Construction and Demonstration of a Prototype Mobile Microreactor

Environmental Impact Statement

CONSTRUCTION AND DEMONSTRATION OF A PROTOTYPE MOBILE MICROREACTOR

ENVIRONMENTAL IMPACT STATEMENT

Volume 2
Comment Response Document

Final | February 2022

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READER'S GUIDE

This Comment Response Document (CRD) portion of the *Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement* (EIS) consists of four sections:

- **Section 1, Overview of the Public Comment Process –** This section describes the public comment process for the Draft EIS; the format used in the public hearings on the Draft EIS; the organization of this CRD and how to use the document; and the changes made by the Department of Defense, Strategic Capabilities Office (SCO) to the Final EIS in response to the public comments and recent developments that occurred since publication of the Draft EIS.
- **Section 2, Topics of Interest –** This section presents summaries of topics of interest identified from the public comments received on the Draft EIS and SCO's response to each issue.
- **Section 3, Public Comments and SCO Responses –** This section presents a side-by-side display of all the comments received by SCO on the Draft EIS and SCO's response to each comment. The comments were obtained at two public hearings on the Draft EIS and via e-mail, U.S. mail, and the project website.
- **Section 4, References –** This section contains the references cited in this CRD.

To Find a Specific Comment and Response

Refer to the "List of Commenters" immediately following the Table of Contents. This list is organized alphabetically by commenter name and shows the corresponding page number(s) where commenters can find their comment(s).

SCO has made a good faith effort to interpret the spelling of names that were handwritten on comment forms and letters or transcribed from oral statements made during public hearings.

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TABLE OF CONTENTS

List of Tables

List of Figures

LIST OF COMMENTERS

Public Officials, Organizations, and Interest Groups

Individuals

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHART

ASER	Annual Site Environmental Report
BBS	Breeding Bird Survey
BEA	Battelle Energy Alliance, LLC
BWXT	BWXT Advanced Technologies
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CITRC	Critical Infrastructure Test Range Complex
CONEX	container express (shipping container)
CRD	Comment Response Document
dBA	A-weighted decibels
DoD	Department of Defense
DOE	U.S. Department of Energy
DOE-HDBK	DOE Handbook
DOE-ID	Department of Energy Idaho Operations Office
DOME	Demonstration of Operational Microreactor Experiments
DSA	Documented Safety Analysis
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ESER	Environmental Surveillance, Education, and Research
FGR	Federal Guidance Report
FR	Federal Register
GHG	greenhouse gas
GTCC	greater-than-Class-C
HEU	highly enriched uranium
HFEF	Hot Fuel Examination Facility
ICRP	International Commission on Radiological Protection
IDA	intentional destructive acts
IDEQ	Idaho Department of Environmental Quality
INL	Idaho National Laboratory
LLW	low-level radioactive waste
LWR	light water reactor
M&O	Management and Operations
MARVEL	Microreactor Applications Research, Validation, and Evaluation
MCRE	Molten Chloride Reactor Experiment
MEI	maximally exposed individual
MFC	Materials and Fuels Complex
MLLW	mixed low-level radioactive waste
mrem	millirem
MWe	megawatts-electric
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFS	Nuclear Fuel Services, Inc.
NIOSH	National Institute for Occupational Safety and Health
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NPR	New Production Reactor
NRC	U.S. Nuclear Regulatory Commission
PIE	post-irradiation examination
PISA	potentially inadequate safety analysis
rem	roentgen equivalent man
ROD	Record of Decision
ROI	region of influence
SC	safety class
SCO	Strategic Capabilities Office
SER	Safety Evaluation Report
SNF	spent nuclear fuel
SS	safety significant
SSC	structures, systems, and components
SWEIS	Site-Wide Environmental Impact Statement
TEPP	Transportation Emergency Preparedness Program
TMI	Three-Mile Island
TRISO	tristructural isotropic
U.S.	United States
UAMPS	Utah Associated Municipal Power Systems
USQ	Unreviewed Safety Question
VTR	Versatile Test Reactor
WIPP	Waste Isolation Pilot Plant

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	4.46	Tons/acre	Tons/acre	0.224	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	16,018.5	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
Radiation					
Sieverts	100	Rem	Rem	0.01	Sieverts
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	3.7854	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	0.000003069	Acre-feet
Acres	43,560	Square feet	Square feet	0.000022957	Acres
Square miles	640	Acres	Acres	0.0015625	Square miles

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}

Section 1
Overview of the Public Comment Process

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1 OVERVIEW OF THE PUBLIC COMMENT PROCESS

This section of this Comment Response Document (CRD) describes the public comment process for the *Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement* (EIS) and the procedures used to respond to those comments. Section 1.1 describes the public comment process and the means of receiving comments on the Draft EIS. It also identifies the comment period and the locations and dates of the public hearings on the Draft EIS. Section 1.2 addresses the public hearing format. Section 1.3 describes the organization of this CRD, including how the comments were categorized, addressed, and documented. Section 1.4 summarizes the changes made to the Draft EIS that resulted from the public comment process and recent developments since publication of the Draft EIS. Section 1.5 summarizes the next steps the Department of Defense (DoD), Strategic Capabilities Office (SCO) will take after publication of the Final EIS.

Please note the following terms used in this CRD:

- **Comment Document** – A communication in the form of an electronic statement (website entry, document upload, or email), letter, transcript, or written statement from a public hearing that contains comments from a sovereign nation, government agency, organization, or member of the public regarding the Draft EIS. Each Comment Document was assigned a Commenter Number.
- **Commenter Number** – A tracking number assigned to each Comment Document. Comment Documents were reviewed to identify individual comments, which were then assigned an identifying comment number.
- **Comment** – A statement or question regarding Draft EIS content that conveys approval or disapproval of proposed actions, recommends changes, or seeks additional information.
- **Response** – The SCO answer to a statement or question or an explanation of a topic raised by a comment.

1.1 Public Comment Process

SCO prepared the Draft EIS in accordance with the National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality (CEQ) NEPA regulations (Title 40 of the Code of Federal Regulations [CFR] Parts 1500–1508). An important part of the NEPA process is solicitation of public comments on a draft EIS and consideration of those comments in preparing a final EIS. SCO made copies of the Draft EIS available online at https://www.mobilemicroreactoreis.com. Through emails, press releases, and a Notice of Availability published in the Federal Register (FR) (86 FR 53039) on September 24, 2021, SCO notified Federal agencies, state and local governmental entities, Native American tribes, and members of the public known to be interested in or affected by implementation of the alternatives evaluated in the Draft EIS that the draft was available for review. On September 24, 2021, the U.S. Environmental Protection Agency (EPA) published a Notice of Availability in the Federal Register (86 FR 53054) announcing the start of a comment period with a scheduled end date of November 9, 2021.

During the public comment period, Federal agencies, state and local governmental entities, Native American tribes, and members of the public were invited to submit comments via the project website, the U.S. mail, or via email at PELE_NEPA@sco.mil. Additionally, SCO held two public hearings on October 20, 2021, at the Shoshone-Bannock Hotel and Event Center in Fort Hall, Idaho. The public hearings provided participants with opportunities to learn more about the project and the content of the Draft EIS from SCO representatives. The two public hearings also provided opportunities for participants to submit oral comments. The public hearings were webcast to provide the opportunity for more of the public to participate. The presentations and other information on the project are available on the project website at https://www.mobilemicroreactoreis.com/hearings.aspx. **Table 1.1-1** lists the date and time of each public hearing as well as the numbers of attendees and commenters. **Table 1.1-2** lists the number of Comment Documents received by each method of submission.

Table 1.1-1 Public Hearings Attendance and Numbers of Commenters

Date	*Attendance*			*Number of Oral Commenters*
	In Person	*Via Internet*	*Total*	
October 20, 2021 3:00 to 5:00 PM Mountain Time	13	18	31	3
October 20, 2021 6:00 to 8:00 PM Mountain Time	7	35	42	3
Total	**20**	**53**	**73**	**6**

Table 1.1-2 Numbers of Comment Documents Received by Method of Submission

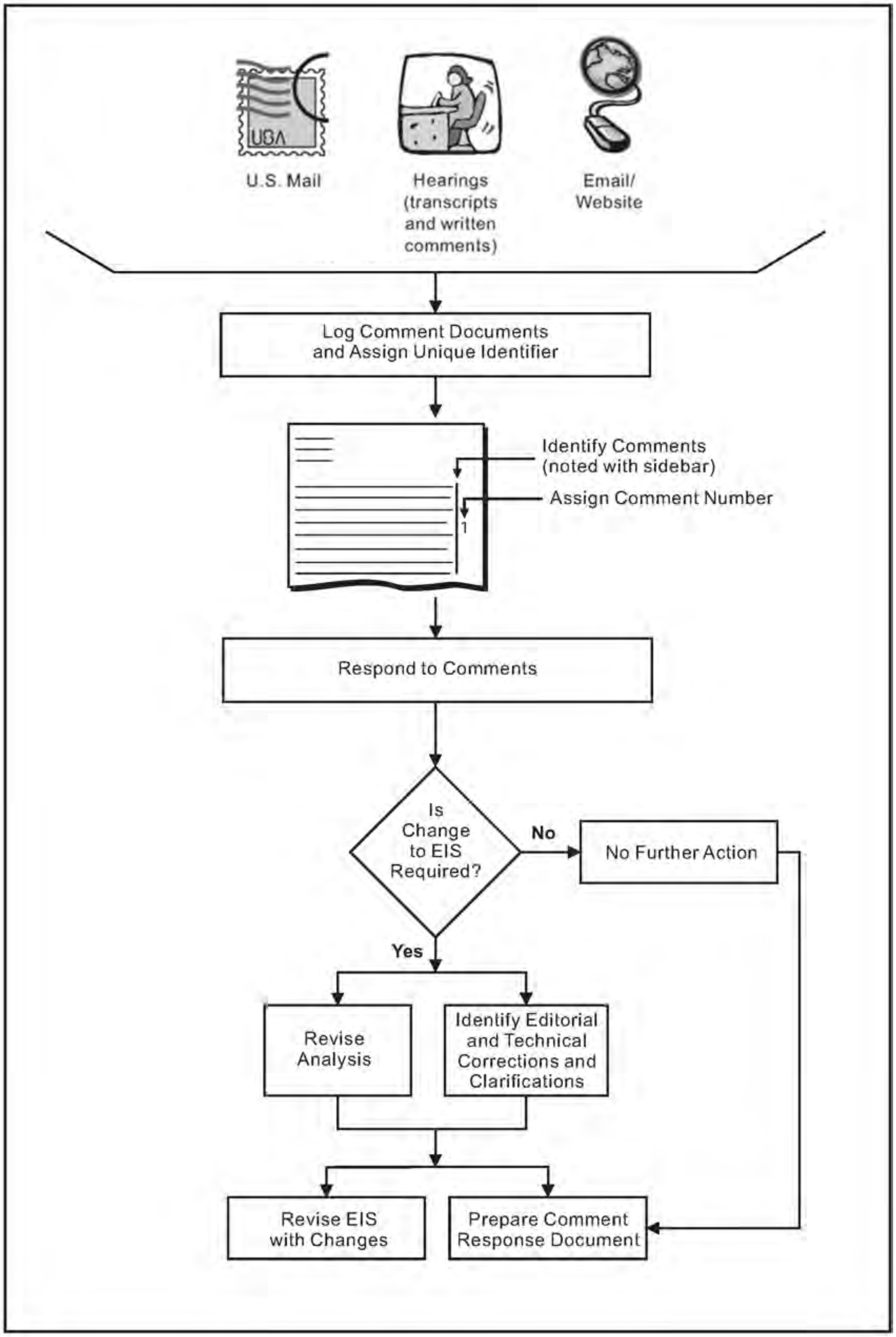
Method of Submission	*Number of Comment Documents*
Email	18
Website	18
U.S. mail	1
Public hearings (oral)	6
Total	**43**

Upon receipt, all written Comment Documents were assigned a Commenter Number. Each commenter who spoke at the public hearing was also assigned a separate Commenter Number. Commenters who submitted written comments and also spoke at the public hearings received a separate Commenter Number for each forum. All Comment Documents were then processed for inclusion in this CRD. In processing the Comment Documents, each document was analyzed to identify individual comments (which were numbered sequentially), and SCO prepared responses to each numbered comment. In preparing the Final EIS, SCO responded to all comments received. Comments that SCO determined to be outside the scope of the EIS are acknowledged as such in this CRD. The remaining comments were then reviewed and responded to by policy experts, subject matter experts, and NEPA specialists, as appropriate. This CRD presents the Comment Documents and the public hearing transcripts, as well as SCO's responses to the comments. **Figure 1.1-1** illustrates the process used for collecting, tracking, and responding to the comments.

The comments and SCO responses are compiled in a side-by-side format in Section 3, with each identified comment receiving a separate response. Comments and responses have been assigned matching identification numbers so a comment can be easily paired with its response.

During preparation of the Final EIS, all comments received on the Draft EIS were considered. This effort served to focus the revision process and ensure consistency throughout the Final EIS. The comments assisted in determining whether the alternatives and analyses presented in the Draft EIS should be modified or augmented, whether information presented in the Draft EIS needed to be corrected or updated, and whether additional clarification was necessary to facilitate better understanding of certain issues. Vertical "change bars" in the margins of pages in Volume 1 of the Final EIS indicate where substantive changes were made and where text was added or deleted. Editorial changes are not marked.

Figure 1.1-1 Comment Response Process for the *Final Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement*



1.2 Public Hearing Format

The two public hearings were designed to offer information about the NEPA process, SCO's Proposed Action, and the results of analysis presented in the Draft EIS. At the hearings, SCO also invited public comments on the document. A court reporter recorded and prepared a transcript of the comments that were presented at the hearing. These comments collected during the public hearings are included in Section 3 of this CRD.

At the two hearings, Jeff Waksman, the SCO Program Manager provided welcoming remarks and information about the project, the NEPA process, and the Draft EIS. After the overview presentation, a meeting moderator opened the comment session. A time limit was established to ensure that everyone who wished to speak would have an opportunity to provide oral comments. Everyone who was asked to conclude their remarks to comply with the time limitation was encouraged to submit additional comments in writing. Additionally, the commenters were given the opportunity to provide comments a second time during the hearings. The hearing transcripts were reviewed for comments on the Draft EIS, as described in Section 1.1 of this CRD.

1.3 Organization of this Comment Response Document

This CRD is organized into the following sections:

- Section 1 describes the public comment process for the Draft EIS, the format used in the hearings on the Draft EIS, the organization of this document and how to use this CRD, and the changes made by SCO to the Draft EIS in preparing the Final EIS in response to the public comments.
- Section 2 presents topics of interest from the public comments received on the Draft EIS that appeared frequently in the comments as well as SCO's response to each topic of interest.
- Section 3 presents Comment Documents, received via email, U.S. mail, the project website, and the transcripts of the oral comments received during the hearings. The Comment Documents and SCO's responses to the comments delineated within each Comment Document are presented side by side.
- Section 4 lists the references cited in this CRD.

1.4 Changes from the Draft EIS

In preparing the Final EIS, SCO revised the Draft EIS in response to comments received from other Federal agencies, state and local government entities, and members of the public. In addition, SCO revised the EIS to provide more-recent environmental baseline information and updated project data, as well as to correct minor inaccuracies, make editorial corrections, and clarify text. Vertical "change bars" appear alongside substantive changes in Volume 1 of this Final EIS. Typographical and editorial changes are not marked. The following descriptions summarize the substantive changes made since the Draft EIS. None of these changes would be considered significant changes that would require reissuing the Draft EIS.

1.4.1 Public Comment Period on the Draft EIS

Section S.4 in the Summary and Section 1.6 in Chapter 1 were modified in the Final EIS (Volume 1) to describe the public comment period for the Draft EIS.

1.4.2 Changes Made for the Final EIS

Section 1.7 was added to Chapter 1 of the Final EIS (Volume 1) to describe the substantive changes made to the Draft EIS that appear in the Final EIS.

1.4.3 Additional Studies and Reports

Chapter 3 of the Final EIS (Volume 1) was updated with data available in the latest version of the annual site environmental report for INL (DOE-ID, 2021). Minor revisions were made to selected resource areas to reflect updated monitoring data and descriptions in the most recent report.

1.4.4 Updates to Impact Analyses

Chapter 4 of the Final EIS (Volume 1) was updated to reflect refinement in input data for a few impact areas, including waste management and accidents. Minor revisions to waste volumes and accident source terms were made that resulted in minor changes to the impact analyses.

1.4.5 Intentional Destructive Acts

The text in Section 4.11 of the Draft EIS was expanded in a new Section 4.11.4 in the Final EIS (Volume 1) to better explain the intentional destructive acts analysis.

1.4.6 Cumulative Impacts Analysis

The cumulative impacts analysis in Chapter 5 of this Final EIS (Volume 1) was revised to address additional reasonably foreseeable actions at the INL Site (i.e., Microreactor Applications Research, Validation and Evaluation [MARVEL] Project and Molten Chloride Reactor Experiment [MCRE]).

1.5 Next Steps

SCO will use the analyses presented in the Final EIS, as well as other information, in preparing a Record of Decision (ROD) for the project. SCO will issue a ROD no sooner than 30 days after the EPA publication of the Notice of Availability of the Final EIS in the Federal Register. The ROD will describe the alternative and/or options selected for implementation and explain how environmental impacts will be avoided, minimized, or mitigated, as appropriate.

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Section 2
Topics of Interest

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2 TOPICS OF INTEREST

Upon review of the comments received on the Draft EIS, the DoD identified several topics of interest to be addressed in this section. These include topics of broad interest or concern as indicated by their recurrence in comments or technical topics that warrant a more detailed discussion than might be afforded in responding to an individual comment. This section summarizes the comments received on each topic of interest and presents the DoD's response to those comments:

- Support and Opposition
- Purpose and Need
- Scope of the Proposed Action
- Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition
- Mobile Microreactor Accidents
- Intentional Destructive Acts
- Nuclear Reactor Research and Development

2.1 Support and Opposition

Comments Summary: Some commenters expressed support for constructing the prototype mobile microreactor and demonstrating it at the Idaho National Laboratory (INL) Site. Commenters in support of the Proposed Action provided reasons for their support, including that INL is well equipped for these activities, the project would bring additional good-paying jobs to the region, and a viable mobile microreactor could benefit military and civilian applications. Some commenters strongly opposed this action and supported the No Action Alternative. Commenters in opposition to the Proposed Action identified concerns including the risks associated with accidents, waste disposal, impacts to the Snake River Aquifer, and spent nuclear fuel management. Some commenters identified alternative means to meet the needs for power production identified by the DoD. These power production methods included alternative reactor designs and some non-reactor designs.

Response: The DoD appreciates and acknowledges the commenters' preferences regarding Project Pele and demonstration activities at the INL Site. Although the DoD considered every comment received, the DoD reiterates the CEQ statement that "Commenting is not a form of 'voting' on an alternative" (CEQ, 2007). The number of comments received for or against a particular alternative does not dictate the action that a Federal agency must take.

In accordance with the NEPA and CEQ implementing regulations, the Final EIS evaluates a No Action Alternative and a reasonable action alternative for implementing Project Pele. The DoD evaluated, in detail, demonstration of the prototype mobile microreactor at the INL Site. Consideration was given to demonstration at other U.S. Department of Energy (DOE) sites (EIS Section 2.1, *Mobile Microreactor Siting*, and Section 2.5, *Alternatives Considered and Dismissed from Detailed Analysis*). However, based on the siting criteria, including site capabilities, only the INL Site was identified as meeting all the requirements for the demonstration location. EIS Chapter 2, *Description of Alternatives*, describes the alternative evaluated and summarizes the potential environmental impacts.

Some commenters suggested the DoD consider other power-generating system designs, including both alternative reactor designs and alternative power sources. The selection of the design for the prototype mobile microreactor is not a decision supported by the Final EIS. As discussed in EIS Section 1.3, *Proposed Action and Scope of this EIS*, a Defense Science Board task force examined the electrical energy needs for the DoD and found that "the U.S. military could become the beneficiaries of reliable, abundant, and continuous energy through the deployment of nuclear energy power systems." SCO then initiated a mobile nuclear reactor design competition and issued design information requests to industry. This request identified performance criteria but placed no limitations on the type of reactor. All designs submitted were reviewed, and three were selected for consideration. This set of designs was subsequently reduced to the two discussed in the EIS.

The DoD has considered all the comments received on the Draft EIS in the development of the Final EIS. DOE has considered all viable alternatives objectively and identified a preferred alternative for Project Pele (the Proposed Action). The DoD will announce its decision regarding Project Pele in a ROD issued no sooner than 30 days after EPA publishes the Notice of Availability for the Final EIS in the Federal Register. The potential environmental impacts presented in the Final EIS, along with public input, cost, policy considerations, and other factors, will be considered by the DoD in making a decision. The ROD will present the DoD's decisions regarding Project Pele; describe the alternative selected for implementation; explain how environmental impacts will be avoided, minimized, or mitigated; and describe the factors considered in making those decisions.

2.2 Purpose and Need

Comments Summary: Some commenters questioned the purpose and need to construct and demonstrate a prototype mobile microreactor. Other commenters made statements supportive of the need for a microreactor.

Commenters questioning the need for a microreactor stated their belief that nuclear energy is "old school," dangerous, and expensive. Commenters also expressed that there are safer and cheaper means of energy production and that pursuing nuclear energy is a misguided approach to addressing energy needs and the climate crisis. Commenters indicated that public funds should not be used to develop new forms of nuclear energy and that funds should be used for research, development, and widespread implementation of renewable energy sources, such as wind and solar, and making renewable energy more reliable.

Commenters supporting the need to construct and demonstrate a prototype mobile microreactor cited a number of reasons, including Section 3 of Executive Order 13972 (January 5, 2021), *Promoting Small Modular Reactors for National Defense and Space Exploration*. These commenters noted that demonstrating a prototype mobile microreactor could be the first step in developing a power source that could reduce the need to transport fuel to military bases, saving the lives of future warfighters, and could also provide reliable power for nonmilitary applications.

Response: The purpose of the DoD's action is to construct and demonstrate a prototype mobile microreactor (EIS Section 1.2, *Purpose and Need for Agency Action*). Whereas some commenters believe that nuclear energy is old technology and should not be pursued, advances and improvements are being made in nuclear energy technology, and it should be part of the overall mix of energy sources in the United States. As described in EIS Section 1.2, the DoD is following executive office and congressional direction. Pursuant to the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115–91, 131 Stat. 20 1283 and 131 Stat. 1857 Section 2831), as codified in Title 10 United States Code 2911 (Energy policy of the Department of Defense), the "Secretary of Defense shall ensure the readiness of the armed forces for their military missions by pursuing energy security and energy resilience." Further, pursuant to the Consolidated Appropriations Act, 2020, Public Law 116–93, Division A, Title IV, and the act's accompanying congressional explanatory statement, 165 Congressional Record H10613, H10886 (daily edition December 17, 2019), the DoD and SCO received an appropriation for a prototype mobile microreactor. In addition, Section 3 of Executive Order 13972 (January 5, 2021), *Promoting Small Modular Reactors for National Defense and Space Exploration*, calls on the Secretary of Defense to establish and implement a plan to demonstrate the energy flexibility, capability, and cost-effectiveness of a Nuclear Regulatory Commission (NRC)-licensed microreactor at a domestic military installation.

The DoD and DOE acknowledge that funds and research are needed for other renewable energy sources such as solar and wind, as evidenced by the February 2021 announcement of funding for transformative clean energy technology research and development (DOE, 2021). But a report prepared by the Defense Science Board (DoD Defense Science Board, 2016) noted that renewable sources of energy, such as wind, tidal, solar, and similar energy sources, can reduce the need for some fuel, but most renewable resources are limited by location, weather, time of year, storage capacity, available land area, and constructability. The intermittent character of many alternative energy sources requires energy storage technologies or redundant power supplies, and emerging technologies for improved energy storage do not appear able to keep pace with the growth of the DoD's energy needs. These technologies and practices are useful to meet some current demands, and military adoption of renewable energy has occurred at domestic bases and, in specific-use cases, in deployed locations (e.g., where a small source of power [few watts] is needed to power sensors, unmanned aerial vehicles, and warfighter power systems). For example, solar energy has shown the most promise to date, with successful demonstrations in remote outposts, for sensors and on unmanned aerial vehicles, but due to the intermittent supply and large footprint required, solar power does not offer the capability of conventional power production systems when significant amounts of on-demand power are needed.

The Defense Science Board report concluded that very small modular reactors with an output of less than 10 megawatts of electrical power (i.e., microreactors) may be transportable and deployable at Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases and could eliminate the need for fuel otherwise dedicated to producing electrical power. In addition, microreactors could provide reliable power for domestic bases. Before a mobile microreactor could be deployed, a prototype must be built and tested to ensure that it can meet regulatory requirements as well as DoD specifications and operational requirements.

As noted by commenters supporting the need for this action, multiple potential benefits may derive from successful demonstration of the prototype microreactor. If successfully demonstrated, in the future (and after additional environmental analysis), microreactors may be deployable at domestic bases, as well as Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases in foreign countries and U.S. territories, and could eliminate the need for fuel otherwise dedicated to producing electrical power. Such nuclear energy power systems present an opportunity to "invert" the paradigm of military energy, where the extremities of U.S. military power could be the beneficiaries of reliable, abundant, and continuous energy, instead of the most energy-challenged segments. In civilian applications, mobile microreactors could be transported to support disaster response work and provide temporary or long-term support to critical infrastructure like hospitals as well as remote civilian or industrial locations where delivery of electricity and power is difficult.

2.3 Scope of the Proposed Action

Comments Summary: Commenters asked if additional microreactor testing would be performed at other sites. Other commenters were concerned the Draft EIS does not include the impacts of deployment of the microreactor at domestic bases, Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases. Also, the Draft EIS does not include the impacts of using the microreactor for nonmilitary applications such as providing power for remote settlements, industrial sites, and emergency response situations. Another commenter questioned why the Draft EIS did not provide an estimate of the reduction of greenhouse gases (GHGs) that could be achieved by using the microreactor to supply power versus using fossil fuel-powered energy sources.

Response: As described in EIS Sections 1.2 and 1.3, SCO, in partnership with DOE as a cooperating agency, proposes to fabricate an advanced prototype mobile microreactor at offsite commercial facilities and demonstrate operation and transportability of the microreactor at the INL Site. A prototype must be built and tested to ensure it can operate as designed and meet regulatory requirements as well as the specific design goals and requirements identified by SCO (see Table 2.2-1 of the EIS). Therefore, the scope of the EIS is limited to fabrication of a prototype mobile microreactor off-site, and demonstration of the microreactor at the INL Site. Testing at other sites and deployment at domestic bases, and Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases in foreign countries and U.S. territories, is not included in the scope of the EIS. Likewise, use of the microreactor for nonmilitary applications such as providing power for remote settlements, industrial sites, and emergency response situations (for example, in response to power outages during and following catastrophic events), is not included in the scope of this EIS. After completion of the demonstration at the INL Site, the knowledge gained from the testing may be used to facilitate design of mobile microreactors that would meet the DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. The potential environmental impacts of deployment and use of these future designs, if they were to occur, would be the subject of additional environmental analyses.

Because the EIS does not evaluate deployment, it does not provide an estimate of the reduction of GHGs that could be achieved by using the mobile microreactor to supply power versus energy sources powered by fossil fuel. A reduction in GHGs would not be achieved during construction and demonstration of the mobile microreactor, but GHGs emitted from Project Pele activities would be a negligible percentage of U.S. and global GHG emissions and would not substantially contribute to climate change (EIS Section 5.3.7, *Global Commons – Climate Change*).

2.4 Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition

Comments Summary: Commenters expressed concerns about generating radioactive waste, including waste associated with reactor disposition and spent nuclear fuel (SNF) management. These concerns included the potential for storage and disposal on-site and the lack of long-term solutions for the management and disposal of radioactive waste and SNF. Some commenters were concerned about the potential for SNF to be stranded at the INL Site.

Response: Current management of radioactive waste and SNF at the INL Site is described in EIS Section 3.9, *Waste and Spent Nuclear Fuel Management*. The potential environmental consequences associated with radioactive waste and SNF management are described in EIS Section 4.9, *Waste and Spent Nuclear Fuel Management*. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the reactor module container express (CONEX) container and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted or licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria.

In recent years, the INL Site has disposed LLW and treated MLLW at the DOE Nevada National Security Site or two commercial facilities: Waste Control Specialists Facility in Andrews County, Texas, and the

Energy*Solutions* Site in Clive, Utah. The INL Site's on-site LLW and MLLW facilities restrict the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any LLW in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008).

SNF would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it is transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of the EIS.

2.5 Mobile Microreactor Accidents

Comments Summary: Comments related to the impacts on human health and safety from mobile microreactor accidents reflected both positive and negative opinions. Some comments expressed a need for the military to have a safe and reliable source of electrical power for operations at remote bases and that this could save lives. Comments related to DOE failing to provide adequate analysis and oversight to prevent and mitigate accidents were also received. Comments related to the use of a new microreactor technology asserted that accidents would be more likely. One commenter mentioned the experimental SL 1 (Stationary Low-Power Reactor Number One) accident west of Idaho Falls, Idaho, as an example.

Another comment asserted that the U.S. military has a long and sad history of failing to consider the risks associated with radioactive materials as, for example, in Iraq, where the use of depleted uranium munitions has caused significant health problems. The comment also asked whether the design for the proposed mobile microreactor represents a departure from the design of existing light water reactors (LWRs) in terms of safety and what happens when the cooling system of the prototype mobile microreactor fails.

A comment requested that the analysis be comprehensive in considering the full extent of radioactivity that could be released if the microreactor is destroyed by an accident. Comments related to total curies of radioactivity and outdoor storage of the mobile microreactor were also received. Comments were received relating to the material at risk and radiation health effects. A commenter stated that the amount of radiological material at risk could be significantly larger than assumed but provided no technical basis for the assertion. Another commenter indicated that the negative health impacts from radiation in general and from releases from the INL Site specifically have not been addressed in the accident analysis.

Comments were received relating to the accident event frequency. A commenter indicated that, while the EIS asserts that an accident is so unlikely as to be less than 1 chance in 10,000 or 1 chance in a million per year, it is only a biased assertion and not an estimate based on data. A commenter stated that the EIS does include a long-term estimate of the widespread impact of contaminated food and future generations of people living in the long-lived radioactive contamination. Comments stated, without supporting evidence, that the economic impact of a mobile microreactor accident is grossly understated in the EIS and that the EIS must address decades of non-use of farmland, worthless real estate, and long-term evacuation of residents and elevated levels of human health impacts, not limited to cancer.

Response: SCO takes its responsibility for the safety and health of the workers and the public seriously. Past microreactor experience and knowledge gained from the Army Nuclear Power Program, which ran from 1954 to 1977, provide information about operating microreactors. The program developed several small nuclear reactors. Those reactors ranged in power production from 1 to 10 megawatts. Examples include:

- The PM-1 reactor was used in Sundance, Wyoming, from 1962 to 1968.
- The PM-2A was used at Camp Century, Greenland, from 1961 to 1964.
- The PM-3A was used at McMurdo Base, Antarctica, from 1962 to 1972.
- The ML-1 was used in developmental testing from 1962 to 1966.
- The MH-1A was used in the Panama Canal Zone from 1965 to 1977.

EIS Section 3.11, *Human Health – Facility Accidents*, addresses DOE's program for emergency preparedness and DOE's commitment to maintain and improve the program. EIS Section 4.11.1, *Key Mobile Microreactor Safety Functions*, discusses features of the prototype mobile microreactor to protect human health. EIS Section 4.11.2, *Hazardous Material Release Impacts*, presents DOE's program for worker health and safety. Worker and public safety are DOE's and SCO's highest priority, and workers at DOE and military sites are highly trained in performing their jobs. DOE and the military require programs and controls to ensure that workers have a safe work environment. Education and training, including safety and radiation protection requirements, are commensurate with job functions.

The purpose of the EIS is to assess the environmental impacts of the Proposed Action. SCO used state-of-the-art science, technology, and expertise to ensure quality in the accident impacts analyses. Personnel with many years of experience performed the accident analyses using state-of-the-art computer programs approved for use by DOE and NRC. EIS Section 4.11, *Human Health – Facility Accidents*, includes a comprehensive assessment of potential impacts from prototype mobile microreactor accidents that could result during all phases of the project, from initial construction through decommissioning of the prototype mobile microreactor and disposal of materials. EIS Section 4.11 presents the analysis of impacts from potential radioactivity releases from microreactor accidents along with long-term impacts.

As detailed in EIS Section 1.3, *Proposed Action and Scope of the EIS*, the scope of the EIS is limited to the construction and demonstration of the prototype mobile microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate design of mobile microreactors that would meet the DoD's ultimate goals for an effective mobile power source that could support the DoD missions worldwide. The potential environmental impacts of deployment and any use of these future designs would be the subject of additional environmental analyses.

The analysis of impacts used the maximum amount of radioactive material that could be released as a result of any inadvertent nuclear criticality, on-site transportation accident, or operation accident. Because of the protective characteristics of the tristructural isotropic (TRISO) fuel particles used for the microreactor, only a very, very small fraction of the radioactive materials would be released from the fuel under accident conditions. TRISO fuel has been specifically developed to ensure retention of radioactive fission products during normal operating and accident conditions. Each TRISO particle is made up of a uranium oxycarbide (a mixture of uranium dioxide and uranium carbide) fuel kernel encapsulated by three layers of carbon- and ceramic-based (silicon carbide) material. The microreactor fuel contains high-assay low-enriched uranium; it contains no highly enriched uranium. As indicated based on significant testing and demonstration, TRISO fuel can operate at temperatures almost double those experienced by the mobile microreactor during normal operation and above temperatures expected during accident conditions, without significant degradation and release of fission products.

These maximum quantities of radioactive material were input to the accident analyses described in EIS Section 4.11, *Human Health – Facility Accidents*. As such, the accident analyses yield consequences to the non-involved worker, the maximally exposed off-site individual, and the public that are greater than the consequences of any inadvertent nuclear criticality, any transportation accident, or any operation accident (including attacks on the microreactor) that may be postulated for the mobile microreactor. The analyses discussed in EIS Section 4.11 adequately address environmental impacts and public safety consequences from abnormal operations and accidents related to testing the prototype mobile microreactor at the INL Site.

EIS Section 4.11.1, *Key Mobile Microreactor Safety Functions*, addresses features of the prototype mobile microreactor to protect human health and prevent the release of radioactive material to the environment. The hazard analysis for the mobile microreactor considered a wide spectrum of potential accident scenarios, including fire, spills, criticality, fuel-handling errors, confinement breaches, control system failure, earthquake, and aircraft crash. Based on the hazard analysis, an inadvertent nuclear criticality, an operational accident, and a transportation accident were selected for quantitative analysis. In contrast to the analysis for the civilian nuclear industry, the quantitative analysis of the mobile microreactor (EIS Section 4.11) is based on conservative assumptions that do not consider decay of short-lived isotopes, mitigation to limit releases, or emergency actions such as evacuation or sheltering in place. The NRC-evaluated risks for LWRs are based on more realistic assumptions for as-built LWRs and consider preventative and mitigation features of the LWRs, including evacuation of persons within the typical 10-mile-radius emergency planning zones surrounding the LWRs. Severe accident modeling for LWRs also considers radioisotope decay for releases that occur hours or days after the LWR shuts down.

SCO disagrees with the statement that the event frequency estimate is a biased assertion and not an estimate based on data. SCO would have multiple engineered and administrative controls in place to prevent these failures. The estimated frequencies of accident initiating events consider the probability of failure of these engineering and administrative features.

An emergency preparedness program (described in EIS Section 3.11.1, *Emergency Preparedness*) is in place so that if an accident were to occur, there would be adequate warning to the off-site public about harvesting and ingesting foods that could be contaminated as a result of a radiological release. The MACCS2 computer program (an NRC-approved code) was used to project economic costs, including population-dependent costs, farm-dependent costs, decontamination costs, interdiction costs, emergency phase costs, and milk and crop disposal costs.

SCO acknowledges that many different perspectives are represented in the comments received, but no comments were received that indicate any of the accident analysis data presented in the EIS should be reconsidered based on technical or scientific reasons.

2.6 Intentional Destructive Acts

Comments Summary: Some commenters were concerned that implementation of the mobile microreactor project could put the public at risk for terrorist attacks. They expressed concern about the quality-of-life impacts of a terrorist attack on this proposed project and what possible scenarios of mitigation have been developed to both protect this project from a terrorist attack as well as respond to one should it occur. Concerns related to the destruction of the mobile microreactor, security of the demonstration site, vulnerability to attack at Forward Operating Bases in foreign countries where enemy attack is likely, and vulnerability to loss of control or theft of the microreactor were expressed. Commenters asked who would be affected by radiation released because of sabotage or terrorism and what would be done to make those affected “whole.”

Some commenters expressed concern about the potential for cyberattacks that could result in worst-case-scenario accidents. They indicated that the EIS does not indicate that SCO conducted an analysis of potential accidents that could result from cyberattacks. They also indicated that while potential cyberattack-driven accidents have not been analyzed in EISs from DOE, recent widespread cyberattacks in the United States and abroad—including malicious attacks on nuclear power plants and water-treatment facilities—indicate that SCO should have addressed cyberattacks in the EIS.

Response: The DoD and DOE constantly assess, train, and prepare for potential intentional destructive acts (IDAs). All of the microreactor-related facilities would have a very high level of physical security designed to stop credible threats. The passive safety approach of the mobile microreactor makes it robust against multiple IDAs, including those attempting to disable the heat rejection systems. Furthermore, the use of TRISO fuel would serve to inhibit consequences from an IDA. TRISO fuel has been specifically developed to retain radioactive fission products during normal operating and accident conditions. Each TRISO particle is made up of a uranium oxycarbide (a mixture of uranium dioxide and uranium carbide) fuel kernel encapsulated by three layers of carbon- and ceramic-based (silicon carbide) material. TRISO fuel has been tested and verified at temperatures almost double those that would be experienced by the mobile microreactor during normal operation and above temperatures expected during accident conditions, without significant degradation and release of fission products. This type of construction renders the microreactor fuel well protected from external threats, including both natural events and IDAs. The radiological releases from IDAs are bounded by the releases from the accidents evaluated in the EIS. Section 4.11.4 of the EIS discusses IDAs as well.

In the aftermath of the attacks on September 11, 2001, DOE, DoD, and the U.S. Department of Homeland Security implemented measures to minimize the risk and consequences of potential terrorist attacks on DoD and DOE facilities. The DoD and DOE maintain a system of regulations, orders, programs, guidance, and training that forms the basis for maintaining, updating, and testing site security to preclude and mitigate any postulated IDAs (Brooks, 2004; DHS, 2006) (Public Law 107-296, 33 CFR 165, and 33 CFR 334). Safeguards applied to protecting facilities that contain nuclear material involve a dynamic process of enhancement needed to meet evolving threats. Security at these facilities is a critical priority for both the DoD and DOE, which continue to identify and implement measures to deter attacks and defend against them. The DoD and DOE continually reevaluate security scenarios involving IDAs to assess potential vulnerabilities and identify improvements to security procedures and response measures.

SCO considers cyberattacks to be a credible threat, and prevention systems would be in place. A key design consideration in the implementation of control systems for a new microreactor is the inclusion of a defense-in-depth strategy for cybersecurity. The mobile microreactor would be designed with a high level of physical and cybersecurity to protect staff, property, and the public from a range of potential security threats. Since the prototype microreactor control and protection systems would not be accessible remotely, the risks from cyberattacks would be reduced.

An analysis of physical or cyber vulnerabilities and defenses is a security function that would be performed independent of the EIS. These analyses would be performed throughout the design and construction phases to ensure that after the mobile microreactor is operational, preventative and mitigation security features would be present. Details of the mobile microreactor design and cybersecurity features to preclude any IDA are not available to the public for security reasons.

As described in EIS Section 1.3, *Proposed Action and Scope of this EIS*, the scope of the EIS is limited to fabrication of the prototype mobile microreactor at offsite commercial facilities and demonstration of the microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate design of mobile microreactors that would meet the DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD missions worldwide. The potential environmental impacts of any deployment and use of these future designs would be the subject of additional environmental analyses.

IDAs during fabrication, or transport of nonradiological mobile microreactor components from the manufacturer to the INL Site, would be similar to IDAs for other common industrial activities. The impacts of IDAs during transportation of fresh fuel from the fabricator to the INL Site would be similar to or less than the impacts of transportation accidents evaluated in this EIS. IDAs during transportation of the prototype mobile microreactor at the INL Site would be unlikely because only limited transport of the operational reactor would be conducted. Transport at the INL Site would be conducted on closed roadways under high security. The likelihood of an IDA occurring during transport of the mobile microreactor at the INL Site is minimized by the security measures that would be taken to reduce knowledge of and access to the shipments. The radiological impacts of IDAs at the INL Site are expected to be similar to or less than the impacts of the accidents evaluated in the EIS. IDAs during transportation of fresh fuel to the INL Site, and waste and SNF to storage or disposal facilities, are likewise similar to or less than the impacts of transportation accidents evaluated in the EIS. IDAs for construction and demonstration of a mobile microreactor at other locations in the United States, in a U.S. territory, or in a foreign country are outside the scope of the EIS and, therefore, were not considered.

2.7 Nuclear Reactor Research and Development

Comments Summary: Commenters expressed concerns that the prototype mobile microreactor would be one of the first of a large number of demonstration/test reactors that could be located on the INL Site. The cumulative impacts of siting multiple reactors at the INL Site were of particular concern.

Response: The INL Site is the proposed location for several new reactors, ranging in size from microreactors smaller than the prototype mobile microreactor evaluated in the EIS up to roughly 100 times (1,000 megawatts thermal) the size of this microreactor. These new reactors represent a variety of designs with differences in fuels (for example, high assay low enriched uranium and plutonium) and cooling systems that include gas cooled (for example, the Project Pele prototype), sodium cooled (for example, the Versatile Test Reactor [VTR]) and water cooled. The differences in size and type mean that each has the potential for different impacts on the surrounding environment.

NEPA analyses (environmental assessments and EISs) for some of these reasonably foreseeable[1] reactors (the MARVEL and VTR) have been completed. Additionally, the Utah Associated Municipal Power Systems (UAMPS) and NuScale have announced plans to locate up to 12 small modular reactors at the INL Site, the Oklo Power LLC, AURORA microreactor project plans to place a reactor on the INL Site, and the Southern Company and DOE have established a cooperative agreement to design, construct, and operate the MCRE at the INL Site. The NRC will prepare the NEPA analyses for the UAMPS and AURORA reactors as part of its license application review.

In addition, the National Reactor Innovation Center (NRIC) is a partnership between DOE and private companies to test and demonstrate new reactors. NRIC envisions building new reactors, possibly two by the mid-2020s and more beyond that. Other activities being considered for NRIC, efforts to assess how nuclear power would be integrated into electrical systems and evaluations of improved (faster) construction techniques, would not require the construction of operable reactors. NEPA analyses for future NRIC reactors are not yet available.

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[1] *Reasonably foreseeable* means sufficiently likely to occur such that a person of ordinary prudence would take it into account in reaching a decision (40 CFR 1508.1). In this EIS, reasonably foreseeable actions are generally understood to be those that have been identified in a NEPA document or are from another environmental impact analysis that is available and for which the effects can be meaningfully evaluated. These include actions unrelated to DOE.

Each of these reactor projects will require NEPA analysis. This analysis could be either an environmental assessment (as was done for the MARVEL project) or an environmental impact statement (as was done for the VTR). An assessment of cumulative impacts would be included in each NEPA analysis.

The cumulative impact analysis in Chapter 5 of Volume 1 of the EIS for the prototype mobile microreactor considers impacts from these other reactor projects, commensurate with the level of information available. Additional reasonably foreseeable non-reactor projects are also included in the cumulative impacts analysis presented in Chapter 5 of the EIS.

Section 3
Public Comments and SCO Responses

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3 PUBLIC COMMENTS AND SCO RESPONSES

This section presents a side-by-side display of the comments received by SCO during the public comment period on the Draft EIS and SCO's response to each comment. To find a specific commenter or comment on the following pages, refer to the "List of Commenters" immediately following the Table of Contents. The list is organized alphabetically by commenter name and shows the corresponding page number(s) where commenters can find their comment(s).

Commenter No. 01: Katie Andrle

From:	Katie Andrle [redacted]
Sent:	Tuesday, September 28, 2021 2:29 PM
To:	pele_nepa@sco.mil
Subject:	EXTERNAL: DOD Prototype Microreactor DEIS Comments
Attachments:	Microreactor DEIS_NDOW comments.pdf

To whom it may concern,

Please find attached the Nevada Department of Wildlife's comments on the Prototype Microreactor DEIS.

Thank you and please let me know if you have any questions.

Katie Andrle, Western Region Supervising Habitat Biologist
Nevada Department of Wildlife
1100 Valley Road
Reno, Nevada 89512
[redacted]

Support Nevada's Wildlife… Buy a Hunting and Fishing License

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Commenter No. 01: Katie Andrle

State of Nevada
DEPARTMENT OF WILDLIFE
1100 Valley Road
Reno, Nevada 89512
Phone (775) 688-1500 • Fax (775) 688-1595

STEVE SISOLAK
Governor

TONY WASLEY
Director

BONNIE LONG
Deputy Director

JACK ROBB
Deputy Director

September 27, 2021

Mobile Microreactor EIS Comment
c/o Leidos
2109 Air Park Rd SE, Suite 200
Albuquerque, NM 87106

Re: Prototype Mobile Microreactor Draft EIS

To whom it may concern,

The Nevada Department of Wildlife (the "Department") appreciates the opportunity to comment on the Department of Defense's (DoD) *Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement* (DEIS). At this time, the Department does not have major wildlife or habitat related concerns with the proposed action. Should the Nevada National Security Site be selected as the preferred waste disposal site for the project, the Department would appreciate being notified of that decision. ***01-1***

Please let me know if you have any questions or need additional information.

Sincerely,

Katie Andrle
Western Region Supervising Habitat Biologist
Nevada Department of Wildlife
[redacted]

01-1 At this time, the specific waste disposal site(s) has or have not been identified. The Nevada National Security Site is one of several potential disposal sites for the disposal of the very small quantities of waste generated under the Proposed Action. If the Nevada National Security Site is not available for any reason, then another appropriate facility would be selected consistent with that facility's applicable waste acceptance criteria and capacities.

Commenter No. 02: David Crouse

From: Crouse, David [redacted]
Sent: Monday, September 27, 2021 2:43 PM
To: PELE_NEPA@sco.mil
Cc: Webster, Tegan; Shackelford, Aaron K.
Subject: EXTERNAL: Prototype Microreactor EIS Comments
Signed By: [redacted]

Dear Dr Nepa:

I read about the comment period for the construction and demonstration of a prototype advanced mobile nuclear microreactor published in the federal register.

I would like to comment that you might want to consider a thorium reactor, despite the fact that no existing U.S. reactor (that I am aware of) is thorium based and, because of that, I would not expect any contractors to submit bids with such a design if you were to put out an FNC.

One of the keynote speeches at the IEEE Aerospace Conference in 2016 discussed thorium nuclear reactors claiming that they are significantly safer, produce much less nuclear waste, and that thorium is more plentiful than uranium. It was claimed that the motivation for advancing the more dangerous uranium reactors many years ago was because aspects of the technology better served a use as breeder reactors for plutonium for nuclear weapons. The same argument for such a choice is presented in a 2012 Forbes article entitled "The Thing About Thorium: Why The Better Nuclear Fuel May Not Get A Chance." ***02-1***

Earlier this month, the Journal Nature reported the China is preparing to test a thorium reactor, so their success or failure should be something worth following: "China prepares to test thorium-fueled nuclear reactor" https://www.nature.com/articles/d41586-021-02459-w

I am not a nuclear physicist and cannot make any truly informed design recommendations. However, since I have seen that proposals to government tend to be minor modifications of existing technology, and existing technology is at risk of a meltdown, produces significant waste, is at a risk of exploding if the zirconium rods overhead and hydrogen is produced, and even the supposedly meltdown-free pellet reactors are wasteful and have significant drawbacks, it is worth looking into the technological option that was spurned years ago, because it couldn't be used to make weapons. ***02-2***

Dr. David F. Crouse
Electronics Engineer, Radar Division
Code 5344
Naval Research Laboratory
[redacted]

1

02-1 The selection of the reactor design is not a decision to be supported by this EIS. The design selection process is described in Sections 1.3, *Proposed Action and Scope of this EIS*, and 2.2.2, *Proposed Mobile Microreactor Concepts Selected by SCO for Further 1 Design*, of this EIS. Please see Section 2.1, *Support and Opposition*, of this CRD for additional information.

02-2 See the response to Comment 02-1. Chapter 4, *Introduction*, of this EIS addresses the impacts associated with the alternatives considered in this EIS, including the analysis of human health impacts associated with the normal operation of the prototype mobile microreactor (Section 4.10, *Human Health – Normal Operations*), accidents during the demonstration of the mobile microreactor (Section 4.11, *Human Health – Facility Accidents*), and the transportation of materials in support of the demonstration (Section 4.12, *Human Health – Transportation*). The waste generated from the demonstration of a prototype mobile microreactor is discussed in Section 4.9, *Waste and Spent Nuclear Fuel Management*. The scope of this EIS is limited to the construction and demonstration of the prototype microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. Before a mobile microreactor could be deployed, a prototype must be built and tested to ensure that it can meet regulatory requirements, as well as the specific design goals and requirements identified by SCO (as identified in Chapter 2, *Description of Alternatives*, Table 2.2-1 of this EIS).

Commenter No. 03: Al Dec

From: Al Dec [redacted]
Sent: Sunday, September 26, 2021 5:24 AM
To: PELE_NEPA@SCO.MIL
Subject: EXTERNAL: DoD Mobile Nuclear Reactors

As a former warfighter and retired engineer from the defense and aerospace sector I offer a couple of observations.

1. Such devices would instantly become high value targets to any adversary.
2. Breaching such devices would present potentially greater contamination than depleted uranium. **03-1**

As an alternative I suggest you consider putting reactors into low earth orbit and beaming the power to portable ground stations via passive collectors. **03-2**

Such a system offers greater safety and security while retaining the ability to provide power to multiple dispersed locations and steering scalable power to various end users. For example, a FOB would require more power than a COP but both could be serviced from the same orbital platform.

When not required to support DoD operations a system of this nature could be repositioned to support disaster relief.

Cheers,

Al Dec

1

03-1 1. DoD and DOE constantly assess, train, and prepare for potential threats to the mobile microreactor. All of the prototype microreactor-related facilities would have a very high level of physical security designed to stop credible threats. Even though these activities and designs make an attack on the mobile microreactor improbable, the consequences of an intentional destructive action are considered. The consequences of such an action are similar to or lower than the consequences of the spectrum of accidents evaluated in Section 4.11, *Human Health – Facility Accidents*, of this EIS. The scope of this EIS is limited to the construction and demonstration of the prototype microreactor at INL. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. Before a mobile microreactor could be deployed, a prototype must be built and tested to ensure that it can meet regulatory requirements, as well as DoD specifications and operational requirements. Testing at other sites and deployment at domestic bases, Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases are not included in the scope of this EIS. Likewise, use of the microreactor for nonmilitary applications, such as to provide power for remote settlements or for industrial sites, is not included in the scope of this EIS. Activities outside the scope of this EIS would require additional National Environmental Policy Act documentation before they could be implemented. Please see Section 2.6, *Intentional Destructive Acts*, of this CRD for additional information.

2. As indicated above, the scope of this EIS is limited to construction and demonstration of the prototype microreactor at the INL Site. For this EIS, the impact of contamination caused by breach of the prototype mobile microreactor at the INL Site is included in the accident analysis described in Section 4.11, *Human Health – Facility Accidents*, of this EIS. The "Near+Long-Term Dose" includes the combined effects of exposure to radionuclides remaining after the plume passage. Exposure pathways include ingesting contaminated foods; direct radiation exposure from residual material on the ground (ground shine); inhalation of disturbed, residual ground-level particulates (resuspension); and ingestion of contaminated water. The "Near+Long-Term Dose" for each of the analyzed accidents is significantly below regulation limits and presents a minimal impact to workers and the public. The commenter's statement related to depleted uranium contamination is probably related to depleted uranium deployment scenarios on the battlefield. Scenarios related to explosions involving depleted uranium are outside the scope of this EIS.

03-2 The Defense Science Board evaluated available energy technologies before concluding that electrical generating capability for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases can best be met by a less than 10-Mwe microreactor system that can be safely and rapidly moved by road, rail, sea, or air for quick setup and shutdown. This EIS addresses the need to demonstrate such a prototype mobile microreactor. Please see the discussion in Sections 2.1, *Support and Opposition*, and 2.2, *Purpose and Need*, of this CRD for additional information.

Commenter No. 04: Michael Keller

From: [redacted]
Sent: Thursday, September 16, 2021 5:14 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: Draft EIS Comment - Hybrid Power Technologies LLC

Gentlemen,
I have reviewed the draft EIS for the prototype mobile micro reactor and am troubled by the lack of environmental information with respect to abnormal operations and accidents. Such information is routinely provided for nuclear reactors licensed by the US Nuclear Regulatory Commission.

I realize the Department of Defense is exempt from Federal Regulations applied to the civilian nuclear industry. Never-the-less, the proposed facility is located in the United States and adverse operation of the facility may involve severe environmental impacts and public safety consequences that should not be ignored by the DoD and DOE.

This concern becomes even more troubling for mobile micro reactors operated in foreign countries and US overseas territories.

My ultimate point is that the design and construction of the facility must include proper protective measures to minimize the potential for hazardous radiation associated with Design Basis Events. The Environmental Impact Statement should not ignore the issue.

04-1

Kindly confirm receipt of this e-mail. ***04-2***

Michael F. Keller
President
Hybrid Power Technologies LLC
[redacted]

Professional Engineer - State of Kansas
50 year veteran of energy industry, including nuclear power.

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04-1 Please refer to Section 4.11.1, *Key Mobile Microreactor Safety Functions*, and Section 4.11.3, *Radioactive Material Release Impacts*, of this EIS. Section 4.11.1 addresses the design of the mobile microreactor. The text addresses features of the mobile microreactor to protect human health and to prevent the release of radioactive material to the environment. The hazard analysis for the mobile microreactor considered a wide spectrum of potential accident scenarios, including fire, spills, criticality, fuel-handling errors, confinement breaches, instrumentation failure, earthquake, and aircraft crash. Based on the hazard analysis, an inadvertent nuclear criticality, an operational accident, and a transportation accident were selected for quantitative analysis. In contrast to the analysis for civilian nuclear industry, the quantitative analysis for the mobile microreactor is based on conservative assumptions that do not consider decay of short-lived isotopes, mitigation to limit releases, or emergency actions such as evacuation or sheltering-in-place. The NRC-evaluated risks for light water reactors (LWRs) are based on more realistic assumptions for as-built LWRs and consider preventative and mitigation features of the LWRs, including evacuation of persons within the typical 10-mile radius emergency planning zones surrounding the LWRs. Severe accident modeling for LWRs also considers radioisotope decay for releases that occur hours or days after the LWR shuts down. Section 4.11.3 identifies the maximum amount of radioactive material that could be released as a result of any inadvertent nuclear criticality, any on-site transportation accident, or any operation accident. These maximum quantities of radioactive material are input to the quantitative analysis. As such, the quantitative analysis yields consequences to the non-involved worker, the maximally exposed off-site individual, and the public that are greater than the consequences of any inadvertent nuclear criticality, any transportation accident, or any operation accident (including attacks on the reactor) that may be postulated for the mobile microreactor. The doses for each of the analyzed accidents are significantly below regulation limits and present a minimal impact to workers and the public. This EIS adequately addresses environmental impacts and public safety consequences from abnormal operations and accidents related to the mobile microreactor operations at the INL Site. Before a mobile microreactor could be deployed, a prototype must be built and tested to ensure that it can meet regulatory requirements, as well as DoD specifications and operational requirements. Therefore, the scope of this EIS is limited to construction and demonstration of the prototype microreactor at the INL Site. Testing at other sites and deployment at domestic bases, Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases are not included in the scope of this EIS. Likewise, use of the microreactor for nonmilitary applications, such as to provide power for remote settlements or for industrial sites, is not included in the scope of this EIS. Activities outside the scope of this EIS would require additional National Environmental Policy Act documentation before they could be implemented.

