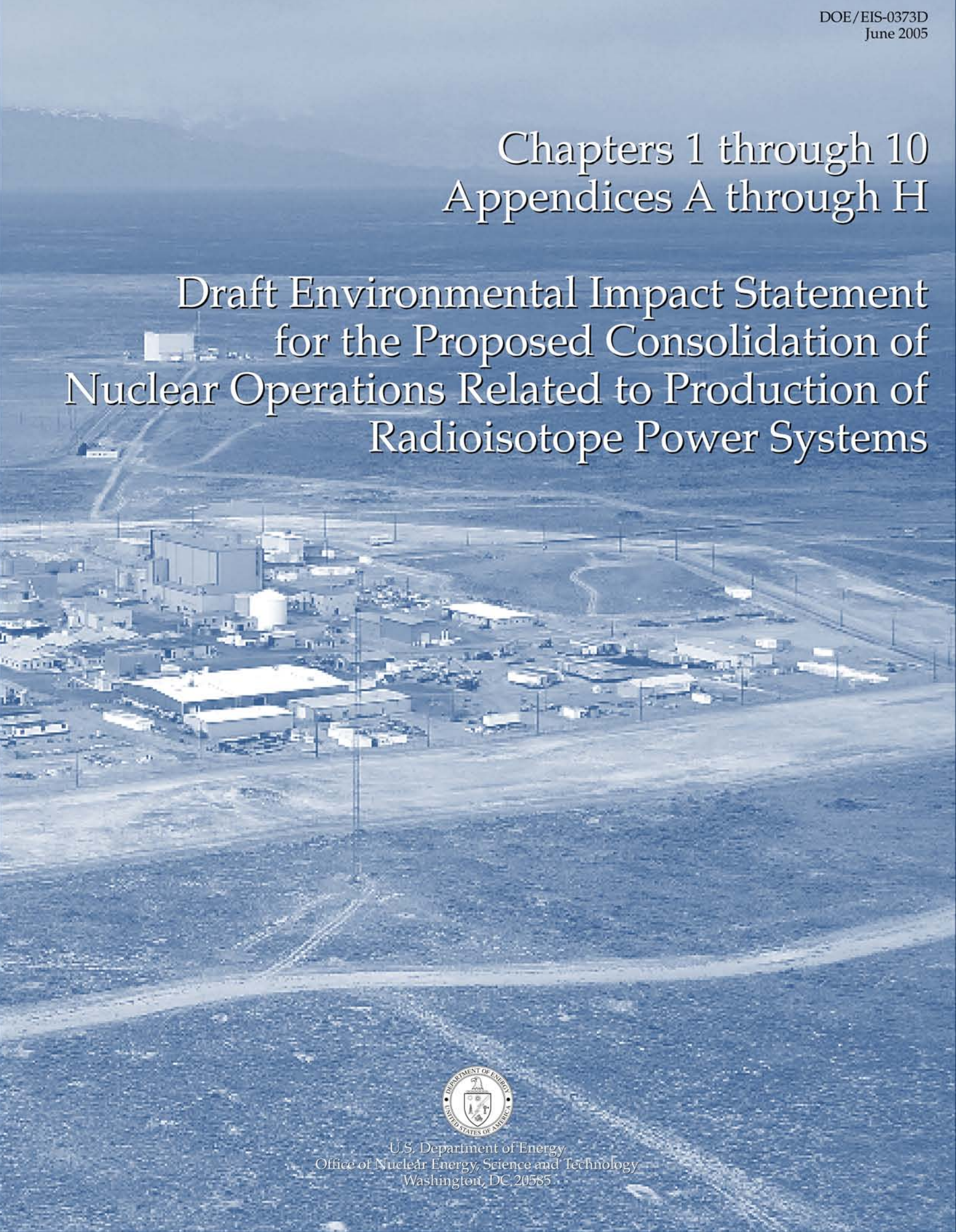
DOE/EIS-0373D
June 2005

Chapters 1 through 10
Appendices A through H

Draft Environmental Impact Statement for the Proposed Consolidation of Nuclear Operations Related to Production of Radioisotope Power Systems



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AVAILABILITY OF THE DRAFT CONSOLIDATION EIS

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This document is available on the Office of Nuclear Energy, Science and Technology's Website (http://consolidationeis.doe.gov) for viewing and downloading.

