Surplus Plutonium Disposition Program (SPDP) Environmental Impact Statement (EIS)

National Nuclear Security Administration (NNSA)
Office of Defense Nuclear Nonproliferation
January 2023

Meeting Agenda

Part 1: Meeting rules and tips –

Dave Goodman, Moderator

Part 2: Meeting Presentation –

Virginia Kay, Material Disposition Director and

Maxcine Maxted, NEPA Document Manager

- Overview of NNSA's mission as it relates to this program
- Description of the NEPA process and NNSA's environmental review process
- Description of plutonium disposition history and relevant past analyses
- Description of purpose and need, proposed action, and alternatives analyzed in the Draft Environmental Impact Statement (EIS)

Part 3: Open public comment period

EIS: Environmental Impact Statement
NEPA: National Environmental Policy Act
NNSA: National Nuclear Security Administration

Meeting Rules and Tips

Today's Purpose

To provide information on the Draft Surplus Plutonium Disposition Program EIS and seek your input.

- All comments are treated equally (mail, phone, e-mail, oral comments in public hearing).
- 3-minute time limit per speaker.
- Provide a brief summary of your comment if you are also providing a written comment or if others have already covered your points. If time permits, you may be allowed to provide additional comments.

Overview of Program Mission

The National Nuclear Security Administration:

- Is a semi-autonomous agency within the U.S. Department of Energy (DOE).
- Is responsible for delivering and maintaining safe, secure, reliable warheads for an effective nuclear deterrent force.
- Is responsible for preventing nuclear weapons proliferation and reducing the threat of nuclear and radiological terrorism around the world.

Office of Material Management and Minimization:

- Minimizes the use of and, where possible, eliminates weapons-usable uranium and plutonium around the world.
- Is responsible for developing and implementing a plan to disposition 34 MT of plutonium declared excess to national defense needs.

Purpose and Need

- DOE's purpose and need remains, as stated in the Surplus Plutonium Disposition EIS (1999, DOE/EIS-0283):

  "To reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner."

- To that end, NNSA will disposition 34 MT of surplus plutonium in a safe, secure manner in a time frame and at a cost consistent with programmatic priorities, fiscal realities and responsible management.

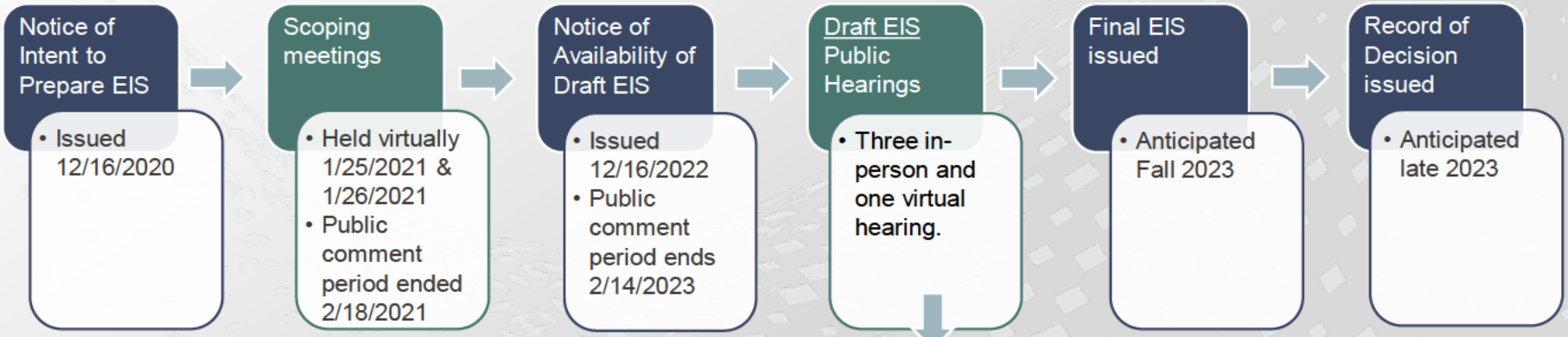
DOE: U.S. Department of Energy
EIS: Environmental Impact Statement
MT: Metric ton
NNSA: National Nuclear Security Administration

NEPA Purpose and Process

The National Environmental Policy Act (NEPA) requires Federal agencies to undertake an assessment of the potential environmental effects of their proposed major Federal actions prior to them making a decision.

The purpose of the NEPA process is to :

- Improve Federal government decision-making by ensuring that decision makers consider the environmental effects of proposed actions and alternatives.
- Provide opportunity for other Federal agencies, Tribal, state, local, and public involvement.