04-2 Thank you for your comments. Your email was received, and substantive comments within it were addressed in preparation of the Final EIS.

Commenter No. 05: Junaid Razvi

From: Junaid Razvi [redacted]
Sent: Friday, September 24, 2021 12:25 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: DRAFT EIS - Project Pele

To: Whom it May Concern C/o Leidos
Mobile Microreactor EIS Comment,
2109 Air Park Rd SE, Suite 200 9 Albuquerque, NM 87106

Hello -

I am in the process of reviewing the subject EIS draft as part of the public comment phase

05-1
The following Idaho National Laboratory referenced documents are not available publicly. Please provide them via e-mail reply so I can better understand some statements in the EIS. These reports are cited in Chapter 4,

1. INL. (2021a). *Pele Microreactor Hazards and Impacts Information in Support of National Environmental 7 Policy Act Data Needs*. INL/EXT-21-62873. Idaho National Laboratory. 8
2. INL. (2021b). *INL/INT-21-61331 Rev 1, Pre-conceptual Evaluation of Department of Defense Pele 9 Microreactor Sites at Idaho National Laboratory*. Idaho National Laboratory. April.

Thank you in advance

[redacted]

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05-1 The first of the two requested documents was provided via email on October 13, 2021. The second document was provided via email on October 28, 2021.

Commenter No. 06: Henry Sokolski

From: Henry Sokolski [redacted]
Sent: Monday, September 27, 2021 3:00 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: Prototype Microreactor EIS Comments
Attachments: 2021-09-27-Prototype Microreactor EIS Comments.pdf

To whom it may concern,

Attached please find a letter commenting on the September 2021 Draft Environmental Impact Statement for the Construction and Demonstration Phase of a Prototype Mobile Micro-reactor. Please let me know if you have any questions.

Sincerely yours,
Henry Sokolski

Henry Sokolski
Executive Director
The Nonproliferation Policy Education Center
1600 Wilson Blvd, Suite 640
Arlington, VA 22209
[redacted]
xxx.npolicy.org

This side left blank intentionally. See the response on the next page.

Commenter No. 06: Henry Sokolski

The Nonproliferation Policy Education Center

1600 Wilson Boulevard, Suite 640, Arlington, VA 22209
phone: (571) 970-3187 / e-mail: info@npolicy.org / www.npolicy.org

OSD Strategic Capabilities Office
ATTN: Prototype Microreactor EIS Comments,
675 N Randolph Street,
Arlington, Virginia
22203–2114

September 27, 2021

To whom it may concern,

I write to comment on the September 2021 Draft Environmental Impact Statement for the Construction and Demonstration Phase of a Prototype Mobile Micro-reactor. I am Executive Director of the Nonproliferation Policy Education Center, which has considerable experience in nuclear power issues. My comments follow:

1. The DOD decision to avoid NRC licensing of the proposed micro-reactor, or at least detailed technical review, risks a flawed design. Recall that Admiral Rickover insisted on an independent review of his submarine reactors. Having NRC liaison "on the team" is not a satisfactory substitute. ***06-1***

2. The draft EIS speaks of use of the proposed micro-reactors at "Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases." Almost all of these would obviously be in foreign countries, most of which would expect to have a say in the presence of an operating reactor that poses potential safety problems and releases of radioactive materials. Any demonstration of micro-reactor deployment has to address the interaction with the host country. But there is not a word about this in the Draft EIS, a striking omission that renders the entire exercise irrelevant. ***06-2***

Sincerely yours,

[signature]

Henry D. Sokolski

06-1 The selection of team participants and their responsibilities is not within the scope of an EIS. The lack of NRC licensing during the construction and demonstration of the prototype mobile microreactor was not the result of a decision to avoid NRC licensing. DOE is better suited to license prototype reactors, and since the reactor is being tested at a DOE site, DOE is the regulating authority. Since this is a prototype microreactor that would not provide commercial products, NRC licensing is not required. The decision to connect the microreactor to an isolated electrical grid is driven by the need for the testing to be done in an environment where the project controls the electrical distribution configuration, a requirement that would not be possible on a commercial electrical grid. The NRC's participation in the project is intended to provide the team with input on the NRC's perspective and experience on the development of new reactors. The NRC, consistent with its role as an independent safety and security regulator, is participating in this project to provide SCO with accurate, current information on the NRC's regulations and licensing processes in connection with construction and demonstration of a mobile microreactor. It is also expected that information learned during this project would provide each participant with insights for future development and licensing of new reactors.

06-2 The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site, and demonstration of the microreactor at the INL Site. Testing at other sites and deployment at domestic bases, Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases in foreign countries and U.S. territories is not included in the scope of this EIS. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Commenter No. 07: Abraham Weitzberg

From: [redacted]
Sent: Friday, September 24, 2021 12:59 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: comments on DEIS

Comments on Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement (September 2021)

It is stated in the DEIS that the mobile microreactor would be operated to confirm that it can operate to DOE nuclear reactor safety basis requirements and all applicable DOE Orders and standards as required and it is also stated that the fuel loading would be about 400 kilograms (kg) of HALEU TRISO fuel.

From the DEIS text below, it appears that the initial fuel loading will be at INL, but will be conducted without any functioning Instrumentation and Control System and not as a loading approach to critical.

> "The fuel loading would utilize the 60-ton crane at TREAT or the 30-ton crane in the truck lock at HFEF. Regardless of the facility chosen to fuel the microreactor, the microreactor module and the CONEX container housing it would be opened, the facility crane may be used to manipulate the microreactor and CONEX container, fuel would be added to the microreactor, and the microreactor and the CONEX container would be closed. The microreactor module then would be transferred to the initial startup testing location."

> "The remaining three CONEX containers (power conversion module, **control module**, and ancillary equipment) would be placed outside the DOME."

07-1

Unless there is criticality testing done elsewhere to confirm that the as-built and as-loaded reactor closely approximates the models used in the safety evaluations, it looks like the plan is to do startup testing in DOME without a loading approach to critical. I believe that is contrary to best practices that have been used for ***every*** reactor built and operated to date. Such testing is necessary to determine the basic parameters of the system such as, critical fuel loading, incremental fuel worth, excess reactivity, drum worth, shutdown margin and neutron lifetime. There is no question that a zero-power just-critical statepoint can be reached during startup testing at DOME, but it remains to be determined if the reactor design and its safe operation can be sufficiently validated without the additional information from a loading approach to criticality.

It appears that PELE does not fully appreciate the need for experimental confirmation of the new as-built reactor core configurations as fuel is being initially loaded into the FOAK reactor. Whether or not the stated approach to startup testing significantly increases the likelihood or consequences of an early criticality accident is an issue that should be addressed, and justification provided why DOE nuclear reactor safety basis requirements would be satisfied without the customary initial loading approach to criticality. The issue is further complicated by the fact that the HALEU TRISO fuel to be loaded into the FOAK reactor will have unverified physical properties including those related to reactivity coefficients in the new configuration.

Additionally, it is unlikely that the TREAT and HFEF locations could be approved as criticality testing locations, should such testing be deemed necessary.

Submitted by Abraham Weitzberg, PhD

Abe Weitzberg [redacted]
Pleasanton, CA [redacted] 1

07-1 Industry standard practices such as subcritical multiplication monitoring and other measurements such as those identified by the commentor would be performed to confirm calculations as part of the fuel handling activities but constitute a level of detail greater than the specificity provided in the overview for this section and, thus, were not overtly specified. Section S.6.2.4, *Mobile Microreactor Startup Testing*, states "…startup testing would be performed to verify that the mobile microreactor would perform as designed. Startup would be in accordance with DOE Order 425.1D Change 2, *Verification of Readiness to Start Up or Restart Nuclear Facilities*." The detailed description as provided by the commenter was not included in the discussion, but the intent was that the startup testing would include those procedural steps identified by the commenter, including the loading approach to critical. Fuel loading procedures would be developed identifying the steps to be performed, controls to be in place, and monitoring requirements to be established to control activities during fuel loading to verify that the microreactor would not approach criticality during this process. Only when moved to the startup testing location, DOME or CITRC, would the mobile microreactor be made critical. At either location, startup and test procedures and controls would be developed that would include the means and methods to address the concerns raised by the commenter.

Commenter No. 08: Stephen Byrd

To: **Mobile Microreactor EIS Comment**
c/o Leidos
2109 Air Park Rd SE
Suite 200
Albuquerque, NM 87106

From: Stephen Byrd
[redacted]
Laredo. TX [redacted]

Subject: Public comments on DOD planned microreactor development

To whom it may concern,

After reviewing the EIS posted by the DOD for the planned microreactor development, I have concluded that such work is unnecessary and dangerous to pursue for the following reasons:

- Nuclear systems would be targeted by enemy forces at the onset of any engagement
- Required onsite security for defense of reactor would present unnecessary strain on base operations (Site security would require around the clock armed personal that could better be deployed in combat)
- Any release of nuclear material would result in years of government commitment to clean-up and restitution to individuals (The US is still paying restitution to individuals of the Three-Mile Island accident.)
- Political and economic liability nullifies any tactical advantages (Host country can make any demands for the use of system to the US at anytime knowing the US would be forced to comply due to the psychological fear of a nuclear release.)
- Transportation issues would make emergency movement of system impossible (draft EIS states that system would require 7 days to "cool down" prior to movement-battles are won/lose in an hour of less

I ask that the DOD instead invest in large scale battery microgrid technology for inland use, and construction of floating nuclear power stations for near shore needs. Both technologies have been proven and established, and both can be precured in the U.S.

08-1

08-1 The Defense Science Board evaluated available energy technologies before concluding that electrical generating capability for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases can best be met by a less than 10-Mwe microreactor system that can be safely and rapidly moved by road, rail, sea, or air for quick setup and shutdown. This EIS addresses the need to demonstrate such a prototype mobile microreactor. The scope of this EIS is limited to the construction and demonstration of the prototype mobile microreactor. Issues associated with the deployment of such a reactor in the future would be subject to additional environmental analyses. Please see the discussion in Section 2.1, *Support and Opposition*; Section 2.2, *Purpose and Need*; and Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Commenter No. 09: Jullinnar M. Cooper

Very interesting technology, but it is hard to live in and around with the formula of gentrification, which includes so many toxins, physical, chemical, audio, vibrational, human and dog. Pretty hard to remain healthy and sane in such an environment, let alone professionally operational. All am exposed to is extreme caiyous (i.e. Concentrated Drugs, chemicals, garbage and violence; sewer, noise, vibrational, dog and human toxins. Truthfully it sucks!

Jullinnar M. Cooper

09-1

09-1 Chapter 4, *Environmental Consequences*, of this EIS addresses the impacts associated with the alternatives considered in this EIS, including the analysis of human health impacts associated with the normal operation of the prototype mobile microreactor (Section 4.10, *Human Health – Normal Operations*), accidents during the demonstration of the mobile microreactor (Section 4.11, *Human Health – Facility Accidents*), and the transportation of materials in support of the demonstration (Section 4.12, *Human Health – Transportation*).

Commenter No. 10: Laura Cornwell

My hope is that this will help reduce our global warming while improving safety. I used to frown on nuclear power generation. With our climate warnings now increasing, we need this technology asap. China is moving ahead of us with smr and molten salt. If we don't participate with other countries, and pursue nuclear power, it will be to all living things peril. Please pursue this matter.

Laura Cornwell

10-1

10-1 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, in this CRD for additional information. The scope of this EIS is limited to fabrication of a prototype mobile microreactor offsite and demonstration of the microreactor at the INL Site. Chapter 4, *Environmental Consequences*, of this EIS includes the assessment of the environmental impacts of operating the microreactor at the INL Site. Environmental benefits associated with the deployment of such a reactor in the future are beyond the scope of this EIS and would be the subject of additional environmental analyses.

Commenter No. 11: Leila El-Wakil

I support this mobile micro reactor project for reliable, and essentially carbon free energy source for our military. I hope that in going forward with this that it will also be a model for civilian use for electrical power. (I am a retired physician, and my father taught mechanical engineering and wrote texts on heat transfer and nuclear power plant technology at the University of Wisconsin)

Leila El-Wakil

11-1

11-1 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information.

Commenter No. 12: Paul Harris

Concur with the need to study alternative energy technologies for Forward Operating Bases, Remote Operating Bases, and expeditionary forces. After a review of the draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement, it does not appear to address lessons learned from the SM-1 Nuclear Reactor at Fort Belvoir, Virginia (http://www.virginiaplaces.org/energy/nuclearbelvoir.html). What lessons learned from the installation, operation, maintenance, and decommissioning are being incorporated in to this study? Thank you.

Paul Harris

12-1

12-2

12-1 SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please see the discussion in Section 2.2, *Purpose and Need*, of this CRD for additional information.

12-2 Lessons learned from the design and operation of all previous reactors inform the design and operation of new facilities. However, the design of the prototype mobile microreactor is not a subject of this EIS. Please see the discussion in Sections 2.1, *Support and Opposition*, and 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Commenter No. 13: Joe Smoe

What about DOE SCO2 Tech Team's plan for a 300 MW Brayton cycle turbine, working fluid supercritical carbon dioxide. The reactor may contain actinide oxide fuel pellets e.g. 238-Plutonium dioxide, or actinide carbide such as 237-Neptunium carbide. The radioactive coolant and neutron moderator will be high pressure carbon dioxide at 1200 psi, adsorbed in zeolite (maybe, tetracalcium aluminosilicate hydroxide) circulating onto a heat exchanger. The size of the reactor chamber is about 1 meter and Brayton cycle turbine is also 1 meter in size.You can search the link yourself.

Joe Smoe

13-1

13-1 The selection of the reactor design is not a decision to be supported by this EIS. The design selection process is described in Sections 1.3, *Proposed Action and Scope of this EIS*, and 2.2.2, *Proposed Mobile Microreactor Concepts Selected by SCO for Further 1 Design*, of this EIS. Please see the discussion in Sections 2.1, *Support and Opposition*, and 2.2, *Purpose and Need*, of this CRD for additional information.

Commenter No. 14: James K Sprinkle Jr.

This prototype reactor is likely to be environmentally superior to the existing military deployable power systems. It should be tested to confirm that. I strongly support the preferred alternative. Thank you for your attention.

James K Sprinkle Jr.

14-1

14-1 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information. The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Chapter 4, *Environmental Consequences*, of this EIS includes the assessment of the environmental impacts of operating the microreactor at the INL Site. Environmental benefits associated with the deployment of such a reactor in the future are beyond the scope of this EIS and would be the subject of additional environmental analyses.

Commenter No. 15: David Greene

I know that nuclear power is a failure economically and is dangerous because of waste and continuous leakage of nuclear materials. Where would the radioactive materials generated by this experiment be stored and what method of disposal would be used. All previous methods have been faulty and endanger the public. We must not generate new waste and must not continue to create dangerous and costly mistakes like the Prototype Mobile Microreactor.

David Greene

15-1

15-1 DoD acknowledges your opposition to the Proposed Action and concerns regarding nuclear waste. Considering public comments on the Draft EIS is an important step in the EIS process. While the socioeconomic impacts of the construction and demonstration of the prototype mobile microreactor is a subject addressed in this EIS (Section 4.14, *Socioeconomics*), the economic viability of nuclear power is not within the scope of this EIS. The impacts associated with spent nuclear fuel and radiological waste from the Proposed Action are discussed in this EIS (Section 4.9, *Waste and Spent Nuclear Fuel Management*). As described, spent nuclear fuel would be stored at existing facilities at the INL Site until such time as an off-site storage or disposal option is available. Wastes would be handled with existing wastes generated by other activities at the INL Site and disposed of at either DOE-operated or commercial waste disposal sites. Please see the discussions in Section 2.1, *Support and Opposition*, and Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

Commenter No. 16: Richard Provencher

A lot of the planning, siting, and design of this microreactor makes sense to me. Use of the INL with its large buffer zone, co-location of the microgrid for testing purposes, and presence of knowledgeable scientists and support staff will make this a huge success. The use of the CITRIC microgrid allows real world testing of the reactor and helps ensure it will be safeguarded from outside interference. Also, use of the newly reconditioned DOME provides an existing, proven facility for initial reactor checkout and testing The use of high assay low enriched fuel makes sense as this reactor is ultimately planned for use in a battle environment. The initial licensing of this prototype using DOE authority makes sense since DOE has the demonstrated capability and knowledge base at NE-ID to meet the DOD timeline. Having NRC observe and consult makes sense to enable the future potential for commercial licensing. Project Pele is a passively safe design with the use of Triso fuel, gas cooling, and a passive air heat sink. No active components are necessary for cooling the fuel in upset conditions making it very safe to operate at INL and ultimately in a battle theatre. I like also that no wet storage of the spent fuel will be necessary which helps protect the Snake River Plane aquifer. This demonstration appears to fit well within the mission of the INL and in conformance with agreements with the State of Idaho. The INL also has significant PIE capability which will enable learning to factor into a battle hardened design. ***16-1*** Following this demonstration I hope DOD will continue to work with INL scientists to battle harden the device as they have significant expertise in that area as well. ***16-2*** For all these reasons, I think the draft EIS adequately assesses the impacts, shows they are all acceptable and manageable, and proves this is a mission worth pursuing at the INL. I fully support this draft EIS and a positive record of decision. ***16-3***

Richard Provencher

16-1 DoD acknowledges your support for demonstration of the prototype mobile microreactor at the INL Site. Considering public comments on the Draft EIS is an important step in the EIS process. The environmental impacts of demonstration of a prototype mobile microreactor at the INL Site are described in Chapter 4, *Environmental Consequences*, of this EIS. Some of the topics identified by the commenter (i.e., selection of the microreactor design, involvement of the NRC [and any future licensing for commercial applications]) are not within the scope of this EIS. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information.

16-2 The prototype mobile microreactor that is proposed for testing at the INL Site would not be used in any test of the capability of the microreactor to withstand the effects of the types of threats identified by the commenter. The impacts associated with such battle-hardening tests are not within the scope of this EIS. It should be noted that if and when such tests are performed, a fueled microreactor would not be required. Fuel simulants could be used, thus resulting in no radiological impacts from the tests. The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Testing at other sites and deployment at domestic bases, Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases in foreign countries and U.S. territories are not included in the scope of this EIS. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

16-3 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor at the INL Site. DoD will announce its decision regarding Project Pele in a Record of Decision issued no sooner than 30 days after publication in the Federal Register of the U.S. Environmental Protection Agency's Notice of Availability for this Final EIS. Also, see the response to Comment 16-1.

Commenter No. 17: Jacob Chassereau

To whom it may concern, I was going that on my Xbox and it just got spring on my and it kept crashing but I was able to find out how about the other guys preset plan. When I had no idea. Won't happen again I am really good at cyber attacks but I couldn't move my mouse.

Jacob Chassereau

17-1 Thank you for your comment.

Commenter No. 18: Dylan Prevost

I support the Preferred Alternative to proceed with the project.As someone previously involved in this work, I am intimately familiar with the radiological environmental impact of the proposed microreactors in their implementation, and recognize the numerous means that may be employed to ensure their safety in regards to staff, the public, and the environment. The INL site has a perfect combination of isolating factors for reactor demonstration of this kind. I have full confidence, having read this statement, that Project Pele is operating in accordance with ALARA principles, which offer guidance in limiting personnel and environmental radiation dose in a way that is "as low as reasonably achievable".In terms of Project Pele's value to the public, particularly beyond the military applications of the reactors in question, this project has no peer. Microreactors writ large offer a fundamental evolution in our relationship with nuclear energy. Any project which demonstrates microreactor technology, particularly in applications such as disaster relief, remote power, and district heating, brings us closer to winning the climate change challenge. This project is one of the most significant to date in this regard. ***18-1*** ***18-1 (cont'd)*** ***18-2*** ***18-3***

Dylan Prevost

18-1 DoD acknowledges your support for the Preferred Alternative including demonstration of the microreactor at the INL Site. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information.

18-2 Your comment is appreciated. DOE takes its responsibility for the safety and health of the workers and the public seriously. Facilities that would be used for the demonstration of the prototype mobile microreactor, including the microreactor itself, would be operated in accordance with their approved safety basis authorization and maintained to control the radiological impacts to workers and the public.

18-3 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Use of the microreactor for nonmilitary applications, such as to provide power for disaster relief, remote settlements, and heating, is not included in the scope of this EIS. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Commenter No. 19: Ryan Baker

I think this project is vital to not only our nation's defense but also to the advancement of our civilian nuclear industry which provides a unquely clean and reliable source of energy. When evaluation whatever impact and risk this project presents, one must also examine the alternative ways of providing energy and the costs, both in risk and monetary of transporting and securing those alternate sources of energy.

Ryan Baker

19-1

19-1 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. The scope of this EIS is limited to the construction and demonstration of a prototype mobile microreactor. Issues associated with the deployment (either for military or commercial applications) of such a reactor in the future would be subject to additional environmental analyses. Please see the discussions in Sections 2.1, *Support and Opposition*, and 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Commenter No. 20: Tami Thatcher

From: Tami Thatcher [redacted]
Sent: Monday, October 18, 2021 1:32 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: Can't find INL external reports cited in draft EIS for mobile microreactor

Dear Jeff Waksman,

I can't find the Idaho National Laboratory reports online.

I at least expected that the INL reports designated as external reports would be accessible.

Can you tell me how I can access these reports cited in the draft EIS?

INL. (2020e). *PLN-114, Section 3, Offsite Response, May 31, 2020.* Idaho Falls, ID: Idaho National 3 Laboratory. 4
INL. (2020f). *ECAR-5162, Evaluation of Pele Microreactor Inhalation Dose Consequences.* Idaho Falls, ID: 5 Idaho National Laboratory. October 5, 2020. 6
INL. (2021a). *Pele Microreactor Hazards and Impacts Information in Support of National Environmental 7 Policy Act Data Needs.* INL/EXT-21-62873. Idaho National Laboratory. 8
INL. (2021b). *INL/INT-21-61331 Rev 1, Pre-conceptual Evaluation of Department of Defense Pele 9 Microreactor Sites at Idaho National Laboratory*. Idaho National Laboratory. April.

20-1

Thanks,
Tami Thatcher

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20-1 Three of the requested documents were provided via email on October 28, 2021. The remaining document (ECAR-5162) was cited in the Draft EIS in error. This document was not used as a basis for this EIS and is not in the Final EIS; therefore, it was not provided.

Commenter No. 21: Michel Lee

From: Michel Lee Council [redacted]
Sent: Thursday, October 21, 2021 10:51 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: Comments on Draft Environmental Impact Statement for the Construction and Demonstration of a Prototype Mobile Microreactor

October 21, 2021

Comments on September 2021 Draft Environmental Impact Statement (DEIS) for the Construction and Demonstration of a Prototype Mobile Microreactor

To Mobile Microreactor EIS Comment via email PELE_NEPA@sco.mil

October 21, 2021

The Council on Intelligent Energy & Conservation Policy (CIECP) and Promoting Health and Sustainable Energy (PHASE) (jointly, CIECP-PHASE) submit that the September 2021 Draft Environmental Impact Statement (EIS) for the Construction and Demonstration of a Prototype Mobile Microreactor is deficient. **21-1**

The US Department of Defense (DoD) – acting through its Strategic Capabilities Office (SCO) as the lead agency, and with the US Department of Energy (DOE) as the cooperating agency – is promoting the construction and demonstration of, *inter alia*, a Prototype Mobile Microreactor as part of implementation of a project dubbed "Project Pele".

A key rationale asserted for development of mobile miroreactors, is the massive use of energy by the DoD. In its EIS, DoD states: "The DoD is one of the largest users of energy in the world, consuming around 30 terawatt-hours of electricity per year and more than 10 million gallons of fuel per day, and projections for future military operations predict energy demand will increase significantly in coming years." (EIS, p S-1)

CIECP-PHASE do not dispute that energy is a critical enabler of military operations.

We do take issue with what appears to be the DoD and DOE's undue focus on nuclear power as a generator.

The rooting of the DoD and DOE in the Manhattan Project and the bureaucratic expansion of the predominantly nuclear-focused national lab complex during the Cold War through to today explain this strong bias. However developments in economics, science, technology, domestic and world affairs no longer support it. These developments form the context for environmental considerations and are inextricably linked to them. **21-2**

Our comments here pertain to the EIS and dubious wisdom of using nuclear microreactors in the US and in overseas operations for power generation purposes. We are not here weighing in on nuclear weapons or on Navy submarine nuclear propulsion. Yet it seems quite obvious that the DoD's and DOE's predilection towards development of nuclear reactors is based on interests of these departments in supporting military atomic activities and capabilities. This should be honestly acknowledged in government promulgated documents and statements.

The EIS states:" DoD installations need the capability to reduce their present reliance on local electric grids, which are highly vulnerable to prolonged outages from a variety of threats, such as natural disasters, cyber **21-3**

1

21-1 SCO believes this EIS has no significant deficiencies. As described in EIS Section 1.3, *Proposed Action and Scope of this EIS*, this EIS has been prepared in accordance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations (40 Code of Federal Regulations 1500 through 1508). Any minor deficiencies identified in the Draft EIS have been resolved in this Final EIS. See below for responses to your specific comments.

21-2 SCO believes the need to construct and demonstrate a prototype mobile microreactor has been adequately described in this EIS. SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please see Section 2.2, *Purpose and Need*, of this CRD for additional information.

21-3 There are likely to be significant differences in off-base and on-base electrical distribution systems (grids). As described in EIS Section 1.1, *Introduction*, large off-base grids would be vulnerable to prolonged outages from a variety of threats, such as natural disasters, cyberattacks, terrorism, and grid failure from lack of maintenance and aging infrastructure. An on-base grid powered by a microreactor would be relatively small and would be located within the base security perimeter; therefore, it would be easier to maintain and more secure. As described in EIS Section 1.3, *Proposed Action and Scope of this EIS*, the scope of this EIS is limited to the construction and demonstration of the prototype mobile microreactor at the INL Site. Considerations related to local electrical grids and potential vulnerabilities and threats to deployed systems during potential future deployment of the mobile microreactor are not within the scope of this EIS. The potential environmental impacts of deployment would be the subject of additional environmental analyses.

21-4 Before a mobile microreactor could be deployed, a prototype must be built and tested to ensure that it can meet regulatory requirements, as well as the specific design goals and requirements identified by SCO (as identified in Table 2.2-1 of this EIS). Therefore, the scope of this EIS is limited to construction and demonstration of the prototype microreactor at the INL Site. Testing at other sites and deployment at domestic bases, Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases are not included in the scope of this EIS. Likewise, use of the microreactor for nonmilitary applications, such as to provide power for remote settlements or for industrial sites, is not included in the scope of this EIS. Activities outside the scope of this EIS would require additional NEPA documentation, including additional accident analysis, before they could be implemented. Please refer to Section 4.11.1, *Key Mobile Microreactor Safety Functions*, and Section 4.11.3, *Radioactive Material Release Impacts*, of the EIS. Section 4.11.1 addresses the design of the prototype mobile microreactor at the INL Site. The text addresses features of the mobile microreactor used to protect human health and to prevent the release of radioactive material to the environment. The hazard analysis for the mobile microreactor considered a wide spectrum of potential accident scenarios applicable to the

Commenter No. 21: Michel Lee

attacks, domestic terrorism, and grid failure from lack of maintenance and aging infrastructure. These scenarios are occurring with increasing frequency all over the world (e.g., natural disasters exacerbated by climate change, grid failure). This vulnerability places critical missions at unacceptably high risk of extended disruption." (EIS, p S-1)

21-3 (cont'd)

Astonishingly, the EIS then proceeds to ignore this entire cited litany of vulnerabilities as it applies negatively to the envisioned distribution of microreactors. Indeed, the EIS implicitly adopts the assumption that all of the natural, logistical, security, and technological troubles which currently challenge fuel and electric power supply lines, will somehow miraculously not apply to microreactors and their attendant fuel life cycle. On the face of it, this is absurd.

Despite its length, the EIS presents an extraordinarily myopic perspective. Indeed, if viewed holistically, the very litany of vulnerabilities presented in the EIS illustrates the need for a broader long-term perspective. We use the EIS list as the framework.

Natural Disasters Exacerbated by Climate Change

21-4

The EIS avers:

- "The uniqueness of the mobile microreactor of Project Pele is in the ability of the mobile microreactor packages to be transported by ship, rail, train, or plane." (EIS, p 2-4)
- The proposed microreactor will be able to generate threshold power (1 to 10 MWe) for more than 3 years without refueling. (EIS, p 2-4)
- "Time for planned shutdown, cool down, disconnect, prepared transport, and safe transport: less than 7 days." (EIS, p 2-4)

Each such attribute would seem to present a liability under any number of extreme natural disasters, clearly natural disasters and extreme weather events can strike as microreactors are in transit. The US and world is now commonly experiencing extreme conditions with not just increasing frequency and severity, but with more widespread geographic ambit. Under such conditions, there is little assurance a nuclear reactor in transit is will be able to be timely relocated to a safe and secure area. Similarly, while meteorology may provide sufficient forewarning of certain conditions and phenomena (and may allow reactor shutdown, disconnect, et al in under 7 days), warnings are also not always adequate, even in the US, where meteorological capability is highly sophisticated.

Events in arid areas of our warming world such as large out-of-control wildfires and sandstorms present dangers which appear grossly insufficiently assessed, especially for operating microreactors or movements of spent fuel. In this regard the assertion that mobile microreactors will have "passive heat rejection upon shutdown to achieve safety under all circumstances" (EIS, p 2-7) betrays a worrisome level of hubris.

Major natural disaster events do not always occur as independent phenomena. Extreme weather periods in Australia and the U.S. (most recently in California) have repeatedly shown over the past decade, drought and major wildfires can result in landscape conditions highly susceptible to catastrophic flooding events, and all such events may entail (landslides, loss of infrastructure, spread of hazardous chemicals, etc). As Japan's Fukushima-Daiichi nuclear disaster demonstrated, a large earthquake can be followed by a tsunami, which, in turn, consequences widespread grid failure, and loss of use of other infrastructure (roads, rail, etc).

Moreover, the chaos often attendant to such events presents ample opportunity for opportunistic exploitation by malicious actors.

21-5

Cyber Attacks

2

21-4 (cont'd)

demonstration of the prototype mobile microreactor at the INL Site, including natural phenomena hazards. Section 4.11.3 identifies the maximum amount of radioactive material that could be released as a result of any inadvertent nuclear criticality, any on-site transportation accident, or any operation accident (including loss of cooling). These maximum quantities of radioactive material are input to the quantitative analysis. As such, the quantitative analysis yields consequences to the non-involved worker, the maximally exposed off-site individual, and the public that are greater than the consequences of any inadvertent nuclear criticality, any transportation accident, or any operation accident (including attacks on the reactor) that may be postulated for the prototype mobile microreactor. The consequences from any natural disaster would be less than the consequences for the accidents analyzed in Section 4.11, *Human Health – Facility Accidents*, of this EIS. The doses for each of the analyzed accidents are significantly below regulation limits and present a minimal impact to workers and the public. This EIS adequately addresses environmental impacts and public safety consequences from abnormal operations, accidents, and natural phenomena hazards related to the mobile microreactor operations at the INL.

21-5 DoD and DOE acknowledge the commenter's concerns about potential cybersecurity threats and the intentional destruction of the proposed microreactor at deployment sites. However, the scope of this EIS is limited to the construction and demonstration of the prototype microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. Before a mobile microreactor could be deployed, a prototype must be built and tested to ensure that it can meet regulatory requirements, as well as the specific design goals and requirements identified by SCO (as identified in Chapter 2, *Description of Alternatives*, Table 2.2-1 of this EIS). Relative to the scope of this EIS, DoD and DOE constantly assess, train, and prepare for potential threats to the prototype mobile microreactor. Section 2.6, *Intentional Destructive Acts*, of this CRD discusses issues related to cybersecurity, required attack potentials, and malicious acts. All of the prototype microreactor-related facilities at the INL Site would have a very high level of physical security designed to stop credible threats. DoD and DOE consider cyberattacks to be a credible threat, and prevention systems would be in place. Cybersecurity is one of many factors that would be considered in the design of the control systems and the supporting activities. The implementation of control systems for a new microreactor allows cybersecurity to be a key design consideration. Analyses of physical or cyber vulnerabilities and defenses are security functions that would be performed independent of this EIS. These analyses would be performed throughout the design and construction phases to ensure that after the mobile microreactor is operational, preventative and mitigation security features would be present. Even though secure activities and designs make an attack on the prototype mobile microreactor improbable, the potential consequences of an intentional destructive action are considered. The consequences of such an action are similar

Commenter No. 21: Michel Lee

The opportunities for sabotage and malicious action via cyber are vast and extend beyond the possibility of infiltration of supervisory control and data acquisition (SCADA) systems to and through supply chains, telecom equipment, hardware, firmware, software and all electronic communications systems. Given the multitude of cybersecurity weaknesses exposed across US government agencies, critical infrastructure, telecommunications, US network infrastructure devices and pretty much in every sector of economic endeavor in recent years, there is no reasoned basis to conclude that somehow microreactors and the electronic systems with which they would necessarily at least occasionally interact would be immune from malicious cyber activity. There is even less reason to believe microreactors would be immune from the non-malicious variety of difficulties and complications that plague the cyber-realm. Security and operational challenges would most certainly be substantially elevated for reactors and sites which are remote and must necessarily depend upon monitoring and maintenance to field controllers and devices. Exploiting remote code-execution vulnerabilities could give attackers direct access to field devices and cause physical damage. **21-5 (cont'd)**

Terrorism

There is no doubt that electric grids are vulnerable to terrorism – both domestic and foreign.

The most economic, ecologically benign, and lowest-risk solution to the problem on the home front would seem to be a combination of the following: grid hardening; rapid buildup of widely distributed renewables (such as solar with an integrated battery); and transition to microgrids.

There is no evidence that microreactors would be better than these other options – all of which carry far less security risks, and do not generate radioactive waste. Available renewable technologies, with proper policy support, can be up-and-running in a matter of just a few years. Energy availability and resilience during periods of higher demand or lower output can be assured by a shift from use of natural gas from use as a primary energy generator to a backup reserve – something that would enable the fossil sector to play a more optimal role in decarbonization. Nuclear – micro –or large – is poorly suited to support rapid swings in grid power supply and demand. **21-6**

The argument for other options and against microreactors is even stronger. As noted cyberattack presents a broad and complicated area of risk. Many state and non-state actors have missile technology. A mushrooming number of militias are turning to use of unmanned aerial vehicles (UAVs) – more colloquially known as drones.

The January 8, 2020 successful strike launched by Iran on two military bases used by US troop in Iraq and the September 2019 successful precision attack perpetuated by Iran upon refineries in Saudi Arabia involving drones and cruise missiles represent two examples of how a coordinated operation could target a site with a microreactor. The consequences of a direct hit would go beyond the damage caused by the kinetics to the untenable injury caused by radioactive fallout. American troops would be put in exceptional peril. Further, the people of the region in which the reactor was operating would be subject to ongoing contamination. The scenario presents a case study for a major international incident. **21-5 (cont'd)**

In this regard, it is worthwhile to recall that, just hours after Iran launched its 15 missiles on January 8, 2020, jittery Iranian Revolutionary Guards shot down a civilian Ukraine International Airlines flight which had taken off from Tehran Airport in the mistaken belief that the plane was a hostile aircraft. Mother Nature contributed to the events of the day by delivering a 4.5-magnitude earthquake to southern Iran. The point of noting the confluence of events – a deliberate attack, an erroneously delivered defensive strike, a natural disaster – is to suggest the imperative of consideration of how the addition of a highly damaged microreactor to the equation during that tragic and very bizarre day might have turned out.

3

21-5 (cont'd)

to or lower than the consequences of the spectrum of accidents evaluated in Section 4.11, *Human Health – Facility Accidents*, of this EIS. The "Near+Long-Term Dose" addressed in Section 4.11 includes the combined effects of exposure to radionuclides remaining after the plume passage. Exposure pathways include ingesting contaminated foods; direct radiation exposure from residual material on the ground (ground shine); inhalation of disturbed, residual ground-level particulates (resuspension); and ingestion of contaminated water. The "Near+Long-Term Dose" for each of the analyzed accidents is significantly below regulation limits and presents a minimal impact to workers and the public. To elaborate on the scope of this EIS, testing at other sites and deployment at domestic bases, Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases and use of the microreactor for nonmilitary applications, such as to provide power for remote settlements or for industrial sites, are not included in the scope of this EIS. Activities outside the scope of this EIS would require additional NEPA documentation, including additional accident analysis, before they could be implemented.

21-6 The Defense Science Board evaluated available energy technologies before concluding that electrical generating capability for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases can best be met by a less than 10-Mwe microreactor system that can be safely and rapidly moved by road, rail, sea, or air for quick setup and shutdown. This EIS addresses the need to demonstrate such a prototype mobile microreactor. The scope of this EIS is limited to the construction and demonstration of a prototype mobile microreactor. Application of the technology when deployed and the consideration of other options for improving the electrical infrastructure are not within the scope of this EIS. Please see the discussion in Sections 2.1, *Support and Opposition*, and 2.2, *Purpose and Need*, of this CRD for additional information.

21-7 As described in Section 1.3, *Proposed Action and Scope of this EIS*, of this EIS, high-assay low-enriched uranium fuel for the mobile microreactor demonstration would be produced from existing DOE stockpiles of highly enriched uranium located at DOE's Y-12 National Security Complex in Oak Ridge, Tennessee. Therefore, no new enriched uranium would be produced, and demonstration of the prototype mobile microreactor at the INL Site would not be expected to be a proliferation risk. The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Future deployment at military bases and use in nonmilitary applications are not included in the scope of this EIS. The potential environmental impacts of deployment, if it were to occur, would be the subject of additional environmental analyses. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information. If it is determined to be needed, a Nuclear Proliferation Assessment Statement would be prepared in preparation for a decision on mobile microreactor deployment.

Commenter No. 21: Michel Lee

One must also recognize that departures from operational fields do not always go as smoothly as desired. The turmoil as the US pulled out of Kabul is the most recent example of that reality. There is a very real possibility that a microreactor and spent fuel would be left in the hands of an enemy or in a conflict zone. **21-5 (cont'd)**

Deployment of microreactors would also add to proliferation risk. America would be poorly positioned to argue against other countries using microreactors for power in theaters of conflict when we are doing so. Proliferation risk is exceptionally enhanced by the proposed use of high-assay low-enriched uranium (HALEU) fuel. While HALEU may be technically considered low-enriched uranium (up to the 20% level of uranium-235 concentrations), standard fuel for conventional reactors is ~5% and enriching uranium to 20% purity increases the potential for its use for military purposes. HALEU can be more easily enriched to weapons-grade than standard low-enriched uranium (LEU) which has been conventionally used in reactors. This is why under the Joint Comprehensive Plan of Action (JCPOA) – the 2015 nuclear accord with Iran, signed by China, France, Germany, Russia, the US and the UK, Iran was only permitted to enrich uranium to 3.67% purity. **21-7**

Grid Failure from Lack of Maintenance and Aging Infrastructure

There is no question that grids are failing due to lack of maintenance and aging infrastructure. **21-8**

Under the No Action Alternative, a mobile microreactor would not be constructed, fuel would not be fabricated, and the mobile microreactor would not be demonstrated at the Idaho National Laboratory (INL) Site. This alternative is desirable, but it is not investigated in EIS. **21-9**

The rationale for the proposed project is to address certain problems, but the only mode of address postulated is the microreactor scheme. This hardly represents a meaningful analysis of alternatives. We suggest consideration of options guided by the finding of the most economic, ecologically benign, and lowest-risk solutions to the problem. No evidence presented in the EIS indicates that the expenditure of billions on microreactors is the clear way to go. **21-10**

In the US, money seem more obviously to be better spent directly targeting the problems of lack of maintenance and the need to modernize our aging grid infrastructure. **21-8 (cont'd)**

CONCLUSION

The EIS fails to show that other far better alternatives exist to combat the challenges cited as the rationale for the project. **21-10 (cont'd)** Establishment of a microreactor program will result in a net increase in uranium mining, milling, and enrichment, which will negatively impact the environment, public health, and lead to increased generation of radioactive waste. **21-11** Microreactors present problematic sabotage targets for domestic sites and terrorist and military targets for overseas operations. **21-5 (cont'd)** Proliferation risk is significant, and not adequately analyzed in the EIS. **21-7 (cont'd)**

Respectfully submitted,

Michel Lee, Esq.
On behalf of Council on Intelligent Energy & Conservation Policy (CIECP) and Promoting Health and Sustainable Energy (PHASE)

4

21-8 Considerations related to electrical distribution grid failure from lack of maintenance and aging infrastructure during potential future deployment of the mobile microreactor are not within the scope of this EIS. See the response to Comment 21-3.

21-9 DoD acknowledges your support for the No Action Alternative. Considering public comments on the Draft EIS is an important step in the EIS process. The No Action Alternative would result in environmental impacts consistent with the current use of the INL Site. These conditions are discussed in Chapter 3, *Affected Environment*, of this EIS. While these impacts are often referred to as a baseline for comparison with the impacts from alternatives considered in an EIS, they do represent the impacts of the No Action Alternative. Please see the discussions in Section 2.1, *Support and Opposition*, of this CRD for additional information.

21-10 The meaningful analysis referenced by the commenter was the subject of the Defense Science Board that resulted in the identification of a mobile microreactor for energy production to meet DoD's needs. The Defense Science Board evaluated available energy technologies before concluding that electrical generating capability for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases can best be met by a less than 10-Mwe microreactor system that can be safely and rapidly moved by road, rail, sea, or air for quick setup and shutdown. This EIS addresses the need to demonstrate such a prototype mobile microreactor. The scope of this EIS is limited to the construction and development of the prototype mobile microreactor. Please see the discussion in Sections 2.1, *Support and Opposition*, and 2.2, *Purpose and Need*, of this CRD for additional information.

21-11 The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Future establishment of a microreactor program and deployment at military bases and use in nonmilitary applications are not included in the scope of this EIS. The potential environmental impacts of establishment of a microreactor program, if it were to occur, would be the subject of additional environmental analyses. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information. In addition, as described in Section 1.3, *Proposed Action and Scope of this EIS*, of this EIS, high-assay low-enriched uranium fuel for the mobile microreactor demonstration would be produced from existing DOE stockpiles of highly enriched uranium located at DOE's Y-12 National Security Complex in Oak Ridge, Tennessee. Therefore, fabrication of a prototype mobile microreactor off-site, and demonstration of the microreactor at the INL Site, would not involve an increase in uranium mining, milling, or enrichment.

Commenter No. 22: Alan Kuperman

From: Kuperman, Alan J [redacted]
Sent: Wednesday, October 27, 2021 6:36 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: Mobile Microreactor EIS Comments
Attachments: Pele-Draft EIS-Comments by Kuperman NPPP.pdf

Please find attached my comments in response to your email of September 15, 2021.

Sincerely,

Alan J. Kuperman, Ph.D.
Associate Professor, LBJ School of Public Affairs
Coordinator, Nuclear Proliferation Prevention Project
www.NPPP.org
University of Texas at Austin
=====

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Commenter No. 22: Alan Kuperman

NPPP

NUCLEAR PROLIFERATION PREVENTION PROJECT

October 27, 2021

Mobile Microreactor EIS Comment
c/o Leidos
2109 Air Park Rd SE
Suite 200
Albuquerque, NM 87106
Via Email: PELE_NEPA@sco.mil

Re: Comments on Draft EIS on Army Mobile Microreactor Prototype

Dear Sir or Madam,

Below are my comments on the "Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement" (hereafter "Draft EIS").

22-1 The Draft EIS fails to evaluate the environmental impact of tests that the Army will need to conduct to assess the prototype reactor's ability to withstand enemy attack by standoff weapons, such as missiles, or by infiltration. The Army plans to deploy such reactors to "Forward Operating Bases" (FOBs),[1] and the Army is well aware that such bases have come under enemy attack. For example, in January 2020, Iran attacked U.S. forces at Iraq's al Asad base using ballistic missiles of two varieties including the larger Qiam 2, which is 40 feet long and has an estimated 750 kilogram (kg) warhead containing fragmentation high explosive and/or cluster munitions. Eleven missiles hit the base and damaged or destroyed at least five structures, leaving craters as large as 30 feet in diameter, and igniting a large fire. The missiles were fired from approximately 500 km and were extremely accurate.

At least two attack scenarios could induce overheating of fuel in a deployed mobile microreactor and thereby trigger radioactive release: a kinetic blast burying the reactor in debris, or infiltrators sabotaging the reactor by covering it with an insulating blanket. A former U.S. Deputy Assistant Secretary of State was among those who recently highlighted the prospective threats to deployed reactors, stating that, "High energy weapons and their support infrastructure, including reactors, may be initial targets in a conflict."[2] The Defense Department's notice of intent to prepare the EIS also alluded to such potential enemy attack

[1] "Request for Solutions: Pele Program Phase 1," U.S. Secretary of Defense, May 2019.

[2] Alex Gilbert, Morgan Bazilian, and Julia Neshelwat, "The Complex Policy Questions Raised by Nuclear Energy's Role in the Future of Warfare," March 16, 2020, https://www.justsecurity.org/69056/the-complex-policy-questions-raised-by-nuclear-energys-role-in-the-future-of-warfare/.

The University of Texas at Austin LBJ School of Public Affairs | PO Box Y | Austin, TX 78713-8925 | www.NPPP.org | (512) 471-8245

22-1 The commenter is correct that tests to assess the ability of a mobile microreactor to withstand enemy attacks by standoff weapons or by infiltration are not addressed in this EIS. This EIS addresses the impacts of the demonstration of the operability of a prototype mobile microreactor. The prototype mobile microreactor would not be used in any test of the capability of the microreactor to withstand the effects of the type of threats identified by the commenter. The impacts associated with such battle-hardening tests are not within the scope of this EIS. It should be noted that if and when such tests are performed, a fueled microreactor would not be required. Fuel simulants could be used, thus resulting in no radiological impacts from the tests. The analysis of intentional destructive acts included in this EIS focused on such acts that could impact the demonstration at the INL Site. Impacts associated with the deployment of a mobile microreactor system are beyond the scope of this EIS. Please see the discussion in Sections 2.3, *Scope of the Proposed Action*; 2.5, *Mobile Microreactor Accidents*; and 2.6, *Intentional Destructive Acts*, of this CRD for additional information.

Commenter No. 22: Alan Kuperman

during wartime by stating that, "SCO seeks to produce a prototype that will minimize consequences to the nearby environment and population in case of kinetic or non kinetic action affecting structural integrity or release of contamination."[3]

To ensure the safety of U.S. troops, the Army will need to test whether the prototype reactor can withstand such attacks before deploying a reactor to a FOB. However, the Draft EIS fails to evaluate the environmental impact of such test attacks on the prototype reactor. The Draft EIS asserts that, "Intentional destructive acts are covered by the accidents discussed in this section" (p. 4 42), but in reality the Draft EIS never even mentions attacks by standoff weapons, such as the Iranian missiles used in 2020, or by infiltration to interrupt the reactor's passive cooling, and it never evaluates the environmental impact of testing such attacks.

Accordingly the Draft EIS must be revised so that a final version evaluates the environmental impact of tests that the Army will need to conduct prior to deploying a reactor to a FOB to assess the prototype reactor's ability to withstand enemy attacks by standoff weapons, such as missiles, or by infiltration.

22-1
(cont'd)

Thank you for this opportunity to provide public comment.

Sincerely,

Alan J. Kuperman

Alan J. Kuperman, Ph.D.
Associate Professor, LBJ School of Public Affairs
Coordinator, Nuclear Proliferation Prevention Project
University of Texas at Austin

[3] *Federal Register*, Vol. 85, No. 41 (March 2, 2020), 12275.

Page 2 of 2

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Commenter No. 23: Hootie Langseth

From: Hootie Langseth [redacted]
Sent: Thursday, November 4, 2021 9:44 AM
To: pele_nepa@sco.mil
Subject: EXTERNAL: Project Pele EIS Comment

To Whom it May Concern:

Thank you for the opportunity to comment on the *Construction and Demonstration of a Prototype Mobile Microreactor* Environmental Impact Statement. I am a commissioner of Butte County, Idaho representing the 2nd District, and appreciate the opportunity to offer the following comments.

23-1

Project Pele aims to construct and demonstrate a mobile Microreactor capable of producing up to 5 MWe, at the Idaho National Laboratory (INL) Site. Approximately 86 percent of Butte County is federally owned with a large portion of federal ownership being controlled by the Department of Energy. Having Project Pele demonstrated at the INL Site will be another example of INL's influence seen around the globe.

No Idaho county is more enmeshed with INL than Butte County. Over 60 percent of the INL is within Butte County's border. A vast majority of the INL Site's facilities that store Waste and Spent Nuclear Fuel happen to be within the border of Butte County, causing a disproportionately high amount of environmental impacts without much benefit. The Draft EIS briefly describes how SNF will be managed at the INL Site under the 1995 Idaho Settlement Agreement; along with the 1995 EIS which doesn't discuss SNF management from future projects. It would be beneficial to the residents of Butte County that DOE reassess SNF for future projects that may cause disproportional impacts to its residents.

Thank you for taking the time to review these comments.

M.H. "Hootie" Langseth
Butte County Commissioner

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23-1 The list of reasonably foreseeable actions considered in the assessment of cumulative effects (Section 5.2, *Reasonably Foreseeable Actions*) in this EIS includes: (1) recapitalization of infrastructure supporting Naval spent nuclear fuel (SNF) handling and (2) DOE Idaho Spent Fuel Facility and independent SNF storage installation. Section 5.3.6, *Environmental Justice*, of this EIS discusses the potential cumulative effects of past, current, and reasonably foreseeable actions, including those that generate SNF, on environmental justice concerns within the ROI. The very small quantity of SNF that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. Any potential issues that may arise concerning the 1995 Idaho Settlement Agreement would be addressed with the State of Idaho. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussions in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, and Section 2.7, *Nuclear Reactor Research and Development*, of this CRD for additional information.

Commenter No. 24: Tami Thatcher

From: Tami Thatcher [redacted]
Sent: Saturday, November 6, 2021 4:32 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: Public comment submittal on Project Pele Prototype Mobile Microreactor Draft EIS
Attachments: Pele2021commentdraftEIS.pdf

Attached please find my comment submittal (pdf file) for the U.S. Department of Defense Draft Construction and Demonstration of a Prototype Mobile Microreactor (Project Pele) Environmental Impact Statement Issued September 2021.

The attached public comment submittal is from Tami Thatcher, Idaho Falls, Idaho, sent November 6 and due November 9.

Notification that you have received these comments would be appreciated.

Thank you,

Tami Thatcher
[redacted]

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Commenter No. 24: Tami Thatcher

Public Comment Submittal on the U.S. Department of Defense Draft Construction and Demonstration of a Prototype Mobile Microreactor (Project Pele) Environmental Impact Statement Issued September 2021

Comment submittal by Tami Thatcher, November 6, 2021.

Comments Due: November 9, 2021. Sent by email to PELE_NEPA@sco.mil.

BACKGROUND

The Department of Defense has issued the *Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement* (Draft EIS) to satisfy the National Environmental Policy Act (NEPA) process, see https://www.mobilemicroreactoreis.com. [1] The project is part of Project Pele, named after the goddess of volcanos, and it is aptly named as volcanos are known to cause destruction of lives and homes. [2]

The Draft EIS "evaluates the potential environmental impacts of the proposed construction and operation of a prototype mobile microreactor and the fabrication of fuel (a single mobile microreactor core)." The mobile microreactors are to be gas-cooled high temperature nuclear reactors sized to provide 1 to 5 megawatts of electrical power, which has been presumed to be bounded by reactor thermal energy of 10 megawatts-thermal. The stated use for the reactors would be at foreign military bases and the goal of the project would involve transport of fresh nuclear fuel and fission-product laden spent nuclear fuel anywhere in the world by rail, ship, truck or airplane.

The Department of Energy will provide the regulatory oversight and expertise on technical, safety, environmental, and health requirements, not the U.S. Nuclear Regulatory Commission.

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[1] The Department of Defense (DoD), acting through the Strategic Capabilities Office (SCO) and with the Department of Energy (DOE) serving as a cooperating agency, announces the availability of the Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement. SCO is also announcing a public comment period and public hearings to receive comments on the Draft EIS. SCO prepared the Draft EIS to evaluate the potential environmental impacts of alternatives for constructing and operating a prototype mobile microreactor capable of producing 1 to 5 megawatts of electrical power (MWe). The Draft EIS is available at https://www.mobilemicroreactoreis.com. DoD as the prime agency, acting through the SCO and in cooperation with the DOE, invites Federal agencies, state agencies, local governments, Native American tribes, industry, other organizations, and members of the public to review and submit comments on the Draft EIS. Comments will be accepted during the comment period that will extend for 45 days after the U.S. Environmental Protection Agency publishes the Notice of Availability in the Federal Register on September 24, 2021. The comment period will end on Tuesday, November 9, 2021.

Additional information about the project and the public hearings can be found at this website: https://www.mobilemicroreactoreis.com. All comments, whether oral or written, will be considered by DoD as the EIS is finalized and can be emailed to e-mailed to PELE_NEPA@sco.mil.

[2] The mobile microreactor design, construction and testing is also referred to by the Department of Defense's Strategic Capabilities Office (SCO) as Project Pele although not identified as such in the Federal Register or EIS document title.

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Responses to Commenter No. 24's comments begin on page 3-34 and are presented sequentially in order of comment ID but not necessarily right next to the first instance of a given comment ID. Responses end on page 3-56.

Commenter No. 24: Tami Thatcher

Two designs are being considered; both are small, advanced gas-cooled reactors using high-assay low enriched uranium (HALEU tristructural isotopic (TRISO) fuel. The mobile microreactor would be fabricated at either BWXT Advanced Technologies, LLC or X-energy, LLC team facilities. The fuel would be fabricated at BWXT facilities in Lynchburg, Virginia.

Reactor fuel would be produced from DOE stockpiles of highly enriched uranium (HEU) located at DOE's Y-12 plant in Oak Ridge, Tennessee, that would be converted to an oxide form at the Nuclear Fuel Services (a subsidiary of BWXT) facility in Erwin, Tennessee, and downblended to HALEU and fabricated into TRISO fuel at the BWXT facility in Lynchburg, Virginia. The proposed fuel for the gas-cooled mobile microreactors would be tri-structural isotopic (TRISO) silicon-carbide coated fuel pellets inside cylindrical fuel compacts using high-assay low-enriched uranium (HALEU) from the National Nuclear Security Agency (NNSA) enriched uranium stockpile. The BWXT-Nuclear Fuel Services Erwin, Tennessee, and BWXT Lynchburg, Virginia, facilities are the only private U.S. facilities licensed to possess and process HEU.

