5.6.2 Postulated Material Event Initiated by Unspecified Accident

As a result of review of available documentation, the accident assessment team considered a case of a hydrogen tanker explosion. The potential effects of hydrogen explosions are estimated using trinitrotoluene (TNT) equivalence model. The case examined is an explosion of a refueling tanker truck carrying 40,000 cubic feet (ft^3). These impacts would be limited to the immediate vicinity of the explosive device and would not impact the offsite public. The potential effects are estimated in Table 5-43. Impacts would be the same for all three alternatives.

5.7 COMPARISON OF DATA ANALYZED AND ENVIRONMENTAL CONSEQUENCES AMONG ALTERNATIVES

The SWEA combines the results of several studies to address consequences to the environment and risks associated with the NNSA's operations at SNL/CA. The environmental consequences presented in the SWEA includes the following 13 resource areas (excludes accidents): land use and visual resources, geology and soils, water resources and hydrology, biological and ecological resources, cultural resources, air quality, infrastructure, human health and worker safety, transportation, waste generation, noise, socioeconomics, and environmental justice.

The following section presents the comparison of the consequences by resource area under each alternative in tabular form (Table 5-44).

Table 5-43. Physical Effects as a Function of Distance for the Postulated Flammable Gas Explosions

Physical Effects	Distance in Feet	
	40,000 cubic feet (209-pound) TNT	10,000 cubic feet (52-pound) TNT
Peak Pressure	19	12
50 percent survival rate for pressures in excess of 50 psi	46	29
50 percent rate of eardrum rupture and total destruction of buildings for pressures in excess of 10 psi	96	60
Pressures in excess of 2 to 3 psi will cause concrete or cinder blocks to shatter.	282	177
Pressures in excess of 1 psi will cause a house to be demolished.	501	315

Source: Original
psi: pounds per square inch
TNT: trinitrotoluene

Table 5-44. Comparison of Potential Consequences of Continued Operations at Sandia National Laboratories, California

Resource Area		No Action Alternative	Planned Utilization and Operations Alternative	Maximum Operations Alternative
Land Use		Includes current land use plus LTF (2-acre construction site), DISL (4-acre construction site [estimate]), and Hazardous Waste Storage Facility modifications.	New facilities are the same as the No Action Alternative plus one new facility. Other activities would include upgrades to Arroyo Seco (as described in the Arroyo Management Plan and the Biological Assessment), setting aside 30 acres for a wildlife reserve, upgrading storm water runoff areas, designating 93 acres as future construction sites, leaving 122 acres as undesignated, and establishing a 25-acre soil management area. An easement would be established with landowners along western boundary.	Same as Planned Utilization and Operations Alternative. Other activities would include replacement of Building 916 (42,000 sq ft) with a building twice the size (84,000 sq ft) and the addition of a new 16,000-sq ft facility similar to the existing CRDL for research and development. Removal of no longer economically useful structures (100,000 sq ft).
Geology and Soils	Overall	SNL/CA activities are not anticipated to impact geology and soils.	Same as No Action Alternative	Same as No Action Alternative
	Solid Waste Management Units	23 (20 No Further Action) 3 to Long Term Monitoring	Same as No Action Alternative	Same as No Action Alternative
	Soil Removed from Arroyo Seco	Not Part of This Alternative	4,000 to 5,000 yd^3/yr	Same as Planned
	New Material, Backfill, Stone, etc.	Not Part of This Alternative	30,000 to 60,000 yd^3 over 10 years	Same as Planned
	Onsite Soil Management Area (25 acre site)	Not Part of This Alternative	30,000 to 40,000 yd^3 over 10 years	Same as Planned
Water Resources	Impervious Surface	49.2 acres	76.9 acres	Same as Planned Utilization and Operations Alternative
	Water Use	50 to 60 MGY	56.5 to 67.8 MGY	76.5 to 91.8 MGY
	Wastewater Discharge	12 to 19 MGY	13.6 to 21.5 MGY	18.4 to 29.1 MGY
	Irrigation	16 to 17 MGY	Same as No Action Alternative	Same as No Action Alternative

Table 5-44. Comparison of Potential Consequences of Continued Operations at Sandia National Laboratories, California