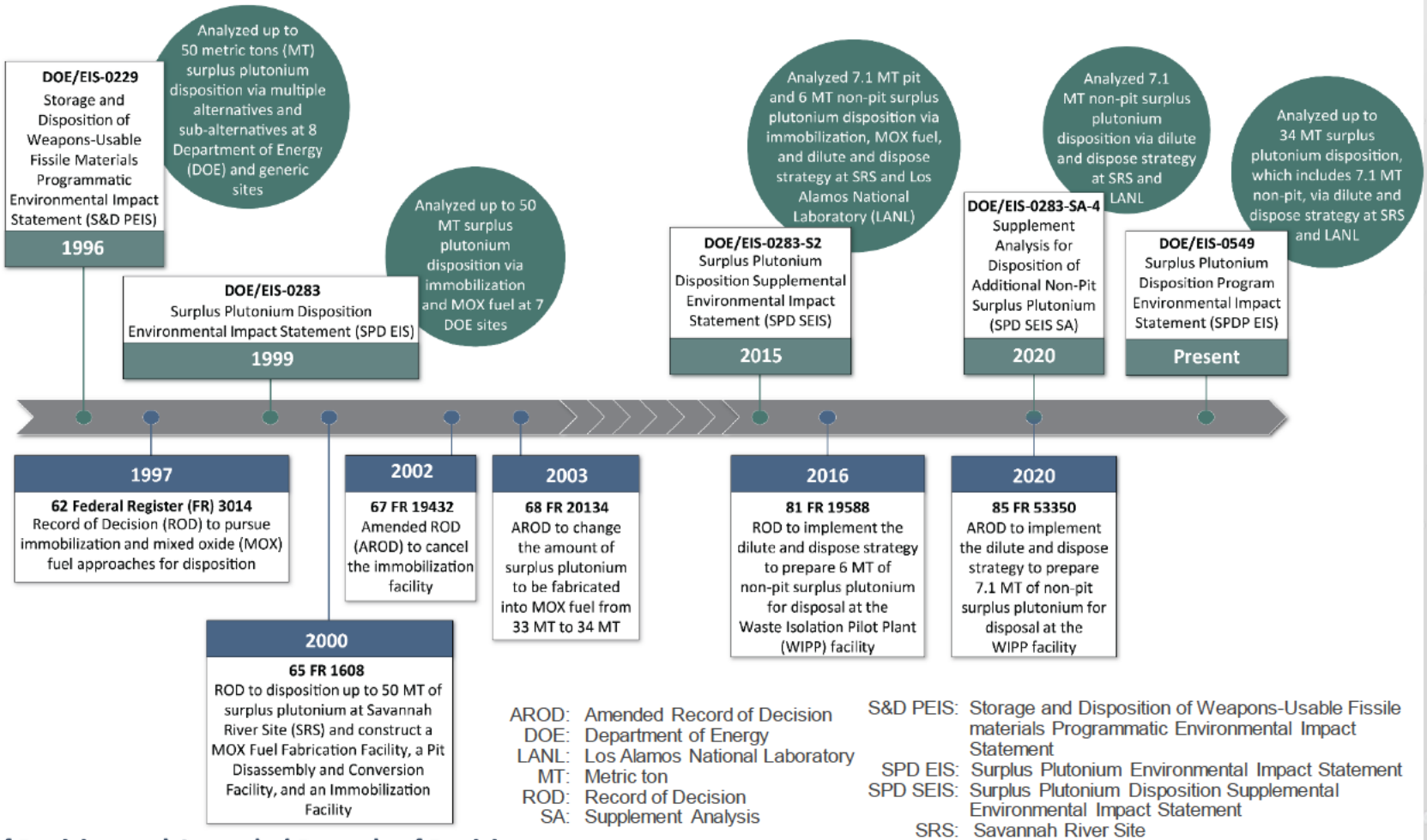


Savannah River Site	1/19/2023
Waste Isolation Pilot Plant	1/24/2023
Los Alamos National Laboratory	1/26/2023
Virtual	1/30/2023

EIS: Environmental Impact Statement
NEPA: National Environmental Policy Act

NEPA Background and History

Environmental Impact Statements and Related Analyses



AROD: Amended Record of Decision
DOE: Department of Energy
LANL: Los Alamos National Laboratory
MT: Metric ton
ROD: Record of Decision
SA: Supplement Analysis

S&D PEIS: Storage and Disposition of Weapons-Usable Fissile materials Programmatic Environmental Impact Statement
SPD EIS: Surplus Plutonium Environmental Impact Statement
SPD SEIS: Surplus Plutonium Disposition Supplemental Environmental Impact Statement
SRS: Savannah River Site
WIPP: Waste Isolation Pilot Plant

Records of Decision and Amended Records of Decision

National Nuclear Security Administration

Proposed Action

The Proposed Action for the Surplus Plutonium Disposition Program includes a reconsideration of the pathway for disposition of up to 34 MT of surplus plutonium.

