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

Chapters 1 through 10
Appendices A through H
AVAILABILITY OF THE DRAFT CONSOLIDATION EIS

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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

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<tr>
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<th>Description</th>
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<tr>
<td>AEI</td>
<td>areas of environmental interest</td>
</tr>
<tr>
<td>ALARA</td>
<td>as low as is reasonably achievable</td>
</tr>
<tr>
<td>ALOHA</td>
<td>Areal Locations of Hazardous Atmospheres</td>
</tr>
<tr>
<td>ATR</td>
<td>Advanced Test Reactor</td>
</tr>
<tr>
<td>BEIR</td>
<td>Biological Effects of Ionizing Radiation</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td>CEQ</td>
<td>Council on Environmental Quality</td>
</tr>
<tr>
<td>CFA</td>
<td>Central Facilities Area</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CHEMTREC</td>
<td>Chemical Transportation Emergency Center</td>
</tr>
<tr>
<td>CIRRPC</td>
<td>Committee on Interagency Radiation Research and Policy Coordination</td>
</tr>
<tr>
<td>CITRC</td>
<td>Critical Infrastructure Test Range Complex (formerly Power Burst Facility)</td>
</tr>
<tr>
<td>CPP</td>
<td>Chemical Processing Plant</td>
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<tr>
<td>DARHT</td>
<td>Dual Axis Radiographic Hydrodynamic Test</td>
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<td>dBA</td>
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<td>Fluorinel Dissolution Facility</td>
</tr>
<tr>
<td>FDPF</td>
<td>Fluorinel Dissolution Process and Fuel Storage Facility</td>
</tr>
<tr>
<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
</tr>
<tr>
<td>FFTF</td>
<td>Fast Flux Test Facility</td>
</tr>
<tr>
<td>FMF</td>
<td>Fuel Manufacturing Facility</td>
</tr>
<tr>
<td>FONSI</td>
<td>Finding of No Significant Impact</td>
</tr>
<tr>
<td>FR</td>
<td>Federal Register</td>
</tr>
<tr>
<td>FY</td>
<td>Fiscal Year</td>
</tr>
<tr>
<td>HEPA</td>
<td>high-efficiency particulate air (filter)</td>
</tr>
<tr>
<td>HEU</td>
<td>high enriched uranium</td>
</tr>
<tr>
<td>HFIR</td>
<td>High Flux Isotope Reactor</td>
</tr>
<tr>
<td>HLW</td>
<td>high level radioactive waste</td>
</tr>
<tr>
<td>HVAC</td>
<td>heating, ventilating and air conditioning</td>
</tr>
<tr>
<td>IAEA</td>
<td>International Atomic Energy Agency</td>
</tr>
<tr>
<td>ICRP</td>
<td>International Commission on Radiological Protection</td>
</tr>
<tr>
<td>INEEL</td>
<td>Idaho National Engineering and Environmental Laboratory</td>
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</table>
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\textsubscript{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
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>RESRAD</td>
<td>residual radiation</td>
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<tr>
<td>RfC</td>
<td>reference concentration</td>
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<tr>
<td>RHU</td>
<td>radioisotope heater units</td>
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<td>RLWTF</td>
<td>Radioactive Liquid Waste Treatment Facility</td>
</tr>
<tr>
<td>ROD</td>
<td>Record of Decision</td>
</tr>
<tr>
<td>ROI</td>
<td>region of influence</td>
</tr>
<tr>
<td>RPS</td>
<td>radioisotope power system</td>
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<tr>
<td>RTC</td>
<td>Reactor Technology Complex (formerly Test Reactor Area)</td>
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<tr>
<td>RTG</td>
<td>radioisotope thermoelectric generator</td>
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<tr>
<td>RWL</td>
<td>Radiological Welding Laboratory</td>
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<tr>
<td>RWMC</td>
<td>Radioactive Waste Management Complex</td>
</tr>
<tr>
<td>SFM</td>
<td>special fissionable material</td>
</tr>
<tr>
<td>SM</td>
<td>source material</td>
</tr>
<tr>
<td>SMC</td>
<td>Specific Manufacturing Complex</td>
</tr>
<tr>
<td>SNL</td>
<td>Sandia National Laboratories</td>
</tr>
<tr>
<td>SNM</td>
<td>special nuclear material(s)</td>
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<tr>
<td>SPERT</td>
<td>Special Power Excursion Reactor Test</td>
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<td>SRS</td>
<td>Savannah River Site</td>
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<td>SSPSF</td>
<td>Space and Security Power Systems Facility</td>
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<td>SST/SGTs</td>
<td>Safe, Secure Trailer/Safeguards Transports</td>
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<tr>
<td>TA</td>
<td>technical area</td>
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<tr>
<td>TAN</td>
<td>Test Area North</td>
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<tr>
<td>TDEC</td>
<td>Tennessee Department of Environment and Conservation</td>
</tr>
<tr>
<td>TEDE</td>
<td>total effective dose equivalent</td>
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<tr>
<td>TEEL</td>
<td>Temporary Emergency Exposure Limits</td>
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<tr>
<td>TRAGIS</td>
<td>Transportation Routing Analysis Geographic Information System</td>
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<td>TRANSCOM</td>
<td>Transportation Tracking and Communications System</td>
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<tr>
<td>TRU</td>
<td>transuranic waste</td>
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<td>TVA</td>
<td>Tennessee Valley Authority</td>
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<td>UFSF</td>
<td>Unirradiated Fuel Storage Facility</td>
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<td>USFWS</td>
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<td>USGS</td>
<td>U.S. Geological Survey</td>
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<td>WAG</td>
<td>waste area group</td>
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<tr>
<td>WERF</td>
<td>Waste Experimental Reduction Facility</td>
</tr>
<tr>
<td>WROC</td>
<td>Waste Reduction Operations Complex</td>
</tr>
<tr>
<td>WIPP</td>
<td>Waste Isolation Pilot Plant</td>
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<tr>
<td>Y-12</td>
<td>Y-12 Plant</td>
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<tr>
<td>ZPPR</td>
<td>Zero Power Physics Reactor</td>
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## CONVERSIONS