The Draft EIS states that "The mobile reactor would be **fabricated** at either BWXT Advanced Technologies, LLC or X-energy, LLC team facilities." [Emphasis added.] Yet, the Draft EIS also states on page S-5 that "The primary decision to be made regarding Project Pele is whether to: **Fabricate** and demonstrate a mobile microreactor at the INL Site." [Emphasis added.] The Draft EIS appears to say it plans to **fabricate** the mobile microreactor away from the INL (at a BWXT or X-energy facility) but then states it will have a primary decision to make, as to whether to **fabricate** it at the INL. (There seems to be ambiguity in some statements in the Draft EIS about the location where fabrication would take place.) ***24-1***

Final assembly, fuel loading, and demonstration of the operability and mobility of the mobile microreactor would be performed at the Idaho National Laboratory (INL), using the Materials and Fuels Complex (MFC) and the Critical Infrastructure Test Range Complex (CITRC). After testing and operation of the reactor, the mobile microreactor would be placed into "temporary storage" at the DOE facility. "At some later time, it would undergo disposition." "The mobile microreactor components would be disposed of at licensed disposal sites as appropriate for the waste type." Radioactive wastes would be dispositioned using "existing processes" or stored onsite. ***24-2***

The Draft EIS states that it may "Temporarily store the mobile microreactor at MFC's Radioactive Scrap and Waste Facility (RSWF) or Outdoor Radioactive Storage Area (ORSA)." The Draft EIS does not clearly say how long it plans to store the mobile microreactor spent nuclear fuel from INL testing, nor where mobile microreactor spent fuel from military use of mobile microreactors would be stored. ***24-7*** The Draft EIS also states that the mobile microreactor spent nuclear fuel may be stored indefinitely at INL's INTEC. ***24-2 (cont'd)***

The Draft EIS states that the Proposed Action is the Preferred Alternative. The No Action Alternative was also considered but according to the Draft EIS, it does not meet the purpose and need. Under the No Action Alternative, a mobile microreactor would not be constructed, fuel would not be fabricated by BWXT, and the mobile microreactor would not be demonstrated at the INL Site.

2

24-1 The EIS has been revised to clearly indicate that the prototype mobile microreactor would be fabricated at a location other than the INL Site. The ambiguity in the statements has been eliminated.

24-2 The very small quantity of spent nuclear fuel (SNF) that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

24-3 DoD acknowledges your opposition to the Proposed Action. Considering public comments on the Draft EIS is an important step in the EIS process. The Defense Science Board evaluated available energy technologies before concluding that electrical generating capability for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases can best be met by a less than 10-Mwe microreactor system that can be safely and rapidly moved by road, rail, sea, or air for quick setup and shutdown. This EIS addresses the need to demonstrate such a prototype mobile microreactor. Please see the discussions in Sections 2.1, *Support and Opposition*, and 2.2, *Purpose and Need*, of this CRD for additional information. The commenter's SNF management concerns are addressed in detail in responses provided to more specific concerns identified later in the commenter's submittal. Also, see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

24-4 Section 1.6, *Public Involvement*, in this EIS summarized the comments received during the public scoping period (specifically see Table 1.6-1). All comments received during the public scoping period were considered in preparing the Draft EIS. See the response to Comment 24-30 for a response to comments about radiation protection standards. See the response to Comment 24-12 for a response to comments about the environmental monitoring program at the INL Site.

24-5 DOE prepared the EIS and included all information necessary to determine the potential for significant environmental impact. DOE used state-of-the-art science, technology, and expertise to assure quality in the impacts analyses. Both DOE and SCO disagree with the statements made about the radioactive material source term. The radioactive material inventory is based on fueling the prototype mobile microreactor with 400 kg of high-assay low-enriched uranium fuel. The source term and the radioactive material inventory are not the same thing. The source terms are presented in this EIS because they are used in the accident analyses. Both the

Commenter No. 24: Tami Thatcher

The final EIS is stated to be expected in early 2022, and the Record of Decision by spring of 2022.

SUMMARY OF PROJECT PELE DRAFT EIS INADEQUACIES

I disapprove of the Department of Defense's preferred alternative, construction and testing of a prototype mobile microreactor, because it is unsafe and wasteful, and the spent nuclear fuel, which poses a radiological hazard that must be confined for millennia, is expected to remain indefinitely in Idaho, because the Department of Energy has no spent nuclear fuel disposal program.

Despite logical suggestions that the Draft EIS consider other reasonable alternatives such as continued diesel generator use, increased use of solar power, increased use of battery power, the Draft EIS authors have refused to do so. Their mission is to throw money at unreliable undesirable gas-cooled reactors, likely to be as popular and economical as the gas-cooled Fort St. Vrain reactor that the tax payers pay millions of dollars each year, just to tend to its spent nuclear fuel. **24-3**

Concerns from the scoping comments over outdated and inadequate radiation protection standards (see page 1-10 of the Draft EIS) were ignored.

The Draft EIS states that publicly available annual reports document the extensive monitoring conducted on and around the INL Site. The Draft EIS does not mention important weaknesses in the environmental monitoring program conducted by the Department of Energy such as: not mentioning that extended outages and unavailable of the environmental monitoring database have been common place; that the reports available may be exclude certain months; that only the annual reports since 2000 are included at the monitoring website; that the monitoring ceases in certain locations, sometimes for months on end; that the monitoring program withholds data from the U.S. Environmental Protection Agency's Radnet at whim; that the statistical tests for declaring that a sample is radioactive have been selected to create an indefensibly high bar for stating that radioactivity was detected; that various elements of the stated monitoring program were simply never conducted, such as monitoring of the prevalent iodine-129, which was stated to be included in the monitoring program for many years, yet no monitoring results were ever presented even as the expected doses from iodine-129 were a significant portion of the INL's radiation doses from airborne waste (effluents). **24-4**

The Project Pele mobile microreactors are not demonstrated to be safe or reliable, and no matter the level of inherent accident tolerance, will still remain unsafe because of being targets for sabotage and missile targets. A single mobile micro reactor may release thousands of curies of radionuclides into the environment. The term 'micro" does not characterize the potential radiological releases from a single microreactor. And it must be understood that very small curie amounts, far below a single curie, of plutonium, uranium and other actinides are very harmful when released into the environment. To be misleading, the Draft EIS has omitted the mobile microreactor spent nuclear fuel radionuclide inventory, presenting instead, only an accident source term that has been greatly reduced. The Draft EIS has not included a comprehensive or bounding set of accident consequences. The Draft EIS has not included acts of sabotage or **24-5**

3

24-5 (cont'd) radioactive material inventories and the source terms are presented in the referenced INL report, INL/EXT-21-62873 "Pele Microreactor Hazards and Impacts Information in Support of National Environmental Policy Data Needs." The accident source terms are based on detailed analysis of the microreactor and its operation. Personnel with many years of experience prepared the radioactive material source terms used in the Project Pele EIS accident analysis. Personnel considered heavy metal contamination on the tristructural isotropic (TRISO) fuel, defects in the manufactured fuel, burnup of the fuel, and accident conditions to which the fuel could be exposed. TRISO fuel is a fuel form that has been specifically developed to retain radioactive fission products during normal operating and accident conditions. Section 4.11, *Human Health – Facility Accidents*, of this EIS includes a comprehensive assessment of potential impacts from prototype mobile microreactor accidents that could result from initial construction through decommissioning of the project and disposal of materials. A prototype mobile microreactor accident would result in a dose significantly below regulation limits and minimal impact to workers and the public. The consequences of an intentional destructive act are similar to or lower than the consequences of the spectrum of accidents evaluated in Section 4.11 of this EIS.

24-6 The impacts from the demonstration of a prototype mobile microreactor are presented in Chapter 4, *Environmental Consequences*, of this EIS. Human health impacts are presented in Sections 4.10, *Human Health – Normal Operations*; Section 4.11, *Human Health – Facility Accidents*; and Section 4.12, *Human Health –Transportation*, and waste disposal impacts are presented in Section 4.9, *Waste and Spent Nuclear Fuel Management*. Radiological releases were derived from the best available information (as identified in the sections listed above) and reflect best estimates for radiological releases. Monitoring of the prototype mobile microreactor over time would be part of surveillance programs at the INL.

24-7 The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Deployment at domestic bases and Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases in foreign countries and U.S. territories is not included in the scope of this EIS. The potential environmental impacts of deployment, if it were to occur, would be the subject of additional environmental analyses. Please see the discussion in Section 2.3, *Scope of Proposed Action*, of this CRD for additional information. SCO believes the need to construct and demonstrate a mobile microreactor has been adequately described in this EIS. Please see Section 2.2, *Purpose and Need*, of this CRD for additional information. Non-Project Pele military training, and the impacts of that training, are outside the scope of this EIS.

24-8 The impacts from the construction and demonstration of a prototype mobile microreactor have been presented in Chapter 4, *Environmental Consequences*, of this EIS. This EIS (as is common practice in EISs) uses population and maximally exposed individual dose and latent cancer fatality as the measure of health impacts on the public. DOE recognizes that these are not the only potential impacts from radiation exposure. As the commenter notes, cancer incidence is an impact, and the morbidity

Commenter No. 24: Tami Thatcher

"intentional destructive acts" to cause an accident, despite this being a concern stated in the scoping comment summary (page 1-10 of the Draft EIS). The Draft EIS incorrectly states that it considers the consequences of "intentional destructive acts" when in fact it has not. The actual microreactor radionuclide inventory (curie amount of each radioisotope) after the reactor is operated has been unrealistically reduced to an accident source term that is one-ten-thousandth of the actual radionuclide inventory. **24-5 (cont'd)**

The mobile microreactor concept is environmentally unsound because of the health hazard of radiological effluents from routine operations, from accidents and during storage of the spent fuel. The hazard remains even when the reactors are not operating. The hazards do not diminish over time, but increase as equipment, containers and fuel degrades over time. **24-6**

The accidents considered in the Draft EIS are not comprehensive over the life of the spent nuclear fuel. Accidents must be considered for all operating modes, including extended storage of the fueled mobile microreactor. The Draft EIS fails to adequately address spent nuclear fuel storage degradation issues, of the container or the fuel, during storage of the spent fuel. The preplacement of spent nuclear fuel storage containers, as they degrade, must be addressed because many decades can be expected to pass before the Department of Energy has even a disposal facility that would be hoped to confine the spent nuclear fuel from air, water and soil. Actually, it may not be feasible to develop a disposal facility that is capable of isolating the radioactive fuel, fission products and activation products from the environment over the millennia that these radionuclides are toxic and a risk to health.

The Department of Energy's boundless enthusiasm for new reactor research is coupled with unfunded, languishing and mismanaged waste management of the spent nuclear fuel that remains a hazard for millennia. The spent fuel is packaged into containers that last hopefully for more than a few decades. The costs of management and disposal of spent nuclear fuel are so burdensome that the Department of Energy simply refuses to estimate the costs that will burden future generations. The Draft EIS also states that the mobile microreactor spent nuclear fuel may be stored indefinitely at INL's INTEC, yet it does not evaluate the flood plain hazard for fuel stored at INTEC. In fact, the facilities at INTEC are aging. And even if spent nuclear fuel were to be repackaged, should a facility for repackaging certain Department of Energy spent nuclear fuel now stored at INL, there is no guarantee that the mobile microreactor spent nuclear fuel could be handled by the new facility, if built. The Project Pele mobile microreactor spent nuclear fuel would likely be at the end of the line for a place in a disposal facility, should one ever be built. **24-2 (cont'd)**

The Draft EIS Project Pele Flowchart misleads the reader, implying storage of the microreactor at one of two areas at the Materials and Fuels Complex (RSWF or ORSA), no mention of INTEC on the Flowchart, and strongly implies that all wastes including the spent nuclear fuel will be dispositioned within 3 years, but this is absolutely not the case. The duration of "temporary" storage of the fueled microreactor is unknown. And the duration of "temporary" storage of the spent nuclear fuel after removal from the microreactor in undetermined facility at undetermined time, in an undetermined way, is a direct plan for long-term, interim (forever) storage of the spent fuel in Idaho, until the containers and/or fuel are degraded.

4

24-8 (cont'd)
rate is higher than the mortality rate. The mortality rate used by DOE when making estimates of risk uses a conversion factor of 6×10^{-4} latent cancer fatalities per rem or person-rem (the conversion factor used in this EIS), while the morbidity conversion factor suggested for use is 8×10^{-4}. Consistent use of the cancer mortality rates allows for an assessment of the impacts. Adding the morbidity rate to the assessment would not add to the ability to assess impacts.

24-9 One of the purposes of the demonstration of a prototype mobile microreactor at INL is to assess the operability of the microreactor design. The intent would be to identify potential operational vulnerabilities and test the design capability to mitigate against the vulnerability, such as the ability to prevent coolant leakage or the ingress of oxygen or moisture that could result in degradation of the fuel compacts. The accident analysis presented in Section 4.11, *Human Health – Facility Accidents*, addresses a wide range of accidents that are intended to present accident scenarios that could result in radiological releases. These accidents include design basis accidents and the less likely beyond design basis accidents. As shown in Section 4.11, the doses for each of the analyzed accidents are significantly below regulation limits and present a minimal impact to workers and the public.

24-10 DOE is sympathetic with those who have chronic illnesses or cancer or who have lost family or friends to disease. Cancer has a major impact not only on family and friends but also on society at large in the United States. This EIS provided information on the cancer rates in the area of interest around the INL Site (see Section 3.10.3, *Regional Cancer Rates*). From the low doses predicted from the radiological releases from demonstration of the prototype mobile microreactor (see Section 4.10, *Human Health – Normal Operations*), no additional fatalities or instances of thyroid cancer would be expected. As noted by the commenter, there are elevated levels of thyroid cancer in the counties surrounding the INL Site. However, the overall cancer rate for the surrounding counties is lower than that for Idaho and for the United States in general. It is not the purpose of this EIS to establish a cause for any of these cancer rates. Cancer is caused by both external factors (e.g., tobacco, infectious organisms, chemicals, and radiation) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism). Risk factors for cancer include age, alcohol usage, exposure to cancer-causing substances, chronic inflammation, diet, hormones, immunosuppression, exposure to infectious agents, obesity, exposure to radiation, exposure to sunlight, and tobacco use. Therefore, determining the cause of any incidence of cancer can be very difficult, as there are many confounding factors. The commenter's speculation as to the reason for the increase in thyroid cancer in the United States is beyond the scope of this EIS. Effective dose is defined as the sum of the products of the equivalent dose to the organ or tissue and the tissue weighting factors applicable to each of the body organs or tissues that are irradiated. The equivalent dose is a measure of the biological damage to living tissue as a result of radiation exposure. Also known as the "biological dose," the equivalent dose is calculated as the product of absorbed dose in tissue multiplied by a radiation weighting factor and

Commenter No. 24: Tami Thatcher

The Department of Energy has no program for the disposal of spent nuclear fuel, despite the misleading and deceptive language used to make misleading assertions to the contrary. The used or spent microreactor fuel used in the prototype microreactor will languish "temporarily," for decades, but likely far longer, at the Idaho National Laboratory. Spent fuel from deployment of mobile microreactors will either languish as stranded fuel where the microreactors are deployed, or be unsafely transported back to the U.S., very likely to the Idaho National Laboratory. The transportation of the microreactors will put any community the reactors are transported through at risk of becoming permanent exclusion zones, where an accident or sabotage could contaminate land with levels of radioactivity too high for people to live in. **24-2 (cont'd)** **24-7 (cont'd)**

The Draft EIS as written white washes the radioactive waste problems and ignores the financial burdens of relocating, repackaging and disposing of (if possible) the spent nuclear fuel. These gas-cooled mobile microreactors will have harmful effects wherever they are located because of the ongoing emissions and the damage to human health for people working at the project and people living anywhere near it. The vulnerability of the fuel to oxygen or moisture is not adequately described in the Draft EIS, nor is it adequately mitigated. **24-2 (cont'd)** **24-8** **24-9**

The higher enrichment fuels such as high-enriched low-assay uranium fuels (HALEU) fuel, as well as the plutonium fuels the Department of Energy wishes to use in other reactor projects, create even more challenging pre-disposal and post-disposal containment and criticality issues. Early Yucca Mountain analyses simply assumed away the criticality problem, but now criticalities are deemed so likely as to be unavoidable. The impact of criticalities on the geologic medium where the waste is disposed of, remains unknown. **24-2 (cont'd)**

The U.S. Department of Energy has no idea how many trillions of dollars it will ultimately cost to continue seeking a permanent solution to isolate the radio-toxic material for millennia.

Because U.S. utilities and investors don't want the added liability or the cost of new nuclear reactors, the Department of Defense is being conned into thinking that moving truck-load sized nuclear reactors to medical or other military or non-military installations would be a dandy idea. There is likely to be very little in the way of environmental monitoring, as the negligent practices by the U.S. military have already used in allowing U.S. troops to live in areas contaminated by depleted uranium, that when surveyed by other countries, were deemed too contaminated for their troops to be stationed at. And who at the military or Department of Energy has ever cared if there is no place to dispose of the spent nuclear fuel. They will be happy to retire, having made radioactive dump sites here, there, and everywhere. **24-7 (cont'd)** **24-2 (cont'd)**

The Project Pele mobile microreactor Draft EIS presents information showing the elevated rate of the incidence of thyroid cancer in the communities surrounding the Idaho National Laboratory but is irresponsibly silent on pointing out the elevated cancer rates and apparently uninterested in the actual human health effects of the INL's ongoing radiological releases in its silence on the question of why this is so. **24-10**

The Project Pele mobile microreactor Draft EIS continues to state that 100 millirem per year (also stated here as mrem/yr, 1000 millirem is equal to 1 rem) radiation dose to the public is acceptable despite the fact that when that limit was established, it was assumed that the fatal **24-11**

5

24-10 (cont'd)

then sometimes multiplied by other necessary modifying factors at the location of interest. International and national radiation protection guidance incorporates accepted values for all of the parameters used to estimate these quantities. Both quantities are expressed in terms of rem or sievert. From these definitions, it is apparent that the whole body dose considers the doses to each of the organs or tissues in the body. It does not diminish or hide information but rather provides a more succinct measure of impacts. It is possible to sum the potential consequences (cancer incidence and fatality) of exposure to the individual organs. However, the use of the effective dose and the conservative dose conversion factor of 0.0006 results in an estimation of latent cancer fatalities that incorporates all of the individual types of cancers. While this does not allow for a comparison of individual cancer types, it does provide an estimation of public health impact. The impacts associated with the demonstration of the prototype mobile microreactor are population and individual doses (see Section 4.10 of this EIS). These doses do not result in any additional latent cancer fatalities. Presentation of this impact by organ or tissue would result in the multiple presentation of zero expected latent cancer fatalities for populations and a series of smaller risk to individual numbers (summing to less than the effective dose impact). The information the commenter cites regarding the relationship between americium and thyroid cancer addresses updating dose conversion factors to be in agreement with Federal Guidance Reports (FGRs) 12/13, *External Exposure to Radionuclides in Air, Water, and Soil/Cancer Risk Coefficients for Environmental Exposure to Radionuclides*, recommendations rather than FGR 11, *Limiting Values Of Radionuclide Intake And Air Concentration And Dose Conversion Factors For Inhalation, Submersion, And Ingestion*, recommendations. The new FGR 13 data is based on the revised bio-kinetic and dosimetric model from International Commission on Radiological Protection (ICRP) Publication 60, *1990 Recommendations of the International Commission on Radiological Protection*, and beyond, using age-dependent effective dose calculations, which are different from those models used in support of FGR 11 effective dose calculations. These changes in the Pacific Northwest National Laboratory report reflect the advancement in the science of dose analyses and do not reflect any misinformation or misuse of the historical dose effects (as the commenter perceived). While that update did increase the factor for uranium americium and plutonium isotopes impacts on the thyroid, those conversion factors are still very small. The current dose calculations are now all using the FGR 13 effective dose method; therefore, they reflect the current state-of-the-art dose analyses method. The cancers identified as most prevalent due to exposure to americium are associated with bone tissue, the lungs, and liver; it is not a significant thyroid cancer source. The dose conversion factor update discussed in the commenter's reference report has already been considered in the estimation of health impacts from the releases of plutonium, uranium, and americium. The reference to the 1989 Idaho National Engineering Laboratory historical dose evaluation not listing americium is also not relevant, as the releases used to assess human health in this EIS are based on more recent release data, data that includes americium. Environmental monitoring is performed at all DOE sites including INL. The monitoring programs record and document the impacts of activities at the site.

Commenter No. 24: Tami Thatcher

cancer risk from radiation was 0.0001 fatal cancers per rem. Even the Draft EIS uses 0.0006 fatal cancers per rem, yet the 100 mrem/yr limit remains unchanged. **24-11 (cont'd)**

The thyroid dose from the Idaho National Laboratory's ongoing radiological airborne effluents is far larger than the thyroid organ dose from background radiation. **24-10 (cont'd)** Yet, the Department of Energy continues to emphasize and display only the effective whole-body dose estimates, a fraction of a millirem, according to DOE's annual airborne radiological effluent estimates. The deception has more to do with avoiding negative public perception and avoiding liability for causing the increased rates of cancer in the region than scientific examination of the health effects.

The Project Pele mobile microreactor Draft EIS presents selected years of Department of Energy radiation doses from the INL's ongoing and increasing annual airborne waste (effluents). **24-12**

The estimated doses are effective whole body radiation doses. The Draft EIS is silent on the increasing releases over the last 20 years and on the expected large increases of airborne effluent releases from various new and existing programs. The Draft EIS is silent on the fact that the Department of Energy did not include all of the significant-to-dose airborne radionuclide effluents that it released during many years of its operations or if included, understated the amount. For example, for many years the radionuclides sent to percolation ponds from INL facilities were excluded from being included in airborne effluents used in estimating radiation dose to the public. The radioactivity in liquid waste sent to ponds was all assumed to enter the soil and groundwater below. Other radionuclides were simply not reported at all to the public on the basis of not wanting to disclose the radionuclides being released.

And other radionuclides were released, in quantities that could have been far higher than stated releases of non-noble-gas releases, but were ignored, as the drum breaches that have periodically occurred as Rocky Flats transuranic waste was being dumped into the burial ground pits at the Idaho National Laboratory. Center for Disease Control investigations for radiation worker illness compensation have learned that there were numerous such open-air drum breaches and that no monitoring or bioassay was conducted in response to these events. The releases of americium-241 and plutonium from a single barrel of waste having been breached during unloading or during past burial ground flooding events has not ever been factored in to the dose to the public despite ample evidence of excessive americium-241 in the environment. **24-13** The DOE's environmental surveillance monitoring program, when it detects americium-241 off of the INL site, simply attributes it to former nuclear weapons testing.

The Draft EIS points to the estimated radiation dose of an average annual dose of 0.12 mrem (whole-body effective dose) from "ingestion of waterfowl" that had visited the INL. But it does not clarify that this means the ingestion of only a single 8-ounce portion of duck per year. Nor does it clarify that the radionuclides in the duck's bones would greatly add to the estimated dose if the person were to consume duck bone broth. Nor does it explain that it assumes that the extensive radiological contamination on the feathers were simply washed off the hands and did not contribute to the estimated dose.

6

24-10 (cont'd)

Information about monitoring may be found in the Annual Site Environmental Reports (ASERs) for each location via the following link: https://www.energy.gov/sites/default/files/2021/ 03/f83/ASER-URLs-and-Site-Contacts-March-2021.pdf. Information presented in the ASERs complies with DOE Order 231.1B, *Environment, Safety and Health Reporting*, and the INL Site Environmental Monitoring Plan is in compliance with DOE Order 458.1, *Radiation Protection of the Public and the Environment*. This EIS presents the most recent information available on the current environment at the INL Site.

24-11 The DOE dose limit for a member of the general public, which is 100 millirem per year from all pathways, is prescribed in DOE Order 458.1, *Radiation Protection of the Public and the Environment*. DOE orders and standards are continually reviewed to determine whether these documents and the requirements and guidance within the documents should be revised. To date, DOE has not identified a need to update the 100 millirem requirement in DOE Order 458.1. (This order was last updated in September of 2020.) The latent cancer fatality risk to an individual who receives this dose, using the 0.0006 conversion factor, is 0.00006. The 100 millirem requirement is consistent with national and international standards for the protection of the public.

24-12 Effective dose is defined as the sum of the products of the equivalent dose to the organ or tissue and the tissue weighting factors applicable to each of the body organs or tissues that are irradiated. The equivalent dose is a measure of the biological damage to living tissue as a result of radiation exposure. Also known as the "biological dose," the equivalent dose is calculated as the product of absorbed dose in tissue multiplied by a radiation weighting factor and then sometimes multiplied by other necessary modifying factors at the location of interest. International and national radiation protection guidance incorporates accepted values for all of the parameters used to estimate these quantities. Both quantities are expressed in terms of rem or sievert. From these definitions, it is apparent that the whole body dose considers the doses to each of the organs or tissues in the body. It does not diminish or hide information but rather provides a more succinct measure of impacts. It is possible to sum the potential consequences (cancer incidence and fatality) of exposure to the individual organs. However, the use of the effective dose and the conservative dose conversion factor of 0.0006 results in an estimate of latent cancer fatalities that incorporates all of the individual types of cancers. While this does not allow for a comparison of individual cancer types, it does provide an estimate of public health impact. The inference that this EIS tried to hide information by providing data from selected years has no basis. The purpose of Chapter 3, *Affected Environment*, of this EIS is to provide existing environment information. The data for the most recent years of operation are most reflective of that environment. It is not the purpose of this EIS to provide an encyclopedic history of the INL Site. However, the commenter's statement that "the Draft EIS is silent on the increasing releases over the last 20 years and on the expected large increases of airborne effluent releases from various new and existing programs" ignores the information in the figure provided by the commenter that airborne releases have been lower during the last several years than

Commenter No. 24: Tami Thatcher

Importantly, in 1985, that Department of Energy annual report acknowledges that if a person ate one duck that had visited the ATR Complex, that person would receive 10 mrem, far above the stated levels in the Draft EIS (page 3-40). I have not found enough publicly available information to determine if plutonium etc. in the waterfowl bones were assumed to be consumed in these earlier studies. The estimated radiation whole-body doses from eating a single duck are large in comparison to the DOE's stated estimated effective whole-body radiation dose estimates from ongoing airborne radiological waste (effluents) which are usually significantly below 0.1 mrem per year. (Note that the Department of Energy's annual reports prior to 2000 are not being displayed on its environmental monitoring website. Also, trending tools that were once available but revealed large gaps in the air and water monitoring data, have been removed from the DOE's environmental monitoring website.)

When waterfowl (such as ducks) are analyzed and are known to have had a visit to the Idaho National Laboratory's ATR Complex (formerly Test Reactor Area) warm waste ponds, then the radionuclides known to be in the ponds are usually acknowledged as a possible source of the radionuclides in the animal tissue. [3] The accumulation of various radionuclides in muscle and bone of ducks is made to seem that close contact with the radioactive waste ponds is required. But the fact is that detections of the same radionuclides can be found in yellow-bellied marmots located 50 miles away in Pocatello. Some of these radionuclides are prevalent at the INL's radioactive waste water ponds. And some of these radionuclides cannot have resulted from former nuclear weapons testing or any place other than the INL.

24-13 (cont'd)

In 2002, marmot tissues were analyzed for radionuclide content by the Department of Energy's environmental surveillance program (formerly Idahoeser.com and apparently now changed to Idahoeser.inl.gov). The marmots were taken from the Idaho National Laboratory near the Radioactive Waste Management Complex and also collected from an area near the Pocatello Zoo. There was also marmot data from 1998 also detecting cobalt-60, zinc-65, niobium-95, cesium-134, cerium-141 and also strontium-90, cesium-137 and plutonium-238, consistent with INL radioactive waste water ponds.

Both the INL's RWMC and the Pocatello marmots had the mainstays: strontium-90 and cesium-137 in their tissues. And in 2002, both the INL's and the Pocatello marmots had these short-lived neutron activation products that can only be from the INL: cerium-141, cobalt-58 and cobalt-60, chromium-51, hafnium-181, manganese-54, niobium-95, zinc-65, and the fission product ruthenium (either Ru-103 or Ru-106, both of which are short-lived).

The only way from the marmots residing near the Pocatello Zoo to have these radionuclides in their tissues is from the spread of airborne contamination from the INL. The DOE's environmental surveillance program, as usual, discarded strong evidence of radioactivity in the marmot tissues based on its decision to require an infinitesimal probability of false positives, its

[3] Ronald W. Warren et al., Under contract for the Department of Energy, "Waterfowl Uptake of Radionuclides from the TRA Evaporation Ponds and Potential Dose to Humans Consuming Them," Stoller-ESER-01-40, October 2001. http://idahoeser.com/Surveillance/PDFs/TRADuckReport.pdf

7

24-12 (cont'd)

during the 1990s. This EIS provides an assessment of current and new projects in Chapter 5, *Cumulative Impacts*, of this EIS. The INL Site environmental surveillance programs collect and analyze samples or direct measurements of air, water, soil, biota, and agricultural products from the INL Site and off-site locations in accordance with DOE Order 458.1, *Radiation Protection of the Public and the Environment*; DOE-HDBK-1216-2015, *Environmental Radiological Effluent Monitoring and Environmental Surveillance*; and DOE-STD-1196-2021, *Derived Concentration Technical Standard*. The purpose of DOE Order 458.1 is to establish requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of DOE pursuant to the Atomic Energy Act of 1954, as amended. Monitoring activities are performed to generate measurement-based estimates of the amounts or concentrations of contaminants in the environment. Measurements are performed by sampling and laboratory analysis or by "in-place" measurement of contaminants in environmental media. The INL Site environmental surveillance programs meet or exceed requirements within these governing documents and have been determined through technical review to effectively characterize levels and extent of radiological constituents in the environment and distinguish INL Site-related contributions from those typically found in the environment at background levels. The ASER describes the quality assurance program to ensure validity of results from the environmental surveillance programs. Quality assurance is an integral part of every aspect of an environmental monitoring program, from the reliability of sample collection through sample transport, storage, processing, and measurement, to calculating results and formulating the report. Monitoring performed by the INL Management and Operations (M&O) contractor; the Idaho Cleanup Project Core contractor; the INL Environmental Surveillance, Education, and Research (ESER) Program contractor (independent from the M&O contractor); and the Idaho Department of Environmental Quality (IDEQ) INL Oversight Program demonstrate that impacts from the INL are low and consistent with the emissions reported in annual INL radionuclide National Emission Standards for Hazardous Air Pollutants (NESHAP) reports. DOE contractors' ambient air monitoring data are reported annually in the ASER, which is available at https://idahoeser.inl.gov/publications.html. IDEQ's INL Oversight Program Annual Reports are available at IDEQ's INL Oversight Program website (https://www.deq.idaho.gov/idaho-national-laboratory-oversight/inl-oversight-program/).

24-13 The purpose of the EIS is neither to provide an encyclopedic history of the INL Site nor pass judgement on past activities. The purpose of Chapter 3, *Affected Environment*, is to provide existing environment information. Presentation of operation data associated with the most recent years and data from the most recent ASERs provides information on the radiological environment for the INL Site and is not a deceptive description of the site as stated by the commenter. The INL Site environmental surveillance programs collect and analyze samples or direct measurements of air,

Commenter No. 24: Tami Thatcher

practice of accepting a very high probability of false negatives (with probability as high as 50 percent), and ambiguous gamma spectroscopy practices.

The question of what radionuclides from the INL we have in our muscles and bones from the INL was never raised, largely because it was a simple matter for the environmental monitoring program to claim that the gamma spectroscopy peaks exhibited by the marmot tissues from Pocatello were not going to be deemed true detections due to the practice of requiring miniscule probability of false positive detections while allowing the probability of false negatives to be as high as 50 percent. **24-13 (cont'd)**

The entire Project Pele mobile microreactor Draft EIS is misleading, exemplified by the avoidance of clarity concerning the radiation dose from ingestion of waterfowl. The Draft EIS favors assumptions that it does not provide documented bases for. The unsupported assumptions are not conservative or bounding but are intended to grease the presented information in a way so that the public does not understand the true ramifications of either the project or the INL's past and ongoing environmental effects. The Draft EIS does not meet the intent of the NEPA process: it does not protect people or the environment. **24-14**

The military's proposed Project Pele Mobile Microreactor project is ill-conceived, puts troops, the public and the environment at risk, wastes precious resources, and bases its contrived safety case on biased assumptions that they don't wish to disclose. **24-3 (cont'd)** The radiological releases from a 10 megawatt-thermal [4] reactor could be far higher than the draft EIS discusses. **24-4 (cont'd)** The risks and costs associated with the management of its spent fuel are also very important and dismissed with vague and misleading statements that is would be addressed by "existing processes" pretending as though the Department of Energy has a spent nuclear fuel disposal program. **24-2 (cont'd)** The draft EIS is misleading, lacks transparency, and fails to protect people or the environment. I oppose the Project Pele Mobile Microreactor project and this first step of fabricating the reactor somewhere and of testing the reactor at the Idaho National Laboratory and of storing the resulting spent nuclear fuel in Idaho, at the INL indefinitely. **24-3 (cont'd)**

No Realistic Military Mission for Missile-Targeted Mobile Microreactors

The Project Pele proposal to build portable gas-cooled nuclear reactors for transport around the globe puts any community and country in its transportation path at risk of becoming an "exclusion zone," an area so radioactive, that no one can live there. The Project Pele mobile microreactors, from 1 to 5 megawatts-electric in size, put military bases and other installations where these would be located at risk as they would become missile targets. The dispersal of nuclear fuel, especially after the buildup of fission products from operating the reactor, would force the permanent evacuation of the area where the mobile microreactors are located. **24-7 (cont'd)**

[4] The megawatts-thermal figure represents the reactor's energy production without reduction of the inefficiencies in creating electrical energy. Generally, the megawatts-electrical capacity might be roughly one-third of the megawatts-thermal energy of the reactor.

8

24-13 (cont'd)

water, soil, biota, and agricultural products from the INL Site and off-site locations in accordance with DOE Order 458.1, *Radiation Protection of the Public and the Environment*; DOE-HDBK-1216-2015, *Environmental Radiological Effluent Monitoring and Environmental Surveillance*; and DOE-STD-1196-2021, *Derived Concentration Technical Standard*. The purpose of DOE Order 458.1 is to establish requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of DOE pursuant to the Atomic Energy Act of 1954, as amended. Monitoring activities are performed to generate measurement-based estimates of the amounts or concentrations of contaminants in the environment. Measurements are performed by sampling and laboratory analysis or by "in-place" measurement of contaminants in environmental media. The INL Site environmental surveillance programs meet or exceed requirements within these governing documents and have been determined through technical review to effectively characterize levels and extent of radiological constituents in the environment and distinguish INL Site-related contributions from those typically found in the environment at background levels. The ASER describes the quality assurance program to ensure validity of results from the environmental surveillance programs. Quality assurance is an integral part of every aspect of an environmental monitoring program, from the reliability of sample collection through sample transport, storage, processing, and measurement to calculating results and formulating the report. Monitoring performed by the INL M&O contractor, the Idaho Cleanup Project Core contractor, the INL ESER Program contractor (independent from the M&O contractor), and the IDEQ INL Oversight Program demonstrate that impacts from the INL are low and consistent with the emissions reported in annual INL radionuclide NESHAP reports. DOE contractors' ambient air monitoring data are reported annually in the ASERs, which are available at https://idahoeser.inl.gov/publications.html. IDEQ's INL Oversight Program Annual Reports are available at IDEQ's INL Oversight Program website (https://www.deq.idaho.gov/idaho-national-laboratory-oversight/inl-oversight-program/).The EIS incorporated the maximally exposed individual estimates from the ASERs for the individual dose from existing operations. The parameters used to determine the dose from the consumption of waterfowl are identified in the ASERs and were not reproduced, nor modified for use, in this EIS. There are a limited number of ducks that make the Advanced Test Reactor waste pond their home, so the assumption that only one duck per year is consumed by the same individual is reasonable. Broth from duck bones is not a normal ingestion pathway, and handling of the feathers would not be expected to add significantly to the dose from ingesting the duck. DOE takes its responsibility for the safety and health of the workers and the public seriously, but prior INL epidemiology studies are not within the scope of this EIS. The Energy Employee Occupational Illness Compensation Program is administered by the Department of Labor with DOE and the Department of Health and Human Services, specifically the National Institute for Occupational Safety and Health (NIOSH). The Department of Labor has the primary responsibility to administer the program. Dose reconstruction is the responsibility of NIOSH. The DOE role in the program is

Commenter No. 24: Tami Thatcher

Critics say that the nuclear reactors will be targets and that it is unwise to deploy nuclear reactors in theaters of war. [5]

Even the military does not want these reactors deployed at foreign military bases. [6] The project is a way to funnel government money to the nuclear industry for projects that cannot obtain private investor support. The refusal of the Draft EIS authors to even consider obviously more safe, reliable and affordable options is proof of the unacceptable bias of the Draft EIS.

24-7 (cont'd)

24-15

Draft EIS Stated Accident Consequences Unrealistically Low-Balled

The uranium fuel is part of the radionuclide inventory of the microreactor spent fuel and must be included in the accident source term for any accident with dispersal of the spent nuclear fuel, such as from an intentional destructive act. The radionuclide inventory was not included in the Draft EIS but must be included in the Draft EIS and substantial evidence must be provided for the greatly reduced accident source terms used in the Draft EIS.

The proposed high-assay low-enriched uranium fuel known as HALEU is stated in the draft EIS to be composed of just under 20 percent uranium-235 (by weight), just under 80 percent uranium-238 (by weight) and also uranium-234 and uranium-236. See Table 1 for the HALEU weight fraction and radioactive activity for a mobile microreactor using 400 kg HALEU fuel.

Table 1. Beginning-of-life fuel content of high-assay low-enriched uranium (HALEU) fuel proposed for the Project Pele mobile microreactor.

Radioisotope	Weight Fraction	Activity (curie) for 1/10th of 400 kg HALEU	Activity (curie) for 400 kg HALEU
Uranium-234	0.0021	2.74E-2	2.74E-1
Uranium-235	0.1975	8.86E-4	8.86E-3
Uranium-236	0.0011	1.41E-4	1.41E-3
Uranium-238	0.7994	5.58E-4	5.58E-3

Table notes: Information source is *Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement (Draft EIS)*, September 2021, https://www.mobilemicroreactoreis.com, Table 4.12-2 for roughly 40 kg of HALEU fuel. The mobile microreactor will use 400 kg of HALEU fuel.

The fuel, and end-of-life fission and activation product radionuclide inventory for a 10 megawatt-thermal reactor is anything but "micro," see Table 2. The radiological inventory for a "mobile microreactor" is thousands of curies and is not included in the Draft EIS.

Rather, the draft EIS points to unavailable documents to explain why the draft EIS stated releasable material, the "source term" is a tiny fraction of the fission and activation products inventory that will be in the spent fuel. Both the radionuclide inventory for the mobile

24-16

[5] Associated Press, *The Idaho Falls Post Register*, "US military eyes prototype mobile nuclear reactor in Idaho," September 26, 2021.

[6] Alan J. Kuperman, Nuclear Proliferation Prevention Project, NPPP Working Paper #4, *Proposed U.S. Army Mobile Nuclear Reactors: Cost and Risks Outweigh Benefits*, April 22 2021. www.NPPP.org

9

24-13 (cont'd)

informative. DOE responds to requests for facility and worker records (over 15,000 such requests per year, which may cover worker information from multiple facilities); requests for site characterization and research (typically responding to four or five such requests at any one time); and requests about issues for specific facilities (over 300 facilities covered, with many being private company facilities; considered large-scale requests that could involve researching information for multiple facilities over multiple decades). DOE has an extensive staff who work in a transparent manner assigned to support the Energy Employee Occupational Illness Compensation Program. DOE strives to provide timely and accurate responses to the Department of Labor and NIOSH requests for information. This EIS uses the linear no threshold model for estimating dose impacts to both the workers and the public. This model explicitly estimates the cumulative cancer effects of incremental small doses to be the same as a single larger dose. Thus, small doses (less than 10 rem) to a large number of people are modeled as resulting in potential cancers. The commenter's statement that the nuclear industry says there is no impact from doses below 10 rem is a mischaracterization of the presentation of the risks associated with radiation. As needed, DOE updates its radiological protection requirements to implement requirements consistent with the latest approved information from the ICRP, the National Research Council and National Academy of Sciences, and the U.S. Environmental Protection Agency (EPA) (e.g., use of FGR 13 data and models). This EIS (as is common practice in EISs) uses population and maximally exposed individual dose and latent cancer fatality as the measure of health impacts on the public. DOE recognizes that these are not the only potential impacts from radiation exposure. Cancer incidence is also an impact, and the morbidity rate is higher than the mortality rate. Accepted quantifiable models for other health impacts, especially at low doses, are not available.

24-14 As described in EIS Section 1.3, *Proposed Action and Scope of this EIS*, this EIS has been prepared in accordance with the National Environmental Policy Act and Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500 through 1508). As described in Chapter 4, *Environmental Consequences*, and summarized in Section 2.7, *Summary of Environmental Consequences*, of this EIS, the environmental impacts of fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site would be minor. As described in EIS Section 5.4, *Conclusion*, the incremental impacts for all resource areas from Project Pele activities would be very small and would not substantially contribute to cumulative impacts.

24-15 SCO believes the need to construct and demonstrate a mobile microreactor has been adequately described in this EIS. SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please see Section 2.2, *Purpose and Need*, of this CRD for additional information.

24-16 DoD prepared this EIS and included all information necessary to determine the potential for significant environmental impacts. This EIS used state-of-the-art science,

Commenter No. 24: Tami Thatcher

microreactor and the greatly reduced source term assumed in the draft EIS are provided in Table 2. The Draft EIS must include the entire maximum radionuclide inventory following reactor operations. The Draft EIS must allow address all accidents and sabotage or military attack.

Table 2. The estimated 10 megawatt-thermal mobile microreactor spent fuel radionuclide inventory decayed by 7 days and the greatly reduced "source term" presented in the draft EIS.

Isotope (Half-Life)	Inventory of spent fuel, curie	Greatly reduced "source term" stated in the draft EIS
Krypton-85, noble gas (10.7 year)	3,200	0.279
Krypton-88, noble gas (2.84 hour)	4.83E-13	4.43
Strontium-90 (28.9 year)	28,000	2.52
Yttritium-90 (64.0 hour)	23,500	-
Ruthenium-103 (39.26 day)	539,000	4.48
Rhodium-103 stable. It is unknown what is meant here. But note that Ru-106 (1.02 year) would decay to Rh-106 (30 seconds) which would decay to stable Pd-106.	486,000	-
Silver-110 (24.6 seconds)	6.54	2.31
Silver-111 (7.45 day)	26,600	102
Antimony-125 (2.73 year)	3,880	0.165
Tellurium-125 (stable) It is unknown what they are representing here. I-125 (59.37 day) decays to stable Te-125.	315	-
Tellurium-132 (3.20 day) Te-132 decays to I-132 which decays to stable Xe-132.	99,000	12.3
Iodine-131 (8.04 day)	180,000	10.8
Iodine-132 (83 minute)	102,000	-
Iodine-133 (20.8 hour)	2,220	7.96
Xenon-131	886	41.1

10

24-16 *(cont'd)*

24-16 (cont'd)

technology, and expertise to assure quality in the impacts analyses. Both DOE and SCO disagree with the statements made about the radioactive material source term. The radioactive material inventory is based on fueling the prototype mobile microreactor with 400 kg of high assay, low-enriched uranium fuel, followed by operation of the microreactor. The comments about Table 4.12-2 in Section 4.12, *Human Health – Transportation*, of this EIS are not applicable to the radioactive material inventory in the microreactor. The information in Table 4.12-2 is related to shipping one container of fuel that would be used in the microreactor. The source term and the radioactive material inventory are not the same thing. The source terms are presented in this EIS because they are used in the accident analyses. Both the radioactive material inventories and the source terms are presented in the referenced INL report, INL/EXT-21-62873 "Pele Microreactor Hazards and Impacts Information in Support of National Environmental Policy Data Needs." The accident source terms are based on detailed analysis of the microreactor and its operation. Personnel with many years of experience prepared the radioactive material source terms used in the Project Pele EIS accident analysis. Personnel considered heavy metal contamination on the TRISO fuel, defects in the manufactured fuel, burnup of the fuel, and accident conditions to which the fuel could be exposed. TRISO fuel is a fuel form that has been specifically developed to retain radioactive fission products during normal operating and accident conditions. Even if the TRISO fuel were dispersed because of an explosion, the radioactive material is expected to be retained in the fuel particles. The purpose of assuming that a criticality occurs in a uranium solution is only for determining the maximum impact at the INL Site. A criticality, if it were to occur in the mobile microreactor, would involve solid material. A criticality involving solid material would result in a core disruption and a number of fissions orders of magnitude lower (e.g., 1×10^{12} fissions) than the number of fissions in a uranium solution. Section 4.11, *Human Health – Facility Accidents*, of this EIS includes a comprehensive assessment of potential impacts from prototype mobile microreactor accidents that could result from initial construction through decommissioning of the project and disposal of materials. A prototype mobile microreactor accident would result in a dose significantly below regulation limits and minimal impact to workers and the public. The consequences of an intentional destructive act are similar to or lower than the consequences of the spectrum of accidents evaluated in Section 4.11 of this EIS.

24-17 DoD and DOE acknowledge the commenter's concerns about potential sabotage, terrorism, and the intentional destruction of the proposed microreactor. However, the scope of this EIS is limited to the construction and demonstration of the prototype microreactor at the INL Site. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet the DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. Before a mobile microreactor could be deployed, a prototype must be built and tested to ensure that it can meet regulatory requirements, as well

Commenter No. 24: Tami Thatcher

Isotope (Half-Life)	Inventory of spent fuel, curie	Greatly reduced "source term" stated in the draft EIS
(5.25 day) I-131 decays to stable Xe-131.		
Xenon-133, noble gas (5.25 day) I-133 decays to Xe-133 which decays to stable Cs-133.	286,000	-
Cesium-134 (2.07 year)	30,800	3.62
Cesium-137 (30.2 year)	28,000	16.0
Barium-137 is stable, it is unknown what this represents. Cs-137 beta decays to stable Ba-137.	26,500	-
Lanthanum-140 (1.6785 day) Ba-140 (12.7 day) decays to La-140 which decays to stable Cs-140.	30,600	0.593
Cerium-144 (284.6 day)	383,000	1.95
Praseodymium-144 (17.3 minute) (Cerium-144 beta decays to Pr-144, not stable)	383,000	-
Plutonium-239 (24,110 year) Pu-239 decays through many more decay progeny)	78	0.000172

Table notes: Source of 10 megawatt-thermal mobile microreactor radionuclide inventory from Idaho National Laboratory for the U.S. Department of Energy operated by Battelle Energy Alliance, *Pele Microreactor Hazards and Impacts Information in Support of National Environmental Policy Act Data Needs*, INL/EXT-21-62873, September 2021. This appears to be only a partial inventory of the radionuclides. Source of "source term" is Table 4.11-2 in the mobile microreactor draft EIS, *Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement (Draft EIS)*, September 2021, https://www.mobilemicroreactoreis.com. I have included the radioactive half-life from various information sources for information, but the value cited may not necessarily be from the most recent or consistent information source.

As shown in Table 2, there is an extremely large reduction of the radionuclide inventory to the curie amounts considered releasable as the accident "source term." The draft EIS did not disclose the total radionuclide inventory and is not disclosing how it arrived at the far smaller "source term" that it assumes could be released to the environment.

In addition to the factor of 10,000 reduction from "attenuation," also unexplained are how many significant radionuclides have been screened out. Note that none of the uranium fuel is

24-16 *(cont'd)*

11

24-17 (cont'd)

as the specific design goals and requirements identified by SCO (as identified in Chapter 2, *Description of Alternatives*, Table 2.2-1 of this EIS). Relative to the scope of this EIS, DoD and DOE constantly assess, train, and prepare for potential threats to the prototype mobile microreactor. Section 2.6, *Intentional Destructive Acts*, of this CRD discusses issues related to required attack potentials and malicious acts. All of the prototype microreactor-related facilities at the INL Site would have a very high level of physical security designed to stop credible threats. DoD and DOE consider sabotage and terrorism to be a credible threat, and prevention systems would be in place. Sabotage and terrorism are some of the many factors that would be considered in the design of the control systems and the supporting activities. Analyses of physical vulnerabilities and defenses are security functions that would be performed independent of this EIS. These analyses would be performed throughout the design and construction phases to ensure that after the mobile microreactor is operational, preventative and mitigation security features would be present. Even though secure activities and designs make an attack on the prototype mobile microreactor improbable, the potential consequences of an intentional destructive action are considered. TRISO fuel is a fuel form that has been specifically developed to retain radioactive fission products during normal operating and accident conditions. Even if the TRISO fuel were dispersed because of an intentional destructive act, the radioactive material is expected to be retained in the fuel particles. The consequences of such an action are similar to or lower than the consequences of the spectrum of accidents evaluated in Section 4.11, *Human Health – Facility Accidents*, of this EIS. The near+long-term impacts on population within 50 Miles addressed in Section 4.11 include the radiation exposures due to the initial plume passage without mitigation and the combined effects of exposure to radionuclides remaining after the plume passage. The long-term exposure pathways include ingesting contaminated foods; direct radiation exposure from residual material on the ground (ground shine); inhalation of disturbed, residual ground-level particulates (resuspension); and ingestion of contaminated water. The radiation doses for each of the analyzed accidents are significantly below regulation limits and present a minimal impact to workers and the public.

24-18 The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Concerns about the decommissioned Fort St. Vrain reactor are outside the scope of this EIS. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

24-19 The flowchart the commenter refers to is intended to identify the major phases of the construction and demonstration of the prototype mobile microreactor. The durations of the activities as shown are the current estimates for each phase. Since the duration of temporary storage is not known at this time, no duration is given for this phase on the flowchart. The text following the chart clearly indicates that the duration of this phase has not been determined. This EIS clearly identifies that the activities associated with storing the SNF post-disposition are similar to activities currently performed at INL and would use existing facilities. The facilities identified in this EIS

Commenter No. 24: Tami Thatcher

assumed to be released. Why other actinides such as plutonium-240 and plutonium-241 have not been included in the source term is not explained. **24-16 (cont'd)**

In reality, the release of the mobile microreactor fuel could be released to the environment by sabotage or "intentional destructive acts" which the Draft EIS did not include as well as by the limited set of evaluated reactor transients that could lead to an accident. It appears that the draft EIS is understating the possible radiological impacts by a tremendous degree, in order to create a false impression of the project as being "safe." **24-17**

The TRISO fuel safety for all accident scenarios has not been presented. Nor has the radiological risk during spent nuclear fuel storage been adequately evaluated.

The Draft EIS portrayal of inadvertent criticality states that it could occur during any phase of the project. "An inadvertent criticality is assumed to occur because of human errors, fuel handling errors, plant design or construction errors, or a transportation accident (e.g., flooding or core reconfiguration)." "An inadvertent criticality could expose personnel to high levels of radiation and could lead to fuel temperatures higher than those for which the TRISO fuel is designed. TRISO fuel could crack and/or degrade, resulting in a release of fission products into the environment." Yet, the Draft EIS ignores the additional end-of-life fission product inventory which may add to the fresh core source term from the criticality (Table 4.11-1). The radiological release from a criticality accident has been low-balled. And no degradation of the fuel from failure to keep moisture away from the microreactor fuel or other operating or aging degradation has been considered. The propensity for methane generation when carbide is exposed to moist air or water must also be addressed.

Very importantly, explosion or sabotage that would compromise the structure confining the mobile microreactor fuel has not been included. The confinement and fuel have been assumed to stay intact despite the fact, that in actual service or realistic transportation accidents such as aircraft transport, the confinement structures and fuel could be widely dispersed. **24-16 (cont'd)**

It should be noted that in the Department of Defense's stated envisioned role for mobile microreactor operations, that failure to properly supervise mobile microreactor operations at an isolated installation must also address reactor operators who are not fit for duty and fail to operate the reactor in a safe manner, due to lack of training or drunken or drugged mental impairment, causing a reactor accident. The failure to properly install or configure various equipment, which may result in degradation of the fuel or equipment, or compromise the protection of personnel near the reactor due to improperly installed shielding or other operational features would increase routine exposures from the mobile microreactor and this must also be considered, as the lack of supervision and safety oversight would increase the likelihood of shortcutting safety requirements and produce unpredictable and unsafe operations. **24-7 (cont'd)**

The TRISO fuel, X-energy has publicly claimed, won't release fission products but didn't discuss actual fission product releases from routine operation or accident conditions. TRISO fuel particles are made from a mixture of uranium carbide and uranium oxide. TRISO fuel was used in the U.S. Fort St. Vrain and the Peach Bottom nuclear reactors. Even if the fuel were more robust than fuel in conventional light-water reactors, the storage of TRISO high enriched fuel and its disposal is proven to be costly and also susceptible to degradation over time. And of **24-2 (cont'd)**

12

24-19 (cont'd)

are representative of the facilities that could be used; no decision has been made as to which facility would be used. Many variables could impact the facility selected, including the availability of the facilities at the time the fuel would be packaged for temporary storage at the INL Site pending transfer of the material at an approved disposal site (e.g., a geologic repository).

24-20 The very small quantity of SNF that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. Any potential issues that may arise concerning the 1995 Idaho Settlement Agreement would be addressed with the State of Idaho. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

24-21 See the response to Comment 24-20. This EIS used the best available information for the analysis of the disposition of SNF. DOE continually assesses the adequacy of its existing documentation and updates the documents (e.g., through the development of supplement analyses) as needed.

24-22 See the response to Comment 24-20. The commenter's concerns about the analysis for the Yucca Mountain repository are not within the scope of this EIS.

24-23 See the response to Comment 24-20. The commenter's concerns about NRC activities related to spent fuel disposition are not within the scope of this EIS.

24-24 DOE and SCO believe that the transportation of nuclear materials to the reactor fuel fabrication (BWXT) and operational facility (INL) and the low-level radioactive waste and transuranic wastes to the disposal facilities would result in very low overall human health risks, as these activities are conducted in a safe manner based on compliance with Federal and state comprehensive regulatory requirements. The transportation occurs by truck-trailers only; no rail transports are included in this EIS. For each destination (facility or disposal site), the routes most affected would be the interstate highways that are closest to the site. The route selection for all of the nuclear fuel and radioactive wastes meets the requirement of the highway route controlled quantities as prescribed in 49 CFR 397. The objectives of the regulations are to reduce the impacts from transporting radioactive materials, establish consistent and uniform requirements for route selection, and identify the role of state and local governments in routing radioactive materials. The regulations attempt to reduce potential hazards by prescribing that populous areas be avoided and that

Commenter No. 24: Tami Thatcher

course, the Fort St. Vrain gas-cooled nuclear reactor was a complete economic disaster and rarely operated because it was always needing repairs. **24-18**

The spent nuclear fuel resulting from new research from X-energy TRISO fuel and other higher enriched fuels proposed for various small and microreactors will require additional research for spent fuel container, transportation and disposal, according to a May presentation to the U.S. Nuclear Waste Technical Review Board. [7]

Project Pele Draft EIS Fails to Disclose Serious SNF Storage and Disposal Issues

The Draft EIS regarding spent nuclear fuel management is inadequate. And spent nuclear fuel management is unsustainable from a growing cost liability point of view that places an enormous burden on future generations to continue to try to isolate the waste from air, soil and water by repeatedly repackaging the waste and/or by continuing to seek a repository to adequately confine the waste. **24-2 (cont'd)**

The criticality and/or breach of a mobile microreactor spent nuclear fuel container for the decades and longer that such containers may languish in Idaho has not been adequately addressed in the Draft EIS.