- NNSA had previously proposed to disposition the 34 MT of surplus plutonium that is the subject of this EIS by using it in the fabrication of Mixed Oxide (MOX) fuel.
- MOX is no longer a viable alternative.
- DOE must use a mature method and proven technology that is based on processes requiring minimal research and engineering development.

The 34 MT is composed of pit and non-pit plutonium

A **pit** is the central core of a nuclear weapon that principally contains plutonium or enriched uranium.

Non-pit plutonium may be in metal or oxide form or may be associated with other materials that were used in the process of manufacturing and fabricating plutonium for use in nuclear weapons.

NNSA National Nuclear Security Administration

MT: Metric ton
MOX: Mixed Oxide Fuel
NNSA: National Nuclear Security Administration

Preferred Alternative

NNSA's preferred alternative for disposition of the 34 MT is the dilute and dispose strategy, also known as "plutonium downblending".

The effort would require capabilities at the Pantex Plant, Los Alamos National Laboratory (LANL), the Savannah River Site (SRS), the Waste Isolation Pilot Plant (WIPP), and Y-12 National Security Complex.

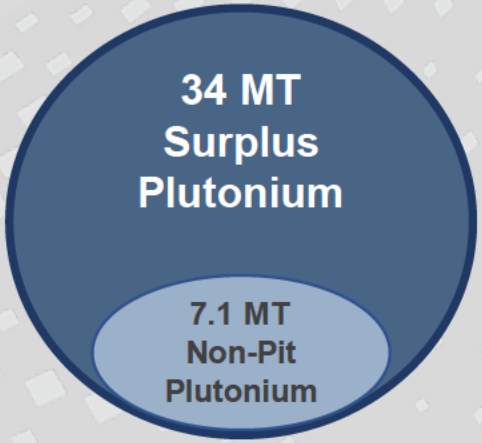
The dilute and dispose strategy is not new.

- In 2016 DOE published in the Federal Register the decision to dispose of a separate 6 MT of surplus non-pit plutonium using the dilute and dispose strategy.
  *The 6 MT is **not** part of the 34 MT.*

- In 2020 DOE decided to dispose of an additional 7.1 MT of surplus non-pit plutonium using the dilute and dispose strategy and published a Record of Decision in the Federal Register.
  *The 7.1 MT **is** a part of the 34 MT.*

Dilute and Dispose Strategy

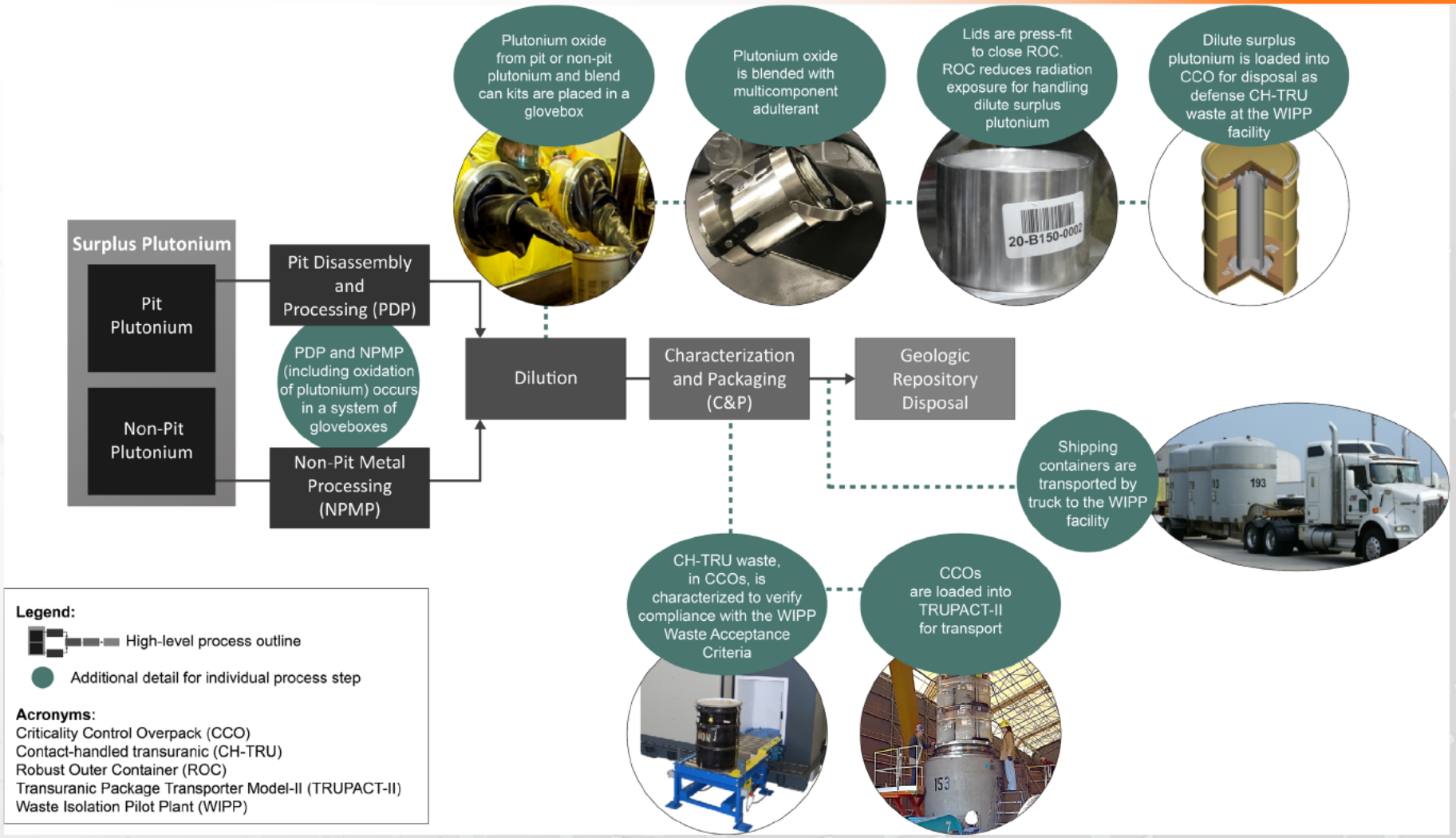
- Convert pit and non-pit plutonium to oxide;
- Blend surplus plutonium oxide with an adulterant; and
- Emplace the resulting contact-handled transuranic waste underground at WIPP.



