include surficial soils, both unconsolidated and consolidated sediments, and unsaturated bedrock.

5.2.15.1 Relationship with Site Operations

This section summarizes the relationship between projects described in Section 3.2 under the No Action Alternative and the site contamination impact analysis.

Soil and groundwater contamination at LLNL occurred as the result of past operations and could be occurring from ongoing operations in outdoor testing areas, handling and storage of hazardous materials, waste management activities, and radioactive material management activities. At the Livermore Site, selected remedial actions are expected to be in place by the end of FY2006. The remediation of VOCs will be conducted using soil vapor extraction. Contamination in the unsaturated zone will be remediated only if it is predicted to impact groundwater above the

maximum contaminant level (MCL). The cleanup of these soils is not expected to exceed predetermined, risk-based cleanup standards, but concentrations are still expected to exceed background levels. At Site 300, selected remedial actions are expected to be in place by the end of FY2008.

NNSA is concerned with deposition of contaminants on the ground surface during normal operations or accidents. The more frequently activities are undertaken, the greater the probability of an occurrence that results in soil contamination. The No Action Alternative would increase the likelihood of soil contamination over the existing conditions. A 3 percent increase in activity levels across the site is projected; accordingly, an increase in hazardous material management and waste management, and an associated spill or release could occur. LLNL would continue to conduct immediate cleanup actions and periodic site surveys to ensure environmental impacts are minimized.

Chemical, oil, or hazardous material spills or releases would be possible given the variety of materials handled at LLNL. Although substantial quantities of hazardous materials are not present on LLNL, some buildings use a variety of chemicals, acids, bases, solvents, and other hazardous materials. The radioactive and hazardous waste management facilities store and handle hazardous and radioactive wastes being prepared for onsite treatment and shipment offsite for disposal. These facilities are the onsite receiving point for all chemical wastes and have the potential for hazardous spills, releases, or fires. Additionally, most of the onsite research laboratories use small amounts of chemicals for research projects. At LLNL, controls are in place to minimize the potential for soil contamination from any LLNL operations.

5.2.15.2 *Impact Analysis*

As of the end of 2002, 1.9 billion gallons of groundwater have been treated at the Livermore Site (LLNL 20031). Offsite contamination is being effectively cleaned up and plume sizes are decreasing. A total of 104 of the 120 release sites are in long-term stewardship. Of the remaining sites, further cleanup is ongoing.

By the end of FY2006, NNSA plans to have in place remediation facilities at all currently identified sites scheduled for long-term stewardship, in some cases 50 to 60 years. Cleanup activities scheduled for the Livermore Site during the next 5 years are listed in Chapter 4, Section 4.17.1.3.

As of the end of 2002, 236 million gallons of groundwater have been treated at Site 300 (LLNL 20031). Offsite contamination has been effectively remediated and contaminant concentrations in source areas are being reduced. A total of 53 of the 73 release sites have completed assessment and remedial action phases are designated for long-term stewardship (DOE 2001b). Of the remaining sites, further investigation and remediation are ongoing.

By the end of FY2008, NNSA plans to have in place remediation facilities at all currently identified sites scheduled for long-term stewardship of contaminated areas, in some cases, 60 to 70 years. Cleanup activities scheduled for Site 300 during the next 5 years are listed in Chapter 4, Section 4.17.2.3.

The No Action Alternative would increase the likelihood of soil contamination over the existing conditions; however, minimal deposition of contaminants from continued operations to soil and continued removal of known contaminants under the cleanup effort would occur. No adverse impacts to future designated land use would be expected. No further adverse impacts on groundwater would be expected. Under the No Action Alternative, continued improvement of water quality and source reduction would occur at both the Livermore Site and Site 300 due to operation of existing remediation facilities, construction of planned remediation facilities, and natural attenuation of contamination already in soils and groundwater.

5.2.15.3 Cumulative Impacts

The ROI for site contamination involves LLNL and its remedial sites as presented in Chapter 4 of this LLNL SW/SPEIS. The ROI for analysis of cumulative impacts is larger than that presented in Chapter 4 and considers the contributions of LLNL (Livermore Site and Site 300) and local projects to contamination of nearby groundwater resources. Cumulative impacts could result either from LLNL groundwater contamination commingling with other plumes causing exceedance of water quality criteria in the combined plume, or from a limitation of aquifer/land usability as the volume or areal extent of contaminated groundwater/soil makes the aquifer/land substantially less suitable for its designated purposes.

Sandia National Laboratories/California

SNL/CA Environmental Restoration Program activities began in 1984. By 1991, 23 solid waste management units were identified. Of these locations, nine were identified for further investigation. The largest site, the Navy Landfill, is 2 acres. Investigation of these sites is regulated under RCRA. As of February 2002, environmental restoration activities at SNL/CA had progressed through a series of remedial and closure actions to the point where most sites have attained closure and active environmental monitoring is continuing on three sites: Fuel Oil Spill, Navy Landfill, and the Trudell Auto Repair Shop site. SNL/CA is working with the State of California on full closure requests and monitoring requirements.

Five non-Federal contaminated sites are located in the city of Livermore, none of which are listed on the National Priorities List. Two sites (one Federal) are located in the city of Tracy. The Federal Defense Distribution Center of San Joaquin is on the National Priorities List.

Past, present, and planned activities are designed to minimize contamination at LLNL, SNL/CA, and other sites. The cleanup of these sites has been and will be performed to a level that meets State of California's approved health risk based standards, which vary depending on the contaminants of concern, corresponding to the intended future uses of the sites. As existing contamination at LLNL is being cleaned up under the Environmental Restoration Program, no cumulative impacts would be expected.