Resource Area		No Action Alternative	Planned Utilization and Operations Alternative	Maximum Operations Alternative
Biological Resources		Impacts projected for biological resources are minimal.	Same as the No Action Alternative plus several additional actions. Other activities would include upgrades to Arroyo Seco (20 improvement projects), setting aside 30 acres for a wildlife reserve, upgrading storm water runoff areas, designating 93 acres as future construction sites, and leaving 122 acres as undesignated.	Same as Planned Utilization and Operations Alternative.
Cultural Resources		No impacts.	Same as No Action Alternative	Same as No Action Alternative
Air Quality	Criteria Pollutants	Concentrations would be below the most stringent standards, which define the pollutant concentrations below which there are no adverse impacts to human health and the environment.	Same as No Action Alternative	Same as No Action Alternative
	Chemical Pollutants	Concentrations are below regulatory standards and human health guidelines.	Same as No Action Alternative	Same as No Action Alternative
Infrastructure		All projected activities are within capacities of existing road, waste management, and utility systems. The Glass Furnace and Melting Laboratory requires a new natural gas line.	Same as No Action Alternative	Same as No Action Alternative
Human Health and Worker Safety	Estimated increase in number of latent cancer fatalities	3.4×10^{-4}	4.0×10^{-4}	5.4×10^{-4}
	Total recordable cases of accident or injury	43 – 54	50 – 61	68 – 78
	Lost work-day cases	10 – 13	12 – 15	17 – 19

Table 5-44. Comparison of Potential Consequences of Continued Operations at Sandia National Laboratories, California

Resource Area		No Action Alternative	Planned Utilization and Operations Alternative	Maximum Operations Alternative
Transportation	Paved and unpaved road	6.2 miles	9.7 miles	9.7 miles
	Pedestrian mall	4 acres	6.24 acres	6.24 acres
	Paved service areas	5.5 acres	8.6 acres	8.6 acres
	Paved service parking	12.7 acres	19.8 acres	19.8 acres
	Material (Annual Shipments Radioactive, Chemical, and Explosives)	33 trips per year	37 trips per year	50 trips per year
	Waste (includes hazardous and radioactive)	76 shipments per year	86 shipments per year	116 shipments per year
	Sanitary Waste	52 shipments per year	59 shipments per year	80 shipments per year
	SNL/CA Weekly Hazardous Materials Transports (excluding waste)	1 to 3 outbound shipments per week (Total of 33)	1 to 3 shipments (Total of 37)	1 to 3 shipments (Total of 50)
	Supplier Weekly Hazardous Material Transports	1 to 3 inbound shipments per week (Total of 100)	1 to 3 shipments (Total of 113)	1 to 3 shipments (Total of 150)
	Soil Transports	Not Part of This Alternative	1,600 to 2,000 shipments over 10 years	1,600 to 2,000 shipments over 10 years

Table 5-44. Comparison of Potential Consequences of Continued Operations at Sandia National Laboratories, California

Resource Area		No Action Alternative	Planned Utilization and Operations Alternative	Maximum Operations Alternative
Transportation	Incoming Material (Rock, Soil, Concrete)	Not Part of This Alternative	1,500 to 3,000 shipments over 10 years	1,500 to 3,000 shipments over 10 years
	Site-Related Traffic, Total Daily Traffic	700 to 1,000 vehicles	791 to 1,130 vehicles	1,071 to 1,530 vehicles
Waste Generation	Management Capability	All projected activities are within capacities of existing facilities and systems	Same as No Action Alternative	Same as No Action Alternative
	LLW	5,308 kg/yr	5,998 kg/yr	8,121 kg/yr
	LLMW	451 kg/yr	510 kg/yr	690 kg/yr
	Total Hazardous	90,488 kg/yr	98,833 kg/yr	118,465 kg/yr
Noise		No impacts	Same as No Action Alternative	Same as No Action Alternative
Socioeconomics	SNL/CA Budget	$131 M	$170 M	$262 M
Environmental Justice		No disproportionately high and adverse impacts to minority or low-income communities are anticipated	Same as No Action Alternative	Same as No Action Alternative

Source: Original
[a]To bound the analysis, soil transports were assumed to be delivered to an offsite location. SNL/CA plans include managing soil onsite.
[b]Total hazardous including RCRA, California Toxic, TSCA, and biohazardous
CRDL: Chemical and Radiation Detection Laboratory
DISL: Distributed Information Systems Laboratory
kg: kilograms per year
LLW: low-level waste
LLMW: low-level mixed waste
LTF: LIGA Technologies Facility
M gal: millions of gallons
MGY: million gallons per year
SNL/CA: Sandia National Laboratories, California
sq ft: square foot/feet

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