LANL: Los Alamos National Laboratory
MT: Metric ton
SRS: Savannah River Site
WIPP: Waste Isolation Pilot Plant

National Nuclear Security Administration

Surplus Plutonium Disposition



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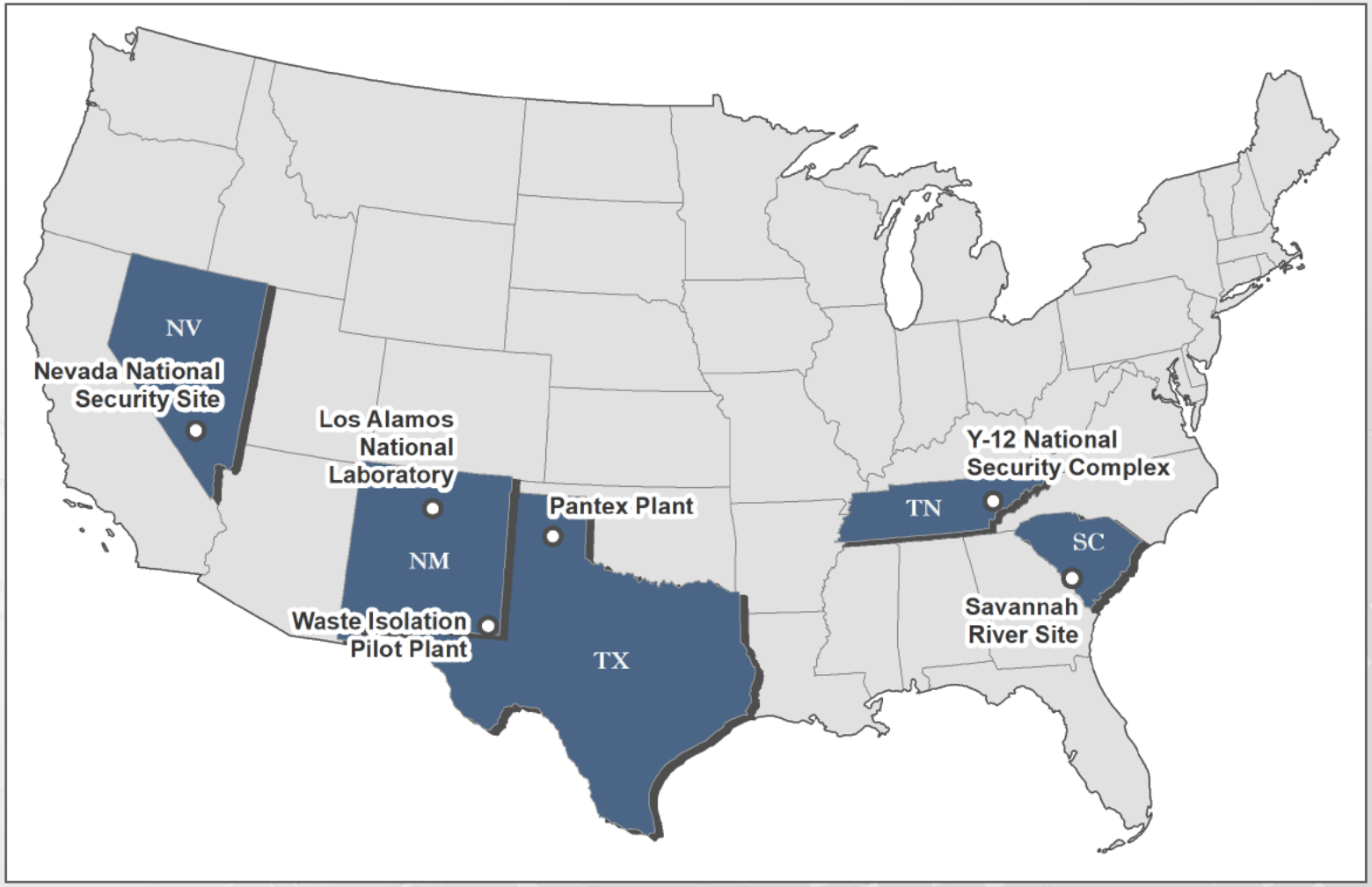
Locations of Major Facilities