Project Pele Waste Management Approach Anything But "Cradle to Grave"

The so-called mentioned "cradle to grave" management of the project's spent nuclear fuel, at the public meeting, is misleading because the Department of Energy has no spent nuclear fuel disposal program. A court of law made this finding and forced the Department of Energy to cease collecting fees from electricity rate payers who use nuclear power because the DOE actually has no spent nuclear disposal program.

The Project Pele Flowchart (Figure S-2 and Figure-2.3-2) is misleading and implies that disposition of the mobile microreactor and its spent nuclear fuel will take place in three years after testing. The Flowchart shows temporary storage at RSWF or ORSA and then a dotted line to waste disposition, taking 3 years.

The text several pages down does say that the duration of the "temporary storage" is unknown. The text also describes INTEC, located in a flood plain, also may be used as a temporary storage location but this is not included on the Flowchart. **24-19**

The Project Pele Flowchart must be changed to state clearly state the length of time and the design life of the storage of the fueled mobile microreactor. The Project Pele Flowchart must state on the flowchart that the duration called "temporary" is completely unknown and may be many, many decades or longer. The Project Pele Flowchart must state all locations where the spent nuclear fuel that has been removed from the mobile microreactor may be stored, and must correspond to the writing in the text, and therefore include storage of Project Pele spent nuclear fuel in a flood plain at the INL's INTEC facility. When the Project Pele Flowchart does not

[7] Sylvia Saltzstein et al. (Sandia National Laboratories, Oak Ridge National Labs, Pacific Northwest National Laboratory, Argonne National Labs and Department of Energy Office of Nuclear Energy), Presentation: Accident Tolerant Fuel and the Back End of the Nuclear Fuel Cycle, U.S. Nuclear Waste Technical Review Board, may 12-13, 2021, Virtual Meeting. https://www.nwtrb.gov/docs/default-source/meetings/2021/may/saltzstein.pdf?sfvrsn=8

13

24-24 (cont'd)

travel times be minimized. In addition, the regulations require the carrier of radioactive materials to ensure (1) that the vehicle is operated on routes that minimize radiological risks and (2) that accident rates, transit times, population density and activity, time of day, and day of week are considered in determining risk. Section 4.12, *Human Health – Transportation*, of the EIS details the transportation analysis and provides a perspective of the expected impacts in terms of the individual and population exposure from normal operations (Incident-free) and accident conditions. The results, which are summarized in Table 4.12-4 of this EIS, clearly indicate the risks from transport of various radioactive materials are very small, when considering that each U.S. resident receives a dose of about 300 millirem (mrem) per year from natural background radiation. With regards to expected damage to the infrastructure (e.g., roads and bridges) from transports of various wastes described in this EIS, it should be noted that the annual expected transports would be a very small fraction of what is currently occurring. As indicated in Table 4.12-4 of this EIS, the total traveled distances transported (if we were to consider round-trip transport) would be about 100,000 miles (or about 160,000 kilometers). In contrast, the average annual total vehicle-mile transports on the nation's roads are estimated to be about 3,180 billion miles (or about 5,374 billion kilometers) over the calendar years 2015 to 2018 (DOT, 2020), which indicates the transportation described in this EIS contributes less than 0.000004 percent of the total miles travelled. Hence, this contribution is essentially nonsignificant. With regards to the state-level interface, the Senior Executive Transportation Forum was established by the Secretary of Energy in January 1998 to coordinate the efforts of Departmental elements involved in the transportation of radioactive materials and waste. In response to recommendations from various DOE programs and external stakeholders, the Forum agreed to evaluate the shipping practices being used or planned for use throughout the Department, document them, and standardize them where appropriate. The results of that effort are reflected in DOE Manual 460.2-1A, *Radioactive Material Transportation Practices Manual*. This manual establishes a set of standard transportation practices for DOE organizations to use in planning and executing off-site shipments of radioactive materials, including radioactive waste. These practices establish a standardized process and framework for interacting with state, Tribal, and local authorities and transportation contractors and carriers regarding DOE radioactive material shipments. DOE Manual 460.2-1A was developed in a collaborative effort with the State Regional Groups (Western Governors Association, Southern States Energy Board, Midwest and Northeast Councils of State Governments) and tribal representatives. DOE maintains a working relationship with the State Regional Groups to address transportation planning issues as they arise. Use of the State Regional Groups ensures that concerns are addressed from one region to another when planning routing. It should be noted that, for radioactive waste transports, the carrier is responsible for the routing of the shipment in accordance with Department of Transportation 49 CFR requirements. DOE has also established the Transportation Emergency Preparedness Program (TEPP) to address concerns and help ensure Federal, state, Tribal, and local responders have access to the plans, training, and technical assistance necessary to respond to

Commenter No. 24: Tami Thatcher

match the text, it is deceptive. It appears to deliberately give the impression of timely radioactive waste disposition when in fact the spent nuclear fuel will languish in Idaho, forever. **24-19 (cont'd)**

The degree to which the 1995 Idaho Settlement Agreement is on target to be missed must be discussed in the Draft EIS. The applicability of the 1995 Idaho Settlement Agreement to the mobile microreactor spent fuel must be addressed in the Draft EIS. The disposal challenges that the TRISO fuel mobile microreactor fuel creates for a spent nuclear fuel repository must also be addressed. The degree to which the mobile microreactor project simply puts the burden on future generations, which is unacceptable, must also be addressed in the mobile microreactor Draft EIS. **24-20**

The Project Pele Flowchart used in presentations and in the Draft EIS must address the number of years that the mobile microreactor may remain fueled and the number of years of spent nuclear fuel storage. How is container or fuel design life determined to be adequate when the storage life is unknown? Such fuzzy thinking has long been the strong suit of the Department of Energy. The citizens of the region are continually inhaling Three Mile Island Unit 2 radioactive debris in the air because the Department of Energy didn't know how to confine this fuel. The citizens of the U.S. continue to pay millions of dollars every year for management of existing spent nuclear fuel from a single facility, the Fort St. Vrain gas-cooled reactor, and are on the hook for untold trillions of dollars to continue to attempt to find a way to dispose of the spent nuclear fuel this country has accumulated.

The Project Pele Draft EIS tries to hide the fact that the mobile microreactor spent nuclear fuel is going to languish in Idaho indefinitely (which could mean forever). The meaning of the dotted line in the flowchart means that it is undecided if post-irradiation examination (PIE) will actually be conducted but the Project Pele Flowchart misleads the reader as it implies that the spent nuclear fuel and all waste from the project will be dispositioned in 3 years. **24-19 (cont'd)**

Several pages away from the Flowchart, in the statement describing the temporary storage of the used mobile microreactor on page S-13 admits that "There is no defined duration for this phase. Temporary storage of at least portions of the mobile microreactor would continue until an off-site spent nuclear fuel disposal facility or geologic repository is available to accept the mobile microreactor spent nuclear fuel. "

Despite no mention of INTEC for fuel storage on the Flowchart, on page S-14, it is stated that "Any spent fuel designated for disposal would be packaged in standard casks and transferred to a storage location on the INL Site (several locations such as the Idaho Nuclear Technology and Engineering Center [INTEC] or RSWF would be capable of storing the spent fuel) pending shipment to an interim storage facility or geologic repository."

This fuel is also not covered by the Idaho Settlement Agreement. And if there were a spent fuel disposal facility, this fuel would likely be placed at the end of the line. And wouldn't any spent fuel from the deployment of mobile reactors be likely to return to languish in Idaho due to the lack of a spent nuclear fuel repository? **24-20 (cont'd)**

The Draft EIS has not stated the storage life of any storage container, nor are there any licensing requirements of the mobile microreactor or any aspect of its storage. The project is **24-2 (cont'd)**

14

24-24 (cont'd) radiological transportation accidents safely, efficiently, and effectively. TEPP focuses training and outreach along active or planned DOE transportation corridors and is coordinated with local and state officials in the affected jurisdictions. TEPP actively works with the corridor states and Tribes to provide training, planning assistance, and exercises. More information on TEPP can be found at www.em.doe.gov/otem. Contrary to the assertion in the comment, the Price-Anderson Act would compensate members of the public following a transportation accident involving DOE radioactive materials. With regards to the prototype mobile microreactor, it should be noted that the scope of this EIS is limited to the construction and demonstration of the microreactor at the INL Site. Transportation of a mobile microreactor and/or its SNF beyond U.S. borders is not a proposed action. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate design of mobile microreactors that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. The potential environmental impacts of deployment and use of these future designs, if they were to occur, would be the subject of additional future environmental analyses.

24-25 The commenter infers that Dr. Lyman's document (referenced by the commenter) states that TRISO fuel tests "had to be terminated prematurely when the fuel began to release fission products at a rate high enough to challenge off-site radiation dose limits." The Electric Power Research Institute (EPRI) report (Uranium Oxycarbide (UCO) Tristructural Isotropic (TRISO) coated Particle Fuel performance Topical Report EPRI-AR-1(NP) 2019 Palo Alto Ca) does not say that the tests were terminated due to challenging off-site dose limits. The EPRI report states that the 1,700 degree Centigrade tests were terminated due to "rapidly increasing release of fission products." The two statements are not equivalent. Releases in the test capsules are not the same as releases from the test facility. Test capsules provide containment and, should that fail, the facility used for the tests provides containment. The tests were performed at the Advanced Test Reactor, which has a ventilation system designed to limit the release of radionuclides. The EPRI report also includes the following statement regarding the performance of the TRISO fuels: "No TRISO failures were observed in any of the 1600 °C safety tests. … The combined AGR-1 and AGR-2 TRISO failure fraction at 1800 °C is $\leq 3.0 \times 10^{-4}$ at 95% confidence. … is significantly beyond peak core temperatures expected during an accident, it is noteworthy this value is still a factor of 2 below the specification for allowable failures at 1600 °C …" As data from the ASERs indicate (see summary of off-site doses in Section 3.10, *Human Health – Normal Operations*, of this EIS), the 10-mrem dose to an individual was not "challenged" as a result of this test. The response to Comment 24-12 provides a discussion of the adequacy and compliance with DOE standards of the INL monitoring program.

24-26 Effective dose is defined as the sum of the products of the equivalent dose to the organ or tissue and the tissue weighting factors applicable to each of the body organs or tissues that are irradiated. The equivalent dose is a measure of the biological damage to living tissue as a result of radiation exposure. Also known as the "biological dose," the equivalent dose is calculated as the product of absorbed dose in tissue

Commenter No. 24: Tami Thatcher

setting a course for another unsafe and irresponsible nuclear boondoggle at the Idaho National Laboratory to further burden future generations.

According to the Pele Project draft EIS, "SNF would be managed and stored at the INL Site but pending off-site shipment to a permanent repository. SNF would be managed in accordance with applicable laws and other requirements…."

In other words, the mobile-microreactor Pele Project spent nuclear fuel will be indefinitely stored at the INL because there is no SNF disposal facility on the horizon. The Department of Energy does not have a spent fuel disposal program, nor does it have a program to repackage spent nuclear fuel in Idaho or at stranded fuel sites around the country where spent nuclear fuel is stored at operating or closed commercial nuclear reactor sites.

Spent nuclear fuel management, according to a 2019 report by Sandia National Laboratory, [8] will require some combination of three options: 1) repackaging spent fuel in the future, 2) constructing one or more repositories that can accommodate DPCs [dual purpose canisters that are canisters that can be disposed of in the repository], and/or 3) storing spent fuel at surface facilities indefinitely, repackaging as needed. The report admits that current practices "are not optimized for transportation or disposal."

24-2 (cont'd)

The Sandia report downplays the technical problems we face in designing a safe repository for spent nuclear fuel. The report mentions that for a repository, post-closure criticality continues to be analyzed and the capability of predicting how fast the radionuclides will escape the repository continues to be studied.

Unlike anyone I listened to from the Nuclear Energy Institute during public comment for consolidated spent nuclear fuel storage in New Mexico, the Sandia report admits that "stress corrosion cracking of canisters may be a concern in some parts of the country, and work is ongoing in analysis, detection, and mitigation." Sandia also states that monitoring and aging management practices at storage sites will be important to confirm storage system performance during extended service.

The enrichment of fuel used in earlier commercial nuclear reactors was only about 3 percent uranium-235. With increasing enrichment comes significantly more criticality risk during spent nuclear fuel storage and disposal, should a repository ever become available.

While operating the reactor, fission products build up in the fuel that can be released during routine operation or from an accident. Every phase of Project Pele's Mobile Microreactor — from fuel fabrication, to fuel transport, to reactor transportation prior to operation, to reactor operation, to stranded spent fuel storage, to spent fuel transportation — poses the risk of harming people and contaminating communities. Although the radiological release can be far higher after the reactor has operated, even before operating a nuclear reactor, the uranium in the reactor can be dispersed upon explosion due to sabotage. Uranium is known to cause birth defects and other health problems.

24-8 (cont'd)

[8] Nuclear Energy Fuel Cycle Programs, *Spent Nuclear Fuel Storage R&D at Sandia National Laboratories*, SAND2019-1140PE, February 7, 2019. https://www.osti.gov/servlets/purl/1598436

15

24-26 (cont'd)

multiplied by a radiation weighting factor and then sometimes multiplied by other necessary modifying factors at the location of interest. International and national radiation protection guidance incorporates accepted values for all of the parameters used to estimate these quantities. Both quantities are expressed in terms of rem or sievert. From these definitions, it is apparent that the effective dose or whole body dose considers the doses to each of the organs or tissues in the body. It does not diminish or hide information but rather provides a more succinct measure of impacts. It is possible to sum the potential consequences (cancer incidence and fatality) of exposure to the individual organs. However, the use of the effective dose and the conservative dose conversion factor of 0.0006 results in an estimate of latent cancer fatalities that incorporates all of the individual types of cancers. While this does not allow for a comparison of individual cancer types, it does provide an estimate of public health impact. The impacts associated with the demonstration of the prototype mobile microreactor are population and individual doses (Section 4.10, *Human Health – Normal Operations*, of the EIS). These doses do not result in any additional latent cancer fatalities. Presentation of this impact by organ or tissue would result in the multiple presentation of zero expected latent cancer fatalities for populations and a series of smaller risk to individual numbers (summing to less than the effective dose impact.) This EIS (as is common practice in EISs) uses population and maximally exposed individual dose and latent cancer fatality as the measure of health impacts on the public. DOE recognizes that these are not the only potential impacts from radiation exposure, but latent cancer fatalities are the predominant fatality impact. Cancer incidence is also an impact, and the morbidity rate is higher than the mortality rate. The parameters used to generate the public health impacts are provided in Sections 4.10 and 4.11, *Human Health – Facility Accidents* (for normal releases and accidents). Wind data (including wind speed, direction, and stability class) for the release is based on 8 years of data (2013 to 2020) from the meteorological tower located at CITRC. Release durations are provided in these sections for normal and accident evaluations. The DOE dose limit for a member of the general public, which is 100 mrem per year from all pathways, is prescribed in DOE Order 458.1, *Radiation Protection of the Public and the Environment*. DOE orders and standards are continually reviewed to determine whether these documents and the requirements and guidance within the documents should be revised. To date, DOE has not identified a need to update the 100 mrem requirement in DOE Order 458.1. (This order was last updated in September of 2020.) The latent cancer fatality risk to an individual who receives this dose, using the 0.0006 conversion factor, is 0.00006. The 100 mrem requirement is consistent with national and international standards for the protection of the public. As the commenter states, dose impacts to different segments of the population do differ. The analysis in this EIS uses a dose-to-risk factor of 0.0006 latent cancer fatalities per rem of exposure as recommended by the Interagency Steering Committee on Radiation Standards, which is in agreement with values contained in *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (one of the reports cited by the commenter as

Commenter No. 24: Tami Thatcher

The radionuclides released for routine operations and from accidents cannot be remediated and will continue to sow seeds for birth defects, increased infant mortality, cancer and many other adverse health effects. The nuclear industry focuses primarily on cancer mortality (or death by cancer), choosing to downplay the incidence of cancer, birth defects, genetic effects, increased heart disease especially from cesium-137 and damage to the immune system especially from bone seekers such as strontium-90, plutonium-239, and americium-241. **24-8 (cont'd)**

The Department of Energy would like to give the public the idea that the "existing processes" for addressing spent nuclear fuel storage and disposal are adequate. The reality is that the Department of Energy has no repackaging facilities for continued storage of spent nuclear fuel and has no spent nuclear fuel disposal program.

The real Project Pele approach to waste management is like a song, "Tomorrow, tomorrow, there's always tomorrow…" This is the Department of Energy's approach to spent nuclear fuel management and disposal. And it generally hinges on the DOE manager's retirement being only a day away, so that it's always someone else's problem. **24-2 (cont'd)**

The Draft EIS must acknowledge that the DOE has already exceeded its allotted limit of spent nuclear fuel and HLW in Yucca Mountain. The Draft EIS must explain how after decades of promising to open a repository but failing to, that the DOE, with no repository program since 2010, is going to obtain a repository.

The Draft EIS Has Relied on Inadequate and Deeply Flawed EISs for Spent Nuclear Fuel Management and Disposal

The Draft EIS relies on out-of-date, inappropriate, now known to be inadequate Department of Energy spent nuclear fuel disposal environmental impact statements. The Draft EIS relies on the deeply flawed assumptions in other Department of Energy EISs for the management of the spent nuclear fuel (and high-level waste).

The fact is that the Department of Energy **has no spent nuclear fuel disposal program** for either its DOE-owned spent fuel or for the spent nuclear fuel from commercial nuclear power plants. Consolidated interim storage is not a substitute for a permanent solution.

The fact is that the Nuclear Waste Fund that collected fees from electricity generated by nuclear power plants has been discontinued and the $30 billion or so that it collected is not even enough money to package commercial spent nuclear fuel in disposal containers, let alone to license and construct a repository. **24-21**

The many trillions of dollars that this will cost the U.S. taxpayer to continue to seek a repository is not being opening and honestly presented, by the Department of Energy or by propaganda sessions conducted at taxpayer expense by the Idaho National Laboratory.

The Department of Energy habitually ignores state and federal laws. For example, the amount of spent nuclear fuel and HLW allocated to the DOE for the failed Yucca Mountain repository effort is limited and the DOE already has exceeded its lawful allotment. The Nuclear Waste Policy Act remains the law; it limits the quantity of spent nuclear fuel from commercial nuclear power plants to 63,000 metric tons heavy metal (MTHM), 2,333 MTHM for DOE SNF

16

24-26 (cont'd)
"showing higher risks to women and children"). The dose conversion factors used in the analysis of human health impacts are designed to estimate the impacts from radiation to a population as a whole, considering the different impacts to men, women, and children.

24-27 The INL Site environmental surveillance programs collect and analyze samples or direct measurements of air, water, soil, biota, and agricultural products from the INL Site and off-site locations in accordance with DOE Order 458.1, *Radiation Protection of the Public and the Environment*; DOE-HDBK-1216-2015, *Environmental Radiological Effluent Monitoring and Environmental Surveillance*; and DOE-STD-1196-2021, *Derived Concentration Technical Standard*. The purpose of DOE Order 458.1 is to establish requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of DOE pursuant to the Atomic Energy Act of 1954, as amended. Monitoring activities are performed to generate measurement-based estimates of the amounts or concentrations of contaminants in the environment. Measurements are performed by sampling and laboratory analysis or by "in-place" measurement of contaminants in environmental media. The INL Site environmental surveillance programs meet or exceed requirements within these governing documents and have been determined through technical review to effectively characterize levels and extent of radiological constituents in the environment and distinguish INL Site-related contributions from those typically found in the environment at background levels. The ASER describes the quality assurance program to ensure validity of results from the environmental surveillance programs. Quality assurance is an integral part of every aspect of an environmental monitoring program, from the reliability of sample collection through sample transport, storage, processing, and measurement to calculating results and formulating the report. Monitoring performed by the INL M&O contractor; the Idaho Cleanup Project Core contractor; the INL ESER Program contractor (independent from the M&O contractor); and the IDEQ INL Oversight Program demonstrate that impacts from the INL are low and consistent with the emissions reported in annual INL radionuclide NESHAP reports. DOE contractors' ambient air monitoring data are reported annually in the ASERs, which are available at https://idahoeser.inl.gov/publications.html. IDEQ's INL Oversight Program Annual Reports are available at IDEQ's INL Oversight Program website (https://www.deq.idaho.gov/idaho-national-laboratory-oversight/inl-oversight-program/).

24-28 Nowhere in this EIS is the statement made that a dose of 1,000 rem would cause no harm. The commenter is referring to a dose to a single individual over a very short time frame that would result in what is commonly called radiation poisoning. There are no such doses associated with either INL Site current operations or from the demonstration of the prototype mobile microreactor. All doses from the demonstration would be less than 1 rem.

24-29 The parenthetical notation in the acronym list (and in the table endnotes) for a rem was an editorial error and has been corrected. The definition of a rem used in this EIS

Commenter No. 24: Tami Thatcher

and 4,667 MTHM for HLW. The quantity of commercial SNF, DOE SNF, and DOE-managed HWL are each greater than DOE's allotment for the first repository. [9] But DOE hasn't obtained its first repository, which by law, would be at Yucca Mountain.

24-21 (cont'd)

The Department of Energy promised to begin disposal of spent nuclear fuel by 1998. Then came other promised dates that have come and gone. The U.S. Nuclear Regulatory Commission believed those empty promises from the Department of Energy, expecting to disposal by 1998, then 2008, and then by the first quarter of this century. [10] [11] The Department of Energy's rapidly evolving waste emplacement concepts continued to evolve as every assumption about how the repository would contain the waste didn't hold up. No utility has packaged its spent nuclear fuel into DOE's recommended "transport, aging and disposal" TAD canister. The Yucca Mountain repository concept also relies on never designed titanium drip shields that no one honestly believes are feasible to install decades after the waste is emplaced.

24-22

The Draft EIS must address that fact that the Department of Energy has no spent nuclear fuel repository program and hasn't since 2010. It must address the fact that the Department of Energy **has no credible cost estimate for the costs of disposal of now-existing spent nuclear fuel** plus the fuel from already operating reactors. Few people know that there is already more than double the amount of spent nuclear fuel (and high-level waste) than Yucca Mountain was set to legally hold. And few people know that if nuclear energy were to make a dent in climate, we would need a new Yucca Mountain every year.

While the Department of Energy's estimated releases from the proposed Yucca Mountain repository are unbelievably low, this is an artifact of reducing the water infiltration rates through the corroding waste containers. Using more realistic water infiltration rates and their variability over time results in far higher releases.

The heat load of the spent nuclear fuel placed in the repository poses a risk to the structure of the repository and the DOE never actually decided whether to use a "hot" repository or a "cool" repository design. The amount of waste and how it is spaced in the repository obviously affect the ability to cool thermally hot spent nuclear fuel.

The criticality issues for Yucca Mountain have grown substantially as the enrichment level used in commercial nuclear power plants has increased. It has also grown because YM originally was not envisioned to dispose of the Department of Energy's highly enriched fuels. And another change has been the included possibility of disposal of surplus plutonium at Yucca Mountain. The Department of Energy concedes that criticalities are possible in the repository, yet it does not address the harm to the repository or the additional spacing requirements.

Doubling the capacity of Yucca Mountain, the slated 70,000 metric tons of spent nuclear fuel and high-level waste, may seem easy, when only the fraudulent radionuclide trickle-out radiation

[9] U.S. Nuclear Waste Technical Review Board (NWTRB), Management and Disposal of U.S. Department of Energy Spent Nuclear Fuel. Arlington, December 2017. See p. 15.

[10] Nuclear Regulatory Commission, 10 CFR 51, Waste Confidence-Continued Storage of Spent Nuclear Fuel, Federal Register, Vol. 78, No. 178, September 13, 2013.

[11] Blue Ribbon Commission of America's Nuclear Future. 2012. (It uses 2010 estimates for spent fuel quantities) www.brc.gov

17

24-29 (cont'd)

is correct. The information provided by the commenter is additional information but does not invalidate the definition as provided by this EIS.

24-30 DOE takes its responsibility for the safety and health of the workers and the public seriously. The impact of radiation on humans is a subject of continuing research, including efforts supported by DOE. DOE regulations are based on guidance from the agencies identified in Section 4.10, *Human Health – Normal Operations*, including the ICRP, the National Council on Radiation Protection and Measurements, and the National Research Council and National Academy of Sciences. These agencies continually assess and update radiological protection information. When their recommendations change, DOE would assess the need to modify their regulations and requirements and update as appropriate. The modeling of health risks in this EIS uses methodologies accepted by DOE and other agencies. In this EIS, emission and release data from both normal operations and accidents are developed from the best available data (annual reports for existing operations using accepted analytical methods for estimates of prototype mobile microreactor emissions), accepted and quality-assurance-reviewed dispersion and exposure codes, and the accepted dose conversion models for the estimation of human health impacts.

24-31 DOE takes its responsibility for the safety and health of the workers and the public seriously; but, prior INL epidemiology studies are not within the scope of this EIS. The Energy Employee Occupational Illness Compensation Program is administered by the Department of Labor with DOE and the Department of Health and Human Services, specifically NIOSH. The Department of Labor has the primary responsibility to administer the program. Dose reconstruction is the responsibility of NIOSH. The DOE role in the program is informative. DOE responds to requests for facility and worker records (over 15,000 such requests per year, which may cover worker information from multiple facilities); requests for site characterization and research (typically responding to four or five such requests at any one time); and requests about issues for specific facilities (over 300 facilities covered, with many being private company facilities; considered large-scale requests that could involve researching information for multiple facilities over multiple decades). DOE has an extensive staff who work in a transparent manner assigned to support the Energy Employee Occupational Illness Compensation Program. DOE strives to provide timely and accurate responses to the Department of Labor and NIOSH requests for information. The comments regarding worker training are not within the scope of this EIS. The commenter is correct that the regulatory limit for worker dose is 5 rem per year (10 CFR 835, *Occupational Radiation Protection*). However, DOE has established an administrative control limit of 2 rem per year (DOE-STD-1098-2017, *Radiological Control*), and the INL Site has established an administrative limit of 700 mrem per year. The dose model used in the evaluation used the linear no-threshold model, so doses below 400 mrem are modeled as having a statistical likelihood of resulting in a latent cancer fatality.

24-32 Section 3.4.4, *Radiological Air Emissions and Standards*, of this EIS describes the radiological air emissions from INL. EIS Section 3.10, *Human Health – Normal Operations*, describes the impacts of INL emissions on human health. As described in

Commenter No. 24: Tami Thatcher

doses are reviewed but in reality, is far more problematic. The slated capacity of Yucca Mountain already required skirting around seismic faults and required 40 miles of underground tunnels. **24-22 (cont'd)**

U.S. Nuclear Regulatory Commission Chairman Kristine Svinicky recently characterized the nation's growing inventory of spent nuclear fuel as having a volume that would fit in a football field. That the head of the agency that would grant a license to the Department of Energy's proposed Yucca Mountain repository would omit the realities of the difficulties of safely containing the spent nuclear fuel is very telling of the mindset of the NRC. The NRC wants to grow nuclear energy no matter the cost to rate-payers, taxpayers, or to humanity. All the NRC has to do is sign off that they believe the DOE's safety case for repository provides a "reasonable expectation" of meeting stipulated requirements.

An online briefing "What Congress Needs to Know About Pending Nuclear Waste Legislation" was held November 13, 2020 by the Environmental and Energy Study Institute, with guest speakers Robert Alvarez, Institute for Policy Studies; Don Hancock, Southwest Research and Information Center; and Diane D'Arrigo, Nuclear Information and Resource Service to explain hazards associated with spent nuclear fuel and history pertaining to the Nuclear Waste Policy Act. [12]

The State of Nevada was attentive to the DOE's rapidly changing disposal concepts and the many times that technically indefensible studies were used to form the basis for how long it would take the waste containers to corrode and how long it would take radionuclides from the waste to migrate to groundwater.

The Draft EIS cites various DOE EISs that are grossly inadequate as well as inconsistent in every essential aspect related to the spread of radiological material and the harm. The Yucca Mountain safety evaluations assumed 0.9999 efficiency for HEPA filters and that there would be no releases from spent fuel stored outdoors and without HEPA filtering. The Yucca Mountain safety evaluations have used fraudulent and unscientific water infiltration modeling to lower predicted doses from the migration of radionuclides from the disposed of waste. The Yucca Mountain EIS assumes the design of spent fuel canisters, the "TADs," that have not been used for commercial spent nuclear fuel storage **24-2 (cont'd)**

When the Department of Energy twice proposed a disposal container for the commercial nuclear power plant owners to use, they ignored it. The electrical utilities would choose cheaper canister designs not intended for disposal because they planned on it becoming the Department of Energy's problem. And this means that the problem would be solved at the expense of the U.S. taxpayer. And the U.S. Nuclear Regulatory Commission did everything in its power to limit the utilities' costs.

The U.S. Nuclear Regulatory Commission claims to have accepted the highly speculative safety case for DOE's proposed Yucca Mountain, yet no construction license was ever issued. **24-22 (cont'd)**

[12] Environmental and Energy Study Institute (EESI) briefing at https://www.eesi.org/briefings/view/111320nuclear#RSVP and see "Yucca Mountain in Brief at https://www.eesi.org/files/Letter_to_Congress-Yucca_Mountain_in_Brief.pdf

18

24-32 (cont'd)

EIS Section 3.10.1, *Radiation Exposure and Risk*, all of the doses to the maximally exposed individual (MEI) from the operations at the INL Site are well below the DOE dose limit of 100 mrem per year for a member of the general public, and the dose from the air pathway is well below the NESHAP dose limit of 10 mrem per year for emissions from DOE facilities. As described in Section 4.3, *Water Resources*, of this EIS, construction and demonstration of the prototype microreactor at INL would not discharge contaminated effluent directly to surface or groundwater. In addition, as described in EIS Section 4.10, *Human Health – Normal Operations*, air emissions would be very small and, therefore, would not contaminate the ground surface or infiltrate through soil and rock to the groundwater. Radiological emissions and doses from off-site facilities are monitored as part of background and considered as part of the cumulative impacts analysis presented in Chapter 5, *Cumulative Impacts*, of this EIS. As summarized in EIS Section 5.4, *Conclusion*, the incremental impacts for all resource areas from Project Pele activities would be very small and would not substantially contribute to cumulative impacts.

24-33 The comments on the varying opinions of the effects of radiation are not within the scope of this EIS. The commenter has misinterpreted the statements by Dr. Valentin, who was speaking to the uncertainty associated with the dose conversion numbers, not the average value. The statement does not mean that the risks are higher than would be estimated by using the values suggested by the ICRP. DOE does not ignore scientific evidence for the health effects from radiation. As needed, DOE updates its radiological protection requirements to implement requirements consistent with the latest approved information from the ICRP, the National Research Council and National Academy of Sciences, and the EPA (e.g., use of FGR 13 data and models). The DOE dose limit for a member of the general public, which is 100 mrem per year from all pathways, is prescribed in DOE Order 458.1, *Radiation Protection of the Public and the Environment*. DOE orders and standards are continually reviewed to determine whether these documents and the requirements and guidance within the documents should be revised. To date, DOE has not identified a need to update the 100 mrem requirement in DOE Order 458.1. (This order was last updated in September of 2020.) The latent cancer fatality risk to an individual who receives this dose, using the 0.0006 conversion factor, is 0.00006. The 100 mrem requirement is consistent with national and international standards for the protection of the public. The commenter's statement that this EIS presentation of dose distorts the doses (and therefore presumably the consequences of those doses) is incorrect. It is well known that different organs respond differently to radiation, a point the commenter has made. The use of effective dose is an accurate and accepted means (by organizations including the ICRP and the National Research Council and National Academy of Sciences) to quantify radiological health impacts. With regard to radiation exposure to a developing child in utero, the Centers for Disease Control and Prevention (CDC) (2011) states a dose that is equivalent to 500 chest x-rays, the equivalent of 5 rem (the dose from a single chest x-ray is about 10 mrem), would increase the lifetime risk of cancer for that child by about 2 percent (CDC 2011, Radiation and Pregnancy: A Fact Sheet for the Public). The CDC does not identify any non-cancer health effects

Commenter No. 24: Tami Thatcher

Current law prohibits consolidated interim storage about 10,000 metric tons (MT). Despite this, the U.S. NRC is planning to license two far larger consolidated interim storage facilities for spent nuclear fuel. One facility is in New Mexico and the other in Texas.

24-23

Many electrical utilities are seeking to move their spent nuclear fuel away from places the U.S. NRC never should have allowed the spent fuel to be "indefinitely" stored: ocean coastlines and lake shores, among them. These consolidated interim storage sites are planning to accept spent nuclear fuel in non-disposable containers. The proposed consolidated interim storage facilities will have no capability for repackaging a damaged canister, nor repackaging for disposal if a repository were found. And importantly, the Nuclear Waste Policy Act sought to prevent consolidated storage that would have the effect of lessoning the effort to attain a permanent solution for the permanent isolation of the radioactive waste, which remains radio-toxic for millennia.

To help the SONGS utility understand their options for moving their spent fuel farther from the California coastline, they have hired a consultant, North Wind. A tangled web of possibilities was presented at a public meeting for the San Onofre spent fuel but currently there is no place to move their spent nuclear fuel to. [13]

The utility is also concerned that the full costs of transportation and storage may not be fully reimbursable from the Judgment Fund from the litigation with the Department of Energy's partial breach of contract in failure to start disposing of the spent nuclear fuel from commercial nuclear power plants. Also, it was pointed out that utility customers may not be fully shielded from liability for accidents involving storage of spent nuclear fuel at private storage facilities. Utilities want the Department of Energy to take ownership of the spent nuclear fuel. But the Department of Energy has no place to put it. The Nuclear Waste Policy Act of 1982 and amended in 1987 sought specifically to avoid letting up the pressure on the Department of Energy to obtain permanent, safe disposal of spent nuclear fuel. The DOE was restricted from obtaining interim spent fuel storage unless it had obtained a license for a facility for permanent disposal.

Both the U.S. NRC and the Department of Energy are touting consolidated interim storage as though it were equivalent to obtaining a permanent solution for isolating the radioactive waste. They know that repackaging will be needed, acknowledged to be needed every one hundred years or so. Yet both proposed consolidated storage facilities the NRC is planning to approve this year do not have any canister repackaging or isolation capability.

So why would the U.S. NRC be ready and willing to license two consolidated interim storage facilities that by design will not include any capability to repackage damaged canisters? The answer that the U.S. NRC has given is that the situation is similar to the spent fuel facility it licensed in Utah but which was never built. The U.S. NRC said that the Private Fuel Storage facility in Utah did not need any repackaging capability because if a canister of spent nuclear fuel was damaged, it would be sent back to the licensee that generated the waste.

[13] San Onofre Nuclear Generating Station (SONGS), 11/20/20, North Wind slide presentation https://www.songscommunity.com/_gallery/get_file/?file_id=5faf01792cfac225d3c64352&ir=1&file_ext=.pdf

19

24-33 (cont'd)
from doses of less than 10 radians to the embryo or fetus. Doses to members of the public from prototype mobile microreactor demonstration activities at the INL Site are well below these doses and are not expected to result in any fatalities or health effects.

24-34 The scope of this EIS is limited to construction and demonstration of the prototype mobile microreactor. Worker training and public education regarding the impacts of radiation on health is not within the scope of this EIS. DOE takes its responsibility for the safety and health of the workers and the public seriously. DOE does not ignore scientific evidence for the health effects from radiation. As needed, DOE updates its radiological protection requirements to implement requirements consistent with the latest approved information from the ICRP, the National Research Council and National Academy of Sciences, and the EPA. Education and training requirements, including those for safety and radiation protection, are commensurate with job functions.

24-35 Activities at INL are performed in accordance with all applicable laws, regulations, permits, and agreements. As described in Section 3.4.4, *Radiological Air Emissions and Standards*, airborne radiological effluents are monitored at individual facilities at the INL Site to comply with the requirements of NESHAP and DOE Order 458.1, *Radiation Protection of the Public and the Environment*. NESHAP (40 CFR 61), Subpart H, *National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities*, limits the radionuclide dose to a member of the public to 10 mrem per year from the air pathway. The specifics of how laws, regulations, and permits are enforced, as well as the adequacy of radiation protection standards, are outside the scope of this EIS. See Comments 24-11 and 24-12 for more detailed responses to comments about radiation protection standards.

24-36 Prior epidemiology studies are not within the scope of this EIS. DOE does not ignore scientific evidence for the health effects from radiation. As needed, DOE updates its radiological protection requirements to implement requirements consistent with the latest approved information from the ICRP, the National Research Council and National Academy of Sciences, and the EPA (e.g., use of FGR 13 data and models). For the public and environment, these requirements flow to several DOE orders and standards (e.g., DOE Order 458.1, *Radiological Protection of the Public and the Environment*). For workers, DOE provides multiple levels of progressively more restrictive dose limits in its requirements and orders to lower individual site restrictions, from the 5-rem-per-year limit imposed under 10 CFR 835 to the 2-rem-per-year administrative limit in DOE-STD-1098-2017, *Radiological Control*.

24-37 Three of the requested documents were provided via email on October 28, 2021. The remaining document (ECAR-5162) was included in the Draft EIS in error. This document was not used as a basis for this EIS and is not in the Final EIS; therefore, it was not provided.

24-38 DoD and DOE would direct and monitor Project Pele activities. Project Pele activities, including SNF management, would be performed in accordance with all applicable laws, regulations, permits, and agreements. The very small quantity of SNF that would

Commenter No. 24: Tami Thatcher

This is important to understand, as the Department of Energy is actively promoting nuclear energy and failing to mention its continuing failure to find a permanent solution to safety isolate the spent nuclear fuel (and high-level waste) and failing to discuss the problems of short-sighted consolidated interim storage that the U.S. NRC is ready to approve. The challenges of spent nuclear fuel disposal are greater now than they were assumed to be 40 years ago. In fact, the technology to safely isolate these radioactive wastes from our air, soil and water has not been found and this is whispered by the U.S. Nuclear Waste Technical Review Board.

The ridiculousness of the NRC's argument that the consolidated storage facilities have no need for repackaging capability because they would just require the waste to be returned to the utility that generated it shows the extent of nonsensical lying the agency is prone to. A damaged canister cannot be legally shipped. And spent nuclear fuel being sent to a consolidated storage site may have shut down its reactors and decommissioned all its facilities. The NRC's argument that the compromised canister would simply be shipped back to the utility that generated the spent nuclear fuel is utterly absurd. But this is the quality of thought that the NRC has put into much of its licensing and its "waste confidence" rule and its subsequent environmental impact statement for continued storage of spent nuclear fuel. The NRC gave up on trying to keep track of the latest promised date that a repository would be available and now assumes that a repository will become available "when needed." The NRC also assumes that the facilities to repackage the spent nuclear fuel, every 100 years or so, will also become available "when needed." And it simply isn't the NRC's problem what the cost is, or who pays for it, as long as it is not one of its licensees, the electrical utilities who operated nuclear reactors.

24-23 (cont'd)

The technology to repackage the spent nuclear fuel canisters used prevalently by commercial nuclear power plants does not exist. It is recognized that these operations will pose many worker risks and radiological release risks as well as billions of dollars in cost. The disposal canister designs do not exist. And the capability to terminate the radiological release from a damaged canister does not exist. This is problem for the U.S. NRC who assumes no liability for the releases. And actually, the U.S. NRC undermines the radiological monitoring where spent nuclear fuel is stored so that citizens won't know that actual release levels either.

The Draft EIS fails to mention that the Department of Energy has no designed disposal canister for its spent nuclear fuel, for disposal at the repository that the DOE has long promised but, in fact, does not exist, and was never licensed or constructed.

The Department of Energy is rushing to create more spent nuclear fuel, both DOE-owned SNF and new kinds of commercial spent nuclear fuel, while ignoring the problems we already face from decades of spent nuclear fuel accumulation. Each new variety of spent fuel cladding type, enrichment type, burnup and design require new storage and disposal analyses and designs, and more indefinite storage facilities, which fall to the U.S. taxpayer to fund

Project Pele Draft EIS May Leave Citizens Uncompensated for Transportation Accidents and Facility Accidents

24-24

As a country, we have not found the money to keep up with normal and expected repair of our crumbling roads, railways and bridges. Bridge and railway accidents have increased during the last twenty years, as has the severity of fires involved with railway transport of oil.

20

24-38 (cont'd)

be generated under the Proposed Action would be safely stored at the INL Site in compliance with regulations and other agreements until transported to an interim storage facility or permanent repository. Please see Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information. Activities at other DOE sites such as the Hanford Site and Savannah River Site and cleanup of existing contamination are outside the scope of this EIS. See Comment 24-42 for a response to comments about previous incidents at INL and the Waste Isolation Pilot Plant (WIPP). See Comments 24-11, 24-12, and 24-33 for a response to comments about radiation protection standards and epidemiology. Concerns about the Energy Employees Occupational Illness Compensation Program Act are outside the scope of this EIS.

24-39 In January 2005, as part of the transition to Battelle Energy Alliance, LLC (BEA) assuming responsibility for operating INL, all of the Argonne National Laboratory-West nuclear safety documents were reviewed by an independent group of nuclear safety professionals associated with the new INL M&O contractor (BEA), the DOE-ID facility line management, and nuclear safety subject matter experts. The results of the reviews indicated the state of Argonne National Laboratory-West nuclear safety documentation was not in concert with the expectations for an approved nuclear safety document and did not fully satisfy the safe harbor provisions of 10 CFR Part 830, Subpart B, *Safety Basis Requirements*. Steps taken to rectify this issue included the following:

• DOE-ID documented the identified issues in a vulnerability assessment issued in January 2005.
• Documented Safety Analysis (DSA) issues were subjected to a Potentially Inadequate Safety Analysis (PISA) process as part of an MFC Unreviewed Safety Question (USQ) process.
• Actions from a USQ resolution plan were incorporated into the Safety Evaluation Report (SER) as part of the DOE-ID Nuclear Safety Basis Approval.
• These USQ controls were implemented as technical-safety-requirement-level controls.
• DOE identified additional DOE-directed controls that were incorporated through an approved DOE-ID SER.
• BEA incorporated an Integrated Safety Management System that followed DOE G 450.4-1B, *Integrated Safety Management Systems Guide,* and 48 CFR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*. The Integrated Safety Management Systems described the safety management programs used to protect workers, the public, and the environment.
• BEA developed and DOE approved safety performance measures, objectives, and commitments that were tracked by senior DOE management to monitor the contractor's performance to these commitments. These commitments included nuclear-safety-related performance measures.
• A DOE vulnerability assessment informed the development of a DOE management control plan, resulting in a review of nuclear safety management practices at the MFC.

Commenter No. 24: Tami Thatcher

Yet the nuclear promotors want to greatly increase the transportation of nuclear waste and often in larger and heavier containers. The Price Anderson Act does not compensate citizens for radiological releases from transportation accidents that may result in contaminated homes, property, businesses and shortened life spans and disease. The radiological contamination could be severe, despite assertions and active government-sponsored propaganda campaigns to the contrary.

The legal and liability ramifications of a transportation accident of a mobile microreactor and/or its spent nuclear fuel beyond U.S. borders is a show-stopper for the mobile microreactor that the advertising in the Draft EIS has not included.

24-24 (cont'd)

Project Pele's Duck Soup Problem

The draft EIS is full of deception and a good example is its statements about waterfowl ingestion. The Draft EIS states that the dose in millirem per year from "consumption of waterfowl" is an average of 0.12 mrem/yr, which is based on the Department of Energy's environmental surveillance program. What the draft EIS did not say when it presented the estimated radiation dose from ingestion of waterfowl (page 3-40) is important.

The draft EIS does not state that this is dose is from eating one duck. If you were to eat one duck that has visited a radioactive waste pond at the INL and it is assumed that you only eat one 8-ounce portion of the meat, per year. And it is assumed that you cannot have made bone broth or gravy with the bones present. If you did, you would get a far higher dose from radionuclides such as the plutonium, americium-241 and strontium-90. The draft EIS hides the truth of the possible radiation dose from consuming waterfowl in the region.

The INL has continued to release radionuclides to the air within 50 miles of the lab with radionuclides including iodine-131, iodine-129, americium-241, strontium-90, cobalt-60, plutonium-238, plutonium-239, ruthenium-103, cesium-134 and cesium-137 and many others. And while doing so, has continued to insinuate that all the radionuclides are from former nuclear weapons testing or some other mysterious source. A study published in 1988 found the mallard ducks near the ATR Complex percolation ponds at the Idaho National Laboratory to be full of transuranic radionuclides including plutonium-238, plutonium-239, plutonium-240, americium-241, curium-242 and curium-244. [14] An employee who I knew had the habit of jogging around the radioactive waste ponds at lunchtime. He died of liver cancer in his 50s. This health-

24-13 (cont'd)

[14] O. D. Markham et al., Health Physics, "Plutonium, Am, Cm and Sr in Ducks Maintained on Radioactive Leaching Ponds in Southeaster Idaho," September 1988. https://pubmed.ncbi.nlm.nih.gov/3170205/ (This study evaluated the concentrations of strontium-90, plutonium-238, plutonium-239, plutonium-240, americium-241, curium-242 and curium-244 in the tissues of mallard ducks near the ATR Complex reactive leaching ponds at the Idaho National Laboratory. It found the highest concentrations of transuranics occurred in the gastrointestinal tract, followed closely by feathers. Approximately 75%, 18%, 6% and 1% of the total transuranic activity in tissues analyzed were associated with the bone, feathers, GI tract and liver, respectively. Concentrations in the GI tracts were similar to concentrations in vegetation and insects near the ponds. The estimated total dose rate to the ducks from the Sr-90 and the transuranic nuclides was 69 millrad per day, of which 99 percent was to the bone. The estimated dose to a person eating one duck was 0.045 mrem. The ducks were estimated to contain 305 nanoCuries of transuranic activity and 68.7 microCuries of strontium-90.)

21

24-39 (cont'd)

- DOE-ID created an approved Action Plan as required by DOE Order 413.1A, *Management Control Program*. MFC DSA upgrade and implementation activities were tracked as part of the Action Plan, which included a DOE and BEA agreed-upon MFC facility prioritization for the MFC DSA upgrade plan.
- The MFC DSA upgrade effort and implementation provided an upgraded MFC facility DSA that was fully compliant with 10 CFR Part 830, Subpart B, and provided the closure action for the MFC PISA and USQ identified during the INL transition reviews.
- In early February 2007, DOE-ID lead two reviews on MFC Hazard Category 2 and 3 facilities that focused on prioritization of the DSA upgrades and provided an analysis of the adequacy of the existing controls.

As part of the DOE-directed changes from the SER on the MFC DSA USQ, greater emphasis was placed on the identification, operation, and maintenance of safety significant (SS) and safety class (SC) structures, systems, and components (SSCs). DOE-ID personnel developed criteria, review, and approach documents for the conduct of focused reviews on selected MFC facility SS-SSCs and SC-SSCs. These focused reviews ensured that the relied-upon safety systems were operating and being maintained consistent with DSA assumptions and descriptions. BEA conducted reviews focused on the MFC facility SSCs anticipated for selection as SC or SS in the upgraded MFC DSA that was relied upon in existing facility DSAs approved for their safety function. These reviews served two functions: (1) they verified that the performance criteria of the existing facility DSAs were satisfied, and that surveillance and maintenance activities were complete, to ensure long-term operability; and (2) they identified additional SSCs that would be necessary for safe facility operations, if any, over the currently identified SSCs. These reviews provided additional information as to the adequacy of the existing control set and if any additional controls were needed for current facility operations. These activities and reviews contributed to the hazard control development for the MFC DSA upgrade effort and implementation for each of the MFC nuclear facilities. While the USQ and PISA issues were resolved during the upgrade and implementation period of 2005 through 2018, MFC nuclear facility operations were compliant with 10 CFR Part 830, Subpart B, and DOE orders and were safe for facility workers, collocated workers, members of the public, and the environment. DOE-ID and BEA conducted and completed activities to identify potential vulnerabilities with existing MFC nuclear facility DSAs. The follow-on corrective actions, which are approved by the DOE-ID Safety Basis Approval Authority, bridged any gaps identified and ensured facility operations were bounded by the nuclear safety envelope and were compliant with applicable laws and regulations. DOE-ID and BEA also reviewed the relied-upon facility hazard control sets and ensured that equipment that satisfies a DSA-identified safety function performs as intended. These actions related to the 11 MFC nuclear facility safety basis documents ensured that facility operations remained safe for human health and the environment and were appropriately described and approved by DOE. After the November 8, 2011, plutonium contamination accident involving 30-year-old legacy materials at the Zero Power Physics Reactor, the DOE Office of Health, Safety and Security conducted a

Commenter No. 24: Tami Thatcher

conscious non-smoker was told, like the rest of us, that the radioactivity in the ponds was mainly tritium and was of no health concern what-so-ever. **24-13 (cont'd)**

Project Pele's Draft EIS Does Not Address Existing INL Radiological Releases From TRISO Fuel Testing

Edwin Lyman, Union of Concerned Scientists, calls out increased fission product releases from the Idaho National Laboratory's Advanced Reactor Test due to testing of TRISO fuel. Elevated fission product releases were discussed in TRISO fuel presentations for the fourth quarter of 2019. [15] [16] No one in Idaho learned of these releases from the Department of Energy or Idaho Department of Environmental Quality environmental monitoring.

The TRISO fuel released fission products to the skies of southeast Idaho from the INL's Advanced Test Reactor, which had to terminate the testing or exceed 10 mrem annual doses from INL radiological airborne effluents.

24-25

The environmental monitoring at the INL reveals very elevated radionuclides in air, with far higher gross beta levels detected on the INL site at the Experimental Field Station. Correspondingly, there are missing weeks of air monitoring data at Howe, Idaho, north of the Advanced Test Reactor.

The quarterly reports for 2020 show that the State of Idaho's environmental monitoring program for air monitoring in Idaho Falls did not collect any radiological air monitoring data from July 1 to September 18 in 2020. [17]

Despite having some strong program elements, the Idaho Department of Environmental Quality can be counted on to downplay or to not discuss elevated detections of radionuclides in its air monitoring program. I was sad to observe how hard the Idaho DEQ is trying to not acknowledge elevated radiological detections and to not attribute elevated radiological detects to the Idaho National Laboratory when the radiological contamination is certainly due to INL operations. The Department of Energy has stated that it funds the Idaho DEQ's environmental monitoring program; but, even so, the citizens of Idaho expect the Idaho DEQ's program to have some integrity.

[15] Edwin Lyman, Union of Concerned Scientists, "Advanced" Isn't Always Better – Assessing the Safety, Security, and Environmental Impacts of Non-Light-Water Nuclear Reactors, March 2021. https://www.ucsusa.org/sites/default/files/2021-05/ucs-rpt-AR-3.21-web_Mayrev.pdf

[16] Joe Palmer, Idaho National Laboratory, Presented at the Gas-Cooled Reactor Program Annual Review July 14, 2020 via Videoconference from the Idaho National Laboratory, *AGR-5/6/7 Irradiation Summary as of the End of Cycle 167A*, https://art.inl.gov/Meetings/GCR%20Program%20Review%20July%202020/Presentations/Session%202/04_PALMER_AGR%205-6-8%20Irradiation%20Summary.pdf Plots huge increase in gamma counts from the end of Cycle 166A, around September 30 through October 7, 2019. Maximum 95,535.81 counts per second.

[17] See the rarely trended and ever-shrinking set of INL environmental monitoring reports by the Idaho Department of Environmental Quality as decades of monitoring reports are no longer online at https://www.deq.idaho.gov/idaho-national-laboratory-oversight/inl-oversight-program/monitoring-activities/

22

24-39 (cont'd)

detailed accident investigation and prepared an Accident Investigation Report. The Accident Investigation Report included 18 Judgement of Need conclusions for actions where BEA and/or DOE-ID needed to improve. In response to the incident and the Accident Investigation Report, BEA and DOE-ID developed a Corrective Action Plan and have tracked and completed the corrective actions. DOE-ID and BEA have made substantial safety improvements at the MFC and INL since the unfortunate 2011 plutonium inhalation incident at the Zero Power Physics Reactor. It is not the purpose of this EIS to provide an encyclopedic history of the INL Site nor pass judgement on past activities. The purpose of Chapter 3, *Affected Environment*, is to provide existing environment information. The data for the most recent years of operation are most reflective of that environment.

24-40 The cumulative impacts of past, present, and reasonably foreseeable future actions are evaluated in Chapter 5, *Cumulative Impacts*, of this EIS. As summarized in Section 5.4, *Noise*, of this EIS, the incremental impacts for all resource areas from Project Pele activities would be very small and would not substantially contribute to cumulative impacts. Because the impacts of construction and demonstration of the prototype mobile microreactor at the INL Site are very small, they would not substantially contribute to cumulative impacts and do not require further analysis. The extent of the cumulative impacts analysis provided in this EIS is commensurate with the anticipated level of impact from the Proposed Action under consideration. This is consistent with Council on Environmental Quality's instruction that agencies "focus on significant environmental issues and alternatives" (40 CFR 1502.1) and discuss impacts "in proportion to their significance" (40 CFR 1502.2(b)). The surveillance program at INL meets all applicable requirements. Please see response to Comment 24-12 for additional information about concerns related to the environmental surveillance program. The MEI locations for many projects at the INL Site are different and are different from the MEI used for NESHAP analysis. The dose to the MEI presented in Chapter 5 of this EIS has been conservatively estimated by including all MEI doses from current and reasonably foreseeable actions. Most of the information referenced by the commenter on the impacts of past, present, and reasonably foreseeable future actions at INL was also presented in the Versatile Test Reactor (VTR) EIS in Table 5-8, which is referenced in this EIS. Please see the VTR EIS for a description of the information presented. As noted in the VTR EIS, DOE recognizes that different projects would have different MEIs. As stated in the VTR EIS, the doses were conservatively assumed to impact the same individual. This results in higher doses to the hypothetical MEI than would be physically possible.

24-41 DoD and DOE take their responsibility for the safety and health of the workers and the public seriously, and DOE has managed activities at INL in accordance with regulations. Worker and public safety are DOE's and SCO's highest priority, and workers at DOE and military sites are highly trained in performing their jobs. DOE and the military require programs and controls to ensure that workers have a safe work environment. Education and training, including safety and radiation protection requirements, are

Commenter No. 24: Tami Thatcher

Project Pele's Draft EIS Failure to Acknowledge Far Higher INL Releases Over the Last Twenty Years

The DOE greatly increased, sometimes by ten-fold or more, its releases of strontium-90, cesium-137, americium-241, and other radionuclides since 2000, above the levels of the 1990s. With the increase with INL's radionuclide airborne waste (effluent) emissions, the DOE's environmental surveillance contractor **raised the bar defining what would be considered a positive detection of radioactivity** in a sample.

Sample results that were solidly indicating radiological contamination could then be discarded as "not detected." The bar was raised to require the result to be three standard deviations above the mean result, rather than 2 standard deviations. This greatly reduces the probability of a false detection but allows the error of "failure to detect the radionuclide when it is present" to be as high as 50 percent.