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<td>Square meters</td>
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<td>Kilograms/square meter</td>
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<td>Milligrams/liter</td>
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<tr>
<td>Micrograms/liter</td>
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<tr>
<td>Micrograms/cubic meter</td>
<td>1 *</td>
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<tr>
<td><strong>Density</strong></td>
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<tr>
<td>Grams/cubic centimeter</td>
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<tr>
<td>Grams/cubic meter</td>
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<tr>
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<tr>
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<td><strong>Volume</strong></td>
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<td>Cubic meters</td>
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<td>Kilograms</td>
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<td>Metric tons</td>
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**ENGLISH TO ENGLISH**

| Acre-feet | 325.850.7 | Gallons | 0.000003046 | Acre-feet |
| Acres     | 43.560    | Square feet | 0.000022957 | Acres |
| Square miles | 640  | Acres | 0.0015625 | Square miles |

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

### METRIC PREFIXES

<table>
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<tr>
<th>Prefix</th>
<th>Symbol</th>
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<td>exa-</td>
<td>E</td>
<td>1,000,000,000,000,000,000 = 10&lt;sup&gt;18&lt;/sup&gt;</td>
</tr>
<tr>
<td>peta-</td>
<td>P</td>
<td>1,000,000,000,000,000 = 10&lt;sup&gt;15&lt;/sup&gt;</td>
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<tr>
<td>tera-</td>
<td>T</td>
<td>1,000,000,000,000 = 10&lt;sup&gt;12&lt;/sup&gt;</td>
</tr>
<tr>
<td>giga-</td>
<td>G</td>
<td>1,000,000,000 = 10&lt;sup&gt;9&lt;/sup&gt;</td>
</tr>
<tr>
<td>mega-</td>
<td>M</td>
<td>1,000,000 = 10&lt;sup&gt;6&lt;/sup&gt;</td>
</tr>
<tr>
<td>kilo-</td>
<td>k</td>
<td>1,000 = 10&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>deca-</td>
<td>D</td>
<td>10 = 10&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>deci-</td>
<td>d</td>
<td>0.1 = 10&lt;sup&gt;-1&lt;/sup&gt;</td>
</tr>
<tr>
<td>centi-</td>
<td>c</td>
<td>0.01 = 10&lt;sup&gt;-2&lt;/sup&gt;</td>
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<tr>
<td>milli-</td>
<td>m</td>
<td>0.001 = 10&lt;sup&gt;-3&lt;/sup&gt;</td>
</tr>
<tr>
<td>micro-</td>
<td>µ</td>
<td>0.000 001 = 10&lt;sup&gt;-6&lt;/sup&gt;</td>
</tr>
<tr>
<td>nano-</td>
<td>n</td>
<td>0.000 000 001 = 10&lt;sup&gt;-9&lt;/sup&gt;</td>
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<tr>
<td>pico-</td>
<td>p</td>
<td>0.000 000 000 001 = 10&lt;sup&gt;-12&lt;/sup&gt;</td>
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