NM: New Mexico
NV: Nevada
SC: South Carolina
TN: Tennessee
TX: Texas

National Nuclear Security Administration

Overview of Alternatives

Preferred Alternative

Dilute and Dispose. Use the dilute and dispose strategy to disposition 34 metric tons (MT) of surplus plutonium, including up to 7.1 MT of non-pit surplus plutonium.

Sub-Alternatives & Process Steps

Base Approach Sub-Alternative	SRS NPMP Sub-Alternative		All LANL Sub-Alternative	All SRS Sub-Alternative	
	105-K NPMP Option	Modular NPMP Option		F-Area PDP Option	K-Area PDP Option
Pit disassembly (LANL) NPMP (LANL) Dilution (SRS) C&P (SRS) Disposal (WIPP)	Pit disassembly (LANL) NPMP (SRS) Dilution (SRS) C&P (SRS) Disposal (WIPP)		Pit disassembly (LANL) NPMP (LANL) Dilution (LANL) C&P (LANL) Disposal (WIPP)	Pit disassembly (SRS) NPMP (SRS) Dilution (SRS) C&P (SRS) Disposal (WIPP)	

Option refers to where non-pit metal processing (NPMP) occurs within SRS.

Option refers to where pit disassembly and processing (PDP) and non-pit metal processing (NPMP) occurs within SRS.

No Action Alternative

Continued management of both surplus pit and non-pit plutonium. Disposition of up to 7.1 MT non-pit surplus plutonium with an existing disposition decision (dilute and dispose).

Process Steps

Continued pit management (Pantex & LANL)
NPMP (LANL or SRS)
Dilution (SRS)
C&P (SRS)
Disposal (WIPP)

Alternative has NPMP occurring at SRS or LANL with no expansion of LANL capabilities.

C&P: Characterization and Packaging
LANL: Los Alamos National Laboratory
NPMP: Non-Pit Metal Processing
SRS: Savannah River Site
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National Nuclear Security Administration

Overview of Alternatives

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Sub-Alternatives & Process Steps

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Pit Disassembly and Processing Considerations

- The draft Surplus Plutonium Disposition Program (SPDP) Environmental EIS is a bounding analysis for the full scope of *possible* activities, and the associated environmental impacts, needed to dispose of 34 metric tons of surplus plutonium.
- To dispose of the 34 metric tons, NNSA will need some level of capability to disassemble plutonium pits and turn them into an oxide (powder) form suitable for dilution with the adulterant.
- While the draft EIS bounds the maximum possible scope and impacts of the pit disassembly and processing (PDP) currently envisioned capability, NNSA could implement the capability on a smaller scale.
- In addition to the possible environmental impacts analyzed in this draft SPDP EIS, NNSA is currently evaluating a variety of factors, including the results of the recently completed Analysis of Alternatives, the capacity of the NNSA complex to execute another major construction project, and funding constraints, to determine the appropriate path forward for this part of the Surplus Plutonium Disposition program.

