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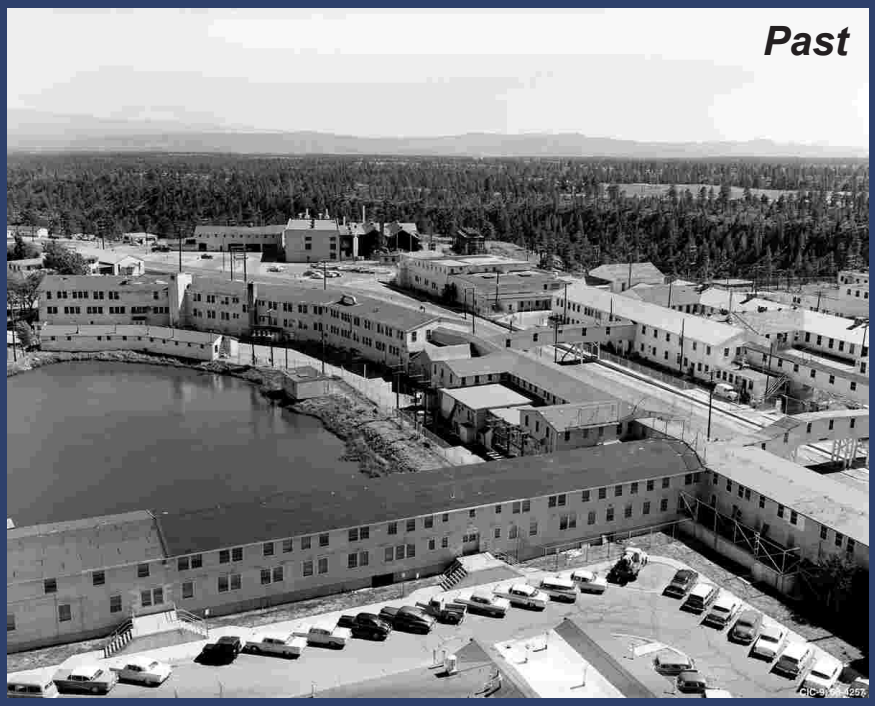

Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico

Volume 2 • Book 1
Appendices A through H

U.S. Department of Energy

National Nuclear Security Administration

Los Alamos Site Office

AVAILABILITY OF
THE FINAL SITE-WIDE ENVIRONMENTAL IMPACT
STATEMENT FOR CONTINUED OPERATION OF
LOS ALAMOS NATIONAL LABORATORY,
LOS ALAMOS, NEW MEXICO

To submit general questions regarding this EIS, or to request a copy, please contact:

Elizabeth Withers, EIS Document Manager
NNSA Service Center - Albuquerque
National Nuclear Security Administration
U.S. Department of Energy
P. O. Box 5400
KAFB East, SC-1
Albuquerque, NM 87185-5400
Telephone: 505-845-4984

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Responsible Agency: U.S. Department of Energy (DOE)
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Title: *Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico* (SWEIS) (DOE/EIS-0380)

Location: Los Alamos, New Mexico

For additional information or for copies of the SWEIS, contact:

Elizabeth Withers, EIS Document Manager
NNSA Service Center - Albuquerque
National Nuclear Security Administration
U.S. Department of Energy
P. O. Box 5400
KAFB East, SC-1
Albuquerque, NM 87185-5400
Telephone: 505-845-4984

For general information on the DOE National Environmental Policy Act (NEPA) process, contact:

Carol M. Borgstrom, Director
Office of NEPA Policy and Compliance
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
Telephone: 202-586-4600, or leave a message at 1-800-472-2756

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***Abstract*:** NNSA proposes to continue operating Los Alamos National Laboratory (LANL), which is located in Los Alamos County in north-central New Mexico. NNSA has identified and assessed three alternatives for continued operation of LANL: (1) No Action, (2) Reduced Operations, and (3) Expanded Operations. Under the No Action Alternative, NNSA would continue the historical mission support activities conducted at LANL at currently approved operational levels. Under the Reduced Operations Alternative, NNSA would eliminate some activities and limit the operations of other activities. Under the Expanded Operations Alternative, NNSA would operate LANL at the highest levels of activity currently foreseeable, including full implementation of mission assignments. Expanded Operations is NNSA's Preferred Alternative. NNSA intends to implement actions necessary to comply with the March 2005 Compliance Order on Consent (Consent Order) to address the investigation and remediation of environmental contamination at LANL, regardless of decisions it makes on other actions analyzed in the SWEIS. Under all of the alternatives, the affected environment is primarily within 50 miles (80 kilometers) of LANL. Analyses indicate little difference in the environmental impacts of the alternatives on many resource areas. The primary discriminators are public risk due to radiation exposure, collective worker risk due to radiation exposure, socioeconomic effects due to LANL employment changes, electrical power and water demand, waste management, and transportation. A classified appendix assesses the potential impacts of terrorist acts.