And even when that wasn't good enough, the environmental surveillance program sometimes **would degrade its stated goal for detection capability**. For example, they raised the iodine-131 detection capability in milk from 1 picocurie per liter (pCi/L) to 3 pCi/L for several years, as these release of iodine-131 were increased. When an environmental surveillance program says nothing was detected, it has long been understood that it is imperative to state the monitoring program's specified detection capability, usually expressed in terms of minimum detectable concentration. But it has become increasingly common for the DOE's monitoring program and the Idaho DEQ's monitoring program not to disclose their specified minimum detectable concentration, the a priori level, or the actually attained minimum detectable concentration.

24-13 (cont'd)

The Draft EIS mischaracterizes the escalating radionuclide releases by the Idaho National Laboratory by selected years discussed. And it mischaracterizes the trends for the estimated radiation doses from INL airborne radiological releases. Importantly, the Draft EIS ignores the already greatly increased airborne waste (effluents) that have been projected in Table 6 based on the Department of Energy's DOE/EA-2063.

The Prototype Mobile Microreactor draft Environmental Impact Statement [18] states the following, which is correct:

"Facilities at the INL Site have the potential to emit radioactive materials and, therefore, are subject to NESHAP, Subpart H, *National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities* (EPA, 2021d). This regulation limits the radionuclide dose to a member of the public to 10 millirem per year from the air pathway. Subpart H also establishes requirements for monitoring emissions from facility operations and analyzing and reporting of radionuclide doses. Airborne radiological effluents are monitored at

[18] The Department of Defense (DoD), acting through the Strategic Capabilities Office (SCO) and with the Department of Energy (DOE) serving as a cooperating agency, announces the availability of the Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement. The Draft EIS is available at https://www.mobilemicroreactoreis.com.

23

24-41 (cont'd) commensurate with job functions. Past microreactor experience and knowledge gained from the Army Nuclear Power Program provides information about operating microreactors. The operating conditions described for the Stationary Low-Power Reactor Number One (SL-1) reactor would not be allowed under present DOE safety regulations. Section 3.11.1, *Emergency Preparedness*, of this EIS addresses DOE's program for emergency preparedness and DOE's commitment to maintain and improve the program. The purpose of this EIS is to assess the environmental impacts of the Proposed Action. The scope of this EIS is limited to the construction and demonstration of the prototype mobile microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. The potential environmental impacts of deployment and use of these future designs, if they were to occur, would be the subject of additional environmental analyses. SCO used state-of-the-art science, technology, and expertise to assure quality in the accident impacts analyses. Personnel with many years of experience performed the accident analyses using state-of-the-art computer programs approved for use by DOE and the NRC. Section 4.11, *Human Health – Facility Accidents*, of this EIS includes a comprehensive assessment of potential impacts from prototype mobile microreactor accidents that could result during all phases of the project, from initial construction through decommissioning of the project and disposal of materials. The section presents the analysis of impacts from potential radioactivity releases as a result of microreactor accidents, along with cumulative impacts. The doses for each of the analyzed accidents are significantly below regulation limits and present a minimal impact to workers and the public.

24-42 Both DOE and SCO disagree with the assertion that emergency preparation for site emergencies and emergency radiological monitoring during and after the emergency is inadequate. DOE takes its responsibility for the safety and health of the workers and the public seriously and has managed activities at INL in accordance with regulations. Worker and public safety are DOE's and SCO's highest priority, and workers at DOE and military sites are highly trained in performing their jobs. DOE and the military require programs and controls to ensure that workers have a safe work environment. Education and training, including safety and radiation protection requirements, are commensurate with job functions. Section 3.2.3, *Radiological Monitoring of Soils*, of this EIS addresses radiological monitoring, and Section 3.11.1, *Emergency Preparedness*, of this EIS addresses DOE's program for emergency preparedness and commitment to maintain and improve the program. See response to Comment 24-12 for a discussion of radiological monitoring at INL. The purpose of this EIS is to assess the environmental impacts of the Proposed Action. The scope of this EIS is limited to the construction and demonstration of the prototype mobile microreactor at the INL Site.

24-43 Project Pele activities would be performed in accordance with all applicable laws, regulations, permits, and agreements. Activities at other DOE sites, such as the

Commenter No. 24: Tami Thatcher

individual facilities at the INL Site (including MFC) to comply with the requirements of NESHAP and DOE Order 458.1, *Radiation Protection of the Public and the Environment* (DOE, 2020b)."

In reality, there is inadequate monitoring at INL facilities and radionuclide releases are only guesstimated. But then the draft EIS states:

"Radionuclide emissions at the INL Site occur from (1) point sources, such as process stacks and vents; and (2) fugitive sources, such as waste ponds, buried waste, contaminated soil areas, and D&D operations. During 2019, an estimated 1,611 curies of radioactivity were released to the atmosphere from all INL Site sources (DOE-ID, 2021c). This level of release is within the range of releases from recent years and is consistent with the general downward trend observed over the past 10 years. For example, reported releases for 2010 and 2015 were 4,320 curies and 1,870 curies, respectively."

There is a general downward trend in the curie amounts of radionuclides over the last ten years; however, **the releases over the last twenty years have generally been higher than the releases during the 1990s**, see Figure 1. The DOE isn't about to discuss the increasing radionuclide releases that commenced in 2001.

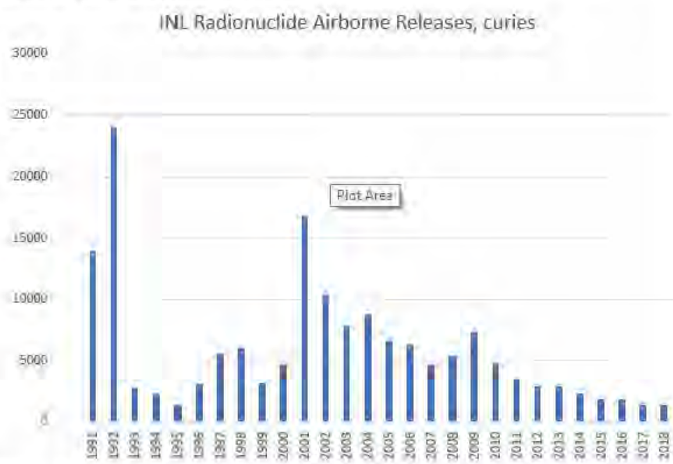

Figure 1. INL Radionuclide Airborne Releases, curies, from 1991 to 2018. Source: Idahoeser.com

24

24-13 (cont'd)

24-43 (cont'd)

Nevada National Security Site and Hanford Site and the former Rocky Flats Plant and testing sites in the Pacific Islands, and cleanup of existing contamination are outside the scope of this EIS. See Comments 24-11, 24-12, and 24-33 for a response to comments about radiation protection standards and epidemiology. See Comments 24-13 and 24-27 for a response to concerns about the environmental monitoring program at INL. Concerns about high-level radioactive waste classification, the Energy Employees Occupational Illness Compensation Program Act, and the interim SNF storage public meetings conducted a few years ago are outside the scope of this EIS.

24-44 As described in Chapter 7, *Laws, Regulations, and Other Requirements*, DoD and DOE operations are performed in compliance with applicable laws, regulations, permits, and agreements. Waste and SNF are stored and managed at the INL Site in compliance with applicable requirements. Transuranic wastes are managed and disposed at the WIPP in compliance with applicable requirements and WIPP waste acceptance criteria. Activities at an off-site consolidated SNF storage facility and high-level radioactive waste management are outside the scope of this EIS.

Commenter No. 24: Tami Thatcher

The next thing to know is that for some radionuclides like krypton-85, very large curie amounts yield small radiation doses, while **for other radionuclides like iodine-129, plutonium-239 and americium-241, very small curie amount releases yield large contributions to radiation dose.** The trend in annual estimated effective dose is provided in Figure 2.

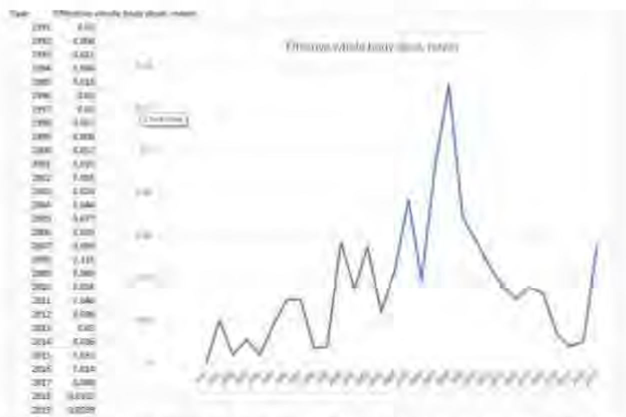

Figure 2. Department of Energy estimated annual effective whole-body dose in millirem from INL airborne releases. Source: Idahoeser.com

As you can see in Figure 2, the radiation doses from the Idaho National Laboratory from 2000 to 2019 are generally higher than for the 1990s. **And the radiation dose trend over the last few years is increasing, not decreasing**. This is without accounting for ingestion of radioactive animal tissue, which the draft EIS does discuss, but I have not included here. The draft EIS asserts that water we drink here, which sporadically includes high levels of radionuclides such as tritium and other man-made radionuclides, don't come from the INL and so they don't add these to the radiation dose. The dose from radioactively contaminated food and water not included in the DOE's dose estimates actually dwarf the annual radiation dose estimates.

The specific radionuclides released from the INL each year vary, as do their curie amounts. The radionuclides that tend to dominate the radiation effective whole-body dose include tritium, argon-41, strontium-90, cesium-137, iodine-129, plutonium-239 and americium-241. **In 2015,**

25

24-13 *(cont'd)*

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Commenter No. 24: Tami Thatcher

561 curies of argon-41 yielded a 0.0025 mrem dose, while 0.000673 curies of plutonium-239 yielded a comparable dose contribution of 0.0019 mrem.

In 1998, most of the radiation dose came from iodine-129 (6.3E-3 mrem) and argon-41 (1.8E-3 mrem), while in 2008 most of the dose came from strontium-90 (0.03 mrem), americium-241 (0.011397 mrem) and plutonium-239 (0.011528 mrem).

The effective dose in millirem for 2015 and 2018 are provided in Table 3, to illustrate the variety of radionuclide contributors to dose.

24-13 (cont'd)

The draft EIS for Project Pele states on page 4-69 that "The highest average individual dose calculated for the MEI (i.e., someone located at the INL Site boundary south of CITRC), regardless of minority or low-income population was 7.0 x 10-3 millirem (i.e., 0.007 millirem). This number is so small that it represents no appreciable change in dose exposure over natural background levels at the INL Site (i.e., 382 millirem) and is well below regulatory limits (i.e., DOE annual public dose limit of 100 millirem or EPA air pathway dose limit of 10 millirem) …"

There are a few things to keep in mind whenever these seemingly negligible doses are discussed. First, they are using the effective whole-body dose which waters down the dose and does not reflect the far higher organ absorbed doses and in no way provides a reliable indicator of health risk, not even fatal cancer risk (more about this in the next article). Second, the organ doses, absorbed doses, need to be presented but are not. The thyroid doses in particular need to be displayed. The thyroid doses are far above natural background levels. And third, the 100 millirem per year that the Department of Energy keeps emphasizing as their allowable and safe level was based on faulty models limited almost exclusively to cancer mortality risk and the incorrect presumption by the ICRP that the risk was 0.0001 fatal cancers per year. This risk was the basis for various regulations selecting 100 mrem per year. But the risk is now admitted to be at least 0.0006 fatal cancers per year (more about this later in this article.)

24-26

There are other problems such as the rate of the releases and which direction the wind is blowing during that release has not been accounted for. And the estimates of the curies released from the INL of each radionuclide are un-scrutinized because the estimate methodologies are not made public. And, it is very possible for the estimated releases to omit actual radiological releases, like the radioactive resin beads released for years from the Advanced Test Reactor and not included in stated releases from the evaporation ponds. And, the deposition rate of various radionuclides on the ground and on crops are only guessed at and greatly influence dose estimates. And, some of the radionuclides very important to dose are also very difficult to detect, like iodine-129, which has a 16-million-year half-life. And finally, the radiological monitoring programs are trying very hard not to attribute radiological contamination to the Idaho National Laboratory.

24-13 (cont'd)

Often forgotten is the fact that the effective whole-body dose is applicable only to late stochastic effects, basically only cancer mortality (fatal cancers) and not to immediate deterministic effects. This fact was forgotten when the Department of Energy misused effective dose and the cancer mortality rate to incorrectly state that doses as high as 1000 rem, yes, 1000 rem, caused no harm, despite the long-known fact that 50 percent of people exposed to 500 rem

24-28

26

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

would die within weeks. (Read more in the August 2021 Environmental Defense Institute newsletter.)

24-28 *(cont'd)*

Table 3. Radionuclides contributing to estimated radiation dose from airborne radionuclide effluents at the Idaho National Laboratory for 2015 and 2019.

Radionuclide (Half Life)	Curies released by INL in 2015	2015 MEI mrem due to INL air effluents	Curies released by INL in 2019	2019 MEI mrem due to INL air effluents
Tritium (H-3) (12.3 year)	532	0.0111	450	0.0011
Carbon-14 (5,700 year)	0.988		0.683	
Chlorine-36 (301,000 year)	-		7.19E-3	0.0035
Argon-41 (1.83 hour)	561	0.0025	884	
Chromium-51 (27.7 day)	-		-	
Cobalt-60 (5.27 year)	1.30E-2		8.22E-3	
Zinc-65 (244 day)	3.26E-5		0.16	0.0019
Krypton-85 (10.7 year)	733		51.1	
Strontium-90 (28.6 year)	3.05E-2	0.0020	2.36E-2	
Antimony-125 (2.73 year)	7.33E-4		-	
Iodine-129 (16,000,000 year)	2.15E-2	0.0037	1.31E-3	
Iodine-131 (8.04 day)	1.1E-2		9.0E-2	
Cesium-137 (30.2 year)	0.0239	0.0010	0.267	0.0314
Plutonium-238 (87.7 year)	1.33E-4		-	
Plutonium-239 (24,000 year)	6.73E-4	0.0019	1.94E-5	
Plutonium-240 (6580 year)	1.90E-4	0.0004	1.88E-6	

27

24-13 *(cont'd)*

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

Radionuclide (Half Life)	Curies released by INL in 2015	2015 MEI mrem due to INL air effluents	Curies released by INL in 2019	2019 MEI mrem due to INL air effluents
Plutonium-241 (14.35 year)	4.19E-3		-	
Americium-241 (458 year)	3.36E-3	0.0093	7.19E-5	
Uranium-234 (246,000 year)	-		5.88E-2	0.0430
Uranium-238 (4.47E9 year)	-		1.29E-1	0.1124
		Total 0.033 mrem, 2015		Total 0.0588 mrem, 2019

Table notes: MEI is the hypothetical maximally exposed individual located near the Idaho National Laboratory residing south of the INL near the Big Southern Butte. A mrem is the annual radiation dose in units of millirem, or 1.0E-3 rem. The source data for the radionuclide curie releases and the estimated radiation dose is from the Department of Energy's Idahoeser.com website for those years. Note that uranium, plutonium and americium decay half-lives are only the beginning of long decay series of radionuclides before ultimately decaying to a stable isotope of lead.

24-13 *(cont'd)*

Draft EIS Fails to Acknowledge the Inadequacies of the DOE's Environmental Surveillance Program

DOE's environmental monitoring program is inadequate and the program is designed more around hiding the INL's contamination than revealing it. When INL's airborne releases were increased, the program raised the bar for what would be considered a detection of radioactivity. When that wasn't enough, the program would raise the concentration level that could be detected. So, when the technology had easily allowed 1 picocurie/liter to be detected, the specified sampling program minimum detectable concentration would be raised to 3 pCi/L in milk, for example. Taking air monitors offline, destruction of samples and similar approaches have been taken in order to keep a lid of the growing radiological contamination in southeast Idaho.

Even now, when ambient air filters are evaluated and found to have americium-241, plutonium-238 and plutonium-239, for example, the DOE and State of Idaho pretend that the source of the radionuclides is due to former weapons testing, even though the ratios of the material and the historical levels of the material do not support this assertion.

Monitoring of waste burial sites for CERCLA at INL and the Snake River Plain Aquifer has often been inadequate and biased to hide contamination findings by reduced monitoring and reduced reporting. The ease with which strong detections can be discounted and the deliberate practice of conducting spotty, infrequent monitoring of land and the aquifer often means "no discernable trend could be found."

24-27

Project Pele's Definition of The Radiation Dose Unit of Rem Is Inadequate

28

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Commenter No. 24: Tami Thatcher

Many places in the Draft EIS offer a definition of REM which is close to being correct, that the REM unit is a unit of effective absorbed dose of ionizing radiation in human tissue. But in over a dozen places in the Draft EIS, the Project Pele Draft EIS states, incorrectly, that a rem is defined as "roentgen equivalent man, a measure of radiation."

The roentgen, used before the SI unit system was adopted, corresponds to an absorption of 87.7 ergs per gram of air, or a dose to the air of 0.877 rad. This is sometimes considered similar to the absorbed dose in tissue and would be nearer to a "rad" of absorbed dose, analogous to the SI unit of Gray, where 100 rad equals 1 Gy. However, a roentgen is NOT a rem. The unit of "rem" is analogous to the SI unit of sievert, where 100 rem equals 1 Sv. However, while the "rad" is a physical quantity, the "rem" is adjusted by a series of multipliers that are selected by the ICRP based on the ICRP's opinion of the biologic effect of the radiation, particularly regarding the cancer mortality effect of the absorbed dose. [19]

24-29

The rem unit starts off with consideration of the absorbed dose, which is related to the number of ionization events in the target region. The absorbed dose, for external radiation, may correlate with the biological effects. However, the rem waters down the absorbed dose by various multipliers chosen by the ICRP based on selected biologic effects, namely "fatal cancer," that was observed from the nuclear weapons industry biased assessments of the survivors of the atomic bombing of Japan.

The explanation of how effective dose equivalent is adjusted for biological endpoints such as for fatal cancer needs to be described in the Draft EIS. Also, the way that the whole-body effective dose gives no indication of the organ absorbed dose or the cancer incidence risk for an organ must be described in the Draft EIS.

The Draft EIS must not simply include "fatal cancer" but must also include a responsible and up-to-date, scientifically valid way of including birth defects, shortened life span, infertility, decreased immune system functioning, increased risk of heart disease, and cancer incidence that does not ignore what has been learned by the Chernobyl nuclear disaster and other nuclear disasters.

24-26 *(cont'd)*

Project Pele's Draft EIS Failure to Acknowledge the Elevated Incidence of Thyroid Cancer in Communities Surrounding the INL

The DOE emphasizes that radiation doses from INL ongoing radiological airborne releases are far below background levels. However, the actual absorbed doses to the organs and tissues in the body are not disclosed. The thyroid organ dose, for example, from the INL releases of iodine-131, iodine-129, americium-241, and others give a far higher thyroid organ absorbed dose than

24-10 *(cont'd)*

[19] One rad of absorbed dose is 100 ergs per gram of tissue and 100 rad is 1 Gray. And 1 Gray is 1 Joule per kilogram. The SI unit of Gray is equivalent to 100 rad. Rad is used for absorbed dose in the U.S. which does not widely use the SI system for radiation workers or EISs, but neither rad nor rem have been defined in terms of roentgens for decades. A roentgen, used before the SI unit system was adopted, corresponds to an absorption of 87.7 ergs per gram of air, or a dose to the air of 0.877 rad.

29

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

the whole-body millirem dose stated by DOE and stated in the draft EIS. **The dose to the thyroid is actually far higher than received from natural background radiation.**

For a recent period of more than ten years, every county surrounding the INL, **the incidence of thyroid cancer has been roughly double the rate in all of the counties surrounding the INL, compared to the rest of the state and the country.** [20] **The draft EIS (page 3-42) presents the higher thyroid cancer incidence rates for a few years but does not address why.**

For years, since 1991 at least and off and on until 2001, the DOE's environmental surveillance program written plans included monitoring iodine-129. But no results were ever presented. They listed iodine-129 (in writing) as a radionuclide that would be specifically monitored in their surveillance program. **But while they sometimes offered excuses, no iodine-129 monitoring results were ever presented.** Meanwhile the releases of iodine-129 sometimes exceeded the iodine-131 releases (8-day half-life). The iodine-129 stays in the environment forever; it has a half-life of 16 million years.

By now, the Department of Energy should have been requiring organ dose assessments, not just a single whole body effective dose estimate. But they aren't. Not event **thyroid organ doses are being presented from INL's releases and the thyroid organ dose would be far higher than the effective whole-body dose.** And the risk of the incidence of thyroid cancer would be far higher than the fatal cancer rate that the draft EIS uses, of 0.0006 fatal cancers per rem. [21] The thyroid organ dose is also far higher than received from naturally occurring background radiation and this is never presented.

24-10 (cont'd)

Project Pele Draft EIS Fails To Acknowledge and Explain Elevated Thyroid Cancer and Childhood Cancer Incidence

The Draft EIS fails to address the inadequacy of the radiation health modeling despite years of double the thyroid cancer incidence in the counties surrounding the INL. As the DOE has been forbidden to conduct epidemiology because of its many past efforts to improperly bias human epidemiology, the assessment of growingly obvious health impacts of INL radiological releases must be conducted by properly independent evaluation. This has not been done, as is evident in the Draft EIS which displays some of the increased cancer rates yet fails to utter any recognition of the obvious doubling of thyroid cancers in counties surrounding the INL. The

[20] See the July 2020 Environmental Defense Institute newsletter for more information about the elevated rates of thyroid cancer in the countries surrounding the Idaho National Laboratory. "Counties near the INL have double the thyroid cancer incidence while other counties in Idaho did not approach these high thyroid cancer incidence rates. The counties near the INL listed in the table [in the newsletter for 2017] are Butte, Bonneville, Madison, Jefferson, Bingham and Fremont counties, which ranged from 42.8 per 100,000 for Butte to 27.9 per 100,000 for Fremont. These cancer incidence rates are double, or more, the US and the Idaho state average for incidence of thyroid cancer which are 15.7 per 100,000 and 14.2 per 100,000." Bonneville country's thyroid cancer incidence rate in 2017 was 30.9 per 100,000.

[21] Project Pele draft EIS, page 4-36 states that a risk factor of 0.0006 LCFs per rem (person-rem) was used in this EIS to estimate risk impacts due to radiation doses from normal operations and accidents.

30

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Commenter No. 24: Tami Thatcher

incidence of thyroid cancer has been doubling for years and is wide-spread, yet the rates ramp up at double the rest of Idaho and the US, in the counties surrounding the INL. Refusing to recognize the impact, which would not be predicted by DOE's accepted radiological release estimates and radiation health models, is immoral as well as not based on scientific integrity.

In 1975, the rate of thyroid cancer incidence for men and women combined was 4.8 per 100,000 in the US. In 2015, thyroid cancer incidence reached 15.7 per 100,000 according to the Surveillance, Epidemiology, and End Results Program (SEER) website. Thyroid cancer incidence and mortality in the US may have finally leveled off after years of increases, according to the National Cancer Institute, Surveillance, Epidemiology, and End Results Program (SEER). [22] However, several counties surrounding the Idaho National Laboratory have roughly double (or more) the thyroid cancer incidence than the Idaho state average and US average.

The SEER 9 region is roughly 10 percent of the US population and includes parts of California [San Francisco and Oakland], Connecticut, Georgia [Atlanta only], Hawaii, Iowa, Michigan [Detroit only], New Mexico, Utah, and Washington [Seattle and Puget Sound region]. [23]

Thyroid cancer incidence in the US increased, on average, 3.6 percent per year during 1974-2013, from 4.56 cases per 100,000 person-years in 1974-1977 to 14.42 cases per 100,000 person-years in 2010-2013. These thyroid cases were not trivial: the mortality also increased. Mortality increased 1.1 percent per year from 0.40 per 100,000 person-years in 1994-1997 to 0.46 per 100,000 person-years in 2010-1013 overall and increased 2.9 percent per year for SEER distant stage papillary thyroid cancer. [24] From 1974 to 2013, the SEER 9 region cancer data included 77,276 thyroid cancer patients and 2371 thyroid cancer deaths.

Bonneville County, where Idaho Falls is located, has double the thyroid cancer rate of the US and double the rate compared to the rest of Idaho, based on the Cancer Data Registry of Idaho (CDRI) for the year 2017. [25] See Table 4.

24-10 *(cont'd)*

[22] National Cancer Institute, Surveillance, Epidemiology, and End Results Program, Cancer Stat Facts: Thyroid Cancer. https://seer.cancer.gov/statfacts/html/thyro.html
[23] National Cancer Institute, Surveillance, Epidemiology, and End Results Program, Cancer Query System. https://seer.cancer.gov/canques/incidence.html
[24] Hyeyeun Lim et al., JAMA, "Trends in Thyroid Cancer Incidence and Mortality in the United States, 1974-2013," April 4, 2017. https://pubmed.ncbi.nlm.nih.gov/28362912/ or https://jamanetwork.com/journals/jama/fullarticle/2613728
[25] C. J. Johnson, B. M. Morawski, R. K., Rycroft, Cancer Data Registry of Idaho (CDRI), Boise Idaho, Annual Report of the Cancer Data Registry of Idaho, *Cancer in Idaho – 2017*, December 2019. https://www.idcancer.org/ContentFiles/AnnualReports/Cancer%20in%20Idaho%202017.pdf

31

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Commenter No. 24: Tami Thatcher

Table 4. Bonneville County thyroid cancer incidence rate compared to the rest of Idaho, 2017.

Cancer type	Sex	Rate in Bonneville County	Adjusted Rate in Bonneville County	Rate for remainder of Idaho
Thyroid	Total	28.2	30.7	14.2
	Male	16.0	17.8	7.4
	Female	40.3	43.5	21.0

Table notes: Rates are expressed as the number of cases per 100,000 persons per year (person-years). Rates are expressed as the number of cases per 100,000 persons per year (person-years). Adjusted rates are age and sex-adjusted incidence rates for the county using the remainder of the state as standard. Data from Factsheet for the Cancer Data Registry of Idaho, Idaho Hospital Association. Bonneville County Cancer Profile. Cancer Incidence 2013-2017. https://www.idcancer.org/ContentFiles/special/CountyProfiles/BONNEVILLE.pdf

Some people have wondered if the thyroid incidence rate is due to overdiagnosis of elderly patients — no, it is not. A study of pediatric thyroid cancer rates in the US found that in pediatric patients with thyroid cancer diagnosed from 1973 to 2013, the annual percent change in pediatric cancer incidence increased from 1.1 percent per year from 1973 to 2006 and markedly increased to 9.5 percent per year from 2006 to 2013. [26]

24-10 *(cont'd)*

Some people have wondered if the increased rate of incidence is due to overdiagnosis of trivial nodules — no, it is not. The figures for the incidence rates for large tumors and advanced-stage disease suggest a true increase in the incident rates of thyroid cancer in the United States. I've seen this just from a handful of acquaintances in Idaho Falls.

For pediatric patients, the thyroid incidence rate was 0.48 cases per 100,000 person-years in 1973 to 1.14 cases per 100,000 person-years in 2013. The incidence rate for large tumors were not significantly different from incidence rates of small (1-20 mm) tumors.

Both thyroid cancer US trend studies (by Lim and by Qian) used the SEER cancer incidence file maintained by the National Cancer Institute and includes 9 high-quality, population-based registries.

As the SEER 9 region thyroid incidence peaked at 15.7 per 100,000, and the State of Idaho thyroid incidence average was 14.2 per 100,000, Bonneville County reached thyroid cancer rates of 30.9 per 100,000. [27] **But other counties near the Idaho National Laboratory also have elevated thyroid cancer incidence rates: Madison (29.3 per 100,000), Fremont (27.9 per 100,000), Jefferson (28.9 per 100,000), and Bingham (28.6 per 100,000). But let's not forget Butte county. Butte county's thyroid cancer rate of 45.9 per 100,000 puts it in a class by itself. Much of Butte county is within 20 miles of the INL and nothing says**

[26] Z. Jason Qian et al., *JAMA*, "Pediatric Thyroid Cancer Incidence and Mortality Trends in the United States, 1973-2013," May 23, 2019. https://pubmed.ncbi.nlm.nih.gov/31120475/ or https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6547136/

[27] Environmental Defense Institute February/March 2020 newsletter article "Rate of cancer in Idaho continues to increase, according to Cancer Data Registry of Idaho."

32

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Commenter No. 24: Tami Thatcher

radiation exposure like Butte's leukemia rate at 3 times the state rate and myeloma at 5 times the state average rate.

The news headline for the Idaho cancer register report issued in 2018 read that "cancer trends for Idaho are stable." [28] That is what citizens were supposed to take away from the 2017 cancer rate study in Idaho. Why were citizens not told about any of the cancers in the counties in Idaho that significantly exceeded state average cancer rates and exceeded the rest of the US? [29]

The wide-spread thyroid cancer incidence increases in the US do not appear to be due to radiation exposure. I suspect other governmentally permitted and highly profitable environmental toxins related to our food and perhaps also cell phone use. **But the rates that are double the rest of Idaho and the US in only counties near the Idaho National Laboratory are, I believe, due to the radiological releases from INL and are perhaps aggravated by airborne chemical releases from the INL.**

The Department of Energy and the State of Idaho are actively ignoring the likely environmental causes of elevated rates of cancer in the communities surrounding the INL and especially the elevated rates of childhood cancer.

The forty-first annual report of the Cancer Data Registry of Idaho (CDRI) was issued in December 2019 for the year 2017. [30] While the rate of some cancers decreased, the bad news for the State of Idaho is that the overall rate of cancer incidence continues to increase.

And, very importantly, childhood cancers in Idaho continue to increase. Pediatric (age 1 to 19) cancer increased at a rate of about 0.6 percent per year in Idaho from 1975 to 2017, see https://www.idcancer.org/pediatriccancer. **24-10 (cont'd)**

The rate of childhood cancer incidence in Bonneville County exceeded the remainder of the state for boys, based on the adjusted rate of cancer incidence. For girls the rate was high, but not above the remainder of the state, see Table 5.

Table 5. Bonneville County childhood cancer incidence rate compared to the rest of Idaho, 2017.

Cancer type	Sex	Rate in Bonneville County	Adjusted Rate in Bonneville County	Rate for remainder of Idaho
Pediatric	Total	17.8	17.9	18.2
Age 0 to 19	Male	19.0	**19.3**	19.1
	Female	16.5	16.5	17.2

Table notes: Rates are expressed as the number of cases per 100,000 persons per year (person-years).

[28] Brennen Kauffman, *The Idaho Falls Post Register*, "New cancer report on 2017 shows stable cancer trends for Idaho," December 13, 2018.

[29] https://statecancerprofiles.cancer.gov/

[30] C. J. Johnson, B. M. Morawski, R. K., Rycroft, Cancer Data Registry of Idaho (CDRI), Boise Idaho, Annual Report of the Cancer Data Registry of Idaho, *Cancer in Idaho – 2017*, December 2019. https://www.idcancer.org/ContentFiles/AnnualReports/Cancer%20in%20Idaho%202017.pdf

33

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Commenter No. 24: Tami Thatcher

The stated radionuclide releases from the Idaho National Laboratory to air have often been incomplete or underestimated the releases. The stated "effective dose equivalent" whole body dose has been a *fictional* fraction of a millirem. **24-27 (cont'd)**

Given the elevated rates of the incidence of thyroid cancer in the counties surrounding the INL due to its ongoing radiological releases, the Draft EIS must present thyroid organ dose and cancer incidence rate from americium-241 and other radionuclides.[31] The Draft EIS has currently addressed only the fatal cancer risk, not the risk of non-fatal cancer. The Draft EIS has not addressed the higher rates of cancer in children due to airborne radioactivity. And the Draft EIS has not addressed the higher rates of infant mortality and birth defects in our region and in INL workers. **24-26 (cont'd)**

Draft EIS Actively Ignores the Current Scientific Evidence of Radiation Health Harm

The Department of Energy's accepted modeling of health risk from radionuclide emissions (routine or from accidents) actively ignores diverse, compelling human epidemiology. I have been told that the reason is "that somebody high up has decided that the benefit of changing the radiation protection standards isn't worth the cost." This basic description comes from university professors and INL lab directors. Basically, the Department of Energy has decided that protecting your health, or your child's health or protecting human beings in the future from its growing inventory of radioactive waste just isn't worth the cost. It would, after all, increase the cost of nuclear waste disposal and it would require reducing airborne emissions from its facilities. **24-30 (cont'd)**

The rates of cancer for children continue to be elevated, especially in counties surrounding the Idaho National Laboratory. The incidence of thyroid cancer is double in the counties surrounding the INL and double that of all other counties in Idaho and double the rates for the country from the SEER database. This is a consistent result over a decade. As thyroid cancer incidence was climbing everywhere, is has been consistently double in the counties surrounding the INL (and unlike the Draft EIS, I reviewed all the counties). The Draft EIS presents some of the cancer data and is silent on the trends. The Draft EIS is also silent on many radiogenic cancers such as male breast cancer. And the Draft EIS is silent on the rates of childhood cancer which are elevated. **24-10 (cont'd)**

The Department of Energy, while accepting lower tabulated radiation doses and focusing on whole-body doses exclusively, has remained silent on the increased thyroid cancer incidence rates from various alpha emitters, and especially americium-241. Due to the low tissue weighting value, whole body dose estimates are not affected much by the elevated thyroid doses.

A 2013 Pacific Northwest National Laboratory (PNNL) report incorporating Federal Guidance Report 13 tabulated whole body and organ specific dose conversion factors for an average half-male and half-female at various ages. [32] The 2013 PNNL report is to be used for

[31] T.R. Hay and J.P. Rishel, Pacific Northwest National Laboratory, Department of Energy, *Revision of the APGEMS Dose Conversion Factor File Using Revised Factor from Federal Guidance Report 12 and 13*, PNNL-22827, September 2013. https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22827.pdf

[32] T.R. Hay and J.P. Rishel, Pacific Northwest National Laboratory, Department of Energy, *Revision of the APGEMS Dose Conversion Factor File Using Revised Factor from Federal Guidance Report 12 and 13*, PNNL-22827, September 2013. https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22827.pdf

34

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

calculating radiation dose but not the risk of higher radiation risks recognized in the EPA's 1999 Federal Guidance Report 13. Buried near the end of the PNNL report is a chart of how wildly increased the thyroid cancer incidence was for various radionuclides, by a factor of 10, of 100, of 1000, of 10,000 and of 100,000! See Figure 3.

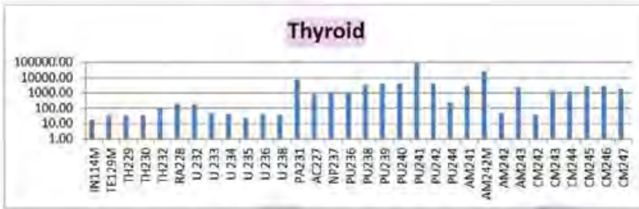

Figure 3. Ratio of the revised Federal Guidance Report (FGR) 13 thyroid dose conversion factors (DCFs) to the original Department of Energy (HUDUFACT.dat) thyroid DCF for radionuclides having the largest increases. (PNNL-22827)

24-10 *(cont'd)*

The radionuclides in Figure 3 include thorium, uranium and uranium decay progeny, plutonium, curium and americium. The thyroid cancer incidence rate increases for plutonium-238, plutonium-239, plutonium-240, plutonium-241 and americium-241 is over 1000.

It is important to understand that for many years, releases of these various americium, curium and plutonium radionuclides were not stated or were understated by the Department of Energy in its environmental monitoring reports. The 1989 INEL Historical Dose Evaluation does not list americium-241 as a radionuclide that it released. Yet, there is evidence of extensive americium-241 contamination at INL facilities when CERCLA cleanup investigations were conducted in the early 1990s.

The levels of transuranics including americium-241 and curium in the air at the ATR Complex and other facilities at the INL are sometimes extensive and the Department of Energy simply assumed their dumping of this waste was to the aquifer and did not include it in public dose estimates for many years. [33] [34]

[33] F. Menetrier at al., *Applied Radiation Isot.*, "The Biokinetics and Radiotoxicology of Curium. A Comparison With Americium," December 2007. https://pubmed.ncbi.nlm.nih.gov/18192096/ (This study found that the biokinetics of curium are very similar to those of americium-241. Lung and bone tumor induction appear to be the major hazards. Retention in the liver appears to be species dependent.)

[34] R. L. Kathren, Occupational Medicine, "Tissue Studies of Persons With Intakes of the Actinide Elements: The U.S. Transuranium and Uranium Registries," April-June 2001. https://pubmed.ncbi.nlm.nih.gov/11319054/ (This study finds that the dose coefficients for alpha radiation induction of bone sarcoma may be too high while those for leukemia are a factor six too low.

35

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Commenter No. 24: Tami Thatcher

The extensive airborne concentrations of americium-241 at the INL may be important to the underestimation of thyroid doses and risks of thyroid cancer incidence. A 1993 study estimated that the dose to the thyroid from americium-241 to be about 1.42 times that delivered to bone. They concluded that the thyroid dose is much higher from americium-241 than has been reported in people.[35]

On the potential health harm of americium-241, the Agency for Toxic Substances and Disease Registry has stated that: "The radiation from americium is the primary cause of adverse health effects from absorbed americium. Upon entering the body by any route of exposure, americium moves relatively rapidly through the body and is deposited on the surfaces of the bones where it remains for a long time. As americium undergoes radioactive decay in the bone, alpha particles collide with nearby cell matter and give all of their energy to this cell matter. The gamma rays released by decaying americium can travel much farther before hitting cellular material, and many of these gamma rays leave the body without hitting or damaging any cell matter. The dose from this alpha and gamma radiation can cause changes in the genetic material of these cells that could result in health effects such as bone cancers. Exposure to extremely high levels of americium, as has been reported in some animal studies, has resulted in damage to organs. **24-10 (cont'd)**

The Department of Energy has largely thwarted efforts to have epidemiology conducted near the INL. Epidemiology that was conducted of INL workers found unexplained elevated levels of certain radiogenic cancers in both radiation and non-radiation workers. **24-31**

The routine emissions from the Idaho National Laboratory and also from U.S. Nuclear Regulatory Commission approved radioactive waste disposal on the western side of the state of Idaho are poisoning the state, as airborne contamination results in gyrating public drinking water contamination. The Draft EIS and the Department of Energy fail to acknowledge the airborne pathway into our drinking water supplies. **24-32**

Public water supplies are intermittently monitored, yet reveal gyrating levels of high levels of gross alpha emitters which usually cannot be shown to be from natural uranium and thorium levels or from past weapons testing fallout. Monitoring programs routinely seek to avoid reporting elevated levels of radionuclides in water, air and soil. These programs, including the state program for the INL and the DOE's contractor for environmental reporting, actively use poor sampling protocols, data deletion, biased blanks for count comparison, and false narratives to explain elevated results. **24-27 (cont'd)**

The internal radiation cancer harm is not based on solid epidemiological evidence and there are experts from Karl Z. Morgan to Chris Busby to Jack Valentin that understand that the accepted models may understate the cancer harm by a factor of 10, 100 or more. The nuclear industry continues to ignore the epidemiological evidence that implies tighter restrictions are needed. Jack Valentin, former chair of the International Commission on Radiological Protection (ICRP) has admitted, before resigning from the ICRP, that the ICRP's radiation model underpredicts the harm of internal radiation by over a factor 100. The Draft EIS, which **24-33**

[35] G. N. Taylor et al., Health Physics, "241Am-induced Thyroid Lesions in the Beagle." June 1993. https://pubmed.ncbi.nlm.nih.gov/8491622/

36

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Commenter No. 24: Tami Thatcher

references Valentin and the ICRP, must explain why DOE decided to adopt the ICRP recommendations and why it considers the very inadequate ICRP models to be acceptable.

Project Pele's Draft EIS Fails to Explain Why the 100 mrem/yr Radiation Dose Limit is Acceptable

The Department of Energy emphasizes that its regulations allow it to dose the public with 100 mrem/yr. The Draft EIS discusses the 100 millirem per year limit pertaining to DOE Order 458.1 on page 3-40 and in other places in the Draft EIS.

The Draft EIS needs to discuss that when in the 1970s when that annual limit was created, it was assumed that the fatal cancer risk from radiation exposure was 0.0001 fatal cancers per rem. Even as the DOE accepts that the fatal cancer risk is at least 6 times higher, at 0.0006 fatal cancers per rem, [36] which would imply a limit of 16 mrem/yr, the DOE retains the same 100 mrem/yr limit.

Despite the Department of Energy's insistence that a 100 millirem/year dose, every year, would be acceptable, anyone who understands anything about radiation health effects, and especially of the increased harm from internal radionuclides knows that 100 mrem per year for a lifetime would cause a health catastrophe. Even the U.S. Environmental Protection Agency, unless knuckling under nuclear industry pressure, understands that a chronic 100 mrem per year dose should be avoided and the authorized limit should be a fraction of the dose limit.

24-33 *(cont'd)*

The 100 mrem per year all pathways radiation dose limit was born based on the International Committee on Radiological Protection (ICRP) assumption back in 1977 that the fatal cancer risk per rem from ionizing radiation was 0.0001 fatal cancers per rem. Then, by 1994, it was recognized that the risk of fatal cancer from ionizing radiation was at least 0.0005 fatal cancers per rem. Current Department of Energy environmental impact statements acknowledge the more recent recommendation (and also underestimate) to be 0.0006 fatal cancers per rem.

Note that the 100 mrem per year radiation health protection standard based on 0.0001 fatal cancers per rem was never changed even when the fatal cancer risk from ionizing radiation was increased 6-fold to 0.0006 fatal cancers per rem.

This is why the EPA was attempting to use 15 mrem per year as the dose limit for various radioactive waste disposal regulations. It wasn't for factors of safety below 100 mrem. It was to try to maintain the same factor of safety presumed in the 1970s that had been wild-assed, hoped for cancer rates by the ICRP! And you can read more about this in a report about TENORM which stands for Technologically Enhanced Naturally Occurring Radioactive Materials. [37]

[36] Project Pele draft EIS, page 4-36 states that a risk factor of 0.0006 LCFs per rem (person-rem) was used in this EIS to estimate risk impacts due to radiation doses from normal operations and accidents.

[37] National Research Council, Committee on Evaluation of EPA Guidelines for Exposure to Naturally Occurring Radioactive Materials. Evaluation of Guidelines to Exposures to Technologically Enhanced Naturally Occurring Radioactive Materials. Washington DC, National Academies Press, 1999. https://www.nap.edu/catalog/6360/evaluation-of-guidelines-for-exposures-to-technologically-enhanced-naturally-occurring-radioactive-materials and chapters at https://www.nap.edu/catalog/6360/evaluation-of-guidelines-for-exposures-to-technologically-enhanced-naturally-occurring-radioactive-materials#toc

37

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Commenter No. 24: Tami Thatcher

It gets worse. No really! It gets worse. It has been known now for a few decades that radiation exposure to the developing embryo and fetus "can cause growth retardation; embryonic, neonatal, or fetal death; congenital malformations; and functional impairment such as mental retardation." [38]

In 2007, the International Commission of Radiological Protection (ICRP) lowered its estimate of the risk of genetic harm of congenital malformations by 6-fold, from 1.3E-4/rem to 0.2E-4/rem. Based on the belief that the study of the Japanese bomb survivors did not detect genetic effects, **the ICRP genetic effect estimate for humans is based on studies of external radiation of mice.**

The ICRP estimate of risk of congenital malformations is a fraction of its predicted cancer risk for cancer mortality (or latent cancer fatality). The ICRP latent cancer fatality risk was 5.0E-4 LCF/rem (1991 estimate), close to the cancer mortality rate used in the Department of Energy's Versatile Test Reactor EIS of 6.0E-4 LCF/rem. [39]

While the studies of genetic injury to the Japan bombing survivors declared that they found no evidence of genetic damage, other researchers have found those studies to have been highly flawed. A report published in 2016 by Schmitz-Feuerhake, Busby and Pfugbeil summarizes numerous human epidemiology studies of congenital malformations due to radiation exposure. [40]

The 2016 report disputes the ICRP genetic risk estimate and finds that diverse human epidemiological evidence supports a far higher genetic risk for congenital malformations. **Nearly all types of hereditary defects were found at doses as low as 100 mrem.** The pregnancies are less viable at higher doses and so the rate of birth defects appears to stay steady or falls off at doses above 1000 mrem or 1 rem. The 2016 report found the excess relative risk for congenital malformations of 0.5 per 100 mrem at 100 mrem falling to 0.1 per 100 mrem at 1000 mrem. **24-33** *(cont'd)*

The 2016 report's result for excess relative risk of congenital malformations of 5.0/rem is 250,000-fold higher than the ICRP estimate of 0.2E-4/rem which ICRP appears to assume has a linear dose response. (See the August 2021 Environmental Defense Institute newsletter.)

The bottom line is that the nuclear industry and especially the Department of Energy is grossly underestimating the fatal cancer risk of their radiological releases, and ignoring serious adverse health effects such as cancer incidence, heart disease, reduced immune system function, fertility problems, increased rates of infant death, and reduced life span. And they are also grossly underestimating the risk of genetic effects of ionizing radiation exposure prior to

[38] Eric J. Hall, *Radiobiology for the Radiologist*, 5th ed., 2000, p. 190.

[39] U.S. Department of Energy's Versatile Test Reactor Draft Environmental Impact Statement (VTR EIS) (DOE/EIS-0542) (Announced December 21, 2020). A copy of the Draft VTR EIS can be downloaded at https://www.energy.gov/nepa or https://www.energy.gov/ne/nuclear-reactor-technologies/versatile-test-reactor. (See discussion in VTR EIS Appendix C, page C-4).

[40] Inge Schmitz-Feurerhake, Christopher Busby, and Sebastian Pflugbeil, *Environmental Health and Toxicology, Genetic radiation risks: a neglected topic in the low dose debate*, January 20, 2016. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4870760/ The 2016 report found the "excess relative risk for congenital malformations of 0.5 per mSv at 1 mSv falling to 0.1 per mSv at 10 mSv exposure and thereafter remaining roughly constant."

38

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Commenter No. 24: Tami Thatcher

conception that are passed on to their children and grandchildren, by relying on ICRP's industry-biased recommendations.

The Draft EIS must include not the deceptive look at five years of estimated effective whole-body doses from INL's airborne waste effluents, it must include the trending of the releases of americium, plutonium and iodine releases from the INL. Figure ?? shows the plutonium and americium-241 releases from the Idaho National Laboratory between 2001 and 2017 based on Department of Energy environmental monitoring reports. [41] The State of Idaho DEQ does not display, report or trend any data before 2013….can anyone guess why? The huge releases from the INL between 2004 and 2013 are shocking and certainly would not fit well with a tourist brochure for visiting Idaho.

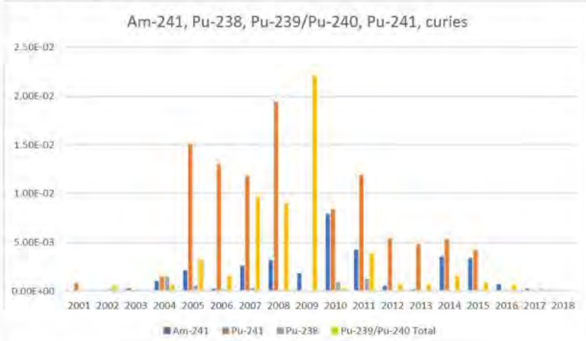

Figure 4. Americium-241, plutonium-238 and other actinides released by the INL between 2001 and 2018.

Figure 5 shows the iodine-129 and iodine-131 releases between 1973 and 2017, in curies. The State of Idaho DEQ went from displaying all of their environmental monitoring reports to displaying ten years of the reports, to know displaying only six years of annual reports and only 4 years of quarterly data reports from 2013 to 2018. **Again, here you can see why the Idaho DEQ didn't want to display INL monitoring data before 2013.**

[41] Department of Energy's environmental monitoring reports, see idahoeser.com and inldigitallibrary.inl.gov.

39

24-13 (cont'd)

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Commenter No. 24: Tami Thatcher

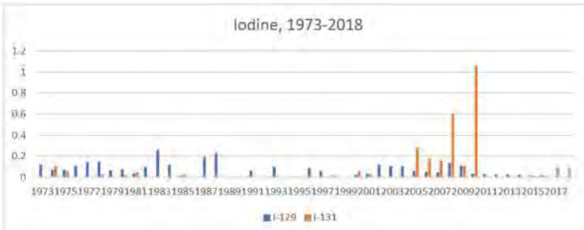

Figure 5. Iodine-129 and iodine-131 released from the INL between 1973 and 2018.

The plutonium and americium-241 and the iodine-129 and iodine-131 are not the only radionuclides with elevated releases from the INL. But these radionuclides might have influenced the elevated thyroid cancers in Bonneville County reported for 2013 to 2017, yet the Department of Energy continued ignoring the thyroid organ doses.

Iodine-129 with its 16-million-year half-life has higher inhalation and ingestion dose conversion factors than iodine-131 with its 8-day half-life. While iodine-131 does give a higher air emersion and ground shine dose, the iodine-129 dose often is a dominant dose contributor for INL airborne releases.

The Draft EIS fails to address the fact the radiation workers are still wrongly told that there is no evidence of damage to DNA or genetic effects from radiation exposure to humans. DOE's radiation workers are not told of the infertility and increased risk of birth defects from radiation.

The Draft EIS fails to address the fact that the investigations into worker contamination at the INL historically are not complete and do find evidence of inadequate worker protection. The investigations continue at a snail's pace by the Center for Disease Control's National Institute of Occupational Safety and Health (NIOSH) for the Energy Employee Occupational Illness Compensation Program. Meanwhile, injured workers and their survivors die, having had their illness claim wrongly denied.

The Draft EIS needs to acknowledge the inadequacy of the 5 rem (or 5,000 millirem per year) limit to actually protect adult radiation workers, page 4-62 of the Draft EIS. The Draft EIS needs to acknowledge the extent that radiological records of contamination in urine and fecal samples is withheld from workers, enabling errors and deliberate falsifications. Many workers go to medical providers and the worker does not have accurate information concerning exposure and radiological intake history.

The public as well as radiation workers need to keep in mind that, despite what they may have been taught:

40

24-13
(cont'd)

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Commenter No. 24: Tami Thatcher

- The cancer risk is not reduced when radiation doses are received in small increments, as the nuclear industry has long assumed. [42]

- Despite the repeated refrain that the harm from doses below 10 rem cannot be discerned, multiple and diverse studies from human epidemiology continue to find elevated cancer risks below 10 rem and from low-dose-rate exposure. [43]

- The adverse health effects of ionizing radiation are not limited to the increased risk of cancer and leukemia. Ionizing radiation is also a contributor to a wide range of chronic illnesses including heart disease and brain or neurological diseases.

24-13 (cont'd)

The public and radiation workers take cues from their management that they should not be concerned about the tiny and easily shielded beta and alpha particles. DOE-funded fact sheets often spend more verbiage discussing natural sources of radiation than admitting the vast amounts of radioactive waste created by the DOE. The tone and the meta-message from the DOE, the nuclear industry, is that if you are educated about the risks, then you'll understand that the risks are low. Yet, these agencies continue to deny the continuing accumulation of compelling and diverse human epidemiological evidence that the harm of ingesting radionuclides is greater than they've been claiming.

The biological harm that ionizing radiation may cause to DNA is mentioned sometimes but it is emphasized that usually the DNA simply are repaired by the body. And the training to radiation workers will mention that fruit flies exposed to radiation passed genetic mutations to their offspring but workers are told that this phenomenon has never been seen in humans even though, sadly, the human evidence of genetic effects has continued to accumulate. Birth defects and children more susceptible to cancer are the result.

Gulf War veterans who inhaled depleted uranium have children with birth defects at much higher-than-normal rate. The same kinds of birth defects also became prevalent in the countries where citizens were exposed to DU. There are accounts to suggest that the actual number of birth defects resulting from the World War II atomic bombs dropped on Japan and by weapons testing over the Marshall Islands have been underreported. The Department of Energy early on made the decision not to track birth defects resulting from its workers or exposed populations. But people living near Hanford and near Oak Ridge know of increased birth defects in those communities.

24-34

In radworker training, there may be discussion of the fact that international radiation worker protection recommends only 2 rem per year, not 5 rem per year. There is no mention of recent

24-31 (cont'd)

[42] Richardson, David B., et al., "Risk of cancer from occupational exposure to ionizing radiation: retrospective cohort study of workers in France, the United Kingdom, and the United States (INWORKS), BMJ, v. 351 (October 15, 2015), at http://www.bmj.com/content/351/bmj.h5359 Richardson et al 2015 This cohort study included 308,297 workers in the nuclear industry.

[43] US EPA 2015 http://www.regulations.gov/#!documentDetail;D=NRC-2015-0057-0436 . For important low-dose radiation epidemiology see also John W. Gofman M.D., Ph.D. book and online summary of low dose human epidemiology in "Radiation-Induced Cancer from Low-Dose Exposure: An Independent Analysis," Committee for Nuclear Responsibility, Inc., 1990, http://www.ratical.org/radiation/CNR/RIC/chp21.txt And see EDI's April 2016 newsletter for Ian Goddard's summary and listing of important human epidemiology concerning low dose radiation exposure.

41

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Commenter No. 24: Tami Thatcher

human epidemiology showing the harm of radiation is higher than previously thought and at low doses, below 400 mrem annually to adult workers, increased cancer risk occurs.

24-31 *(cont'd)*

Project Pele Draft EIS Incorrectly States International Commission on Radiological Protection (ICRP) is Responsible for Guidance in Radiation Safety

Although not always delineated as "effective" whole-body radiation doses, the dose estimates in millirem (mrem) that are provided in Department of Energy environmental surveillance annual reports for the Idaho National Laboratory are given only in "effective" whole-body dose.

It is vital for the NEPA process for the public to understanding the distortion of "Effective Whole-Body Doses" in millirem presented by the Department of Energy.

The non-physical concept of "effective" whole body doses does not provide meaningful doses for estimating fatal cancer risk because the organ absorbed doses are unstated. In addition, the basis for assigning importance of various organs or tissues to the contribution to cancer mortality is based primarily on the external gamma dose received by survivors of the 1946 atomic bombing of Japan and it tells nothing about the cancer risks when radionuclides are inhaled or ingested and incorporated into the body. Cesium-137 mimics potassium, strontium-90 mimics calcium, plutonium-239 mimics iron, etc.

24-33 *(cont'd)*

Even with accounting for the clearance of the radionuclide from the body and accounting for the tendency for the radionuclide to accumulate in certain organs such as the thyroid or in bone tissue — the harm from internal radiation is greater than from external radiation and is not accounted for by the nuclear industry's International Committee on Radiological Protection (ICRP) models because of their reliance on reviewing the radiation harm from external radiation.

Don't blame the ICRP. They are just nuclear weapons industry-funded folks who don't actually understand human biology. Anyone not sticking to the nuclear industry agenda would be booted out, sooner or later. The Draft EIS is incorrect to state that the ICRP is the responsible organization (see page 4-35). The ICRP has no responsibilities what-so-ever.

An "effective" dose in rem builds into the rem estimate various multipliers that lower the rem value based on nuclear promotor's opinions of the cancer mortality effect of radiation to various parts of your body. And this is in addition to the multipliers regarding the type of radiation, the *equivalent* dose, that increase the dose from alpha radiation and neutron exposure over that of gamma exposure.

The Department of Energy tries to tell people they really don't need a healthy thyroid because people don't often die of thyroid cancer. Never mind how important a healthy thyroid is to the developing fetus/embryo in utero.