EIS: Environmental Impact Statement
NNSA: National Nuclear Security Administration
PDP: Pit Disassembly and Processing
SPDP: Surplus Plutonium Disposition Program

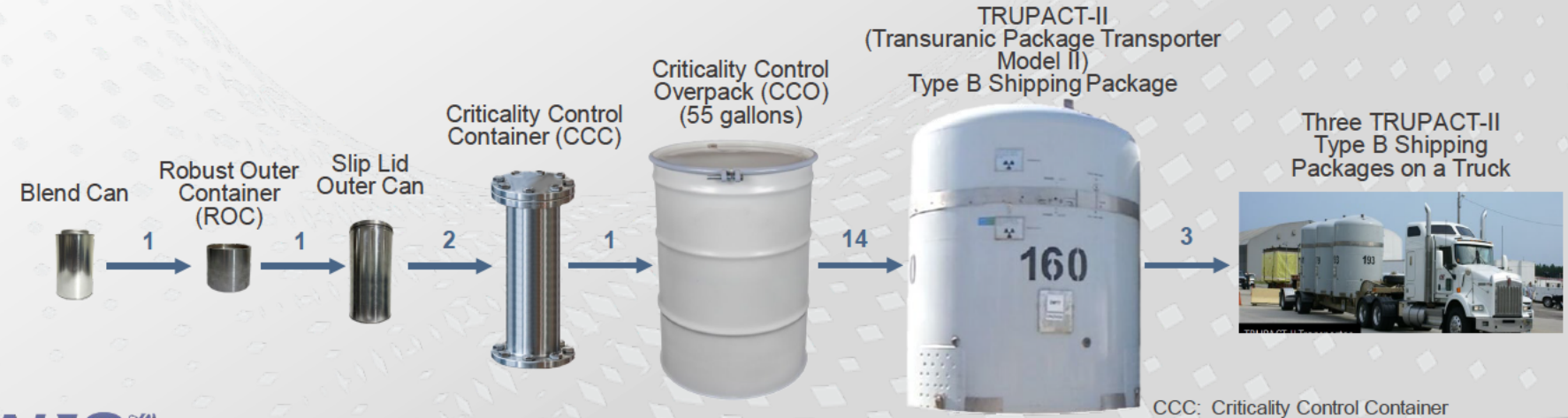
How Plutonium is Packaged for Storage and Transport

[Not to scale]

→ Number of containers within next container

Containers to Ship Plutonium Metal and Oxide

Containers to Ship Diluted Plutonium Oxide as Defense Contact Handled Transuranic Waste



CCC: Criticality Control Container
CCO: Criticality Control Overpack
ROC: Robust Outer Container
TRUPACT-II: Transuranic Package Transporter Model II

National Nuclear Security Administration

Transportation Routes

Savannah River Site

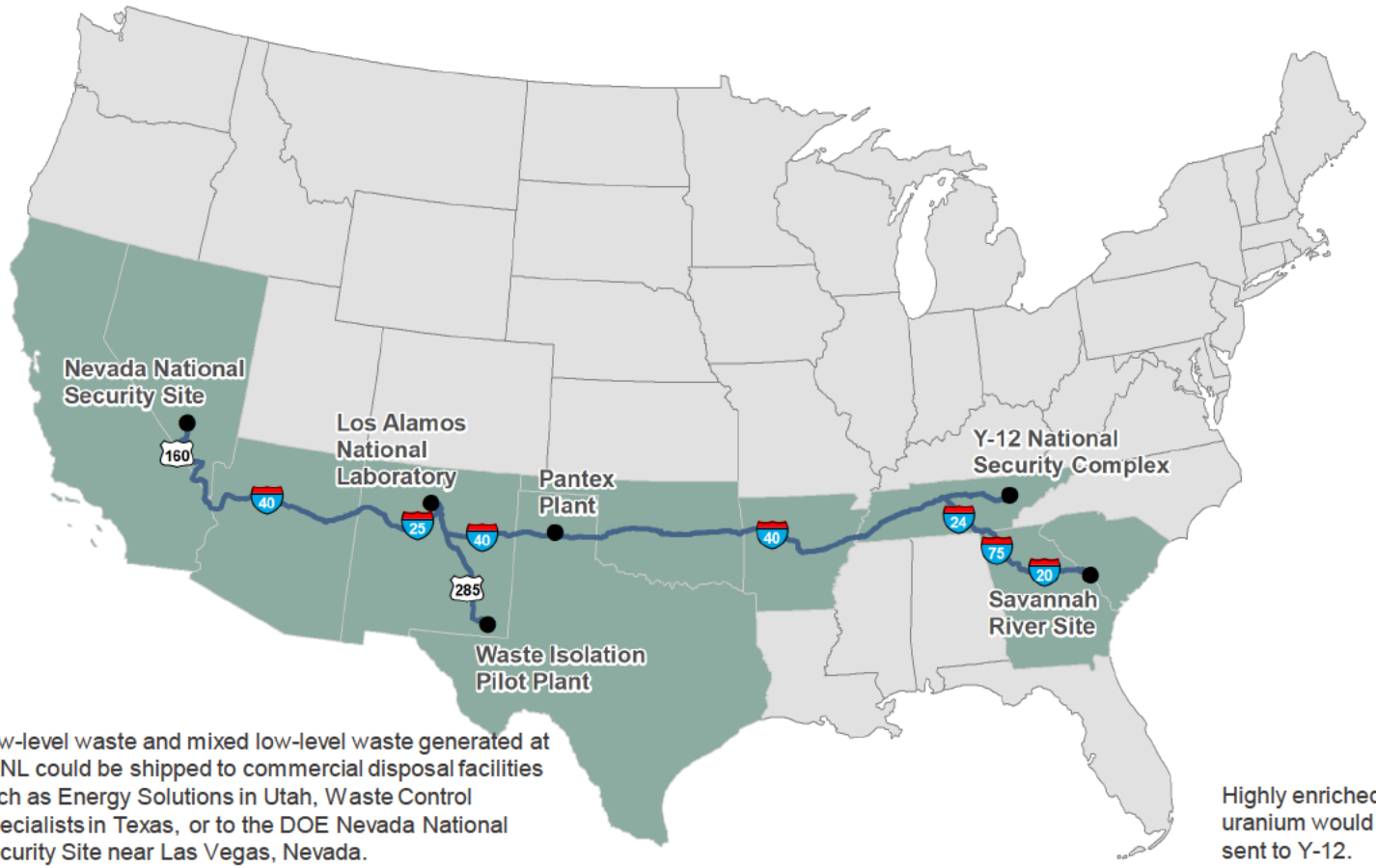
Low-level waste generated at the Savannah River Site would be disposed of on-site. Mixed low-level waste could be disposed of in a commercial facility.