Public Comments: In preparing the Final SWEIS, NNSA considered comments received during the scoping period (January 19 to February 17, 2005) and during the public comment period on the Draft SWEIS (July 7 to September 20, 2006). Public hearings on the Draft SWEIS were held in Los Alamos, Española, and Santa Fe, New Mexico. Comments on the Draft SWEIS were requested during a period of 75 days following publication of the U.S. Environmental Protection Agency's (EPA's) Notice of Availability in the *Federal Register*. All comments, including any late comments, were considered during preparation of the Final SWEIS.

The Final SWEIS contains revisions and new information based in part on comments received on the Draft SWEIS. Vertical change bars in the margins indicate the locations of these revisions and new information. Volume 3 contains the comments received during the public comment period on the Draft SWEIS and NNSA's responses to the comments. NNSA will use the analysis presented in this Final SWEIS, as well as other information, in preparing the Record(s) of Decision (RODs) regarding the level of continued operations at LANL. NNSA will issue ROD(s) no sooner than 30 days after the EPA publishes a Notice of Availability of this Final SWEIS in the *Federal Register*.

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ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ALARA	as low as reasonably achievable
AOC	area of concern
BEIR	Biological Effects of Ionizing Radiation
CAP-88	Clean Air Act Assessment Package – 1988
CASA	Critical Assembly Storage Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CH	contact-handled
CME	corrective measure evaluation
CMR	Chemistry and Metallurgy Research (Building)
CMRR	Chemistry and Metallurgy Research Building Replacement Project
CO	carbon monoxide
CO_2	carbon dioxide
CSU	container storage unit
DARHT	Dual Axis Radiographic Hydrodynamic Test (Facility)
dB	decibel
dBA	decibel A-weighted
D&D	decontamination and decommissioning
DD&D	decontamination, decommissioning, and demolition
DIF	Definitive Identification Facility
DNA	deoxyribonucleic acid
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DVRS	Decontamination and Volume Reduction System
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FY	fiscal year
GIS	geographical information system
HDPE	high-density polyethylene
HE	high explosive
HEPA	high-efficiency particulate air (filter)
HSWA	Hazardous and Solid Waste Amendments
HTO	tritiated water
ISCORS	Interagency Steering Committee on Radiation Standards
ISCST3	Industrial Source Complex Air Quality Dispersion Model

LANL	Los Alamos National Laboratory
LANL SWEIS	*Site-Wide Environmental Impact Statement for the Continued Operation of the Los Alamos National Laboratory, Los Alamos, New Mexico*
LANSCE	Los Alamos Neutron Science Center
LSA	low specific activity (waste)
LASL	Los Alamos Scientific Laboratory (now LANL)
LCF	latent cancer fatality
LEED	Leadership in Energy and Environmental Design
LLNL	Lawrence Livermore National Laboratory
LLW	low-level radioactive waste
LOC	level-of-concern
MAR	material at risk
MDA	material disposal area
MEI	maximally exposed individual
MET	meteorological
MLLW	mixed low-level radioactive waste
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NO_x	nitrogen oxide
NOEL	No Observed Effect Level
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NTS	Nevada Test Site
PC	performance category
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
petaflops	one quadrillion floating point operations per second
PHERMEX	Pulsed High Energy Radiographic Machine Emitting X Rays
PIDAS	Perimeter Intrusion Detection and Assessment System
ppm	parts per million
PM_n	particulate matter less than or equal to *n* microns in aerodynamic diameter
PRS	potential release site
PSVE	passive soil vapor extraction
PuO_2	plutonium dioxide
rad	radiation absorbed dose