The "effective" rem dose is lowered before the ICRP's low-balled cancer mortality rate is even applied. I say this because in 1990, John W. Gofman's review of the atomic bomb effects on Japanese survivors predicted 0.0026 fatal cancers per rem, [44] which is over 4 times higher than

[44] John W. Gofman, M.D., Ph.D., Committee for Nuclear Responsibility, Inc., "Radiation-Induced Cancer from Low-Dose Exposure: An Independent Analysis," 1990. See more in the August 2021 Environmental Defense Institute newsletter.

42

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Commenter No. 24: Tami Thatcher

the current Department of Energy fatal cancers per rem value of 0.0006. But even Gofman's prediction would underestimate the cancer risk from internal radiation, such as the iodine-129, strontium-90, cesium-137, americium-241, plutonium-239, and others, which make up most of the radiation dose from INL radiological releases.

Effective whole-body dose in rem (or millirem which is one thousandth of a rem) starts off with an estimate of absorbed dose but then keeps reducing and further reducing the estimated dose on the basis on ICRP opinion of the likelihood of that organ to cause cancer mortality based on external exposure. Then ICRP sums the reduced organ doses, again weights the organs to reduce their importance and thus the black box spits out an "effective" whole body dose.

This method for estimating the effective whole-body dose had actually originally been called **the doubly-weighted organ doses model** or construct, according to a 2017 article by Fisher and Fahey on *Appropriate Use of Effective Dose in Radiation Protection and Risk Assessment.* [45] For additional information about how misleading the "effective dose" is, read *Burdens of Proof* by Tim Connor, Energy Research Foundation, 1997 regarding the multiple failures to attribute Hanford radiological releases to the thyroid cancers in the region. **24-26 (cont'd)**

As far back as 1977, the U.S. Environmental Protection Agency recognized that continued exposure over substantial portions of a lifetime near 100 mrem per year should be avoided, read more in the TENORM report. [46] In 1977, it was assumed by the ICRP that the risk of fatal cancers was 0.0001 per rem (or 1.0E-5 per millisievert in SI units). Various radiation regulations were based on this assumption. It was recognized by 1994 that the fatal cancer risk was higher, at 0.0005 per rem. Even the ICRP currently recognizes that the fatal cancer risk from ionizing radiation is now at least 0.0006 per rem.

The 100 millirem (mrem) per year all pathways radiation dose limit is greatly emphasized by the Department of Energy as the dose they consider allowable. Air permits may be regulated by the U.S. Environmental Protection Agency or by the states, but in either case, the EPA and the state, such as the State of Idaho, will often emphasize that the state cannot regulate Department of Energy radiological emissions. In Idaho, the State of Idaho Department of Environmental Quality will issue an air permit to the Department of Energy based entirely on the DOE's stated radiological release guesses or estimates, the Department of Energy contractors monitoring or lack thereof, and the State will agree to rapid records destruction of radiation monitoring of open-air radioactive waste evaporation ponds that is fully intended to cover up any radiological releases in excess of agreed to quantities. This is precisely the situation at the Idaho National Laboratory's Advanced Test Reactor air permit with the State of Idaho. Even if the Idaho DEQ **24-35**

[45] Darrell R. Fisher and Frederic H. Fahey, *Health Phys.*, "Appropriate Use of Effective Dose in Radiation Protection and Risk Assessment," August 2017, PMID: 28658055 and https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5878049/

[46] National Research Council, Committee on Evaluation of EPA Guidelines for Exposure to Naturally Occurring Radioactive Materials. Evaluation of Guidelines to Exposures to Technologically Enhanced Naturally Occurring Radioactive Materials. Washington DC, National Academies Press, 1999. See page 108. https://www.nap.edu/catalog/6360/evaluation-of-guidelines-for-exposures-to-technologically-enhanced-naturally-occurring-radioactive-materials and chapters at https://www.nap.edu/catalog/6360/evaluation-of-guidelines-for-exposures-to-technologically-enhanced-naturally-occurring-radioactive-materials#toc

43

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Commenter No. 24: Tami Thatcher

can, it is typically staffed by people who fall in line and go along with whatever the Department of Energy wants. **24-35 (cont'd)**

In the Department of Energy's environmental monitoring reports, it is greatly emphasized that the DOE's derived concentration standards (DCGs) are safe as they imply a dose of 100 mrem per year. By now, you may be starting to understand why 100 mrem per year would actually guarantee a health catastrophe to the health of people, especially children. **24-33 (cont'd)**

Before the late 1990s, radiation risks to females were generally treated as roughly equal to the radiation risks to males. But by the late 1990s, studies of the survivors of the atomic bombing of Japan in 1945 by the International Commission on Radiation Protection (ICRP) had higher radiation risk harm to women than men, for the same dose. And the studies showed higher cancer risk to children, especially female children, than to adults for the same dose. The National Research Council BEIR VII report issued in 2006 found even higher risks to women and children. See Institute for Energy and Environmental Research (IEER.org) report, *Science for the Vulnerable*, for additional insight. [47] (Read more in the August 2020 Environmental Defense Newsletter.) **24-26 (cont'd)**

The Department of Energy's DCG from gross alpha radioactivity in air for a 100 mrem per year dose are getting closer to the DCG for gross alpha radioactivity in air and are actually being exceeded from time to time in southeast Idaho. The most restrictive DCG is for americium-241 at 20 E-15 microcuries per milliliter (E-15 uCi/mL). With gross alpha radioactivity air usually below 4 E-15 uCi/mL, it is notable that values such as 7.2 E-15 uCi/mL occur (see Blackfoot monitoring in 2012). The increasing gross alpha radioactivity in air values are within a factor of three or four of the DCG.

There are large fluctuations in the concentrations of gross beta radioactivity in air in southeast Idaho and these fluctuations appear to be due to the INL's airborne radiological releases, despite statements to the contrary by the Department of Energy's environmental surveillance contractor. In 1998, the gross beta radioactivity in air concentrations ranged from 8 to 38 E-15 uCi/mL. In contrast, in 2002, gross beta concentrations ranged from 8 to 129.4 E-15 uCi/mL. The Department of Energy's environmental surveillance contractor continues to assert that no detected radioactivity could be attributed to the INL, stating: "In general, gross alpha and gross beta activities show levels and seasonal variations not attributable to INEEL releases. Seven of the weekly gross beta results showed statistical differences between boundary and distant locations. In all cases the differences were attributed to natural variation or to inversion conditions." And as typical of every INL annual environmental surveillance report no matter what they detect in their monitoring, they state: "In summary, the results of the monitoring programs for 2002 presented in this report indicate that radioactivity from current INEEL operations could not be distinguished from worldwide fallout and natural radioactivity in the region surrounding the INEEL." **24-13 (cont'd)**

[47] Arjun Makhijani, Ph.D., Brice Smith, Ph.D., Michael C. Thorne, Ph.D., Institute for Energy and Environmental Research, *Science for the Vulnerable Setting Radiation and Multiple Exposure Environmental Health Standards to Protect Those Most at Risk*, October 19, 2006.

44

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Commenter No. 24: Tami Thatcher

The escalating levels of radioactivity in southeast Idaho are addressed by DOE's environmental surveillance program by torturing until submission any "outliers" and using radioactive blanks in order to achieve large negative values to reduce the annual averages.

With intermittent releases puffed out by INL nuclear facilities and evaporation ponds, why would anyone be surprised that the values fluctuated? But the DOE's environmental surveillance program is continually surprised by fluctuating values and it actively seeks to discard the "aberrant" samples showing high concentrations of radioactivity.

The Department of Energy embraces only the effective whole-body dose while ignoring the far higher organ doses, such as the absorbed dose to the thyroid from Idaho National Laboratory releases of iodine-131, iodine-129, americium-241 and other radionuclides.

24-27 *(cont'd)*

Project Pele Draft EIS Wrong To Use ICRP's Treatment of Heritable Disease

While the International Commission of Radiological Protection (ICRP) continues to say that "Radiation induced heritable disease has not been demonstrated in human populations," Chis Busby writes that evidence of genetic effects *has* been found in humans and at very low radiation doses. [48] [49]

Robin Whyte wrote in the *British Medical Journal* in 1992 about the effect in neonatal (1 month) mortality and stillbirths in the United States and also in the United Kingdom. The rise in strontium-90 from nuclear weapons testing from 1950 to 1964 has been closely correlated, geographically, with excess fetal and infant deaths. The doses from strontium-90 due to atmospheric nuclear weapons testing were less than 50 millirem (or 0.5 millisievert), according the Chris Busby. Radioactive fallout from atmospheric nuclear weapons testing would not only include strontium-90, it would include iodine-131, tritium, cesium-137, and other radionuclides, including plutonium. [50] The extent of the nuclear weapons testing immorality continues to astound me and I applaud the work being done to reduce the risk of human extinction from nuclear weapons. [51]

The ICRP maintains that human evidence of genetic effects due to radiation does not exist. The ICRP then uses the study of external radiation on mice to estimate the heritable risks for humans. One study was conducted using internal radionuclides on mice and the study noted that

24-33 *(cont'd)*

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[48] Chris Busby, *The Ecologist*, "It's not just cancer! Radiation, genomic instability and heritable genetic damage," March 17, 2016. https://theecologist.org/2016/mar/17/its-not-just-cancer-radiation-genomic-instability-and-heritable-genetic-damage

[49] Chris Busby, Scientific Secretary, European Committee on Radiation Risk, Presentation, *Radioactive discharges from the proposed Forsmark nuclear waste disposal project in Sweden and European Law*, September 8, 2017. Online pdf 646_Nacka_TR_M1333-11_Aktbil_646_Christopher_Busby_presentation_170908

[50] R. K. Whyte, *British Medical Journal*, "First day neonatal mortality since 1935: re-examination of the Cross hypothesis," Volume 304, February 8, 1992. https://www.bmj.com/content/bmj/304/6823/343.full.pdf

[51] Jackie Abramian, ForbesWomen, "After Her Nuclear Disaster Dress Rehearsal, Cynthia Lazaroff Has A Wake-Up Call For Our World As We Sleepwalk Into Nuclear Extinction," September 21, 2021. https://www.forbes.com/sites/jackieabramian/2021/09/21/after-her-own-nuclear-disaster-dress-rehearsal-cynthia-lazaroff-has-a-wake-up-call-as-our-world-sleepwalks-into-nuclear-extinction/?sh=6a22151d62e2 Lazaroff has founded NuclearWakeupCall.Earth due to her concern over nuclear weapons. "There are nearly 13,500 nuclear warheads in current arsenals of nine nuclear-armed states. That the U.S. has more nuclear warheads than hospitals should be a wake-up call," says Lazaroff.

45

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Commenter No. 24: Tami Thatcher

"detailed research on internal radiation exposure has hardly ever been reported in the past." [52] **This limited study of microcephaly in mice found that far lower doses of <u>internal radiation</u> caused the same effect as higher doses of <u>external radiation</u>.** **24-33 (cont'd)**

Project Pele Draft EIS Not Protective of Radiation Workers or the Public

Epidemiology of thousands of radiation workers found elevated cancer risk occurring at an average 200 mrem/yr. [53] An INL-specific study found radiation and nonradiation workers at the site had higher risk of certain cancers. [54] The US Nuclear Regulatory Commission and the Department of Energy maintain that their 5 rem/yr worker exposure limit is protective despite compelling scientific evidence to the contrary. [55] **24-36 (cont'd)**

The NRC cancelled funding of what would have been the first meaningful epidemiology study of health near US nuclear facilities. They claimed it would cost too much (at $8 million) and take too long. [56]

The US NRC prefers reliance on the 1980s epidemiology study that mixed children and adults and populations near and far from nuclear plants and predictably found no harm. [57] The NRC

[52] Yukihisa Miyachi, J-STAGE, "Microcephaly Due to Low-dose Intrauterine Radiation Exposure Caused by 33P Beta Administration to Pregnant Mice," 2019 Volume 68 Issue 3 Pages 105-113. https://www.jstage.jst.go.jp/article/radioisotopes/68/3/68_680303/_article/-char/en

[53] Richardson, David B., et al., "Risk of cancer from occupational exposure to ionizing radiation: retrospective cohort study of workers in France, the United Kingdom, and the United States (INWORKS), BMJ, v. 351 (October 15, 2015), at http://www.bmj.com/content/351/bmj.h5359 Richardson et al 2015] (And please note that studies of high leukemia risk in radiation workers and of ongoing studies to assess health effects of high and low-linear energy transfer internal radiation must also be studied in addition to this one on external radiation.)

[54] "An Epidemiology Study of Mortality and Radiation-Related Risk of Cancer Among Workers at the Idaho National Engineering and Environmental Laboratory, a U.S. Department of Energy Facility, January 2005. http://www.cdc.gov/niosh/docs/2005-131/pdfs/2005-131.pdf and http://www.cdc.gov/niosh/oerp/ineel.htm and Savannah River Site Mortality Study, 2007. http://www.cdc.gov/niosh/oerp/savannah-mortality/

[55] "Health Risks from Exposure to Low Levels of Ionizing Radiation BEIR VII – Phase 2, The National Academies Press, 2006, http://www.nap.edu/catalog.php?record_id=11340 The BEIR VII report reaffirmed the conclusion of the prior report that every exposure to radiation produces a corresponding increase in cancer risk. The BEIR VII report found increased sensitivity to radiation in children and women. Cancer risk incidence figures for solid tumors for women are about double those for men. And the same radiation in the first year of life for boys produces three to four times the cancer risk as exposure between the ages of 20 and 50. Female infants have almost double the risk as male infants.

[56] NRC (Nuclear Regulatory Commission) 2010. NRC Asks National Academy of Sciences to Study Cancer Risk in Populations Living near Nuclear Power Facilities. NRC News No. 10-060, 7 April 2010. Washington, DC: NRC. The framework for the study was reported in "Analysis of Cancer Risks in Populations Near Nuclear Facilities; Phase I (2012). See cancer risk study at nap.edu.

[57] NCI (National Cancer Institute) 1990. Cancer in Populations Living near Nuclear Facilities. 017-042-00276-1. Washington, DC: Superintendent of Documents, U.S. Government Printing Office.

46

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

actively ignores the irrefutable studies from Germany that found increased cancer and leukemia rates of children living near each of the plants. [58] [59] [60]

The U.S. NRC knows that if people knew the harm of living near nuclear power plants, just from routine radiological emissions, it would be the end of nuclear energy.

24-36 (cont'd)

Project Pele's Draft EIS Devotes Considerable Ink to Biased Non-factual Advertising

Project Pele's Mobile Microreactor project is a horrible idea. Transporting the spent fuel from a military mobile microreactor, **if deployed to a military base somewhere around the globe, puts every country in its transportation path at risk of an accident and at risk of becoming an "exclusion zone" where no one can live.** It puts troops and people around the globe at risk. The military knows this and probably would only deploy the reactors to some place like Alaska, if anywhere. The project is really a way to funnel government money to these reactor developers.

24-7 (cont'd)

Project Pele Siphons Money from Real Climate Solutions

Project Pele siphons scare money away from real climate change solutions. And any meaningful increase in the use of nuclear energy would mean needing a new Yucca Mountain repository every year. [61] The Department of Energy has no repository and no repository program and the Draft EIS tries to hide this because it would reasonably mean that making plans to create far more spent nuclear fuel is of high adverse environmental impact.

24-22 (cont'd)

Project Pele's Draft EIS Included Listing of References That Were Not Publicly Available

The Draft EIS included references that were not publicly available. The solution is not to delete the references, but to make the references available to the public so that the Draft EIS can actually be reviewed.

Several days after I sent a request to the Project Pele office and several days from after the public meeting, I was sent three of the documents referenced that should have been publicly available, including INL external report INL/EXT-21-62873. [62] Documents that are approved for

24-37

[58] Kaatsch P, Kaletsch U, Meinert R, Michaelis J.. 1998. An extended study of childhood malignancies in the vicinity of German nuclear power plants. Cancer Causes Control 9(5):529–533.

[59] The study is known by its German acronym KiKK (Kinderkrebs in der Umgebung von Kernkraftwerken): Kaatsch P, Spix C, Schmiedel S, Schulze-Rath R, Mergenthaler A, Blettner M 2008b. Vorhaben StSch 4334: Epidemiologische Studie zu Kinderkrebs in der Umgebung von Kernkraftwerken (KiKK-Studie), Teil 2 (Fall-Kontroll-Studie mit Befragung). Salzgitter: Bundesamt für Strahlenschutz.

[60] Kaatsch P, Spix C, Schulze-Rath R, Schmiedel S, Blettner M.. 2008. . Leukemia in young children living in the vicinity of German nuclear power plants. Int J Cancer 122(4):721–726.

[61] Edited by Allison M. Macfarlane and Rodney C. Ewing, *Uncertainty Underground Yucca Mountain and the Nation's High-Level Nuclear Waste*, The MIT Press, 2006. Page 4.

[62] Idaho National Laboratory for the U.S. Department of Energy operated by Battelle Energy Alliance, *Pele Microreactor Hazards and Impacts Information in Support of National Environmental Policy Act Data Needs*, INL/EXT-21-62873, September 2021.

47

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

external release should have been available, at least, on the Idaho National Laboratory's technical document online library but were not. **24-37 (cont'd)**

Project Pele Draft EIS Relies on Lax and Ineffective Department of Energy Oversight

No U.S. Nuclear Regulatory Commission licensing will be required for any aspect of the DOD's mobile reactors.

The stated goal to operate the reactors with radiation doses "as low as reasonably achievable" is completely meaningless, especially when the military is involved. For military training, they are already releasing unnecessary radioactive material to the skies of southeast Idaho and knowingly poisoning nearby communities with deliberate, completely unnecessary radionuclide releases that they would not have their own families live in. **24-7 (cont'd)**

While the safety characteristics of any particular fuel and reactor design can affect the operating safety of the reactor, and the fuel storage system outside of the reactor can affect the safety of stored spent nuclear fuel. The reactor and the spent fuel will always be vulnerable to terrorism. Even the fission products released from a 1 to 5 Megawatt-electric (MWe or simply MW) nuclear reactor can be devastating for distances of 50 miles or more from the reactor as the radionuclides spread by the wind. **24-17 (cont'd)**

Isolation of the spent nuclear fuel will require currently unfunded repackaging of the spent fuel and unfunded development of the capability to isolate spent nuclear fuel's radioactive toxic mix of plutonium, cesium, strontium, and other radionuclides. **The capability to isolate the radionuclides from water and air for millennia currently does not exist and in reality, does not appear feasible.** The radionuclides in spent fuel remain toxic for millennia and threaten all life on the planet, although this never appears to bother nuclear proponents. **24-2 (cont'd)**

No one will have a choice of living in a community or neighborhood away from the threat of a nuclear power generating reactor catastrophe when these mobile reactors are unleashed. Citizens will have no say over the nuclear reactors moving to their communities. **24-7 (cont'd)**

DOE oversight is notoriously inadequate and often fails to protect workers, the public and the environment. This Draft EIS is pretending that Department of Energy regulatory oversight of the mobile microreactor will mean prudent, effective oversight but the history of the Department of Energy nuclear oversight proves otherwise. See the 2014 accidents at the Waste Isolation Pilot Plant (WIPP) and the 2011 plutonium inhalation event at the Idaho National Laboratory's Materials and Fuels Complex, which were both found to illuminate the fact that both DOE operations had multiple failed safety programs and failed to implement DOE regulations.

Department of Energy nuclear facilities, including its reactors, are notorious for the practice of lacking as-built drawings and of failure to maintain facility drawings as design changes are made. This alone increases the likelihood of an accident at a DOE-regulated facility. But there are other reasons for the increased accidents risks because of DOE's ability to keep plant problems secret in order to avoid public scrutiny and DOE's loose way of ignoring existing requirements. **24-38**

48

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

DOE is ignoring state and federal laws regarding protections for the State of Nevada where the Yucca Mountain repository was to be sited, the State of New Mexico where the Waste Isolation Pilot Plant (WIPP) is located, and many states as DOE proclaimed that it could reclassify high-level waste to low-level waste, at whim. And the DOE is ignoring its legal settlement with the State of Idaho to remove the spent nuclear fuel stored at the Idaho National Laboratory. The Department of Energy has sought to unravel the Idaho Settlement Agreement, rather than do the work to comply with it. **24-20** *(cont'd)*

DOE's failure to adequately design facilities for and inspect those facilities and the spent nuclear fuel they hold is long standing and has required state and federal intervention to get DOE to begin to address its problems. EBR II spent nuclear fuel corroded in an INL spent fuel pool while the DOE had not inspected the fuel or taken timely actions to address the deteriorating fuel, even as the strontium levels workers were exposed to were recognized. DOE's messes often require federal and state intervention, but by then, the messes are so large that that little cleanup is accomplished even with billions of dollars of cleanup money annually, for the INL, Hanford, Savannah River Site and others.

Reliance on institutional controls to forever repackage spent nuclear fuel in Idaho violates NEPA. There is no repository despite winks and hints that Yucca Mountain would be opening soon. The consequences of spent nuclear fuel blowing in the wind are devastating, cannot be remediated and the importance of our land and our lives is frequently diminished because we live in the "low population zone." **24-38** *(cont'd)*

DOE ignores scientific evidence, the diverse compelling human epidemiology of more health harm from radiation so that it can avoid costs and inconvenience of tighter worker and public radiological protection

Workers harmed by the Department of Energy's operations are often denied illness compensation by the Energy Employee Occupational Illness Compensation Program while the program slowly conducts investigations into the inadequacies of the INL radiological protection programs.

Historical Proof of Inadequate Department of Energy Regulatory Oversight

The Department of Energy's track record, specifically at the Idaho National Laboratory's Materials and Fuels Complex, is to cover up safety deficiencies, especially those deficiencies associated with offsite radiation dose to the public. At MFC, seismic studies were "lost" for years, the safety analysis documentation remained unfinalized for years because no one could agree on how to finagle the radiation doses to be low enough, the DOE officially approved safety documentation as 10 CFR 830 compliance when it knew the documentation was not at all compliant. **24-39**

Then in 2005, Battelle Energy Alliance took over the contract, pointed to the skeleton in the closet, and DOE admitted that the nuclear facility safety documents were not 10 CFR 830 compliant. DOE agreed that it would take many more years to actually make the safety bases for MFC anywhere near code-of-federal regulations compliant.

49

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Commenter No. 24: Tami Thatcher

Despite the Department of Energy signing off on the Materials and Fuels Complex safety bases as code-of-federal regulations compliant about 20 years ago, when it was not compliant, the DOE also bolstered its argument by saying nothing bad was going to happen because of the strong safety culture at MFC.

But at INL's MFC, the condition of safety processes, safety equipment, and safety attitude was still so poor that managers at MFC ignored written warnings of high hazard to workers and MFC managers directly caused the plutonium inhalation event in 2011. After conducting 6 years of safety bases updates, the MFC managers actively ignored repeated warnings of worker radiological safety risks – and the preventable accident was not prevented and 16 workers (and actually more) were harmed by the 2011 plutonium inhalation event at MFC.

And the best the contractor, Battelle Energy Alliance, could do was blame workers despite even the DOE investigation report blaming management. The contractor also produced fraudulent lung count results to lie about the magnitude of the accident.

And because it was clearly Battelle Energy Alliance management's fault and there were multiple inadequate safety programs, BEA was quick to (1) falsify the urine and fecal sample results and the lung count results and (2) to attempt to coerce workers to sign that they had received information about their radiation dose when in fact, they hadn't. Radiation dose information from DOE contractors is not to be believed when high doses would get the contractors hands slapped (with fines). BEA blamed the workers even when DOE's own accident investigation found no fault by the workers who were contaminated.

24-39 *(cont'd)*

And these events follow years of hiding adverse findings about seismic safety at MFC and the DOE's other test reactor, the Advanced Test Reactor as well as other safety problems that often were not reported.

There may be one agency worse at nuclear reactor safety regulation than the U.S. Nuclear Regulatory Commission and that is the Department of Energy, which has set its sights on overseeing safety for the mobile microreactor presumably because of military missions that aren't being discussed. And now we have the U.S. Nuclear Regulatory Commission Chairman Kristine Svinicky actually bragging about how the NRC is hiring former Department of Energy personnel and placing them in high positions in the NRC.

Project Pele Draft EIS Treatment of Cumulative Impacts Is Inadequate

The Draft EIS cumulative impacts evaluation is arbitrary and misleading and fails to address the buildup of radionuclides in our air, water and soil and fails to acknowledge the inadequacy of the environmental surveillance programs.

People might eventually catch on that Idaho is getting more and more radiologically polluted — but with all the deliberate omissions and dis-information, probably not before it's too late.

24-40

Table 6 shows rapidly escalating INL radiological releases, yet the past releases have not been fully disclosed, nor has the needed epidemiology been conducted, having been deemed unnecessary based on failure to disclose the full extent of radiological releases.

50

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Commenter No. 24: Tami Thatcher

Table 6. Estimated annual air pathway dose (mrem) to Idaho communities from normal operations to the maximally exposed offsite individual from proposed projects, including the estimated dose from expanding capabilities at the Ranges based on DOE/EA-2063.

Current and Reasonably Foreseeable Future Action	Estimated Annual Air Pathway Dose (mrem)
National Security Test Range	0.04[e]
Radiological Response Training Range (North Test Range)	0.048[d]
Radiological Response Training Range (South Test Range)	0.00034[a]
HALEU Fuel Production (DOE-ID, 2019)	1.6[a]
Integrated Waste Treatment Unit (ICP/EXT-05-01116)	0.0746[h]
New DOE Remote-Handled LLW Disposal Facility (DOE/ID 2018)	0.0074[a]
Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling (DOE/EIS 2016)	0.0006[c]
TREAT (DOE/EA 2014)	0.0011[a]
DOE Idaho Spent Fuel Facility (NRC, 2004)	0.000063[a]
Plutonium-238 Production for Radioisotope Power Systems (DOE/EIS 2013)	0.00000026[b]
Total of Reasonably Foreseeable Future Actions on the INL Site	1.77[g]
Current (2018) Annual Estimated INL Emissions (DOE2019a)	0.0102[f]
Total of Current and Reasonably Foreseeable Future Actions on the INL Site [**DOE WOULD INCREASE INL'S AIRBORNE RELEASES BY OVER 170 TIMES**]	1.78[g]

Table notes:
a. Dose calculated at Frenchman's Cabin, typically INL's MEI for annual NESHAP evaluation.
b. Receptor location is not clear. Conservatively assumed at Frenchman's Cabin.
c. Dose calculated at INL boundary northwest of Naval Reactor Facility. Dose at Frenchman' Cabin likely much lower.
d. Dose calculated at INL boundary northeast of Specific Manufacturing Capability. Dose at Frenchman's Cabin likely much lower.
e. Sum of doses from New Explosive Test Area and Radiological Training Pad calculated at separate locations northeast of MFC near Mud Lake. **Dose at Frenchman's Cabin likely much lower. PLEASE NOTE THAT THE PUBLIC AT MUD LAKE IS CLOSER TO THE RELEASE THAN TO FRENCHMAN'S CABIN.**
f. Dose at MEI location (Frenchman's Cabin) from 2018 INL emissions (DOE 2019a). The 10-year (2008 through 2017) average dose is 0.05 mrem/year.
PLEASE NOTE THAT MANY RADIOLOGICAL RELEASES ARE IGNORED AND NOT INCLUDED IN THE RELEASE ESTIMATES IN NESHAPS REPORTING.
g. This total represents air impact from current and reasonably foreseeable future actions at INL. It conservatively assumes the dose from each facility was calculated at the same location (Frenchman's Cabin), which they were not.
h. Receptor location unknown, according to the Department of Energy, the agency that is supposed to know the receptor location.

51

24-40
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Commenter No. 24: Tami Thatcher

The Draft EIS fails to address the existing contamination levels in communities and drinking water. The Draft EIS fails to acknowledge that current INL radiological airborne monitoring is woefully inadequate because (1) emissions from the INL are usually based on estimates and not the reality, (2) the current environmental monitoring programs are designed to be inadequate, (3) the reports are tardy by nearly a year and are increasingly tardy, and (4) the quarterly and annual environmental monitoring reports are not reliable and are prone to "lost samples" or "air monitor not functioning" excuses.

Historical and current radiological monitoring programs omit INL releases, and are designed to hide, not reveal, the level and the source of radiological contamination.

The Draft EIS fails to truthfully discuss the multitude of INL CERCLA cleanup sites that cannot be released in 2095, as it goes about creating more CERCLA sites at the INL.

24-27 *(cont'd)*

DOE expects to continue increasing the "normal background" radiation levels both on and off the Idaho National Laboratory site until our communities all receive unhealthy levels of radionuclide ingestion and inhalation.

"Normal background levels" are already elevated above what was naturally occurring and continue to rise. By selecting a contaminated area to determine "normal background," it appears to me that this is how some radiological facilities can claim to operate within "normal expected background" no matter what radiological release incident just occurred.

The DOE continues to not disclose what it considers "normal background levels" on and off the INL or to trend how the "normal background levels" have changed over time.

The INL's past practices of inflating "normal background levels" meant that employees worked in contaminated areas that when assessed independently during CERCLA cleanup investigations in 1995, these facilities had to be disposed of as radiological waste. Various INL areas had been highly contaminated for decades, and yet not monitored or controlled as such. See the Administrative Record for CERCLA cleanup at the Idaho National Laboratory at https://ar.icp.doe.gov .

24-13 *(cont'd)*

Project Pele Draft EIS Does Not Adequately Characterize Past INL Radiological Releases

At the Idaho National Laboratory, formerly the Idaho National Engineering and Environmental Laboratory, the Idaho National Engineering Laboratory, and the National Reactor Testing Station, historical releases were monitored yet not actually characterized as to what and how many curies were released. When asked by the governor in 1989 to provide an estimate of the radionuclides released from routine operations and accidents, the Department of Energy issued the "INEL Historical Dose Evaluation." [63] [64] It has been found to have underestimated serious releases by sometimes 10-fold. Furthermore, the past environmental monitoring used all

24-39 *(cont'd)*

[63] US Department of Energy Idaho Operations Office, "Idaho National Engineering Laboratory Historical Dose Evaluation," DOE-ID-12119, August 1991. Volumes 1 and 2 can be found at https://www.iaea.org/inis/inis-collection/index.html

[64] Environmental Defense Institute's comment submittal on the Consent-based Approach for Siting Storage for the nation's Nuclear Waste, July 31, 2016. http://www.environmental-defense-institute.org/publications/EDIXConsentFinal.pdf

52

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Commenter No. 24: Tami Thatcher

along to claim no significant releases had occurred were not used in the INEL Historical Dose Evaluation. The environmental records that could have been used against the Department of Energy or its contractors were destroyed.

The Center for Disease Control commenced reviewing the DOE's radiological release estimate that were the basis for denying that any epidemiological study was needed in Idaho communities near the site. The CDC in 2007 issued its review of the 1989 study and found many releases, some of the largest ones, underestimated by a factor of 7. [65] Errors causing underestimation of the INL releases continue to be found as energy worker compensation studies have continued. The INL was originally called the National Reactor Testing Station, later called the Idaho Engineering Laboratory, and then the Idaho National Engineering and Environmental Laboratory before being named the Idaho National Laboratory.

The estimates of the 1991 INEL Historical Dose Evaluation [66] continue to be found in error and to significantly underestimate what was released. [67] [68] [69] Theoretical and idealized modeling of the releases were used for estimating the releases for the 1991 INEL HDE without using environmental monitoring to confirm the estimates — except for the 1961 SL-1 accident in which the environmental monitoring showed that the **theoretical modeling had underestimated the release**. In fact, many of the environmental monitoring records were deliberately destroyed before the 1991 report was released. [70] INL airborne releases included a long list of every fission product that exists including iodine-131, long-lived I-129, tritium, strontium-90, cesium-37, plutonium, and uranium.

The source documents for the INEL HDE are in fact part of the Human Radiation Experiments collection of DOE documents. Why? Because there was enough information available for the DOE to know that showering nearby communities and their farms and milk cows with radiation really was likely to be harmful to their health. The INL (formerly the NRTS, INEL and INEEL) takes up dozens of volumes of binders in the DOE's Human Radiation

24-39 *(cont'd)*

[65] Center for Disease Control, CDC Task Order 5-2000-Final, Final Report RAC Report No. 3, by Risk Assessment Corporation, October 2002. https://www.cdc.gov/nceh/radiation/ineel/to5finalreport.pdf

[66] US Department of Energy Idaho Operations Office, "Idaho National Engineering Laboratory Historical Dose Evaluation," DOE-ID-12119, August 1991. Volumes 1 and 2 can be found at https://www.iaea.org/inis/inis-collection/index.html p. 40

[67] Risk Assessment Corporation, "Identification and Prioritization of Radionuclide Releases from the Idaho National Engineering and Environmental Laboratory," October 8, 2002, https://www.cdc.gov/nceh/radiation/ineel/to5finalreport.pdf See p. 117, 118 for SL-1.

[68] SENES Oak Ridge, "A Critical Review of Source Terms for Select Initial Engine Tests Associated with the Aircraft Nuclear Program at INEL," Contract No. 200-2002-00367, Final Report, July 2005. http://www.cdc.gov/nceh/radiation/ineel/anpsourceterms.pdf See p. 4-67 for Table 4-13 for I-131 estimate for IET's 10A and 10B and note the wrong values for I-131 are listed in the summary ES-7 table.

[69] CDC NIOSH, "NIOSH Investigation into the Issues Raised in Comment 2 for SCA-TR-TASK1-005," September 3, 2013. https://www.cdc.gov/niosh/ocas/pdfs/dps/dc-inlspcom2-r0.pdf See p. 3 stating various episodic releases underestimated by the INEL HDE: IET 3, IET 4 and IET 10.

[70] Chuck Broscious, Environmental Defense Institute Report, "Destruction and Inadequate Retrieval of INL Documents Worse than Previously Reported," Revised September 1, 2018. http://environmental-defense-institute.org/publications/DocDestruction.pdf

53

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Commenter No. 24: Tami Thatcher

Experiments collection and that isn't including the boxes of documents no one can get access to or the records that were deliberately disposed of. [71]

DOE and the CDC still not disclosing the full extent of historical releases, including the magnitude of the 1961 SL-1 release which affected communities including Atomic City and Mud Lake.

Communities near the INL, include Atomic City to the south and Mud Lake to the north and Osgood west of the MARVEL project have been adversely affected already and isn't the harm done to those poor people enough?

The Atomic Energy Commission, predecessor of the Department of Energy, claimed that no other fission products were detected other than 0.1 Curies of strontium-90 and 0.5 curies of cesium-137 within the perimeter fence of the SL-1. [72] The derived release fractions based on trying to fit the AEC claims to a computer derived release fraction show that the AEC claimed low curie amount releases are fiction. Never before or since has a reactor fuel had such low release fractions! The AEC not only left out many radionuclides, they underestimated the amount of the fission product releases from the accident by a factor of over 22 for iodine-131, 588 for Cs-137 and 277 for Sr-90. And even with the low-balled curie releases, the SL-1 accident was a serious accident.

Despite what Risk Assessment Corporation (RAC) writes about prevailing meteorological conditions at the time of the SL-1 accident being characteristic of the typical conditions at the time of year, the conditions were not typical. During the accident, the prevailing winds were from the north to northeast for 100 hours with an extremely strong inversion. Typical conditions are a prevailing wind in the opposite direction during the daytime, with wind reversals at night typical. The SL-1 radionuclide plume blew south toward American Falls and Rupert, Idaho.

The SL-1 reactor fission product inventory consisted of radionuclides produced during the excursion and also radionuclides the had built up in the fuel during previous reactor operations. The operating history of the reactor consisted of 11,000 hours for a total of 932 MW-days. The

24-39
(cont'd)

[71] February 1995, the Department of Energy's (DOE) Office of Human Radiation Experiments published *Human Radiation Experiments: The Department of Energy Roadmap to the Story and Records* ("The DOE Roadmap"). See also the INL site profile on Occupational Environmental Dose: http://www.cdc.gov/niosh/ocas/pdfs/tbd/inl-anlw4-r2.pdf) Most of the documents in the DOE's Human Radiation Experiments collection remain perversely out of public reach. Documents are said to be stored at the INL site, out of state in boxes, [Good luck with getting these documents via the Freedom of Information Act] and in the National Archives. I found that retrieving documents from the National Archive would require extensive fees for searches and copying. Where is the transparency in creating a document collection that cannot be viewed by the public?

[72] Report by Risk Assessment Corporation for Centers for Disease Control and Prevention, Department of Health and Human Services, *Final Report Identification and Prioritization of Radionuclide Releases from the Idaho National Engineering and Environmental Laboratory*, RAC Report No. 3, CDC Task Order S-2000-Final, October 2002, pages 117, 118. https://www.cdc.gov/nceh/radiation/ineel/TO5FinalReport.pdf

54

This side left blank intentionally. Responses to Commenter No. 24's comments are presented previously on pages 3-34 through 3-56.

Commenter No. 24: Tami Thatcher

reactor accident resulted in a total energy release of 133 MW-seconds. Roughly 30 percent of the core's fuel inventory was missing from the vessel, when examined after the accident. [73 74 75]

Risk Assessment Corporation used the computer code RSAC to calculated a fission product inventory based on operation of the reactor at a power level of 2.03 MW (mega-watts) for 458 days, followed by a shutdown period of 11 days and the excursion power level of 88,700 MW for a period of 0.015 seconds. The Center for Disease Control did not call out what were obvious discrepancies and which meant that the SL-1 radiological consequences have been grossly understated. **24-39 (cont'd)**

Sage brush samples were collected and according to the AEC, the "gamma spectra of representative samples indicated that the activity was due to iodine-131. (IDO-12021, p. 131)

Draft EIS Fails to Acknowledge that the Department of Energy is Still Lying About the Causes and Consequences of the 1961 SL-1 Accident

It was customary for the AEC to monitor jack rabbit thyroids and the iodine-131 levels before the SL-1 accident, for jack rabbit thyroids were typically 100 picocuries per gram. After the SL-1 accident, the levels were as high as 750,000 picocuries per gram at the SL-1, 180,000 picocuries/gram at nearby Atomic City, located south of the SL-1, and 50,000 picocuries per gram at Tabor, a farming community southeast of SL-1 and west of Blackfoot, and 11,200 picocuries at Springfield. These rabbit thyroid results reveal much higher rabbit thyroid iodine-131 levels than produced by the other large episodic and routine releases from the Idaho National Laboratory during the 1950s and 1960s. [76 77 78 79] **24-41**

On page 3-44 of the Draft EIS, the EIS displays utter lack of understanding of the causes of the 1961 Stationary Low-Power-1 reactor accident.

> "This section discusses the accident history at the INL Site specific to nuclear reactor accidents. Accident details are only presented when the accident injured personnel or involved a gas-cooled reactor. One event included an incident involving fuel melting at the EBR-I, but the event did not injure personnel and EBR-I was a sodium-cooled reactor.

[73] Department of Energy, Idaho National Engineering Laboratory Historical Dose Evaluation, DOE/ID-12119, August 1991. See https://inldigitallibrary.inl.gov

[74] Atomic Energy Commission, "Final Report of the SL-1 Recovery Operation," IDO-19311, June 27, 1962. See p. III-77 regarding fuel damage. https://inldigitallibrary.inl.gov/PRR/163644.pdf

[75] Atomic Energy Commission, "Additional Analysis of the SL-1 Excursion Final Report of Progress July through October 1962," IDO-19313, November 21, 1962. See p. 27 Table I-VIII. https://inldigitallibrary.inl.gov/PRR/163644.pdf

[76] Atomic Energy Commission, "1958 Health and Safety Division Annual Report, IDO-12012, See p. 72, 73 for iodine-131 in sage brush and rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/112697.pdf

[77] Atomic Energy Commission, "Annual Report of Health and Safety Division, 1959," IDO-12014, See p. 88 for iodine-131 in rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/112700.pdf

[78] Atomic Energy Commission, "Health and Safety Division Annual Report, 1960," IDO-12019, See p. 91 for iodine-131 in rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/90927.pdf

[79] Atomic Energy Commission, "Health and Safety Division Annual Report, 1961," IDO-12021, See p. 128, 133 for iodine-131 in jack rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/163656.pdf

55

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Commenter No. 24: Tami Thatcher

The only nuclear reactor accident that occurred at the INL Site (called the National Reactor Testing Station at the time of the accident) and that met the above criteria involved the Stationary Low-Power Reactor Number One (SL-1) in 1961. The SL-1 reactor was a U.S. Army experimental nuclear power reactor. The purpose of the reactor was to provide electrical power and heat for remote military facilities. The SL-1 reactor generated electricity for the first time on October 24, 1958. The reactor would be operated for periods ranging between 1 and 6 weeks and then shut down for repairs and installation of improvements. During a shutdown that began on December 23, 1960, the control rods were disconnected from the control rod drive mechanisms. In the evening of January 3, 1961, the crew was to reconnect the control rods to the control rod drive mechanisms. While attempting to reconnect the control rods, the center control rod was improperly withdrawn and the reactor underwent a steam explosion and meltdown. Details of the accident are described in the report *Proving the Principle: A History of the Idaho National Engineering and Environmental Laboratory, 1949-1999* (Stacy, 2000). Some emergency planning had been done for the National Reactor Testing Station but the plans had not considered an event like the SL-1 accident. Considerable improvements were made in emergency planning as a result of the SL-1 accident. Current emergency planning for DOE facilities is under the direction of DOE Order 151.1D (DOE, 2016e)."

The fact that the SL-1 accident was caused by extremely poor safety oversight by the Department of Energy (then called the Atomic Energy Commission) and that mismanagement allowed poor design of safety features, in particular by allowing excessive reactivity insertion from withdrawal of a single control rod, allowed poor fabrication of the control rods and other parts of the reactor design, allowed the reactor to be operated despite complete absence of accident analyses during shutdown operations, allowed the reactor to continue operations despite an extensive history of control rod sticking, both during reactor operations and also during shutdown manipulations. The DOE (AEC) allowed SL-1 reactor operations to continue despite fuel swelling so severe that the fuel could not be removed and so fuel examinations simply ceased. The DOE (AEC) had verbally authorized, without documenting any safety evaluation, higher power operations than the existing safety documentation addressed.

24-41 *(cont'd)*

That this Project Pele Draft EIS has displayed such a limited understanding of the cause of the SL-1 accident, stating that they conclude that the main lesson from SL-1 was that of not adequately addressing emergency preparations underscores the mistake it is to have the Department of Energy oversee any aspect of safety regarding an uncontained, unfiltered, and inadequately staffed mobile microreactor at a military base or in Idaho.

The extensive history of control rod sticking was downplayed and actually dismissed by the AEC as the cause of the SL-1 accident prior to investigation of the core internals. The reason was that the control rod sticking, and this included during shutdown operations and material swelling had greatly increased in the last few weeks of SL-1 operation. Virtually never discussed is the finding that severity of the SL-1 accident was increased 10-fold due to the reduced heat transfer from the fuel caused by having allowed the coolant water to become greatly subcooled and there was no safety study prior to the accident that had been conducted on this and no stated temperature limit while conducted core changes. The lack of responsible safety oversight by the

56

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Commenter No. 24: Tami Thatcher

Department of Energy, which was shortcutting funding for adequate staffing of the facility in addition to multiple other safety shortcuts caused the accident but the lies about the causes of the SL-1 accident continue to this day, 60 years later.

As anyone who have worked the physically demanding tasks over a reactor top understands, the 84-lb control rod that was stuck, was jerked free, and it was all over. The managers of the SL-1 reactor understood so little about the hazards at the reactor that they insisted that it was not possible that the reactor had caused the damage and they insisted that someone had set a chemical explosive in the facility. Then it was months after the accident that they would learn that the reactor vessel had jumped 9 feet. Thus, there was no need to cut the piping in order to remove the vessel. The piping was already sheared.

Regarding the SL-1 accident, this Draft EIS has referenced a single document, *Proving the Principle: A History of the Idaho National Engineering and Environmental Laboratory, 1949-1999* by S. Stacy, an inadequately reviewed and non-technical document that incorrectly states the distances of rod lift height and includes non-factual propaganda to insinuate that the accident was deliberate. The Project Pele Draft EIS has demonstrated that the Department of Energy does not have the capability or necessary aptitude for overseeing reactor safety.

24-41 *(cont'd)*

Certainly, the emergency planning for the SL-1 was inadequate. The unsafe conditions at the SL-1 reactor included having a total of three crewman, alone at an isolated facility at the INL. There was no one to even call for assistance. There was no one to open the locked gate outside the facility. There was no one at the reactor control room to monitor reactivity changes or radiation levels. There was inadequate radiation monitoring equipment. Recent accidents at the INL indicate that little improvement has been made in emergency planning, pertaining to waste drum explosions and inadequate radiological planning and safety. But the cause of the SL-1 accident, having not been grasped by the best and the brightest individuals who have authored or reviewed the Draft EIS for the mobile microreactor displays their tremendous ignorance of reactor safety issues and this alone is proof that the Department of Energy is incapable of responsible safety oversight of any reactor.

The DOE has lied to the public about the SL-1 accident and still publishes false information about the SL-1 accident, and the Project Pele Draft EIS is doubling down on the deception. Seed my report about the consequences of the SL-1 accident on the Environmental Defense Institute website, *The SL-1 Accident Consequences*, at http://environmental-defense-institute.org/publications/SL-1Consequences.pdf and the cause of the SL-1 accident on the Environmental Defense Institute website, *The Truth about the SL-1 Accident – Understanding the Reactor Excursion and Safety Problems at SL-1* at http://environmental-defense-institute.org/publications/SL-1Accident.pdf

Reactor fuel melting that resulted in large radiological releases such as have occurred at other DOE facilities such as the Department of Energy's Savannah River Site should have also been addressed, even if the accidents were largely covered up by the Department of Energy.

57

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Commenter No. 24: Tami Thatcher

Project Pele Draft EIS Ignores Repeated INL Accidents Having Inadequate Emergency Response

The draft EIS fails to acknowledge decades of repeated inadequate emergency preparation for site emergencies in terms of training, decontamination, radiological medical treatment, inadequate emergency radiological monitoring during and after the emergency.

Not only was the emergency response to the Department of Energy WIPP accidents inadequate in 2014, and the Department of Energy plutonium inhalation event at INL in 2011, it was inadequate at the INL's Radioactive Waste Management Complex in 2018 when, due to deliberate actions to ignore the known contents of waste drums, four waste drums forcefully expelled their powdery contents within a fabric enclosure. The fire department responded to the event due to activation of a fire alarm and the fire department had no idea a radiological event had occurred. The radiation constant air monitors did not alarm and the facility had no available radiological support with knowledge of what might have happened in the facility and had no radiological support staff with self-contained breathing apparatus training – because it was assumed that no matter the unreasonable risks they were taking, there would not be an event.

In fact, the Department of Energy actually avoids any oversight or evaluation of the emergency preparedness of facilities that it recognizes have large deficits. It is for this reason that the Department of Energy has long avoided any oversight assessment of the INL's Materials and Fuels Complex emergency preparedness. ***24-42***

The draft EIS fails to acknowledge that the routine and emergency monitoring will ignore the uranium-235 released by the accident as well as inadequate actinide (plutonium, americium, curium, etc.) monitoring because of intentional environmental monitoring inadequacies to avoid implicating the INL as the source of the contamination. The decay products from plutonium-240 and uranium-236 are thorium decay progeny which the environmental monitoring falsely asserts are from naturally occurring thorium-232. The elevated levels of uranium-234, uranium-235, uranium-236 are intentionally not delineated by the specific isotope so the DOE can falsely claim that the uranium is naturally occurring.

From the 1961 SL-1 accident where radiological monitoring was especially inadequate for emergency responders, to the 2011 plutonium inhalation accident caused by management failure to heed repeated warnings of high worker risks and the multiple failures that caused the event and the multiple failures in responding to the event, to the 2018 four drums of waste that exploded and fire fighters, once again, responded without support of adequate training or radiological support personnel.

The Draft EIS fails to acknowledge that the lack of proper decontamination facilities means that an injured worker is going to radiologically contaminate medical facilities in Idaho Falls.

Project Pele Draft EIS Implies DOE Will Comply with Department of Energy Regulations but Ignores DOE's Lack of Compliance

From the DOE's nuclear weapons testing at the Nevada Testing Station, in the Pacific islands, and elsewhere, the DOE told people they were safe and then covered up epidemiology that showed people had increased rates of leukemia and cancer from the fallout. The DOE ***24-43***

58

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Commenter No. 24: Tami Thatcher

claimed its releases from the INL were too low to cause harm, but when asked to state what it had released to the Idaho skies, the DOE didn't know. Then when the DOE issued a report of estimated releases through its history to 1989, reviews by the Center for Disease Control found the releases had been significantly underestimated. It is also documented that many environmental monitoring records were subsequently destroyed, which would have indicated more contamination that the DOE wanted others to know about. The DOE has lost or destroyed worker radiation dose records throughout its history when the records would show elevated doses. The DOE uses secrecy, document destruction, omission of key information during public presentations, and adherence to providing false information about its plans, and breaks its commitments. The DOE would not have conducted any cleanup at all if other federal agencies had not been able to say that hazardous chemical laws needed to apply to DOE sites, allowing CERCLA cleanup investigations. The DOE has systematically lied about the pervasive long-lived radionuclides at sites likes the INL, omitting what it well knew, that uranium, plutonium and americium were included in soil and perched water. It omitted this information so well that the DOE and the U.S. Geological Survey have often, without justification, omitted the reporting of extensive radiological contamination at the INL, later found by CERCLA investigations.

DOE lied about its radiological releases decades ago from nuclear weapons testing, reactor testing, and reactor accidents and other operations and it continues to misinform the public about its past and about current contamination.

24-43 *(cont'd)*

The Department of Energy has a long history of telling workers they are protected from radiological hazards — but workers got illnesses. Nationwide, billions of dollars of illness compensation have been paid out under the Energy Employee Illness Compensation Program Act (EEICOPA) even with two-thirds of INL claims denied.

The Department of Energy has a long history of saying its radiological releases were too small to affect the public — but studies found that the public had higher infant mortality and certain cancers and leukemia.

The Department of Energy has rightfully earned and continues to earn the public's distrust. The Department of Energy must not be allowed to unilaterally reclassify HLW waste because the DOE cannot be trusted to comply with its own regulations should its regulations or DOE Orders be deemed inconvenient or costly.

The Idaho National Laboratory along with other Department of Energy operations at Hanford and Rocky Flats have a long tradition of falsification of lung count results. The last situation requiring lung counts, reported that lung counts were not required, despite lung counts being required. Workers are not informed that their lung count results can be manipulated in order to obtain lowered intake results. I have personally seen irrefutable evidence of fraudulent lung count report manipulations by the Idaho National Laboratory.

DOE Actively Seeks to Undermine State and Federal Laws

24-44

The Draft EIS implies by listing various laws that the Department of Energy complies with state and federal laws and complies with meaningful DOE regulations and Orders.

59

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Commenter No. 24: Tami Thatcher

In fact, DOE has for years sought to send radioactive waste to WIPP despite laws prohibiting it.

DOE has for years been seeking consolidated interim storage of spent nuclear fuel and in quantities prohibited by law because the NWPA laws sought to prevent DOE from simply providing above ground storage rather than obtaining permanent disposal.

The DOE has been recognized by the courts as modifying it radioactive waste DOE Orders at whim, which means no EIS that cites a DOE Order can be relied upon.

The DOE has ignored federal law and state legal agreements by unilaterally declaring it can declare its high-level waste is now low-level waste, and with vastly reduced disposal limitations.

The DOE has made a practice of not referring to the sodium-bearing waste at the INL as high-level waste, despite not having made any steps to officially reclassify it as such — because of the legal challenges this may bring. But not calling the waste high-level waste, it can misinform citizens and State of Idaho officials, however. **24-44 (cont'd)**

The Draft EIS Fails to Acknowledge that the DOE has a Record of Not Disclosing Safety Problems Publicly or Accurately and Usually Fails to Publish the Public Comment Submittals

The Department of Energy routinely makes its unusual occurrence reports and other safety information impossible or difficult for the public to obtain. If reported, the public can expect months of delay before information is available publicly.

The DOE has also conducted numerous public comment opportunities, only to refuse to publish those public comments such as the consent-based interim spent nuclear fuel storage meetings conducted a few years ago. [80 81]

The author, Tami Thatcher, has a degree in Mechanical Engineering from the University of Idaho and worked as an Advisory Engineer for the Idaho National Laboratory, specializing in nuclear reactor risk assessment and nuclear facility safety analyses and also maintained radiation worker certification. She has been studying and writing about issues related to the Idaho National Laboratory's extensive radiological contamination of southeast Idaho since 2007, including issues relating to environmental monitoring, aquifer contamination, CERCLA cleanup, nuclear facility safety, radiation worker protection, and radiation health issues. **24-43 (cont'd)**

[80] Before ending the consent-based siting effort, information found about the Department of Energy's consent-based siting at www.energy.gov/consentbasedsiting and its Integrated Waste Management and Consent-based Siting booklet at http://energy.gov/ne/downloads/integrated-waste-management-and-consent-based-siting-booklet

[81] Environmental Defense Institute's comment submittal on the Consent-based Approach for Siting Storage for the nation's Nuclear Waste, July 31, 2016. http://www.environmental-defense-institute.org/publications/EDIXConsentFinal.pdf

60

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Commenter No. 25: Christine Andres

From:	Christine Andres [redacted]
Sent:	Monday, November 8, 2021 4:12 PM
To:	PELE_NEPA@SCO.MIL
Cc:	Justin Costa Rica; Greg Lovato; Brad Crowell; Fred Dilger
Subject:	EXTERNAL: Comments on the Construction and Demonstration of a Prototype Mobile Microreactor EIS.
Attachments:	Comments on Draft DOE_EIS-0546.pdf

Good Afternoon,

Attached to this email, please find comments in pdf format from the Nevada Division of Environmental Protection on the Construction and Demonstration of a Prototype Mobile Microreactor EIS. Should you have any questions, please do not hesitate to contact either Justin Costa Rica at [redacted] or me at [redacted].

Sincerely,
Christine Andres

Christine D. Andres
Chief
Bureau of Federal Facilities
Nevada Division of Environmental Protection
Department of Conservation and Natural Resources
375 E. Warm Springs Road, Suite 200
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[redacted]

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Commenter No. 25: Christine Andres

NEVADA DIVISION OF
ENVIRONMENTAL PROTECTION

STATE OF NEVADA

November 8, 2021

Mr. Jeff Waksman
U.S. Department of Defense
c/o Leidos
2109 Air Park Rd SE
Suite 200
Albuquerque, NM 87106

RE: Construction and Demonstration of a Prototype Mobile Nuclear Microreactor Draft Environmental Impact Statement, DOE/EIS-0546, September 2021

Dear Mr. Waksman:

The Nevada Division of Environmental Protection (NDEP) provides herein comments on the U.S. Department of Energy's (DOE) and Department of Defense's (DoD) *Construction and Demonstration of a Prototype Mobile Nuclear Microreactor* Draft Environmental Impact Statement (PMNM DEIS), DOE/EIS-0546, September 2021.

1. Summary, Page 18, Table S-1 of the PMNM DEIS identifies the NNSS and EnergySolutions (Clive, UT) as disposal sites for MLLW & LLW, with the NNSS identified as the primary LLW and MLLW disposal option. The document also identifies TRU or GTCC-like waste being disposed at WIPP, with SNF being stored onsite. Additionally, the document identifies "Cold Waste" as non-radioactive industrial waste which would be disposed of onsite.