Highly enriched uranium would be sent to Y-12.

National Nuclear Security Administration

Transportation Routes (Continued)

Los Alamos National Laboratory



Low-level waste and mixed low-level waste generated at LANL could be shipped to commercial disposal facilities such as Energy Solutions in Utah, Waste Control Specialists in Texas, or to the DOE Nevada National Security Site near Las Vegas, Nevada.

Highly enriched uranium would be sent to Y-12.

DOE: U.S. Department of Energy
LANL: Los Alamos National Laboratory

Summary of Key Potential Environmental Consequences

Resource Area	Preferred Alternative						No Action Alternative	
	Base Approach	SRS NPMP		All LANL	All SRS		SRS NPMP	LANL NPMP
		105-K	Modular		F-Area	K-Area		
Air Quality	*Construction*							
	LANL – Minor	LANL – Minor		LANL – Minor	LANL – No construction		LANL – No construction	LANL – No construction
	SRS – No construction	SRS – Minor		SRS – No construction	SRS – Minor		SRS – Minor	SRS – No construction
	Operations							
	LANL – None	LANL – None		LANL - Minimal	LANL – None		LANL – None	LANL – None
	SRS – Negligible HAPs	SRS – Negligible HAPs		SRS - None	SRS – Negligible HAPs		SRS – Negligible HAPs	SRS – Negligible HAPs
Ecological Resources	*Construction*							
	LANL – Potential impacts	LANL – Potential impacts		LANL – Potential impacts	LANL – No construction		LANL – None	LANL – None
	SRS – No construction	SRS – Negligible impacts		SRS – No construction	SRS – Impacts unlikely		SRS – None	SRS – None
	Operations							
	LANL – ESA consultation	LANL – ESA consultation		LANL – ESA consultation	LANL – None		LANL – None	LANL – None
	SRS – Negligible impacts	SRS – Negligible impacts		SRS –None	SRS – Impacts unlikely		SRS – None	SRS – None
Land Use – Construction (ac)	5.6	5.6	5.9	5.6	20	20	0	No construction
Human Health – Normal Operations (LCFs)	Workforce – 2 (2.4)	Workforce – 3 (2.9)	Workforce – 3 (2.5)	Workforce – 2 (1.8)	Workforce – 2 (2.4)	Workforce – 2 (2.4)	Workforce – 1 (0.8)	Workforce – 1 (0.8)
	Public – 0 (0.0001)	Public – 0 (0.0002)	Public – 0 (0.0002)	Public – 0 (0.0002)	Public – 0 (0.00008)	Public – 0 (0.00008)	Public – 0 (0.00002)	Public – 0 (0.00004)
Human Health – Bounding Accidents (Risk for non-involved worker and LCF for population)	Worker – 0.036	Worker – 0.036	Worker – 0.052	Worker – 0.036	Worker – 0.0039	Worker – 0.0033	Worker – 0.0033	Worker – 0.001
	Population – 0 (0.086)	Pop. – 0 (0.1)	Pop. – 1 (0.62)[a]	Pop. – 0 (0.086)	Pop. – 0 (0.14)	Pop. – 0 (0.1)	Pop. – 0 (0.1)	Pop. – 0 (0.028)
Socioeconomics (FTE in peak year)	*Construction Employment*							
	116	186	146	139	525	525	70	No construction
	Operations Employment							
	745	843	778	549	844	844	171	220
Waste Generation	*Operations CH-TRU Waste (diluted plutonium oxide and job control waste) m^3*							
	3,600	3,800	3,800	3,100	3,500	3,500	480	510
Environmental Justice	No disproportionately high and/or adverse impacts on minority or low-income populations affected by activities at either the LANL or SRS sites are expected.							
Offsite Transportation - Operations								
Incident-Free Population Impact (LCFs)	0 (0.2)	0 (0.2)	0 (0.2)	0 (0.08)	0 (0.2)	0 (0.2)	0 (0.03-0.04)	0 (0.04-0.05)
Radiological Accident Impact (LCFs)	0 (0.0001)	0 (0.0001)	0 (0.0001)	0 (0.000001)	0 (0.00006)	0 (0.00006)	0 (0.00003 – 0.00005)	0 (0.00005 – 0.00007)
Traffic Facilities Risk	1 (0.6)	1 (0.6)	1 (0.6)	0 (0.3)	1 (0.6)	1 (0.6)	0 (0.1)	0 (0.1)