RANT	Radioassay and Nondestructive Testing Facility
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
RFI	RCRA facility investigation
RH	remote-handled
RLWTF	Radioactive Liquid Waste Treatment Facility
ROD	Record of Decision
SA	supplement analysis
SAL	Screening Action Level
SHEBA	Solution High-Energy Burst Assembly
SLEV/Q	screening level emission value by the estimated emission rate
SNM	special nuclear material
SO_x	sulfur oxide
SRS	Savannah River Site
SST	safe secure transport
SVE	soil vapor extraction
SWEIS	Site-Wide Environmental Impact Statement
SWMU	solid waste management unit
TA	technical area
TCLP	toxicity characteristic leaching procedure
TEDE	total effective dose equivalent
TEELs	Temporary Emergency Exposure Limits
teraflops	one trillion floating point operations per second
TNT	trinitrotoluene
TRAGIS	Transportation Routing Analysis Geographic Information System
TRU	transuranic
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
TWCF	Transuranic Waste Consolidation Facility
U-233	uranium-233
UCL	upper confidence limit
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
VOC	volatile organic compound
WCRR	Waste Characterization, Reduction, and Repackaging Facility
WIPP	Waste Isolation Pilot Plant
Y-12	Y-12 Complex in Oak Ridge
°C	degrees Celsius
°F	degrees Fahrenheit
µg/g	micrograms per gram
mg/m^3	milligrams per cubic meter

CONVERSIONS

METRIC TO ENGLISH			ENGLISH TO METRIC		
Multiply	**by**	**To get**	**Multiply**	**by**	**To get**
Area					
Square meters	10.764	Square feet	Square feet	0.092903	Square meters
Square kilometers	247.1	Acres	Acres	0.0040469	Square kilometers
Square kilometers	0.3861	Square miles	Square miles	2.59	Square kilometers
Hectares	2.471	Acres	Acres	0.40469	Hectares
Concentration					
Kilograms/square meter	0.16667	Tons/acre	Tons/acre	0.5999	Kilograms/square meter
Milligrams/liter	1 [a]	Parts/million	Parts/million	1 [a]	Milligrams/liter
Micrograms/liter	1 [a]	Parts/billion	Parts/billion	1 [a]	Micrograms/liter
Micrograms/cubic meter	1 [a]	Parts/trillion	Parts/trillion	1 [a]	Micrograms/cubic meter
Density					
Grams/cubic centimeter	62.428	Pounds/cubic feet	Pounds/cubic feet	0.016018	Grams/cubic centimeter
Grams/cubic meter	0.0000624	Pounds/cubic feet	Pounds/cubic feet	16,025.6	Grams/cubic meter
Length					
Centimeters	0.3937	Inches	Inches	2.54	Centimeters
Meters	3.2808	Feet	Feet	0.3048	Meters
Kilometers	0.62137	Miles	Miles	1.6093	Kilometers
Temperature					
Absolute					
Degrees C + 17.78	1.8	Degrees F	Degrees F - 32	0.55556	Degrees C
Relative					
Degrees C	1.8	Degrees F	Degrees F	0.55556	Degrees C
Velocity/Rate					
Cubic meters/second	2118.9	Cubic feet/minute	Cubic feet/minute	0.00047195	Cubic meters/second
Grams/second	7.9366	Pounds/hour	Pounds/hour	0.126	Grams/second
Meters/second	2.237	Miles/hour	Miles/hour	0.44704	Meters/second
Volume					
Liters	0.26418	Gallons	Gallons	3.78533	Liters
Liters	0.035316	Cubic feet	Cubic feet	28.316	Liters
Liters	0.001308	Cubic yards	Cubic yards	764.54	Liters
Cubic meters	264.17	Gallons	Gallons	0.0037854	Cubic meters
Cubic meters	35.314	Cubic feet	Cubic feet	0.028317	Cubic meters
Cubic meters	1.3079	Cubic yards	Cubic yards	0.76456	Cubic meters
Cubic meters	0.0008107	Acre-feet	Acre-feet	1233.49	Cubic meters
Weight/Mass					
Grams	0.035274	Ounces	Ounces	28.35	Grams
Kilograms	2.2046	Pounds	Pounds	0.45359	Kilograms
Kilograms	0.0011023	Tons (short)	Tons (short)	907.18	Kilograms
Metric tons	1.1023	Tons (short)	Tons (short)	0.90718	Metric tons
ENGLISH TO ENGLISH					
Acre-feet	325,850.7	Gallons	Gallons	0.000003046	Acre-feet
Acres	43,560	Square feet	Square feet	0.000022957	Acres
Square miles	640	Acres	Acres	0.0015625	Square miles

a. This conversion is only valid for concentrations of contaminants (or other materials) in water.

METRIC PREFIXES

Prefix	Symbol	Multiplication factor
exa-	E	1,000,000,000,000,000,000 = 10^{18}
peta-	P	1,000,000,000,000,000 = 10^{15}
tera-	T	1,000,000,000,000 = 10^{12}
giga-	G	1,000,000,000 = 10^{9}
mega-	M	1,000,000 = 10^{6}
kilo-	k	1,000 = 10^{3}
deca-	D	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	µ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001 = 10^{-12}