   The State of Nevada requests that the PMNM DEIS verify that Cold Waste, TRU waste, GTTC-like waste and Spent Nuclear Fuel are not being considered for disposal at the NNSS. ***25-1***

2. Summary, Page 18, Table S-1 of the PMNM DEIS states that 247.1 cubic meters, 533.4 meters, and 50 connections (units) of low-level waste would be generated by Project Pele, the Proposed Action. This information is also repeated in Chapter 2, Page 28, Table 2.7-1. However, this information is inconsistent with the low-level waste presented in Tables 4.9-1 and 5.3-1, which included 50,000 gallons of shield water, 500 feet of piping, CONEX containers and the reactor vessel.

   The State of Nevada recognizes that the PMNM DEIS states there will be relatively small volumes of LLW and MLLW generated by the Proposed Action. However, as the NNSS is identified in the PMNM DEIS as a potential waste disposal site, the State of Nevada requests that the PMNM DEIS consistently present the volumes of LLW and MLLW generated by the Proposed Action. ***25-2***

25-1 Current radioactive waste and spent nuclear fuel (SNF) management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the INL Site has disposed LLW and treated MLLW at the DOE Nevada National Security Site (NNSS) or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's onsite LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008). SNF would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS.

25-2 The volume of each type of waste potentially generated have been verified and globally updated throughout the EIS to ensure consistency.

Commenter No. 25: Christine Andres

Mr. Jeff Waksman
Page 2 of 4
November 8, 2021

3. Summary, Page 21, Table S-2 of the PMNM DEIS states "There are existing offsite DOE and commercial waste management facilities with sufficient capacities for the treatment and disposal needs of the relatively small volumes of LLW and MLLW generated by the Proposed Action. Consequently, substantial cumulative impacts on offsite LLW and MLLW treatment and disposal facilities would not be expected."

   401 CFR §1502.15 Affected Environment states, "The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration, including the reasonably foreseeable environmental trends and planned actions in the area(s). … Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced…"

   The State of Nevada recognizes that the PMNM DEIS states there will be relatively small volumes of LLW and MLLW generated by the Proposed Action. However, as the NNSS is identified in the PMNM DEIS as a potential waste disposal site, the State of Nevada requests that the DOE provide the documentation used in the analysis under 40 CFR §1502.15 to show that all past, present, and future actions that contribute to any and all cumulative effects for waste disposal capacity at the NNSS have been evaluated. 25-3

4. *DOE Manual 435.1-1 Chg. 2 Radioactive Waste Management*, Chapter I.2.F (4) states, "DOE radioactive waste shall be treated, stored, and in the case of low-level waste, disposed of at the site where the waste is generated, if practical; or at another DOE facility."

   The NNSS currently receives an average of 1,878 $m^3$of Low-Level Waste (LLW) per year from Idaho National Lab Generators. The projected generation of 247 m^3 of LLW waste from the operation of the PMNM, in addition to the 880 m^3 of LLW waste generated per year from the operation of the proposed Versatile Test Reactor, Feedstock Preparation, and Fuel Fabrication, would contribute to an already significant volume of waste received from Idaho National Lab at the NNSS.

   The Idaho National Laboratory currently has two active low-level waste disposal facilities onsite (RWMC LLW Disposal Facility and Remote-Handled LLW Facility). The PMNM DEIS does not analyze using these existing onsite disposal facilities or any future additional onsite LLW disposal cells.

   The State of Nevada requests, as required by 40 CFR §1502.14(a), the evaluation of <u>reasonable alternatives</u> to the proposed action, including the feasibility of onsite disposal. The findings and analysis should be included in the PMNM DEIS. For alternatives that the agency eliminated from detailed study, the reasons for their elimination should also be briefly discussed. 25-4

25-3 The cumulative impacts of past, present, and reasonably foreseeable future actions are evaluated in Chapter 5, *Cumulative Impacts*, of this EIS. As summarized in the introduction to Chapter 5, as long as the waste disposal capacity of the facility would not be exceeded, the impacts of these waste management activities were already considered in the licensing or permitting processes for these disposal facilities and would not contribute to an increase in impacts. Furthermore, there are a number of options available for the disposal of LLW and MLLW. Two DOE sites, the Hanford Site and the NNSS, allow for disposal of off-site-generated LLW and treated MLLW, as long as the waste meets each sites' waste acceptance criteria. In addition, there are at least two commercial facilities that can accept government-owned LLW: Energy*Solutions* LLW Disposal Facility near Clive, Utah and Waste Control Specialists near Andrews, Texas. Therefore, there are a number of available waste disposal options to address the small volumes of LLW and MLLW that would be generated by the proposed activities. The continued operation of the DOE and National Nuclear Security Administration (NNSA)'s NNSS is not within the scope of this EIS. Continued operation of the NNSS is monitored, and the associated documentation, including National Environmental Policy Act (NEPA) documents, are evaluated for any necessary revisions and updates. While this mobile microreactor EIS does discuss disposal of LLW and MLLW at the NNSS, it does not specify that the wastes would be disposed at the NNSS. NNSS disposal is one option included in this EIS, and its use would be contingent on the status and availability of the disposal facility, as well as other disposal options, at the time disposal would be required. Commercial disposal options were also identified and evaluated in this EIS. Adequate capacity for waste is anticipated regardless of the disposal facility selected. The NNSA Nevada Field Office reviews the NNSS Site-Wide Environmental Impact Statement (SWEIS) continually as activities and projects are proposed or changed. Currently, projected future missions are within the bounds of the NNSS SWEIS; however, the NNSA Nevada Field Office will continue to assess all projects as part of the formal NEPA process. The waste from Project Pele, should it come to the NNSS, would be within the bounds of the NNSS SWEIS analysis. The NNSA will continue to pursue the necessary resources to execute the appropriate NEPA processes, as required.

25-4 Current radioactive waste and SNF management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all LLW and MLLW would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the

Commenter No. 25: Christine Andres

Mr. Jeff Waksman
Page 3 of 4
November 8, 2021

5. The PMNM DEIS cites the *1997 Final Waste Management Programmatic Environmental Impact Statement for Managing, Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) as a NEPA document related to the scope of the PMNM project. The WM PEIS identifies Hanford and the NNSS as regional disposal sites. In addition, the WM PEIS also asserts that, consistent with current practice, LLW disposal operations at LANL, ORR, INEL and SRS would continue, to the extent practicable. LANL and ORR would continue disposal of LLW generated on-site and INEL and SRS would continue to dispose of LLW generated on-site or by the Naval Nuclear Propulsion Program. For the management of MLLW analyzed in the WM PEIS, it is stated that the Department prefers regional disposal at Hanford and NNSS, which was subsequently codified in the *Identification of Preferred Alternatives for the Department of Energy's Waste Management Program: Low-Level Waste and Mixed Low-Level Waste Disposal Sites (64 FR 69241)*, published December 10, 1999.

   On December 18, 2009, the Department of Energy published the *Notice of Modifications to the Preferred Alternatives for Tank Waste Treatment and Disposal of Off-Site Waste in the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, WA* (74 FR 67189), which states, in part, that "... DOE would not send LLW and MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions) at least until the WTP is operational, consistent with DOE's proposed settlement agreement with the State of Washington. Off-site waste would be addressed after the WTP is operational subject to appropriate NEPA review..."

   25-5

   Nevada recognizes the limitations set forth in 74 FR 68179. However, the 2013 NNSS SWEIS states "DOE has established a moratorium on the receipt of offsite waste at the Hanford Site until 2022 or until the Waste Treatment Plant at the Hanford Site is operational. This facility is currently under construction and is designed to treat radioactive waste from the Hanford Site's underground storage tanks." This statement aligns with 74 FR 68179 and expands it with the inclusion of a deadline.

   Additionally, the PMNM DEIS Section 5.0 States that "Two DOE sites, the Hanford Site and the NNSS, allow for disposal of off-site generated LLW and MLLW, as long as the waste meets each sites' waste acceptance criteria."

   The PMNM DEIS does not analyze the option of sending this waste to the Hanford Site even though it is designated as a "Regional" disposal site by WM PEIS and authorized to take offsite generated LLW and mixed low-level waste. As the waste from the PMNM DEIS is not projected to be generated until at least 2023 and the WTP will be operational by 2023, the conditions set forth in 74 FR 68179 for disposal of offsite waste to resume as the Hanford Site would be met.

   The State of Nevada requests, as required by 40 CFR §1502.14(a), the evaluation of <u>reasonable alternatives</u> to the proposed action, including the evaluation of the use of the Hanford Site as an alternative disposal option for the waste generated by the PMNM construction and demonstration. The findings and analysis should be included in the PMNM

25-4 (cont'd)

INL Site has disposed LLW and treated MLLW at the DOE NNSS or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's on-site LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008).

25-5 The DOE evaluation of sending LLW and MLLW generated off-site to Hanford is still pending. However, Chapter 5, *Cumulative Impacts*, states that the Hanford Site is an optional destination that could receive the generated volumes of LLW and treated MLLW discussed in Chapter 4, *Environmental Consequences*. This EIS presents the NNSS as one potential destination for certain wastes generated by Project Pele.

Commenter No. 25: Christine Andres

Mr. Jeff Waksman
Page 4 of 4
November 8, 2021

DEIS. For alternatives that the agency eliminated from detailed study, including this disposal option, the reasons for their elimination should also be briefly discussed. 25-5 (cont'd)

Should you have any questions, or if you wish to discuss Nevada's comments further, please do not hesitate to contact Justin Costa Rica at [redacted] or me at [redacted]. Thank you for your consideration of these comments on the Draft PMNM EIS.

Sincerely,

Christine Andres

Christine D. Andres
Chief
Bureau of Federal Facilities

ec: Greg Lovato, Administrator, NDEP
Brad Crowell, Director, Nevada DCNR
Fred Dilger, Executive Director, Nevada ANP
Justin Costa Rica, NDEP

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Commenter No. 26: Chuck Broscious

From: edinst@tds.net
Sent: Monday, November 8, 2021 1:05 PM
To: Pele NEPA
Subject: EXTERNAL: EIS Comments
Attachments: EDI. Com.Pale.Microreactor.10.pdf

Attached please find Environmental Defense Institute's comments on Project PELE.
Chuck Broscious
Pres
edinst@tds.net
[redacted]

1

Responses to Commenter No. 26's comments begin on page 3-99 and are presented sequentially in order of comment ID but not necessarily right next to the first instance of a given comment ID. Responses end on page 3-101.

Commenter No. 26: Chuck Broscious

Environmental Defense Institute
Troy, ID 83871-0220
edinst@tds.net

November 7, 2021

RE: Prototype Mobile Microreactor EIS Comments

Mobile Microreactor EIS Comment
c/o Leidos
2109 Air Park Rd SE
Suite 200
Albuquerque, NM 87106

Filed via email to: Pele_NEPA@sco.mil

To Whom it may concern,

The Department of Defense (DOD) acting through the Strategic Capabilities Office (SCO) and in close collaboration with the U.S. Department of Energy (DOE) plans on building a "warfighter mobile nuclear reactor power generation" unit at one of 3 Idaho National Laboratory (INL) sites operated by DOE. DOD wants to develop a "prototype advanced mobile nuclear microreactor to support DOD domestic energy demands, DOD operational and mission energy demands, and Defense Support to Civil Authorities mission capabilities." The 3/3/20 Notice of Intent [1] to prepare an Environmental Impact Statement is available for viewing online at:
https://www.federalregister.gov/
https://www.mobilemicroreactoreis.com/comment.aspx

The Environmental Defense Institute has been monitoring DOE's INL operations for over 30 years and can categorically say the US Army and DOE's record of mismanagement of INL nuclear projects has resulted in extensive radiation contamination to the Idaho region. Therefore, we are opposed to this prototype advanced mobile nuclear microreactor for reasons we layout below. *26-1*

Because of the existential threat of climate disaster, these DOD/DOE nuclear addicts have ignored, they must add to the scope of this EIS alternative renewable energy and offer a demonstration for these energy applications. These renewable energy sources will not – as our below discussion demonstrates – add to the radiation contamination of Idaho's air and water. *26-2*

INL Background

In 1948 the Atomic Energy Commission (AEC) made the decision to expand reactor development and spent fuel chemical processing for nuclear weapons materials. Originally the *26-3*

[1] 12274 Federal Register / Vol. 85, No. 41 / Monday, March 2, 2020 / Notice of Intent to Prepare an Environmental Impact Statement for Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor

26-1 DoD acknowledges your opposition to the Proposed Action. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussions in Section 2.1, *Support and Opposition*, of this CRD for additional information. It is not within the scope of this EIS to address the past management performance of DoD or DOE at the INL Site. DOE acknowledges that past activities have led to the contamination of portions of the INL Site. This has led to the designation of portions of the INL Site for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (designation as a Superfund site). DOE, in coordination with the U.S. Environmental Protection Agency and the State of Idaho, is working to control and remediate the impacts from this contamination. Safe operation of the microreactor is paramount. During the demonstration of the prototype mobile microreactor, DoD and DOE would require that the microreactor demonstrations be performed in compliance with documented safety analysis. DOE is committed to maintaining the safety basis for the microreactor in compliance with 10 Code of Federal Regulations 830, *Nuclear Safety Management*. Releases from normal operations would be monitored to ensure compliance with all applicable permits and regulations, including 40 Code of Federal Regulations 61, Subpart H, *National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities*.

26-2 SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please see Section 2.2, *Purpose and Need*, of this CRD for additional information. The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Deployment at domestic bases, and Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases in foreign countries and U.S. territories is not included in the scope of this EIS. The potential environmental impacts of deployment, if it were to occur, would be the subject of additional environmental analyses. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information. Decisions related to funding priorities and budgets are outside the scope of this EIS.

26-3 DoD and DOE appreciates the history of INL presented by the commenter, but both DOE and SCO disagree with the assertion that high-level radioactive and chemical materials have never been properly or legally managed. DOE takes its responsibility for the safety and health of the workers and the public seriously and has managed activities at INL in accordance with regulations. The Stationary Low-Power Reactor Number One (SL-1) accident addressed in the comment is discussed in Section 3.11.2, *Accident History*, of this EIS. Operational occurrences mentioned in the comment are not related to the demonstration of the prototype mobile microreactor. Fuel for the prototype mobile microreactor would not be fabricated at INL. Past microreactor experience and knowledge gained from the Army Nuclear Power Program provides information about operating microreactors. The Hot Fuel Examination Facility (HFEF) hot cells would not require modifications to perform post-irradiation examination. HFEF operations to support the Project Pele mission are within the scope of activities

Commenter No. 26: Chuck Broscious

AEC named the new Idaho reactor site the National Reactor Testing Station (NRTS), and 141,000 additional acres were acquired north and east of the NRTS (for a total of 572,000 acres) as further environmental safeguard and buffer zone for expanded operations.

Over INL's 70+ year history, 52 nuclear reactors were built at INL - currently 3 are operating and another 10 are shutdown but operable. This represents the largest concentration of reactors in the world. [2] In addition to these reactors are facilities that process large quantities of high-level radioactive and chemical materials that have never been properly/legally managed. [3]

INL has had forty-two reactor meltdowns in its history of operations. Sixteen of these meltdowns were accidents. The remaining twenty-six were experimental/intentional meltdowns to test reactor design parameters, fuel design, and radiation releases. These nuclear experiments were conducted with little regard to the radiation exposure to workers and surrounding residents. Below is a partial listing of the more notable meltdowns and criticality releases. See Citizens Guide to INL IX Appendix (A) for a listing of acknowledged melt-downs, accidents, and experimental radioactive releases. The term accidental, used by DOE, is perhaps not an appropriate term any more than when the term is applied to a hot-rodder who "accidentally" crashes his car while speeding at 100 miles per hour down a road designed for 30 mph. Hot-rodding a nuclear reactor just to see what it will take is no accident and no less irresponsible. [4] **26-3 (cont'd)**

DOD Plan for INL

According to DOD, three INL locations are currently under consideration; Idaho Nuclear Technology Center (INTEC) ICPP-691, Materials and Fuels Complex (MFC) ERB-II, and the Power Burst Facility (PBF) Critical Infrastructure Test Range. Initially, DOD will build a prototype inside an existing structure and after hot run testing move the reactor to an INL outside location for additional hot tests. We discuss each of these sites more below. **26-4**

Idahoans remember when DOD built the Army's SL-1 small mobile reactor at the Idaho National Laboratory back in the 1960's because it exploded marking the first nuclear reactor accident that killed 3 operators. Operational mismanagement by the Army and contractor (Combustion Engineering) caused the explosion spreading significant radiation around the region. [5] A crucial element that his new mobile reactor will share with the SL-1 design is there will be little to no radiation containment structure required for Nuclear Regulatory Commission (NRC) licensed reactors. Since the cause of the SL-1 explosion was gross materials/oversight/management problems, DOD appears to be ready to repeat the same old mistakes by stating in the NOI: **26-3 (cont'd)**

> "The microreactor must keep radiation exposure during power operation, abnormal operations, or upset conditions, as low as reasonably achievable. SCO seeks to produce a prototype that will minimize consequences to the nearby environment and population in case of kinetic or non-kinetic action affecting structural integrity or release of

[2] DOE/EH/OEV-22-P, pg.2-8
[3] Citizens Guide to INL, Pg. 15 http://environmental-defense-institute.org/publications/GUIDE.963.pdf
[4] Guide pg. 20
[5] Tami Thatcher, *The SL-1 Accident Consequences*, http://environmental-defense-institute.org/publications/SL-1Consequences.pdf

2

26-3 (cont'd)

currently performed at the HFEF. The purpose of this EIS is to assess the environmental impacts of the Proposed Action. The scope of this EIS is limited to the construction and demonstration of the prototype mobile microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. The potential environmental impacts of deployment and use of these future designs, if they were to occur, would be the subject of additional environmental analyses. SCO used state-of-the-art science, technology, and expertise to assure quality in the accident impacts analyses. Personnel with many years of experience performed the accident analyses using state-of-the-art computer programs approved for use by DOE and the NRC. Section 4.11, *Human Health – Facility Accidents*, of this EIS includes a comprehensive assessment of potential impacts from prototype mobile microreactor accidents that could result during all phases of the project, from initial construction through decommissioning of the project and disposal of materials. The section presents the analysis of impacts from potential radioactivity releases as a result of microreactor accidents, along with cumulative impacts. None of the proposed activities put present and future generations at risk for serious health problems and death.

26-4 The commenter is correct in that these facilities have been identified as locations for demonstration activities. Note that while the MFC and CITRC are identified as locations where activities would be performed (and the impacts of using these facilities have been analyzed in Chapter 4, *Environmental Consequences*, of this EIS), the Idaho Nuclear Technology and Engineering Center is identified as one of several potential locations for the described activity, because the function of the identified facilities is similar to what would be performed in support of the mobile microreactor spent nuclear fuel management. Even if the Proposed Action is selected in the Record of Decision for this EIS, the Idaho Nuclear Technology and Engineering Center may or may not be used depending upon several factors, including availability of the facility.

26-5 As stated in EIS Section 3.9, *Waste and Spent Nuclear Fuel Management*, no high-level radioactive waste would be generated by Project Pele.

26-6 DOE is not self-regulated. As described in Chapter 7, *Laws, Regulations, and Other Requirements*, most aspects of DOE operations are performed under the oversight of Federal and state regulatory agencies. EIS Section 1.3, *Proposed Action and Scope of this EIS*, states that DoD has received authorization from DOE, pursuant to its authority under the Atomic Energy Act and National Security Decision Directive 282, for the acquisition and operation of a prototype reactor. Consistent with the non-commercial nature of the project, the prototype mobile microreactor may proceed under authorization by the Secretary of Energy and does not require an NRC license. The NRC, consistent with its role as an independent regulator, is participating in this project to provide SCO with accurate, current information on NRC's regulations and licensing processes. As described in EIS Section 1.2, *Purpose and Need for Agency Action*, DoD's intent is to develop a mobile microreactor that could be licensed by NRC.

Commenter No. 26: Chuck Broscious

Environmental Defense Institute Page | 3

contamination Further, [Strategic Capabilities Office] SCO seeks to utilize nuclear materials in the construction of a prototype microreactor that, if damaged, do not generate and impose excessive training and equipping burdens on forward area first responders, site medical facilities, or supported military personnel and the civilian population." [6] **26-3 (cont'd)**

INL is desperate for a new mission to justify its existence other than cleaning-up its' huge legacy nuclear waste. DOD knows that the nuclear power option is the most expensive compared to renewables plus and more importantly - there is no permanent deep geological disposal site for the high-level waste these reactors will generate. Tragically, nuclear waste production has never been an issue DOD/DOE have ever been concerned about. It's fine to continue to use Idaho as their nuclear waste dump. DOE/DOE 70+ year history of INL mismanagement and total disregard of the health and environmental effects of their operations is prima-facia evidence that they can **NOT** be trusted for anything other than cleanup of the mess they've already made. [7] **26-5**

Since DOE is self-regulated, its nuclear facilities do not come under the full regulatory authority of the Nuclear Regulatory Commission (NRC). Consequently, this new mobile nuclear microreactor will also not be required to meet NRC design/operation/safety specifications; though DOE claims to seek NRC consultation, it "does not require an NRC license." **26-6**

DOD claims to need a prototype advanced mobile nuclear microreactor to support DOD domestic energy demands capable of producing 1 10 megawatts of electrical power, DOD operational and mission energy demands, and Defense Support to Civil Authorities mission capabilities. Given DOD/DOE track record their claim below sounds ridiculous:

"The microreactor must keep radiation exposure during power operation, abnormal operations, or upset conditions, as low as reasonably achievable. SCO seeks to produce a prototype that will minimize consequences to the nearby environment and population in case of kinetic or non-kinetic action affecting structural integrity or release of contamination. Further, [Strategic Capabilities Office] SCO seeks to utilize nuclear materials in the construction of a prototype microreactor that, if damaged, do not generate and impose excessive training and equipping burdens on forward area first responders, site medical facilities, or supported military personnel and the civilian population." **26-7**

Each of the INL locations DOD/DOE are considering have their own major contamination issues from previous operations. EDI's extensive contamination reports on each site in the following indoor/outdoor locations at INL must be considered in the EIS review process before making the decision to select INL.

- "Conduct mobile microreactor core fueling and final assembly at MFC's Hot Fuel Examination Facility (HFEF) or the Transient Reactor Test Facility (TREAT) located about 0.5-mile northwest of MFC. **26-8**

[6] 12274 Federal Register / Vol. 85, No. 41 / Monday, March 2, 2020 / Notice of Intent to Prepare an Environmental Impact Statement for Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor

[7] See 1995 Settlement Agreement and Consent Order against DOE/INL for mismanagement of nuclear waste.

3

26-7 SCO believes the need to construct and demonstrate a mobile microreactor has been adequately described in this EIS. SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please see Section 2.2, *Purpose and Need*, of this CRD for additional information.

26-8 DOE acknowledges that past activities have led to the contamination of portions of the INL Site. This has led to the designation of portions of the INL Site for cleanup under CERCLA (designation as a Superfund site). DOE, in coordination with the U.S. Environmental Protection Agency and the State of Idaho, is working to control and remediate the impacts from this contamination. The cleanup of existing contamination is outside the scope of this EIS. Chapter 3, *Affected Environment*, of this EIS describes existing contamination of environmental media, such as air, water, soil, and biota, and DOE's monitoring program to detect releases and movement of contaminants. As described in EIS Section 2.5, *Alternatives Considered and Dismissed from Detailed Analysis*, one of the criteria used to evaluate potential locations for demonstration of the mobile microreactor is that the site be located outside of CERCLA sites. Therefore, this was considered in selecting the locations analyzed in this EIS. See the responses to Comments 26-1 and 26-4.

Commenter No. 26: Chuck Broscious

- "Conduct mobile microreactor startup testing at MFC's National Reactor Innovation Center (NRIC) Demonstration of Operational Microreactor Experiments (DOME) or CITRC;
- "Temporarily store the mobile microreactor at MFC's Radioactive Scrap and Waste Facility (RSWF) or Outdoor Radioactive Storage Area (ORSA).
  The mobile microreactor design determination by SCO will precede the decisions supported by this EIS. However, the analysis of impacts is applicable to (i.e., bounds) whichever of the two-candidate mobile 30 microreactor designs is selected."

26-8 (cont'd)

INL Accident History must be considered in the EIS scoping

"The accident at the Stationary Low-Power Reactor Number One (SL-1) occurred on January 3, 1961. Located in the Auxiliary Reactor Area, **SL-1 was a small compact Army nuclear power plant designed to generate electricity at remote military locations such as the Arctic or Antarctic.** The reactor served both as an experimental prototype and as a training facility for military personnel. On the bitterly cold afternoon of January 3rd, three Army technicians arrived at the facility for the four to midnight shift. The SL-1 reactor had been shut down for routine maintenance, and the task of the three men that evening was to complete certain preparations for nuclear startup. Apparently, in the process of attaching control rods to drive motors, one of the men raised the central control rod too far and too fast. Evidence indicates that the rod might have stuck momentarily. In the past, there had been sticking problems with that rod. When it came unstuck, it moved upward much higher than anticipated and triggered a supercritical power excursion in the reactor core. In a fraction of a second the power reached a magnitude of an estimated several billion watts, melting and perhaps even vaporizing a large part of the core. The water in the core region was vaporized, creating a devastating steam explosion. The remaining water in the reactor vessel was hurled upward at high velocity, striking the underside of the reactor's pressure lid and lifting the whole nine-ton vessel upward, shearing cooling pipes in the process. The three men, who had been standing atop the reactor vessel, were crushed against the ceiling of the building before the huge vessel dropped back into place. One of the men remained impaled on the ceiling by a piece of control rod rammed through his groin. It all happened in a second or so." [Norton] [emphasis added]

"It [SL-1] was a terrible accident, made even more grisly because the intensely radioactive fission products scattered inside the building by the accident hampered the work of recovering the bodies. Staying in the building for mere seconds resulted in a year's allowable dose of radiation for rescue workers. And it took six days to remove the body that was impaled on the ceiling by use of a remotely operated crane and a closed-circuit television. The bodies were so badly contaminated, the heads and hands of the victims had to be severed and buried with other radioactive wastes at the Radioactive Waste Management Complex." [Norton] The Oil Chemical and Atomic Workers Union protested vigorously that the government refused to provide a proper Christian burial for the workers.

The SL-1 reactor explosion not only resulted in three deaths but also serious exposure of 0.1-0.5 roentgens [rem] to nearly 100 personnel. Over 12 workers received exposure greater than 10

26-3 (cont'd)

This side left blank intentionally. Responses to Commenter No. 26's comments are presented previously on pages 3-99 through 3-101.

Commenter No. 26: Chuck Broscious

roentgens [rem]. [8] The maximum acknowledged personnel exposure was 1,000 R/hr. (Rad per hour). [9] The exposed reactor was still emitting 22,000 R/hr. five months after the accident. Readings above the reactor one month after the accident were 410 R/hr. [IDO-19301,p.109] [10] 1,128 Ci including 80 Curies of radioactive Iodine were also released during the SL-1 accident. [ERDA-1536,p.II-243] [DOE/ID-12119@A-53] A temperature inversion kept the radiation plume close to the ground and at 25 miles the radioactive iodine levels were 10 times above background. At 100 miles the radiation levels were above background.

The author interviewed the widow of James Dennis who was a member of the SL-1 involuntary Army demolition crew brought in to dismantle the reactor after the accident. Dennis died of a rare blood cancer called Waldenstrom's micro globulin anemia, which his medical documents confirm, was caused by exposure to 50 rem/hr. for nine hours and ten minutes at the SL-1 site. [Dennis,p.10] Dennis' documents further challenge the government's acknowledged exposure of whole body - 2135 mrem, and skin - 3845 mrem [Dennis citing AEC/SL-1,CAB] as grossly understated. Dr. Charles Miller M.C., hematologist / oncologist, chief of Medical Services at Letterman Army Medical Center and Dennis' internal physician, supports the allegation that Dennis' cancer was caused by exposure to radiation. [Dennis, p.17] [11]The government refused to grant Dennis any compensation for his radiation exposure injuries that caused his early death. John Horan, an INL health physics technician, was an expert witness brought in by the Atomic Energy Commission to refute Dennis' claims to radiation induced injuries. Dennis is only one of thousands of individuals who are victims of the health effects of radiation exposure caused by radioactive releases from DOE facilities. **26-3 (cont'd)**

"Proposed Action

"The prototype microreactor is expected to be a small advanced gas reactor (AGR) using high-assay low enriched uranium (HALEU) tristructural isotropic (TRISO) fuel and air cooling. TRISO fuel is encapsulated and has been demonstrated in the laboratory to be able to withstand temperatures up to 1,800 degrees Celsius, allowing for an inherently safe prototype microreactor.

"The Proposed Action includes construction of the prototype microreactor and demonstration activities. The demonstration activities may include testing of project materials, startup and transient testing and evaluation of the constructed prototype microreactor, transportation and operational testing of the prototype microreactor or its components within the boundaries of the selected site to test and evaluate prototype microreactor mobility, and post-irradiation testing of project materials. The EIS also will cover the planned disposition of the prototype microreactor following operation and demonstration.

"Additionally, there are expected to be ancillary activities necessary to support the Proposed Action. These include the fabrication of reactor fuel, the assembly of test/experimental modules at existing, modified, or newly constructed test/ experiment assembly facilities, and the management of waste and spent nuclear fuel. After irradiation

[8] [IDO 19301@138]
[9] ERDA 1536,p.II 243
[10] IDO 19301,p.109
[11] Dennis, p.17

This side left blank intentionally. Responses to Commenter No. 26's comments are presented previously on pages 3-99 through 3-101.

Commenter No. 26: Chuck Broscious

Environmental Defense Institute Page | 6

> of the prototype microreactor, test/experimental cartridges would be transferred to post-irradiation examination facilities. SCO would make use of existing post-irradiation facilities to the extent possible, but existing post-irradiation examination facilities may require expansion or modification." [12]

26-3 (cont'd)

Based on Environmental Defense Institute 20-year observation of DOD/DOE terrible track record at INL, EDI can categorically say the US Army and DOE's record of mismanagement of INL nuclear projects has resulted in extensive radiation contamination to the Idaho region. Therefore, we are opposed to this prototype advanced mobile nuclear microreactor for reasons we layout above.

26-1 (cont'd)

Because of the existential threat of climate disaster, these DOD/DOE nuclear addicts have ignored, they must add to the scope of this EIS alternative renewable energy and offer a demonstration for these energy applications. These renewable energy sources will not – as our above discussion demonstrates – add to the extensive radiation contamination of Idaho's air and water.

Additionally, DOD's recent defeat in Afghanistan and inevitable loss in Iraq, demonstrate the US's attempt to establish a hegemony in the region has failed miserably. It is long past time that this country recognizes that wars of empire that might require the type of power sources in "Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases" is over. It's time to put those resources into combating our immediate existential threat of climate disaster. The US military already admits that climate change is an existential threat to America. [13]

26-2 (cont'd)

Respectfully submitted,

Chuck Broscious

President of the Board

Environmental Defense Institute

edinst@tds.net

[12] 12274 Federal Register / Vol. 85, No. 41 / Monday, March 2, 2020 / Notice of Intent to Prepare an Environmental Impact Statement for Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor

[13] Loid Austin, Chairman Pentagon Joint Chiefs of Staff, 10/21.

6

This side left blank intentionally. Responses to Commenter No. 26's comments are presented previously on pages 3-99 through 3-101.

Commenter No. 27: Jeremy Harrell

From: Jeremy Harrell [redacted]
Sent: Monday, November 8, 2021 10:48 AM
To: PELE_NEPA
Subject: Mobile Microreactor EIS Comment, ClearPath
Attachments: 20211107_ClearPath Response to EIS_Project Pele.pdf

Good morning,

Hope you are well. I have attached ClearPath's comments to the Mobile Microreactor EIS. Please let us know if you have any questions.

Thanks,

--
Jeremy B. Harrell
Managing Director, Policy
ClearPath
518 C Street NE, Suite 300
Washington, D.C. 20002
[redacted]

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Commenter No. 27: Jeremy Harrell

CLEARPATH

ClearPath
518 C St NE
Suite 300
Washington, DC 20002

November 8th, 2021

Dr. Jeff Waksman
Strategic Capabilities Office
1155 Defense Pentagon
Washington, DC 20301-1155

Subject: ClearPath Comments on, "Notice of Availability of Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement" [86 FR 53039]

Dear Dr. Waksman:

ClearPath is grateful for the opportunity to express our support for the construction and demonstration of the prototype mobile microreactor under development through Project Pele.[1] Project Pele is an important element of the broader U.S. strategy to decarbonize and develop advanced reactor technologies.

Project Pele is an important program that can not only meet the specific needs of the Department of Defense (DoD), such as fuel supply reliability, reducing casualties, and supporting humanitarian efforts, but can also help with the decarbonization of mobile generators.[2] As discussed in the Notice of Availability, the DoD consumes around 30 terawatt hours of electricity per year and more than 10 million gallons of fuel per day. Project Pele will demonstrate how end uses that both require a reliable source of energy and are hard to decarbonize can be addressed by nuclear energy's unique capabilities.

This DoD program would also be one of the first advanced reactors in the United States; as such, the Environmental Impact Statement can provide a template for the construction and operation of other microreactors. Microreactors can provide back up generation for essential infrastructure and reliable electricity for small grid systems. Mobile microreactors could even be deployed domestically in lue of a natural disaster that leaves populations without electricity. The regulatory precedent established through the licensing process of Project Pele will enable further development of microreactors for civilian and defense uses. 27-1

[1] https://www.federalregister.gov/documents/2021/09/24/2021-20646/notice-of-availability-of-draft-construction-and-demonstration-of-a-prototype-mobile-microreactor

[2] [illegible]

27-1 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. The scope of this EIS is limited to the construction and demonstration of a prototype mobile microreactor. Issues associated with the deployment (either for military or commercial applications) of such a reactor in the future would be subject to additional environmental analyses. Please see the discussion in Section 2.1, *Support and Opposition*, and 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Commenter No. 27: Jeremy Harrell

Thank you again for the opportunity to comment. ClearPath looks forward to Project Pele continuing towards a Record of Decision in March 2022 followed by the construction and demonstration of the prototype. 27-2

Sincerely,

Nicholas McMurray
Senior Program Director, Nuclear Energy
ClearPath

27-2 SCO acknowledges your support for the construction and demonstration of a prototype mobile microreactor at the INL Site. SCO will announce its decision regarding Project Pele in a Record of Decision issued no sooner than 30 days after publication in the Federal Register of the U.S. Environmental Protection Agency's Notice of Availability for this Final EIS. Also, see the response to Comment 27-1.

Commenter No. 28: Marissa Warren

From: Marissa Warren [redacted]
Sent: Monday, November 8, 2021 1:24 PM
To: PELE_NEPA@sco.mil
Cc: John Chatburn; Joshua Uriarte; Mark Clough; George Lynch
Subject: EXTERNAL: State of Idaho comments on the DEIS to construct and demonstrate a prototype microreactor
Attachments: State of Idaho comments on the DEIS to construct and demonstrate a prototype microreactor.pdf

Thank you for the opportunity to provide comments for the Draft Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor (Prototype Microreactor) Environmental Impact Statement (EIS). Comments from the State of Idaho are attached.

Marissa Warren | *Energy Program Manager/ Sr. Policy Analyst*
Idaho Governor's Office of Energy and Mineral Resources
304 N. 8th Street, Suite 250 | Boise ID 83720-0199
[redacted]

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Commenter No. 28: Marissa Warren

IDAHO GOVERNOR'S OFFICE OF ENERGY & MINERAL RESOURCES

BRAD LITTLE
Governor

JOHN CHATBURN
Administrator

304 N. 8th Street, Suite 250, P.O. Box 83720
Boise, Idaho 83720-0199

(208) 332-1660
FAX (208) 332-1661

November 9, 2021

Strategic Capabilities Office
675 N Randall Street
Arlington, Virginia 22203-2114

Thank you for the opportunity to provide comments for the Draft Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor (Prototype Microreactor) Environmental Impact Statement (EIS). The following comments were developed by the Idaho Department of Environmental Quality (DEQ), the Idaho Governor's Office of Species Conservation, and the Idaho Governor's Office of Energy and Mineral Resources.

General Comment: Consistent with the intent of the 1995 INL Settlement Agreement, all spent nuclear fuel (SNF) generated as a result of Prototype Microreactor operations must be shipped out of the State for ultimate final disposition following temporary dry storage. **28-1**

General Comment: To provide clarity, the Final EIS should include a statement regarding the process associated with determining the applicability of state and federal air permitting requirements. **28-2**

General Comment: The proposed action involves areas at the Idaho National Laboratory (INL) that are located on Federal Facility Agreement and Consent Order (FFA/CO) Sites that are managed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Many of these Sites have Institutional Controls (IC's) and other restrictions in place that must be observed whenever these sites are accessed or disturbed. Examples include activities and projects involving ground disturbance (such as construction of building foundations and utilities). The requirements associated with Munitions Response Areas will need to be followed. **28-3**

As such, Prototype Microreactor staff must coordinate closely with U.S. Department of Energy (DOE) INL Environmental Management and external entities, such as DEQ, to ensure compliance with all applicable state and federal laws, controls, and restrictions. Many of these requirements, and other pertinent information, can be found in the "INL Site-wide Institutional Controls, and Operations and Maintenance Plan for CERCLA Response Actions" document, DOE/ID-11042, Revision 10, dated December 2017 (https://ar.icp.doe.gov/images/pdf/201805/2018050801119SEL.pdf)

Page 1 of 2

28-1 The very small quantity of spent nuclear fuel (SNF) that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. Any potential issues that may arise concerning the 1995 Idaho Settlement Agreement would be addressed with the State of Idaho. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

28-2 Paragraph two of EIS Section 4.4.1, *All Project Phases*, includes the following statement: "Prior to project construction, INL staff would evaluate the need for any project source to obtain a permit to construct from the IDEQ." Regarding radiological air emissions, the last paragraph of EIS Section 4.4, *Air Quality*, states the following: "INL would develop an Air Permitting and Applicability Determination for each applicable source of radiological air emissions to ensure compliance with 40 Code of Federal Regulations 61, Subpart H." Lastly, EIS Section 7.2.1, *Idaho National Laboratory Applicable Permits*, includes further details about potential project air permitting processes.

28-3 EIS Chapter 7, *Laws Regulations, and Other Requirements*, presents additional details on this topic. Section 2.3.3.2, *Mobile Microreactor Initial Startup Testing*, of the this EIS acknowledges that Experimental Breeder Reactor II has been designated as Institutional Control Site ANL-67. However, a risk assessment documented that the remaining hazardous materials did not present an unacceptable risk, provided that intrusion was controlled.

Commenter No. 28: Marissa Warren

Reference: Section 2-24 Line 22: "This survey is conducted once per year…"
Comment: Please clarify when the surveys are conducted every year. If the surveys are conducted at the same time point every year, those surveys could fail to capture the full diversity present at the site such as migratory birds. **28-4**

Reference: Section 3-27 Line 23: "Suitable habitat for greater sage-grouse occurs in the CITRC, but no focused surveys have been conducted (Veolia, 2020)."
Comment: Focused surveys for greater sage-grouse in the CITRC, particularly around Pads B, C, and D, should be conducted. **28-5**

Reference: Section 3-36 Line 7: Existing Noise Environment
Comment: Please clarify whether noise levels have been established nearest to the closest known documented lek (1.2 miles south of the CITRC) during lekking season. The State recommends analyzing whether seasonal restrictions for noise levels near leks during lekking season should be established (March through May). **28-6**

Reference: Section 4-20 Line 19 and Section 4-22 Lines 31-35: "Noise effects from construction would be short term (lasting only the duration of project construction) and would only affect wildlife in the immediate project area."
Comment: Noise has been shown to disturb greater sage-grouse during lekking season. The State recommends analyzing in the Final EIS how a seasonal restriction between 6:00 pm to 9:00 am with a buffer of 2 miles (3.2 km) from leks during lekking season would minimize any noise impact that may occur. **28-7**

Reference: Timing of Project Activities: "Sage-grouse: March 15 through May 15 from 6 p.m. to 9 a.m. Eliminate human disturbance within 0.6 mile of active leks."
Comment: Analysis in the Final EIS should examine other distances and the impact to sage-grouse behaviors based on noise of from leks during lekking and nesting season. Patricelli et al. 2013 provided some ideas in the paper "Recommended management strategies to limit anthropogenic noise impacts on greater sage-grouse in Wyoming". **28-8**

Reference: Table 7.1-1:
Comment: The State of Idaho plans to have an Executive Order for Sage-grouse management signed in Fall 2021. When the Executive Order is finalized, it should be referenced in the analysis. **28-9**

The State of Idaho appreciates the opportunity to submit these comments. Please feel free to contact me should you have any questions or need of clarification.

Sincerely,

John Chatburn
[redacted]

Page 2 of 2

28-4 The Breeding Bird Survey (BBS) survey window, June through July, was added to the text. In addition to the midwinter raptor BBS, corvid and shrike surveys are conducted in early January, and bat surveys are conducted at select locations from May through October. Together, these surveys increase the probability of capturing the diversity of birds on the INL Site. The BBS is part of the larger North American BBS managed by the U.S. Geological Survey and follows the standard timeframes and protocols required by the U.S. Geological Survey. Similarly, the midwinter raptor counts are part of the nationwide midwinter bald eagle counts managed by the U.S. Army Corps of Engineers. DOE reports the count data to the Idaho Department of Fish and Game for inclusion in national statistics.

28-5 As stated in Section 4.5.1.3, *Special Status Species*, nesting bird surveys would occur prior to any ground disturbance or vegetation removal to confirm the definitive absence of sage-grouse from the proposed project area. DOE and the U.S. Fish and Wildlife Service continue to collaborate on sage-grouse protection at the INL Site under the Candidate Conservation Agreement; the loss of potential suitable habitat is subject to DOE's "no net loss of sagebrush habitat" policy on the INL Site, and the project must complete pre- and post-construction surveys to establish the amount of sagebrush restoration and other native revegetation efforts needed to rehabilitate disturbed areas.

28-6 Noise levels have been established at 100 feet from the construction equipment, which was conservatively estimated to be about 83 A-weighted decibels (dBA), and combined construction noise reduces levels to about 63 dBA at 1,000 feet. The lek locations would be well over 5,000 feet away from construction noise sources. As stated in EIS Section 4.5.1.3, *Special Status Species*, seasonal and timing restrictions have been incorporated into Project Pele, and activities are planned to minimize impacts to sage-grouse, where human disturbance would be eliminated within 0.6 mile of any active leks from March 15 through May 15 from 6 p.m. to 9 a.m.

28-7 As stated in this EIS, there are no sage-grouse lek locations within CITRC regarding potential effects to leks; the closest known leks are located approximately 1.93 miles south of Pad B, 1.67 miles south of Pad C, and 1.02 miles south of Pad D. As discussed in EIS Section 4.8.1, *Phase 4: Mobile Microreactor Operations at CITRC*, "Accounting for the concurrent use of the construction equipment, noise levels could be conservatively estimated to be about 83 dBA at 100 feet." Combined construction noise reduces to about 63 dBA at 1,000 feet, 49.2 dBA at 5,000 feet, and about 47.6 at 6,000 feet. Measures are in place to avoid and minimize impacts to sage-grouse, and DOE would follow the *Candidate Conservation Agreement for Greater Sage-grouse on the Idaho National Laboratory Site*.

28-8 See response to Comment 28-7.

28-9 Comment noted. The subject reference was not available at the time of the Final EIS development and publication, and therefore was not referenced in the analysis.

Commenter No. 29: Darice Anderson

NO! No more nuclear waste. Until you can come up with 0% waste, I am opposing ALL nuclear! Enough! Stop destroying the only home you, I and everyone have. ***29-1***

Darice Anderson

29-1 DoD acknowledges your opposition to the Proposed Action and concerns regarding nuclear waste. Considering public comments on the Draft EIS is an important step in the EIS process. The impacts associated with spent nuclear fuel and radiological waste from the Proposed Action are discussed in this EIS (Section 4.9, *Waste and Spent Nuclear Fuel Management*). As described, spent nuclear fuel would be stored at existing facilities at the INL Site until such time as an off-site storage or disposal option is available. Wastes would be handled with existing waste generated by other activities at the INL Site and disposed of at either DOE-operated or commercial waste disposal sites. Please see the discussions in Section 2.1, *Support and Opposition*, and Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

Commenter No. 30: Bryan Davidson

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

DAVID W. SALYERS, P.E.
COMMISSIONER

BILL LEE
GOVERNOR

November 9, 2021

Via Electronic Mail to PELE_NEPA@sco.mil
Mobile Microreactor EIS Comment
c/o Leidos
2109 Air Park Rd SE
Suite 200
Albuquerque, NM 87106

To Whom it May Concern:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the U.S. Department of Defense (DoD) *Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement* (Draft EIS). DoD, acting through the Strategic Capabilities Office (SCO) and with the Department of Energy (DOE) serving as a cooperating agency, has developed the Draft EIS to analyzes the potential environmental consequences of the proposed construction and demonstration of a prototype advanced mobile nuclear microreactor capable of producing 1 to 5 megawatts of electrical power (MWe) to support DoD domestic and operational energy demands.

This EIS evaluates the implementation of Project Pele, including the fabrication of the microreactor components, fabrication of the fuel, transportation of the fuel and microreactor components to the Idaho National Laboratory (INL) Site, demonstration of the mobile microreactor concept, and temporary storage of the mobile microreactor at the completion of demonstration. Post-Project Pele activities evaluated include possible post-irradiation examination and disposition of the mobile microreactor. Reactor fuel for the project would be produced from DOE stockpiles of highly enriched uranium (HEU) located at DOE's Y-12 plant in Oak Ridge, Tennessee, that would be converted to an oxide form at the Nuclear Fuel Services (NFS)/BWXT facility in Erwin, Tennessee. DoD evaluated a range of reasonable alternatives for the Proposed Action in this EIS, including a No Action Alternative, but because a microgrid is required for the demonstration and testing of the mobile microreactor, no other alternatives or options were found to be practical to demonstrate operation of the mobile microreactor and mobility proof-of-concept, and therefore the Proposed Action is also the Preferred Alternative.

TDEC is the environmental and natural resource regulatory agency in Tennessee with delegated responsibility from the U.S. Environmental Protection Agency (EPA) to regulate sources of air pollution; solid and hazardous waste; radiological health issues; underground storage tanks; and water resources. TDEC's comments only address environmental considerations and other impacts of the Proposed Action within Tennessee.

TDEC has reviewed the Draft EIS and has the following comments regarding the Proposed Action and its alternatives:

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Commenter No. 30: Bryan Davidson

General

- The information presented in this document suggest that risks associated with radioactive contamination in Tennessee is limited to transportation activities, waste storage, and "downblending" activities. TDEC has identified several gaps in the descriptions of environmental risks to Tennesseans in this document and encourages DoD to address these items in the Final EIS: **30-1**
  - *Transportation* - Transportation aspects of HEU as well as the downblending material from Y-12 in Oak Ridge, Tennessee to BWXT's facilities in Erwin, Tennessee and/or Lynchburg, Virginia need to be coordinated with the Tennessee Emergency Management Agency (TEMA) in advance of the actual shipments for TEMA to be better prepared to respond to any unexpected event. **30-2**
  - *Mixed Low-level Waste* - It is not clear if EnergySolutions Bear Creek Processing Facility in Oak Ridge will be involved in this project. Any mixed-waste to be received from off-site requires pertinent information to be included in the Annual Update of the ORR's Site Treatment Plan (STP) in a timely manner. **30-3**
  - *Downblending Activities at BWXT in Erwin, TN* - HEU will be downblended and converted to an oxide form at BWXT in Erwin, Tennessee. As written, it is unclear if there are risks associated with this process including the storage of generated wastes. **30-4**

Air Resources

- The narrative does not discuss potential air quality impacts or the need for new permits or permit modifications from TDEC at the NFS/BWXT facility in Erwin, Tennessee. TDEC recommends that the DoD and BWXT carefully review the existing permits at this facility to ensure no new permits or permit modifications will be required for this project. BWXT will be responsible for complying with all terms of their existing permits, as well as obtaining any air construction permits necessary to comply with the Tennessee Air Quality Act, the Tennessee Air Pollution Control Regulations, and any applicable federal air requirements. In addition, DOE will be responsible for complying with Tennessee's fugitive air quality requirements for activities related to material handling of the HEU stockpiles located at their Y-12 facility. **30-5**

Radiological Health

- The Proposed Action requires the transportation of HEU Hexafluoride from a location at the DOE operated Y-12 in Oak Ridge, Tennessee to the NFS/BWXT facility in Erwin, Tennessee and from that location to the BWXT facility in Lynchburg, Virginia. This transportation is allowed under current U.S. Department of Transportation (DOT) guidelines and NFS operates under a current license issued with the Tennessee Division of Radiological Health and the Nuclear Regulatory Commission. **30-6**

Remediation – Oak Ridge

- Tennessee's involvement in this project is limited. HEU from the Y-12 surplus stockpile will be shipped to BWXT in Erwin, Tennessee. At the Erwin facility, the HEU will be converted to an oxide form. Risks to Tennesseans and the environment associated with this process can't be assessed with the level of detail provided in this document. TDEC encourages DoD to include a statement like that found on BWXT's website in the Final EIS, "The NRC has stationed one full-time, independent NRC inspector at the plant **30-7**

30-1 Thank you for your comment. Responses are provided for the specific comments identified.

30-2 The transportation of the special nuclear materials (e.g., highly enriched uranium [HEU]) are routinely carried out by the DOE Office of Secure Transportation. The Office of Secure Transportation is responsible for the safe and secure transport of government-owned nuclear materials in the contiguous United States. Even though this EIS identifies representative routes where the required HEU in this EIS would be transported, specific information on the routes and dates of material movement is classified, to ensure operational security. Notifications are made, as needed. These materials are transported in highly modified secure tractor-trailers and escorted by armed federal agents in accompanying vehicles for additional security, as needed. With regards to the transport of downblending materials, BWXT would acquire the needed materials. These materials are routinely being transported in the United States, and BWXT complies with the required regulations. Therefore, the transportation activities analyzed in this EIS do not present a new or unique hazard that would require specific inspections beyond which the certified transportation carriers are required to perform per the Department of Transportation applicable regulations in 49 Code of Federal Regulations 390 through 397.

30-3 Current radioactive waste and spent nuclear fuel (SNF) management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the INL Site has disposed LLW and treated MLLW at the DOE Nevada National Security Site (NNSS) or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's on-site LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008). As described in Section 3.9.2, *Mixed Low-Level Waste*, MLLW is shipped from the INL Site to commercial waste processing vendors for treatment and then to the Energy*Solutions* LLW Disposal Facility near Clive, Utah; Waste Control Specialists; or the DOE NNSS for disposal. As Energy*Solutions* and Waste Control Specialists also have some waste processing capabilities contiguous to their disposal facilities, these companies may also serve as the waste processing

Commenter No. 30: Bryan Davidson

because of NFS' mission. The NRC inspector reviews and oversees environmental and safety performance of workers and equipment." **30-7**

- **S.6.2.4 Demonstration Activities at the INL Site.** *"After deconstruction, irradiated materials would be stored with other similar DOE-irradiated materials and experiments at MFC, most likely in the HFEF or the RSWF, in accordance with DOE's Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (DOE, 1995a), Record of Decision (DOE, 1995b), supplemental analyses, and the amended Record of Decision (DOE, 1996a). Ultimate disposal of the irradiated materials that have been declared waste would occur along with similar DOE-owned irradiated materials and experiments currently at MFC."* **30-8**

  Comment: Historically, the Oak Ridge Reservation (ORR) has not had any inventory of high-level radioactive waste (i.e., spent nuclear fuel) in storage. The State of Tennessee needs to be assured that this legacy would continue and there would be no high-level radioactive waste shipped to the ORR from this project. TDEC encourages DoD to explicitly state in the final EIS that there will be no storage of high-level radioactive waste at ORR.

- This comment relates to *Table S-1. Summary of Project Pele Environmental Consequences, Section 1.5 Related NEPA documents*, and *Table 2.7-1. Summary of Project Pele Alternative Environmental Consequences.* Specifically, would any of the waste mentioned in *Tables S-1.* or 2.7-1. be destined for the ORR either for treatment, storage or processing, especially, transuranic radioactive (TRU) waste for processing at the Transuranic Waste Processing Facility (TWPC) on the ORR? TDEC is concerned that if NFS/BWXT is involved in processing the material from Y-12 to convert to fuel for the microreactor, waste generated, particularly TRU, could end up in Oak Ridge at TWPC, potentially impacting the schedule of treating ORR's inventory of TRU waste. This concern becomes more relevant for the State of Tennessee given the fact that TRU waste generated from the naval program, and, therefore, considered as defense-related, is being handled by the NFS/BWXT facility in Erwin, Tennessee but shipped for processing at TWPC for ultimate disposal at the Waste Isolation Pilot Plant in New Mexico. Waste that "falls out" from being considered TRU is also still TWPC's responsibility for processing as either low-level or mixed waste. NFS/BWXT has already established a precedent of sending suspected TRU waste to TWPC in Oak Ridge for processing, and because of this precedent for similar wastes TDEC is concerned by the strong possibility that any TRU waste generated by NFS/BWXT for this new microreactor program could eventually pass-through Oak Ridge. **30-9**

- **3.9.2 Mixed Low-Level Waste, Page 3-38.** *"INL's FFCA Site Treatment Plan was approved by the State of Idaho on November 1, 1995, and is updated annually. That plan outlines DOE's proposed treatment strategy for the INL Site's mixed-waste streams. The Mixed Waste Management Plan specifies the requirements for management of the MLLW in accordance with the State of Idaho requirements for Resource Conservation and Recovery Act (RCRA) hazardous constituents and DOE requirements for the radiological constituents."* **30-10**

  and

  "Waste processing vendors could include EnergySolutions LLW and Waste Control Specialists as they have some waste processing capability contiguous to their disposal facilities."

30-3 (cont'd)
vendor. Neither SCO nor DOE plan to transport MLLW to the Energy*Solutions* Bear Creek Processing Facility.

30-4 Downblending of the HEU to high-assay low-enriched uranium would not occur at the BWXT Nuclear Fuel Services, Inc. (NFS) facility in Erwin, Tennessee but at the BWXT facility in Lynchburg, Virginia. The conversion activities that would be performed at the BWXT NFS facility are similar to activities currently performed at that site and would result in impacts as described in the existing National Environmental Policy Act documents for that site (see Section 4.0, *Environmental Consequences*, of this EIS).

30-5 EIS Section 1.5, *Related NEPA Documents*, discloses that existing National Environmental Policy Act documentation provides adequate environmental coverage of all project activities that would occur at the BWXT NFS facility in Erwin, Tennessee and the DOE Y-12 National Security Complex in Oak Ridge, Tennessee. Please refer to Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

30-6 DOE and SCO acknowledge the commenter's statement that the transport of the HEU materials from the Y-12 National Security Complex to both the BWXT NFS facility in Erwin, Tennessee and the BWXT facility in Lynchburg, Virginia is an allowed practice. Regulations for such transports have been in place for many decades.

30-7 The impacts of the prototype mobile microreactor activity (conversion of HEU from a metal to an oxide) at the BWXT NFS facility in Erwin, Tennessee are expected to be within those described in the *Final Environmental Assessment for the Proposed Renewal of U.S. Nuclear Regulatory Commission License No. SNM-124 for Nuclear Fuel Services* referenced in this EIS (NRC, 2011a). The results of that assessment are included in this EIS by reference. As an NRC-licensed facility, it is the responsibility of the NRC to ensure that the BWXT NFS facility operates within the constraints of its license.