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COVER SHEET

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Cooperating Agency: National Aeronautics and Space Administration

Title: *Draft Environmental Impact Statement for the Proposed Consolidation of Nuclear Operations Related to Production of Radioisotope Power Systems (Consolidation EIS)* (DOE/EIS-0373D)

Locations: Oak Ridge National Laboratory (ORNL), Tennessee; Los Alamos National Laboratory (LANL), New Mexico; and Idaho National Laboratory (INL) (formerly known as Idaho National Engineering and Environmental Laboratory), Idaho.

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Abstract**:** DOE and its predecessor agencies have been producing radioisotope power systems (RPSs) for over 35 years for Government national security and space exploration missions. The RPS is a unique technology used in situations that require a long-term, unattended source of heat and/or supply of electrical power in harsh and remote environments. These systems are reliable, maintenance free, and capable of producing heat or electricity for decades. The plutonium-238 in these units serves as the source for generating heat and electricity. The nuclear infrastructure required to produce an RPS is comprised of three major components: (1) the production of plutonium-238; (2) the extraction, purification, and encapsulation of plutonium-238 into a usable fuel form; and (3) the assembly, testing, and delivery of RPSs to Federal users. Currently, DOE RPS production operations exist or are planned to exist at three geographically separate and distant sites: ORNL, Tennessee; LANL, New Mexico; and INL, Idaho, which is the No Action Alternative. DOE is now proposing to consolidate RPS nuclear production operations at a single site. Following the events of September 11, 2001, special nuclear materials require storage at a higher level of security than could feasibly be afforded separately. This consolidation would be consistent with DOE's approach to consolidating nuclear materials, increasing their security, and reducing risks associated with their transportation. The *Consolidation EIS* evaluates the potential direct, indirect, and cumulative environmental impacts associated with each of the alternatives. The Proposed Action, and Preferred Alternative, is to consolidate all RPS nuclear operations at the Materials and Fuels Complex (formerly known as Argonne National Laboratory-West), now a part of INL. A second alternative, the Consolidation with Bridge Alternative, would utilize existing facilities at ORNL and LANL on an interim basis for the production of plutonium-238, followed by consolidation at INL. All alternatives,

including the No Action Alternative, assume that RPS assembly and testing would be conducted at an existing facility at INL.

Public Comments: In preparation of this Draft EIS, DOE considered comments received from the public during the scoping period (November 16, 2004, to January 31, 2005). Comments received after the close of the comment period have been considered to the extent practicable. Locations and times of public hearings on this document will be announced in the *Federal Register* in June 2005. The Public Hearings will be held in Oak Ridge, Tennessee; Los Alamos, New Mexico; Jackson, Wyoming; Fort Hall, Idaho; Idaho Falls, Idaho; Twin Falls, Idaho; and Boise, Idaho. Comments on this Draft EIS will be accepted for a period of 60 days following publication of the Environmental Protection Agency's Notice of Availability in the *Federal Register* and will be considered in the preparation of the Final EIS. Any comments received after the 60-day period will be considered to the extent practicable for the preparation of the Final EIS.