a) For Human Health accidents, the LCF for the population in the vicinity of LANL is 0, and for the population in the vicinity of SRS is 1 for the modular option.

NOTES:

For Human Health Normal Operations, the LCFs to the workforce and public are split between LANL and SRS. The LCF value at any one site will be lower than the total LCF shown except for the All LANL and All SRS Alternatives and for the No Action Alternative when all actions occur at SRS.

For Offsite Transportation, the rounded LCF value is provided, followed by the calculated value in parentheses.

ac: Acres
CH-TRU: Contact-handled Transuranic waste
ESA: Endangered Species Act
HAP: hazardous air pollutant
FTE: Full Time Equivalent
LANL: Los Alamos National Laboratory
LCFs: Lethal Cancer Fatalities
NA: Not Applicable
NNSA: National Nuclear Security Administration
NPMP: non-pit metal processing
PDP: Pit disassembly and processing
SRS: Savannah River Site

National Nuclear Security Administration

Summary

- This analysis allows DOE to consider various alternatives for disposition of surplus plutonium in a safe and environmentally sound manner. All decisions on which alternative will be chosen will be conducted by following the established DOE/NNSA processes.
- The disposed plutonium must be in a proliferation-resistant form that can never again be readily used in nuclear weapons.
- The Draft SPDP EIS evaluates alternatives for conducting the dilute and dispose mission at SRS and LANL along with options of where pit and non-pit disassembly and processing could occur. Decision makers can choose any alternatives or options, including at smaller scales, as long as the impacts have been evaluated.
- Departmental decisions are based on multiple factors, one of those factors is consideration of environmental impacts. Other factors may lead decision makers to select variations of alternatives analyzed under the EIS.
- The sub-alternatives are similar with small impacts to the public.
- Public involvement is vital to the NEPA process and provides decision makers with your concerns and comments for consideration in the decisions they make.

DOE: Department of Energy
EIS: Environmental Impact Statement
LANL: Los Alamos National Laboratory
NEPA: National Environmental Policy Act
SPDP: Surplus Plutonium Disposition Program
SRS: Savannah River Site

How to Comment on the Draft SPDP EIS

Court Reporter

If you provide oral comments tonight, a court reporter will record your comments.

Comment Form

Use a comment form available in the registration area to provide written comments today and drop it off at the registration table when you leave.

E-Mail

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U.S. Mail

Maxcine Maxted, NEPA Document Manager

NNSA Office of Material Management and Minimization

Savannah River Site

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Aiken, South Carolina 29802

A copy of the Draft Surplus Plutonium Disposition Program EIS can be found at the National Nuclear Security Administration (NNSA) National Environmental Policy Act (NEPA) Reading Room.

https://www.energy.gov/nnsa/nnsa-nepa-reading-room

All comments received or postmarked by the end of the comment period (February 14, 2023) will be considered in preparation of the Final EIS. Comments received after the end of the comment period will be considered to the extent practicable.

National Nuclear Security Administration

DOE: Department of Energy
EIS: Environmental Impact Statement
GOV: Government
NEPA: National Environmental Policy Act
NNSA: National Nuclear Security Administration
P.O.: Post Office
Rm: Room
SPDP: Surplus Plutonium Disposition Program