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ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

AEI	areas of environmental interest
ALARA	as low as is reasonably achievable
ALOHA	Areal Locations of Hazardous Atmospheres
ATR	Advanced Test Reactor
BEIR	Biological Effects of Ionizing Radiation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFA	Central Facilities Area
CFR	*Code of Federal Regulations*
CHEMTREC	Chemical Transportation Emergency Center
CIRRPC	Committee on Interagency Radiation Research and Policy Coordination
CITRC	Critical Infrastructure Test Range Complex (formerly Power Burst Facility)
CPP	Chemical Processing Plant
DARHT	Dual Axis Radiographic Hydrodynamic Test
dB	decibel
dBA	decibels A-weighted
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	environmental assessment
EBR	Experimental Breeder Reactor
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
ETTP	East Tennessee Technology Park
FDF	Fluorinel Dissolution Facility
FDPF	Fluorinel Dissolution Process and Fuel Storage Facility
FEMA	Federal Emergency Management Agency
FFTF	Fast Flux Test Facility
FMF	Fuel Manufacturing Facility
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FY	Fiscal Year
HEPA	high-efficiency particulate air (filter)
HEU	high enriched uranium
HFIR	High Flux Isotope Reactor
HLW	high level radioactive waste
HVAC	heating, ventilating and air conditioning
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
INEEL	Idaho National Engineering and Environmental Laboratory

INL	Idaho National Laboratory (formerly Idaho National Engineering and Environmental Laboratory)
INTEC	Idaho Nuclear Technology and Engineering Center
ISCORS	Interagency Steering Committee on Radiation Standards
LANL	Los Alamos National Laboratory
LCF	latent cancer fatality
LLNL	Lawrence Livermore National Laboratory
LOC	level-of-concern
MCL	maximum contaminant level
MEI	maximally exposed individual
MFC	Materials and Fuels Complex (formerly Argonne National Laboratory-West)
MCL	maximum contaminant level
MMI	Modified Mercalli Intensity
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NCRP	National Council on Radiation Protection and Measurements
NEHRP	National Earthquake Hazards Reduction Program
NEPA	National Environmental Policy Act
NI PEIS	*Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility*
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPH	natural-phenomena hazards
NRC	U.S. Nuclear Regulatory Commission
NRF	Naval Reactors Facility
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PEIS	Programmatic Environmental Impact Statement
PIDAS	Perimeter Intrusion and Detection Assessment System
PM_{10}	particulate matter less than or equal to 10 microns in aerodynamic diameter
ppm	parts per million
PSD	prevention of significant deterioration
rad	radiation absorbed dose
RAP	Radiological Assistance Program
RCRA	Resource Conservation and Recovery Act
REDC	Radiochemical Engineering Development Center
rem	roentgen equivalent man

RESRAD	residual radiation
RfC	reference concentration
RHU	radioisotope heater units
RLWTF	Radioactive Liquid Waste Treatment Facility
ROD	Record of Decision
ROI	region of influence
RPS	radioisotope power system
RTC	Reactor Technology Complex (formerly Test Reactor Area)
RTG	radioisotope thermoelectric generator
RWL	Radiological Welding Laboratory
RWMC	Radioactive Waste Management Complex
SFM	special fissionable material
SM	source material
SMC	Specific Manufacturing Complex
SNL	Sandia National Laboratories
SNM	special nuclear material(s)
SPERT	Special Power Excursion Reactor Test
SRS	Savannah River Site
SSPSF	Space and Security Power Systems Facility
SST/SGTs	Safe, Secure Trailer/Safeguards Transports
TA	technical area
TAN	Test Area North
TDEC	Tennessee Department of Environment and Conservation
TEDE	total effective dose equivalent
TEEL	Temporary Emergency Exposure Limits
TRA	Test Reactor Area
TRAGIS	Transportation Routing Analysis Geographic Information System
TRANSCOM	Transportation Tracking and Communications System
TRU	transuranic waste
TVA	Tennessee Valley Authority
U.S.C.	*United States Code*
UFSF	Unirradiated Fuel Storage Facility
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAG	waste area group
WERF	Waste Experimental Reduction Facility
WROC	Waste Reduction Operations Complex
WIPP	Waste Isolation Pilot Plant
Y-12	Y-12 Plant
ZPPR	Zero Power Physics Reactor

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}