30-8 EIS Section 3.9, *Waste and Spent Nuclear Fuel Management*, states that no high-level radioactive waste would be generated during Project Pele. The very small quantity of SNF that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

30-9 Current radioactive waste and SNF management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel*

Commenter No. 30: Bryan Davidson

Comment: Does this include EnergySolutions Bear Creek Processing Facility near Oak Ridge, Tennessee? ORR's STP was approved in September 1995 and is updated annually. Any mixed-waste to be received from off-site requires pertinent information to be included in the Annual Update of the ORR's STP in a timely manner. ***30-10***

Water Resources

- The activities in Tennessee are not expected to impact the water resources in the state and will not involve actions that would require permitting by TDEC's Division of Water Resources. ***30-11***

TDEC appreciates the opportunity to comment on this Draft EIS. Please note that these comments are not indicative of approval or disapproval of the Proposed Action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments. ***30-12***

Sincerely,

Bryan Davidson | Policy Analyst
Office of Policy and Sustainable Practices, TDEC
William R. Snodgrass Tennessee Tower
312 Rosa L Parks Ave, 2nd Floor
Nashville, TN 37243
[redacted]

30-9 (cont'd)

Management, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all LLW and MLLW would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the INL Site has disposed of LLW and treated MLLW at the DOE NNSS or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's on-site LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008). EIS Section 4.12.4, *Radioactive Material Shipments*, specifies that the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE, 1996b) addresses shipments between the HEU source, the BWXT NFS HEU conversion facility, and the BWXT downblending and fuel fabrication facility.

30-10 EIS Section 3.9.2, *Mixed Low-Level Waste*, specifies that MLLW is shipped off-site through commercial waste processing vendors for treatment and then to the Energy*Solutions* LLW Disposal Facility near Clive, Utah; Waste Control Specialists; or the DOE NNSS for disposal. As Energy*Solutions* and Waste Control Specialists also have some waste processing capabilities contiguous to their disposal facilities, these companies may also serve as the waste processing vendor. The INL Site does not plan to transport MLLW to the Energy*Solutions* Bear Creek Processing Facility.

30-11 Thank you for your comment.

30-12 Comment is noted.

Commenter No. 31: Name Withheld

I hereby request that my identity (i.e., first and last names), my address, and my email address, be withheld from public release or exposure. I want to remain unidentified and anonymous to the full extent allowed by law. **31-1** The comments I make below are to be regarded as highly supportive of the project of "Construction and Demonstration of a Prototype Microreactor" although my comments are critical of the EIS document itself in one significant regard. **31-2** Specifically, at the presentation made of the EIS and its contents during the public hearing and in the document itself, the "No Action" Alternative in which the project would not be pursued and the microreactor would not be built assumes and states that there would be no consequences to the site and local area. Such a conclusion is reached only because the EIS draft and the studies leading to it adopt a limited view of what the environment is and of what the environmental consequences of no action would entail. In reality, if a comprehensive systems analysis approach is taken, then, if this project is not pursued, its successor phases would also not occur and that would have a drastic negative environmental impact. Not pursuing the project would eliminate the chance of preventing the release of untold amounts of greenhouse gases into the environment, further contributing to temperature increase of the planet and eventually leading to global catastrophic consequences. The "No Action" Alternative would also have strongly negative health and safety implications. Indeed, the proposed microreactor test is intended to help usher in a new generation of microreactors suitable for use in remote areas that are of difficult access but that still require power and hence that routinely receive truckloads of fossil fuel. The implied traffic is detrimental to the environment and also presents substantially higher risks of traffic accidents than the alternative that leads to the deployment of microreactors. Traffic accidents under normal circumstances can lead to injury and even deaths. Under some special circumstances of particularly dangerous roads, incidents affecting transportation of fossil fuel can have major negative heath and safety impacts with large numbers of injuries. For these environmental and safety and health reasons, the No Action Alternative would be unconscionable, bordering on criminal negligence. The proposed microreactor will use TRISO-based fuel, a recently heavily studied technology that was demonstrated to possess safety feature previously unthinkable. The safety of reactors based on this technology is expected to be orders of magnitude better than the previous generations of reactors. **31-3** The proposed project should be authorized to go forward for all the benefits that are likely to result from it and in order to avoid the detrimental environmental and safety and heath consequences of not pursuing the deployment of microreactors. **31-2 (cont'd)**

[redacted]

31-1 Per request, any personally identifiable information associated with your comment (first and last name, address, email address) was withheld from public release or other exposure. Your comment appears with all personally identifiable information redacted.

31-2 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information.

31-3 The scope of this EIS is limited to fabrication of a prototype mobile microreactor at off-site commercial facilities and demonstration of the microreactor at the INL Site. The impacts of the Proposed Action do not include impacts from future deployment of mobile microreactors. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information. The benefits the commenter cites may be possible but would be dependent upon actions that might be taken only after the prototype mobile microreactor demonstration has been completed. Benefits from or issues associated with the use of such reactors in the future would be subject to additional analysis, including additional environmental analysis.

Commenter No. 32: Rebecca Chu

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3188

REGIONAL ADMINISTRATOR'S DIVISION

November 8, 2021

Dr. Jeff Waksman, Program Manager
U.S. Department of Defense
Strategic Capabilities Office
1155 Defense Pentagon
Washington, DC 20301

Dear Dr. Waksman:

The U.S. Environmental Protection Agency has reviewed the Department of Defense's (DoD) Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement (CEQ Number 20210141; EPA Region 10 Project Number 20-0005-DOD). EPA has responsibility to provide comments on major federal actions pursuant to the National Environmental Policy Act, Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The DEIS evaluates the potential environmental impacts associated with activities to construct and operate a mobile microreactor at the Idaho National Laboratory ("Project Pele"). Activities will include: (1) microreactor fabrication, (2) fuel fabrication, (3) transport of the mobile microreactor from fabrication sites to the Idaho National Laboratory (INL), and (4) mobile microreactor demonstration for two and half years. Other project activities will involve post-irradiation examination, temporary storage of the mobile microreactor at INL, and disposition at a licensed disposal site.

The mobile reactor will be small and advanced gas-cooled reactor using high-assay low-enriched uranium (HALEU) tristructural isotropic (TRISO) fuel and air as the ultimate heat sink. As proposed, the mobile microreactor will produce up to five megawatts of electrical energy, thus providing DoD with a more sustainable source of energy. For analysis of impacts from this project, DoD considered one action alternative and a no action. The DEIS identifies the proposed action as DoD's preferred alternative.

Project Pele may result in potential impacts to nearby communities during demonstration and closure activities. In consideration of the communities with environmental justice concerns in the analysis area, EPA recommends DoD better characterize the cumulative effects and risks to the communities and minimize the resulting impacts. To ensure that the proposed action protects human health and the environment, EPA also recommends DoD continue to coordinate with other federal and state agencies, affected tribes, and meaningfully engage the impacted communities. EPA encourages DoD to include in the Final EIS additional clarifying or missing information on topics discussed in the enclosure. ***32-1***

32-1 The cumulative impacts of past, present, and reasonably foreseeable future actions are evaluated in Chapter 5, *Cumulative Impacts*, of this EIS. As described in Section 5.3.6, *Environmental Justice*, impacts on minority and low-income populations from normal operations would be comparable to those on the population as a whole and would be negligible. Because the impacts from the Proposed Action at the INL Site would be small and there would be no disproportionate high and adverse impacts on minority and low-income populations, Project Pele would not substantially contribute to cumulative environmental justice impacts at the INL Site or throughout the region of influence (ROI) from normal operations. In addition, as described in the response to Comment 32-4, no adverse impacts to off-site populations are anticipated from accident scenarios, to include no disproportionate adverse impacts to environmental justice populations; therefore, no cumulative impacts from these scenarios would occur. The extent of the cumulative impacts analysis provided in this EIS is commensurate with the anticipated level of impact from the Proposed Action under consideration. This is consistent with the Council on Environmental Quality instruction that agencies "focus on significant environmental issues and alternatives" (40 Code of Federal Regulations [CFR] 1502.1) and discuss impacts "in proportion to their significance" (40 CFR 1502.2(b)).

Commenter No. 32: Rebecca Chu

Thank you for providing this opportunity to comment. If you have questions about our comments, please contact David Magdangal of my staff at [redacted] or at [redacted], or you may contact me at [redacted] or by email at [redacted].

Sincerely,

Rebecca Chu Digitally signed by Rebecca Chu Date: 2021.11.08 09:09:39 -08'00'

Rebecca A. Chu, Chief
Policy and Environmental Review Branch

Enclosure

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See the responses on the previous page and the next five pages.

Commenter No. 32: Rebecca Chu

U.S. Environmental Protection Agency (EPA) Detailed Comments on the Draft Construction and Demonstration of a Prototype Mobile Microreactor DEIS at the Idaho National Laboratory, ID

Potential radiological releases and related impacts

The DEIS indicates there is a potential for an accidental release of unintended radiological material during the demonstration of Project Pele. DoD identified this potential impact when performing a hazards analysis to identify accident scenarios associated with the mobile microreactor. Information provided in the DEIS on emergency preparedness is valuable. Because the microreactor design is in the draft phase, the full risks of an accidental release are difficult to characterize. Therefore, EPA recommends the Final Environmental Impact Statement (FEIS) include the following information:

- Results of a probabilistic risk assessment for the proposed reactor including at startup, operational testing, and post-irradiation examination.
- Description of the design basis for effluent concentrations for each radionuclide of the selected design.[1]
- Updated information on the proposed reactor final design and related nuclear risk assessment results.
- Rationale for not using the Clean Air Act Assessment Package-1988 (CAP88) model to characterize potential radiological releases from this project.[2] This model is a regulatory compliance tool under the National Emissions Standard for Hazardous Air Pollutants (NESHAP) and is recommended for estimating dose and risk from radionuclide emissions to air.

32-2

Given an inadvertent criticality accident (i.e., accidental uncontrolled nuclear fission chain reaction) could occur during any phase of Project Pele, it will be important to engage potentially affected communities in development and implementation of this project to raise their awareness about the potential accident and related radiological release risks, exposure pathways, and measures they can take to minimize radiological risks and protect their health.[3]

32-3

Because operation of Project Pele may result in unavoidable radiation and chemical exposure to workers and the public, EPA further recommends additional information on exposure risks be provided to the communities.[4] An EJSCREEN analysis for the area shows several communities are linguistically isolated and/or have a higher population of children under the age of five.[5] These communities already experience disproportionate impacts from several environmental hazards, socio-economic burdens, or both.[6] The EJSCREEN analysis also shows six communities experience 10 or more environmental pollution burdens ("EJ Indexes") that merit closer attention.

32-4

[1] The DEIS Summary states "On March 22, 2021, SCO announced two teams—led by BWXT Advanced Technologies, LLC (BWXT), Lynchburg, Virginia, and X-energy, LLC, Rockville (formerly Greenbelt), Maryland—would proceed with development of a final design for a mobile microreactor under Project Pele (DoD SCO, 2021) …, One of the two companies may be selected to build and demonstrate a mobile microreactor." Table 4.10-1 provides maximum concentrations of radionuclides emitted during normal operations. This table is detailed in INL 2021 (f), which should be included as part of the FEIS, since this defines the design basis for Project Pele.

[2] www.epa.gov/radiation/cap-88-pc

[3] DEIS, Section 4.11.3.3 Accident Description and Consequences

[4] DEIS, pdf page 227

[5] https://ejscreen.epa.gov/mapper/

[6] Statement supported by EPA's EJSCREEN tool and analysis.

3

32-2 As the project evolves, DOE would continue to coordinate with Federal and state agencies, affected Tribes, and others at an appropriate level, commensurate with the stage of the project. DOE appreciates the comments the U.S. Environmental Protection Agency (EPA) provided. Changes to this EIS for the prototype mobile microreactor were made as appropriate. In considering the EPA suggestions, DOE used a sliding scale approach for adding information to this EIS with an eye on keeping the size of the entire EIS (including appendices) reasonable. Some of the detailed information is included in the administrative record. As discussed in Section 4.10, *Human Health – Normal Operations*, of this EIS, Version 2.10 of the GENII Version 2 computer code was used to calculate the projected doses to the public and non-involved workers from demonstration of the prototype mobile microreactor at the INL Site. The GENII computer code was developed under quality assurance plans based on the American National Standards Institute Nuclear Quality Assurance-1 (NQA-1) standard, which is one of the toolbox models that meets DOE Order 414.1D and is overseen by DOE's Office of Quality Assurance Policy and Assistance. The code was reviewed by the EPA Science Advisory Board and a separate, EPA-sponsored, independent peer review panel.

32-3 An inadvertent nuclear criticality is analyzed in Section 4.11.3.3, *Accident Description and Consequences*, of this EIS. The analysis shows that an inadvertent nuclear criticality accident would result in a dose significantly below regulation limits and a minimal impact to workers and the public. Section 3.11.1, *Emergency Preparedness*, of this EIS describes the Emergency Preparedness Program at the INL. The program is applicable to the prototype mobile microreactor and provides actions to inform the public if an inadvertent nuclear criticality were to occur.

32-4 Section 3.15, *Environmental Justice*, of this EIS identifies environmental justice populations within the ROI. EIS Section 4.11, *Human Health – Facility Accidents*, discusses human health impacts from various facility accident scenarios. As summarized in EIS Section 4.11.4, *Intentional Destructive Acts*, radiological impacts to the public from any accident, even in a highly unlikely unmitigated scenario, would be a small fraction of an individual's natural background radiation dose rate of about 0.38 rem per year. The results of this analysis, as described throughout Section 4.11, show that the consequences of accidents involving the mobile microreactor would not adversely impact any receptors, to include off-site populations. Therefore, as there would not be adverse impacts on any off-site populations from an accident scenario, there would not be disproportionate adverse impacts to any environmental justice populations, to include children under the age of 5 or linguistically isolated communities. Please refer to the response to Comment 32-3 regarding engagement of communities within the ROI. Although the EJSCREEN indicators provide informative detail on the surrounding populations, the extent of information and analysis provided in Section 3.15 and Section 4.15, *Environmental Justice*, of this EIS is commensurate with the anticipated level of negligible impacts from the Proposed Action. This is consistent with National Environmental Policy Act regulations at 40 CFR 1502.2 that direct EISs to be concise and the discussion to be "proportional to potential environmental effects and project size."

Commenter No. 32: Rebecca Chu

Because of the cumulative nature of these existing impacts, EPA recommends that the FEIS for the proposed project include additional information on the potential cumulative effects from this project when added to effects of other past, present, and foreseeable projects in the analysis area. As described in EPA's guidance for *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*, "the combined, incremental effects of human activity, referred to as cumulative impacts, may pose a serious threat to the environment." Cumulative impacts of an action can are the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource no matter what entity is taking the actions.[7]

In assessing the cumulative impacts that may occur to the communities in Project Pele's region of influence, EPA believes that it will be important for DoD to partner with state, local, and tribal agencies that routinely monitor affected resources, such as air and biological resources, to better characterize the cumulative effects and determine measures to take to mitigate potential adverse impacts. **32-5**

Coordinating with tribal governments
The DEIS describes coordination with the Shoshone Bannock Tribe to discuss the proposed project and potential impacts to tribal resources. In addition, the DEIS states that, "SCO [DoD's Strategic Capabilities Office] acknowledges its obligation under Federal law and DoD policy to consult with Native American Tribal governments, including Tribes historically or culturally affiliated with impacted lands, and is committed to those consultations for the Proposed Action, in recognition that it may have the potential to affect protected Tribal rights, land, or resources."[8] EPA recommends including in the FEIS information about the planned tribal consultation and the outcomes and recommended measures to minimize impacts and risks to tribal communities and resources. **32-6**

Waste generation and management
Information in the DEIS indicates that the proposed project will generate a variety of waste including low-level radioactive waste, mixed low-level radioactive waste, transuranic waste, and hazardous and Toxic Substance Control Act wastes.[9] In the event an INL facility no longer has capacity to manage waste and Project Pele's spent nuclear fuel and fuel debris continue to await future disposal capacity; EPA recommends the FEIS disclose the following information:

- Waste receiving facilities and location(s).
- Contingency plans.
- Capacities of interim onsite spent fuel storage and other waste.
- Duration of spent fuel and other waste temporarily stored onsite and expected timeline of when a suitable offsite location will become available.
- Regulatory requirements for shipping such wastes to receiving locations.
- The entity responsible for sole ownership of spent nuclear fuel and fuel debris.
- DoD, DOE, and INL's process management of spent fuel and fuel debris. This may include a description on how DoD, DOE, and INL will manage wastes beginning with demonstration, closure, final decay, and lastly, dismantlement. Provide specific information on its current form, containment design, shielding capability, and time of decay in its constructed form before dismantlement.

32-7

[7] https://www.epa.gov/sites/default/files/2014-08/documents/cumulative.pdf
[8] DEIS, p. 1-11
[9] Waste management referenced in DEIS from pg 129 (section 3.9) to 131 (section 3.9.5)

4

32-5 The cumulative impacts of past, present, and reasonably foreseeable future actions are evaluated in Chapter 5, *Cumulative Impacts*, of this EIS. As summarized in Section 5.4, *Conclusion*, of this EIS, the incremental impacts for all resource areas from Project Pele activities would be very small and would not substantially contribute to cumulative impacts. Because the impacts of construction and demonstration of the prototype mobile microreactor at the INL Site are very small, they would not substantially contribute to cumulative impacts and do not require further analysis. The extent of the cumulative impacts analysis provided in this EIS is commensurate with the anticipated level of impact from the Proposed Action under consideration. This is consistent with Council on Environmental Quality's instruction that agencies "focus on significant environmental issues and alternatives" (40 CFR 1502.1) and discuss impacts "in proportion to their significance" (40 CFR 1502.2(b)). Please see the discussion in Section 2.7, *Nuclear Reactor Research and Development*, of this CRD for additional information.

32-6 This EIS was updated to describe the Tribal consultation and results (as well as the National Historic Preservation Act Section 106 consultation), including any changes to the measures to minimize impacts to Tribal resources, which are in EIS Section 4.6.1, *Cultural and Paleontological Resources*: "The land where CITRC is located is culturally sensitive and highly significant to the Shoshone-Bannock Tribes. Therefore, all ground-disturbing activities at CITRC would be monitored by an INL Cultural Resource Management Office archaeologist to ensure that, should an inadvertent discovery occur, the remains would be secured until DOE and the Tribes are contacted and decisions made for their protection and preservation. Shoshone-Bannock Tribal representatives would also be invited to participate in the construction monitoring. Monitoring the ground-disturbing activities would ensure that the Proposed Action would have no impacts on any historic properties or culturally sensitive resources."

32-7 Current radioactive waste and spent nuclear fuel (SNF) management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the INL Site has disposed of LLW and treated MLLW at the DOE Nevada National Security Site or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's on-site LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive

Commenter No. 32: Rebecca Chu

- DoD, DOE, and INL's processes to mitigate capacity issues that may arise as a result of waste generation from Project Pele, and more specifically, spent nuclear fuel and fuel debris.
- Previous experience dealing with spent tristructural isotropic fuel, commonly referred to as TRISO fuel, and any current information that may have presented itself to date. **32-7**

General comments
EPA recommends:

- Evaluating worst case scenarios for a 10 MWe (megawatts of electrical power) microreactor as the basis for all assumptions.[10] **32-8**
- Explain shipping mobile microreactor fuel from the BWXT Advanced Technologies, LLC facility in Lynchburg, Virginia to INL in 10 truck shipments.[11] **32-9**

Technical comments
EPA recommends:

- Describe and reference the method used for determining the amount of radionuclide emissions released.[12] **32-10**
- Describe and reference the method used for determining the effective dose equivalent to the MEI (maximally exposed individual).[13] **32-11**
- Consider adding EPA's requirement for monitoring radionuclide emissions.[14] **32-12**
- Describe and reference the method used for determining the risk factor of 0.0006 LCF (latent cancer fatality) per person-rem or rem (roentgen equivalent man).[15] **32-13**
- Describe how DoD arrived at Table 4.10-2's annual radiological impacts to the public during normal operations at CITRC and if an approved EPA model was used and why or why not. **32-14**
- Use ICRP's updated average value to nominal cancer risk coefficients of 0.00041and 0.00055 per rem (roentgen equivalent man) for adults and the general population or explain why DoD did not use these values.[16] **32-15**
- Describe how DoD arrived at Table 4.10-1's annual estimated radiological emissions from the microreactor during normal operations and provide all information referenced in "INL, 2021f."[17] **32-16**
- Re-estimate radiological impacts (during operations and annual exposure time assumptions) when calculating MEI and population values. When assessing compliance with the EPA's National Emissions Standards for Hazardous Air Pollutants, annual exposure time assumptions are applicable on a case-by-case basis, and not in the general sense. **32-17**
- Evaluate MEI for MFC (Materials and Fuels Complex) emission units or other applicable emissions from the site. **32-18**

[10] Page S-4 in the DEIS Summary states "Therefore, this EIS evaluates microreactors up to 5 MWe." However, the DEIS describes microreactors producing "1 to 10 MWe".
[11] Page S-9 of the DEIS states, "Shipping the mobile microreactor fuel from the BWXT facility to the INL Site could require up to 10 truck shipments".
[12] DEIS reference line 36, pg. 3-16 to line 7 pg. 3-17
[13] DEIS reference line 8 to line 9, pg. 3-17
[14] DEIS reference line 22, pg. 4-35
[15] DEIS reference line 36, pg. 4-34
[16] Page 4-34 of the DEIS states, "A risk factor of 0.0006 LCF per person-rem or rem is used, consistent with DOE guidance (DOE, 2003)."
[17] Page 4-38, Table 4.10-1 of the DEIS provides annual radiological emissions from the microreactor during normal operations and references data from INL, 2021f.

5

32-7 (cont'd)
Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008). SNF would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS.

32-8 This EIS evaluates a wide range of accidents for the prototype mobile microreactor. The Proposed Action includes the construction and demonstration of a mobile microreactor that is capable of producing 1 to 5 MWe. To encompass the Proposed Action, the source terms were developed for a 10-MWe mobile microreactor. As stated in EIS Section 4.11.3, *Radioactive Material Release Impacts*, "The potential impacts from radiological material releases are evaluated for design-basis (possible accidents considered in the design process) and beyond-design-basis (accidents so unlikely that they are not considered in the design process) mobile microreactor accidents." One aspect of evaluating the impacts is to use the maximum amount of radioactive material that can be released as a result of any inadvertent nuclear criticality, any on-site transportation accident, or any operation accident. These maximum quantities of radioactive material are input to the accident analyses described in EIS Section 4.11, *Human Health – Facility Accidents*. As such, the accident analyses yield consequences to the non-involved worker, the maximally exposed off-site individual, and the public that are greater than the consequences of any inadvertent nuclear criticality, any transportation accident, or any operation accident (including attacks on the microreactor) that may be postulated for the prototype mobile microreactor. Consideration of this range of accidents addresses the worst-case scenarios that the commenter recommends including in the analysis.

32-9 As stated in Section 4.12.4, *Radioactive Material Shipments*, of this EIS, one option for transporting the mobile microreactor fuel from BWXT in Virginia to the INL Site could be in the Versa Pac (NRC, 2020) container, which is currently certified by the NRC for transport of unirradiated tristructural isotropic (TRISO) fuel. Other containers, such as the NAC International-Legal Weight Truck, the Westinghouse Traveller, or the Areva MOX Fresh Fuel Package casks could be used for transporting the mobile microreactor fuel, if any of these containers were certified by the NRC for the transport of unirradiated TRISO fuel. For this EIS, as indicated in Section 4.12.4, the Versa Pac-110 container is considered for the transport of TRISO fuel. Based on the limitation on the uranium content for each container and the estimated amount of required high-assay low-enriched uranium fuel, it was conservatively estimated that

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See comments 32-10 through 32-18 on page 3-121.

32-9 (cont'd)
about 10 truck shipments would be required for transport of TRISO fuel to INL. Use of the other containers, should they become available, would lead to a lower number of shipments and, hence, a lower environmental impact.

32-10 INL estimates airborne radiological emissions from its facilities in accordance with 40 CFR 61, Subpart H, *National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities*. The methods used to estimate radionuclide emissions include continuous emissions monitoring of point sources and air sampling of non-point sources for gaseous and particulate radionuclides. INL reports these emissions in the *National Emission Standards for Hazardous Air Pollutants - Calendar Year 2020 INL Report for Radionuclides*, referred to as the National Emission Standards for Hazardous Air Pollutants (NESHAP) Report. Section 2 of the 2020 NESHAP Report presents the methods used to estimate site radionuclide emissions. Section 4 of the *Idaho National Laboratory Site Environmental Report Calendar Year 2020* also describes the methods used to estimate site radionuclide emissions.

32-11 The effective dose to the maximally exposed individual (MEI) cited in Section 3.4.4, *Radiological Air Emissions and Standards*, of this EIS was estimated using the Clean Air Act Assessment Package - 1988, Personal Computer (CAP88-PC), Version 4.0 risk model. The 2020 NESHAP Report and Chapter 8 of the 2020 Annual Site Environmental Report (DOE-ID, 2021) provide details of the methods used in this analysis.

32-12 A statement addressing EPA requirements for monitoring of radiological effluents was added to this EIS in Section 4.10, *Human Health – Normal Operations*.

32-13 The risk factor of 0.0006 latent cancer fatality per person-rem or rem is consistent with DOE guidance contained in the report, *Estimating Radiation Risk from Total Effective Dose Equivalent (TEDE), ISCORS Technical Report No. 1*, and has been used in a number of DOE National Environmental Policy Act documents. The method used to determine this figure can be found in that report and its references.

32-14 As described in EIS Section 4.10.1, *All Project Phases*, radiological releases for the project were developed by scaling (based on power ratios) estimated releases from a larger gas-cooled reactor. These estimated releases were then combined with additional site-specific information (facility release parameters, meteorology, and population) and input into an approved environmental dosimetry computer code (GENII). The parameters set for population exposure for both the general public and the MEI are provided in this EIS. While GENII is not one of the codes identified for NESHAP analysis (this EIS analysis is not intended to be a NESHAP analysis), it is listed as a toolbox code in DOE's safety software Central Registry, having been reviewed and found to meet the quality assurance criteria for inclusion.

32-15 See response to Comment 32-13. The GENII analysis was run using the entire population (not just adult). The 0.0006 latent cancer fatality per person-rem value used for the general population in this EIS, as stated in the Interagency Steering

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See comments 32-10 through 32-18 on page 3-121.

32-15 (cont'd)
Committee on Radiation Standards report, provides a conservative estimate for population cancer risk.

32-16 Because the Pele microreactor is a new design of a high temperature gas-cooled reactor, radiological-emissions data do not exist for this specific reactor. Therefore, the radiological emissions data for the 1,100 MWe New Production Reactor (NPR) (as provided in DOE/EIS-0144D, *Draft Environmental Impact Statement for the Siting, Construction, and Operation of New Production Reactor Capacity*) were scaled for the power output of the Pele microreactor. The scaling factor used was 0.5 percent. The NPR reactor was chosen because it was a modern high temperature gas-cooled reactor with high-fidelity operational emissions data supplied in this EIS for the reactor. The Argon-41 estimates were not provided for the NPR (activation in air was not an issue). Therefore, Versatile Test Reactor air activation numbers from the Draft Versatile Test Reactor EIS (DOE/EIS-0542) (DOE, 2020a) were scaled to provide a bounding estimate with a scaling factor based off power. This information has been added to Section 4.10.1, *All Project Phases*, of this EIS.

32-17 The EIS is not a NESHAP compliance document. The assumptions regarding population and MEI consumption, breathing, and exposure times used to estimate doses, as described in Section 4.10.1, *All Project Phases*, are consistent with those used in previous environmental assessments (EISs and environmental assessments). Differences between the NESHAP and EIS values can be, in part, due to the different functions of the two analyses: the regulatory compliance of NESHAP and the best estimate analysis of an EIS.

32-18 Emissions from MFC as a result of the prototype mobile microreactor activities (demonstration, post-irradiation examination (PIE), and storage) were not estimated in this EIS. As stated in EIS Section 4.10.1, *All Project Phases*, releases related to the prototype mobile microreactor activities at MFC would be much smaller than during the demonstration activities at CITRC. Startup testing at DOME would be of relatively short duration, would use fuel that starts with no fission products (fresh fuel), and would involve operating the microreactor at subcritical or very low power. The buildup of radionuclides and the potential release of these radionuclides would be very small. PIE activities for any samples from the mobile microreactor would consist of actions within current activities at the PIE facilities; minimal additional emissions would be expected.

Commenter No. 33: Leigh Ford

From: Leigh Ford [redacted]
Sent: Tuesday, November 9, 2021 11:18 PM
To: PELE_NEPA@sco.mil
Subject: EXTERNAL: Mobile micro nuclear reactor draft EIS comments
Attachments: mobilemicroreactoreis_SRA_comments_11-9-21.pdf

To whom it may concern,

After not receiving a confirmation screen upon uploading them on the EIS website, I wanted to make sure they were received. I would like to submit my comments via email as backup (attached).

Thank you!

Leigh

Leigh Ford(she/her)

Executive Director

SNAKE RIVER ALLIANCE

On Shoshone and Bannock traditional lands

[redacted]

snakeriveralliance.org

Do Not Be Afraid Of Work That Has No End

~Avot de Rabbi Natan~

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See the responses on the next three pages.

Commenter No. 33: Leigh Ford

Via mobilemicroreactoreis.com website

Mobile Microreactor EIS Comment
c/o Leidos
2109 Air Park Rd SE, Suite 200
Albuquerque, NM 87106

RE: Public comment on the Construction and Demonstration of a prototype mobile micro nuclear reactor at Idaho National Laboratory

Comments submitted by Leigh Ford on behalf of Snake River Alliance

November 9, 2021

33-1 Thank you for the opportunity to comment on the mobile micro reactor draft EIS. Snake River Alliance believes the draft EIS does not satisfactorily demonstrate a need for such a mobile micro nuclear reactor (MMR).

33-2 The Snake River Alliance strongly advises NO ACTION ALTERNATIVE.

33-3 There are several issues with pursuing what the industry is calling "advanced" nuclear reactors and why it will not benefit our nation. Small, mobile, nuclear reactors are not new – one version exists on nuclear submarines – but they all have the radioactive waste that must be treated, transported, stored, guarded/secured and (supposedly) transported to the final destination or centralized interim facility (CIS) then stored and maintained longer than any empire has ever existed.

The United States already has 80,000 metric tons of spent nuclear fuel and nowhere to put it. No permanent repository exists, attempts at creating CIS in Texas are being fought in court, and the Nuclear Waste Policy Act of 1987 states that no interim storage is

33-1 As described in Section 1.3, *Proposed Action and Scope of this EIS*, this EIS has been prepared in accordance with the National Environmental Policy Act and the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500 through 1508). SCO believes the need to construct and demonstrate a mobile microreactor has been adequately described in this EIS. Please see Section 2.2, *Purpose and Need*, of this CRD for additional information.

33-2 DoD acknowledges your support of the No Action Alternative. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussions in Section 2.1, *Support and Opposition*, of this CRD for additional information.

33-3 Current radioactive waste and spent nuclear fuel (SNF) management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the INL Site has disposed of LLW and treated MLLW at the DOE Nevada National Security Site or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's on-site LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008). SNF would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it is transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS.

Commenter No. 33: Leigh Ford

permitted unless and until a permanent repository has been identified and approved by Congress. This draft EIS does not address the problems inherent with radioactive waste or the legal conundrum. There is the probability that an "interim" site could become permanent. Idaho National Laboratory is not designed to isolate nuclear waste for the million years that the waste will remain lethal. At worst, it has potential to become neglected, poorly maintained, and forgotten. Having radioactive waste stored and nuclear tests conducted above our sole source aquifer is a poor choice, especially when we know the waste will stay here. **33-3 (cont'd)** **33-4**

Nuclear energy will not make Americans safer around the world and could put civilians and military personnel at risk. When something goes wrong it can be catastrophic. For this prototype, there is inherent risk at every stage of the process outlined in the EIS. From the fuel itself, to the transportation of the fuel across the nation, to demonstration and waste creation and finally to treating and storing, nuclear waste puts future generations and ourselves at risk for serious health problems and death. Radioactive waste is antithetical to all biological life and would put our sole source freshwater aquifer that lies under INL in more danger. Again, there is nowhere to store the radioactive waste the MMR will produce and too often it gets dumped near the Indigenous people, rural, poor, and people of color. **33-5** **33-4 (cont'd)** **33-6**

The draft EIS does not adequately address environmental justice (EJ) and climate change. While it seems to recognize the authority of federal agencies meeting greenhouse gas reductions mandated in Federal laws, executive orders, and agency policies, it disregards other directives. The Biden Administration has promised to deliver EJ and in his recent executive order, the President directed that "[a]gencies shall make achieving environmental justice part of their missions by developing programs, policies, and **33-7** **33-6 (cont'd)**

33-4 Section 3.3.1.2, *Wastewater*, of this EIS describes the local INL Site hydrology, including the Snake River Plains Aquifer. This discussion includes details regarding the established site groundwater monitoring program and the performance of analyses and studies of the Snake River Plains Aquifer under and adjacent to the site. The groundwater monitoring has generally shown long-term trends of decreasing concentrations for radionuclides, and current concentrations are near or below the U.S. Environmental Protection Agency maximum concentration limits for drinking water. The decreases in concentrations are attributed to discontinued disposal above the aquifer, radioactive decay, and dilution within the aquifer. This groundwater monitoring program is planned to continue into the future, including during operation of Project Pele to detect changes in groundwater quality.

33-5 DOE and SCO disagree with the assertions in the comment. None of the proposed activities put present and future generations at risk for serious health problems and death. Personnel with many years of experience performed the accident, transportation, and waste management analyses discussed in the this EIS. Section 1.3, *Proposed Action and Scope of this EIS*, describes the scope of this EIS. The scope of this EIS is limited to the construction and demonstration of the prototype mobile microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. The potential environmental impacts of deployment and use of these future designs, if they were to occur, would be the subject of additional environmental analyses. Tristructural isotropic fuel is a fuel form that has been specifically developed to retain radioactive fission products during normal operating and accident conditions. This type of microreactor fuel is extremely safe. Section 4.11, *Human Health – Facility Accidents*, of this EIS includes a comprehensive assessment of potential impacts from prototype mobile microreactor accidents that could result from initial construction through decommissioning of the project and disposal of materials. The section presents the analysis of impacts from potential radioactivity releases as a result of microreactor accidents, along with cumulative impacts. A prototype mobile microreactor accident would result in a dose significantly below regulation limits and minimal impact to workers and the public. Section 4.12, *Human Health – Transportation*, of this EIS finds that transportation of radioactive material (fuel) and waste likely would result in no additional fatalities as a result of radiation, and the nonradiological accident risks (the potential for fatalities as a direct result of traffic accidents) are greater than the radiological accident risks. The risks from shipments associated with Project Pele would be negligible. The overall impact of the Proposed Action on waste and SNF management would be negligible to minor. Wastes generated as a result of the Proposed Action would be managed within the current waste management systems and sent off-site for treatment and/or disposal as necessary. Implementation of DOE Order 435.1, *Radioactive Waste Management*, ensures that all DOE radioactive waste is managed in a manner that protects the environment, worker, public safety, and health. Treatment and disposal of all wastes as a result of the Proposed Action is well

Commenter No. 33: Leigh Ford

SNAKE RIVER ALLIANCE

activities to address the disproportionately high and adverse human health, environmental, climate related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts." https://www.whitehouse.gov/briefing-room/presidentialactions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-andabroad/. Additionally, the White House EJ Advisory Committee's list of "PROJECTS THAT WILL NOT BENEFIT A COMMUNITY" includes "procurement of nuclear power." https://www.epa.gov/sites/default/files/2021-05/documents/whejac_interim_final_recommendations_0.pdf **33-6 (cont'd)**

Finally nuclear energy is not "clean" despite attempts to greenwash it to stay relevant in a truly renewable energy future. **33-8** Nuclear waste is the most deadly waste our species has yet created and it relies on fossil fuels. **33-5 (cont'd)** It has no place in a clean energy future and cannot be a part of the climate change solution. Even if it could help, it would take too long. **33-8 (cont'd)**

Thank you, again for the opportunity to comment.

Leigh Ford
Executive Director
SNAKE RIVER ALLIANCE
On Shoshone and Bannock traditional lands
[redacted]
snakeriveralliance.org

33-5 (cont'd)

within the current throughput capacity of INL Site facilities, as discussed in Section 3.9, *Waste and Spent Nuclear Fuel Management*.

33-6 Environmental Justice populations within the region of influence are identified in EIS Section 3.15, *Environmental Justice*, and impacts to these populations from normal operations of the Proposed Action are discussed in Section 4.15, *Environmental Justice*. Please refer to the response to Comment 32-4 regarding consideration of impacts to environmental justice populations from accident scenarios. The extent of the environmental justice analysis provided throughout this EIS is commensurate with the anticipated level of negligible impact from the Proposed Action under consideration. This is consistent with Council on Environmental Quality's instruction that agencies "focus on significant environmental issues and alternatives" (40 CFR 1502.1) and discuss impacts "in proportion to their significance" (40 CFR 1502.2(b)). Please refer to Section 4.9, *Waste and Spent Nuclear Fuel Management*, for discussion of waste and spent nuclear fuel management from the Proposed Action. The impacts of activities at waste storage sites were already evaluated in the licensing or permitting processes for these facilities as described in EIS Chapter 1, *Introduction and Purpose and Need*; therefore, activities would not result in an additional cumulative impact.

33-7 This EIS lists the greenhouse gas policies and directives that are most applicable to Project Pele and its analysis. The DoD and DOE are members of the White House Environmental Justice Interagency Council, as directed by Executive Order 14008 (*Tackling the Climate Crisis at Home and Abroad*), and therefore comply with the requirements of this Executive Order. Project Pele would produce a minimal amount of greenhouse gases and, thus, would have an imperceptible impact to environmental justice.

33-8 SCO believes the need to construct and demonstrate a mobile microreactor has been adequately described in this EIS. SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please refer to Section 2.2, *Purpose and Need*, of this CRD for a discussion of this topic and SCO's response. The scope of this EIS is limited to fabrication of a prototype mobile microreactor at off-site facilities and demonstration of the microreactor at the INL Site. Future deployment is not included in the scope of this EIS. The potential environmental impacts of deployment and use of these future designs, if they were to occur, including potential reduction in greenhouse gas emissions, would be the subject of additional environmental analyses. Please see Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Commenter No. 34: Albert Gilbert/Victor Ibarra

NUCLEAR INNOVATION ALLIANCE

November 9th, 2021

RE: NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT FOR CONSTRUCTION AND DEMONSTRATION OF A PROTOTYPE ADVANCED MOBILE NUCLEAR MICROREACTOR, 86 FED. REG. 53039 (SEPT. 24, 2021)

COMMENTS IN SUPPORT OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FINDINGS FOR THE CONSTRUCTION AND DEMONSTRATION OF A PROTOTYPE MOBILE MICROREACTOR, "PROJECT PELE"

The NIA would like to thank the Strategic Capabilities Office (SCO) for allowing the Nuclear Innovation Alliance (NIA) to provide comments on the Draft Environmental Impact Statement (EIS) prepared for the "Project Pele" Mobile Microreactor. The Nuclear Innovation Alliance strongly supports the U.S. Department of Defense's (DOD) decision to construct and demonstrate a prototype microreactor at the Critical Infrastructure Test Range Complex (CITRC) at the Idaho National Laboratory site. **34-1** The DOD is one of the largest energy consumers in the world so it is critical that they seek alternative energy sources to costly and polluting diesel generators, and reduce their impact on local electrical grids. This cross-department collaborative effort with the U.S. Department of Energy, Office of Nuclear Energy (DOE-NE) can help the United States meet national and global climate policy objectives and enhance national security by demonstrating a technology source that is clean, firm, transportable, does not require refueling, and can integrate with other energy sources to power microgrids. Project Pele will enable the DOD to conduct crucial pilot programs on advanced nuclear energy that can ultimately help accelerate civilian sector decarbonization and increase electrical grid security. Project Pele can also help demonstrate the feasibility of using TRISO fueled advanced reactor designs and the opportunities for integrating microreactors into microgrids. Successful deployment and operation of DOD microreactors could demonstrate how this technology could eventually serve as a crucial tool to decarbonize remote communities that now lack sustainable power sources and even be used to serve as emergency power sources during or after natural disasters. **34-2**

The Draft EIS prepared by the Strategic Capabilities Office (SCO) found that Project Pele would have very limited impacts. In the EIS, the SCO evaluated X-energy's and BWXT's microreactor designs and concluded that each design would result in very limited environmental impact. The Draft EIS also highlighted the protective characteristics of TRISO fuel particles and their ability to mitigate any significant radioactive effluent release. Further, the EIS determined that Project Pele would result in minimal to no expected cumulative impacts related to land use, air quality, or water resources, despite conservative assumptions of completely additive impacts. In reviewing the Draft EIS, NIA believes that the careful analysis conducted by DOD supports these high-level conclusions. The SCOs findings provide insight into the environmental sustainability of future nuclear microreactor designs. **34-3**

NIA appreciates DOD's and SCO's diligence in conducting a full EIS for Project Pele. However, considering the result of the EIS, NIA recommends that DOD consider including a statement in the cover sheet and summary that it did not find significant impacts in its analysis. Although **34-4**

34-1 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor, including demonstration at CITRC at the INL Site. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussions in Section 2.1, *Support and Opposition*, of this CRD for additional information.

34-2 The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Testing at other sites and deployment at domestic bases and Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases in foreign countries and U.S. territories is not included in the scope of this EIS. Use of the microreactor for nonmilitary applications, such as to provide power for remote settlements and disaster relief, is not included in the scope of this EIS. The potential environmental impacts of deployment and use of these future designs, if they were to occur, including potential reduction in greenhouse gas emissions, would be the subject of additional environmental analyses. Please see Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

34-3 Thank you for your comment. Also see the response to Comment 34-1.

34-4 As described in Section 1.3, *Proposed Action and Scope of this EIS*, this EIS has been prepared in accordance with the National Environmental Policy Act and the Council on Environmental Quality regulations (40 Code of Federal Regulations 1500 through 1508). SCO will announce its decision regarding Project Pele in a Record of Decision issued no sooner than 30 days after publication in the Federal Register of the U.S. Environmental Protection Agency's Notice of Availability for this EIS. The information the commenter requested regarding the significance of impacts from the Proposed Action evaluated in this EIS will be presented in the Record of Decision. Preparers of future National Environmental Policy Act documents are free to utilize the analyses and conclusions in this EIS as allowed by law, including incorporation by reference. For DOE activities, Section D4, *Reactors*, of 10 Code of Federal Regulations Appendix D to Subpart D of Part 1021, *Classes of Actions that Normally Require EISs*, states that siting, construction, operation, and decommissioning of power reactors, nuclear material production reactors, and test and research reactors are classes of actions that typically require preparation of an EIS.

Commenter No. 34: Albert Gilbert/Victor Ibarra

NUCLEAR INNOVATION ALLIANCE

November 9th, 2021

issuing a Finding of No Significant Impact (FONSI) is usually tied to an EA preceding an EIS, the in-depth analysis conducted by DOD would support a FONSI had this been an EA. Making such a determination would be helpful for future NEPA reviews by DOD, DOE, and NRC as they consider whether microreactors qualify for categorical exemptions or can conduct an EA to determine whether a full EIS is needed. Microreactors can greatly mitigate environmental impacts from DOD operations; explicitly stating such a finding would reduce future regulatory risk, support national security and DOD's mission, and accelerate emissions reductions through more rapid deployment of clean nuclear energy. If DOD does not believe it has sufficient information to make a FONSI-equivalent for this EIS, it should specifically identify which environmental impacts it considers to significantly affect the quality of the human environment, as well as identify the specific mitigation measures applicable to those effects. **34-4** *(cont'd)*

Thank you for your consideration,

Albert Gilbert and Victor Ibarra, Jr., on behalf of the Nuclear Innovation Alliance.

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See the responses on the previous page.

Commenter No. 35: Scott Carey, Brendon Grant

From: Clearinghouse [redacted]
Sent: Tuesday, November 9, 2021 1:46 PM
To: PELE_NEPA
Subject: Nevada State Clearinghouse Comments for DOD EIS Construction and Demonstration of a Prototype Mobile Microreactor - All Counties

Attached please find a copy of the comments received through the Nevada State Clearinghouse for DOD EIS Construction and Demonstration of a Prototype Mobile Microreactor - All Counties (E2022-095). If you have any questions or need any additional information about these comments please feel free to contact me.

Scott Carey
Nevada State Clearinghouse
Department of Conservation and Natural Resources
901 S. Stewart Street, Suite 5003
Carson City, NV, 89701
NevadaClearinghouse@lands.nv.gov
[redacted]

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See the responses on the next page.

Commenter No. 35: Scott Carey, Brendon Grant

Nevada State Clearinghouse Comments Received for E2022-095 DOD EIS Construction and Demonstration of a Prototype Mobile Microreactor - All Counties - Carson City, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, Washoe, White Pine, Churchill, Arizona (AZ), California (CA), Oregon (OR), Idaho (ID), Utah (UT), Clark, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander

Comment # 1

From: Brendon Grant
Agency: Nevada Division of Environmental Protection NDEP
Title:
[redacted]
Date Received: 09/16/2021

The Bureau of Safe Drinking Water has no comments on this project. ***35-1***

35-1 Comment noted.

Commenter No. 36: Lew Pence/Bob Muffley

Middle Snake Regional
Water Resource Commission
Lew Pence, Chairman
Bob Muffley. Executive Director
122 5th Ave West
Gooding, ID 83330
PH: 208-934-4781

11/8/2021

EIS /comment
% Leidos
2109 Air Park Rd SE, Suite 200
Albuquerque, NM 87106

RE: Mobile Microreactor EIS

The Middle Snake Regional Water Resource Commission representing the counties of Cassia, Gooding, Jerome, Lincoln and Twin Falls in south central Idaho offers the following comments on the draft EIS for the proposed Mobile Microreactor to be located at the INL.

This commission and the counties we represent appose locating this facility above Idaho's ESPA until the INL has developed a proven method to remove the 900,000 gallons of highly radioactive liquid waste stored above our aquifer in stainless steal tanks. [36-1] The 1995 Idaho agreement was amended in 2020 to allow the INL to develop an Advanced Test Reactor, but there is no mention of testing a Mobile Microreactor. [36-2]

You comment, in the draft EIS, that the facility will be operational for 3 years and then be disassembled and temporarily stored at the INL site. We both know this temporary situation could last many lifetimes. The fact is permanent storage of highly radioactive waste is a political issue for which you or the INL have no control. For now and the foreseeable future our politicians in Washington D.C. want nothing to do with seeking a solution. [36-3]

The INL is supposedly a research facility not a test facility. Your draft EIS clearly states the microreactor will be researched and developed at another location and then shipped to the INL for the testing phase. [36-4]

We also have asked ourselves if the notion of a microreactor came from the DOD or was it actually initiated by the DOE. The DOE has a long history of trying to make itself appear [36-5]

36-1 DoD acknowledges your opposition to the Proposed Action. Considering public comments on the Draft EIS is an important step in the EIS process. Management of previously generated "highly radioactive liquid waste" at the INL Site is outside the scope of this EIS. Please see the discussions in Sections 2.1, *Support and Opposition*, and 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

36-2 The very small quantity of spent nuclear fuel (SNF) that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

36-3 Current radioactive waste and SNF management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor which also must be disposed of. No high-level radioactive waste would be generated, and all low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the INL Site has disposed of LLW and treated MLLW at the DOE Nevada National Security Site or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's on-site LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008). SNF would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed

Commenter No. 36: Lew Pence/Bob Muffley

useful when it comes to nuclear power. Some on this commission are former military and must wonder how comfortable land troops will be with a nuclear reactor located at their base of operation and subject to land, air or sea attack. *36-6*

Submitted By:

Lew Pence, Chairman

Bob Muffley, Executive Director

Representing the counties of Cassia, Gooding, Jerome, Lincoln and Twin Falls

36-3 (cont'd)

during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS.

36-4 The activities associated with the demonstration of a prototype mobile microreactor fit well within the capabilities and purpose of INL. The characterization of INL as solely a research facility is inaccurate; INL is a research, development, and demonstration center.

36-5 The Defense Science Board evaluated available energy technologies before concluding that electrical generating capability for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases can best be met by a less than 10-MWe microreactor system that can be safely and rapidly moved by road, rail, sea, or air for quick setup and shutdown. This EIS addresses the need to demonstrate such a prototype mobile microreactor. Please see the discussions in Sections 2.1, *Support and Opposition*, and 2.2, *Purpose and Need*, of this CRD for additional information.

36-6 The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Deployment at domestic bases and Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases in foreign countries and U.S. territories is not included in the scope of this EIS. The potential environmental impacts of deployment, if it were to occur, would be the subject of additional environmental analyses. Please see the discussion in Section 2.3, *Scope of Proposed Action*, of this CRD for additional information.

Commenter No. 37: Chuck Broscious

From: edinst@tds.net
Sent: Tuesday, December 21, 2021 4:38 PM
To: Pele NEPA
Subject: EXTERNAL: Comments on reactor
Attachments: EDI PELE.Com.Microreactor.12-20-21.pdf

Attached please find Environmental Defense Institute comments on small mobile reactor.
chuck broscious
edinst@tds.net

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See the responses on the next three pages.

Commenter No. 37: Chuck Broscious

Environmental Defense Institute
Troy, ID 83871-0220
edinst@tds.net

December 20, 2021

RE: Prototype Microreactor EIS Comments

OSD Strategic Capabilities Office,
ATTN: Prototype Microreactor EIS Comments,
675 N. Randolph Street, Arlington, VA 22203-2114

Filed via email to: Pele_NEPA@sco.mil

To Whom it may concern,

The Department of Defense (DOD) acting through the Strategic Capabilities Office (SCO) and in close collaboration with the U.S. Department of Energy (DOE) plans on building a "warfighter mobile nuclear reactor power generation" unit at one of 3 Idaho National Laboratory (INL) sites operated by DOE. DOD wants to develop a "prototype advanced mobile nuclear microreactor to support DOD domestic energy demands, DOD operational and mission energy demands, and Defense Support to Civil Authorities mission capabilities." The 3/3/20 Notice of Intent [1] to prepare an Environmental Impact Statement is available for viewing online at: https://www.federalregister.gov/

The Environmental Defense Institute has been monitoring DOE's INL operations for over 20 years and can categorically say the US Army and DOE's record of mismanagement of INL nuclear projects has resulted in extensive radiation contamination to the Idaho region. Therefore, we are opposed to this prototype advanced mobile nuclear microreactor for reasons we layout below. **37-1**

Because of the existential threat of climate disaster, these DOD/DOE nuclear addicts have ignored, they must add to this EIS alternative renewable energy and offer a demonstration for these energy applications. These renewable energy sources will not – as our below discussion demonstrates – add to the radiation contamination of Idaho's air and water. **37-2** **There is NO permanent permitted (or even under consideration) deep geological site for this program spent nuclear fuel. Therefore, it is ludicrous to consider ANY new nuclear projects until such a repository is available for the SNF waste.** **37-3**

[1] 12274 Federal Register / Vol. 85, No. 41 / Monday, March 2, 2020 / Notice of Intent to Prepare an Environmental Impact Statement for Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor

37-1 DoD acknowledges your opposition to the Proposed Action. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussions in Section 2.1, *Support and Opposition*, of this CRD for additional information. It is not within the scope of this EIS to address the past management performance of DoD or DOE at the INL Site. DOE acknowledges that past activities have led to the contamination of portions of the INL Site. This has led to the designation of portions of the INL Site for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (designation as a Superfund site). DOE, in coordination with the U.S. Environmental Protection Agency and the State of Idaho, is working to control and remediate the impacts from this contamination. Safe operation of the microreactor is paramount. During the demonstration of the prototype mobile microreactor, DoD and DOE would require that the microreactor demonstrations be performed in compliance with documented safety analysis. DOE is committed to maintaining the safety basis for the microreactor in compliance with 10 Code of Federal Regulations 830. Releases from normal operations would be monitored to ensure compliance with all applicable permits and regulations, including 40 Code of Federal Regulations 61, Subpart H, *National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities*.

37-2 SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please refer to Section 2.2, *Purpose and Need*, of this CRD for additional information. The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Decisions related to funding priorities and budgets are outside the scope of this EIS.

37-3 The very small quantity of spent nuclear fuel (SNF) that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Additional information regarding radioactive waste and SNF management and disposal and reactor disposition can be found in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD.

Commenter No. 37: Chuck Broscious

INL Background

In 1948 the Atomic Energy Commission (AEC) made the decision to expand reactor development and spent fuel chemical processing for nuclear weapons materials. Originally the AEC named the new Idaho reactor site the National Reactor Testing Station (NRTS), and 141,000 additional acres were acquired north and east of the NRTS (for a total of 572,000 acres) as further environmental safeguard and buffer zone for expanded operations.

Over INL's 70+ year history, 52 nuclear reactors were built at INL - currently 3 are operating and another 10 are shutdown but operable. This represents the largest concentration of reactors in the world. [2] In addition to these reactors are facilities that process large quantities of high-level radioactive and chemical materials. [3]

37-4

INL has had forty-two reactor meltdowns in its history of operations. Sixteen of these meltdowns were accidents. The remaining twenty-six were experimental/intentional meltdowns to test reactor design parameters, fuel design, and radiation releases. These nuclear experiments were conducted with little regard to the radiation exposure to workers and surrounding residents. Below is a partial listing of the more notable meltdowns and criticality releases. See Citizens Guide to INL IX Appendix (A) for a listing of acknowledged melt-downs, accidents, and experimental radioactive releases. The term accidental, used by DOE, is perhaps not an appropriate term any more than when the term is applied to a hot-rodder who "accidentally" crashes his car while speeding at 100 miles per hour down a road designed for 30 mph. Hot-rodding a nuclear reactor just to see what it will take is no accident and no less irresponsible. [Guide pg. 20]

DOD Plan for INL

37-5

According to DOD, three INL locations are currently under consideration; Idaho Nuclear Technology Center (INTEC) ICPP-691, Materials and Fuels Complex (MFC) ERB-II, and the Power Burst Facility (PBF) Critical Infrastructure Test Range. Initially, DOD will build a prototype inside an existing structure and after hot run testing move the reactor to an INL outside location for additional hot tests. We discuss each of these sites more below.

37-4 (cont'd)

Idahoans remember when DOD built the Army's SL-1 small mobile reactor at the Idaho National Laboratory back in the 1960's because it exploded marking the first nuclear reactor accident that killed 3 operators. Operational mismanagement by the Army and contractor (Combustion Engineering) caused the explosion spreading significant radiation around the region. [4] A crucial element that his new mobile reactor will share with the SL-1 design is there will be little to no radiation containment structure required for Nuclear Regulatory Commission (NRC) licensed reactors. Since the cause of the SL-1 explosion was gross materials/oversight/management problems, DOD appears to be ready to repeat the same old mistakes by stating in the NOI:

> "The microreactor must keep radiation exposure during power operation, abnormal operations, or upset conditions, as low as reasonably achievable. SCO seeks to produce a

[2] DOE/EH/OEV-22-P, pg,2-8

[3] Citizens Guide to INL, Pg. 15 http://environmental-defense-institute.org/publications/GUIDE.963.pdf

[4] Tami Thatcher, *The SL-1 Accident Consequences*, http://environmental-defense-institute.org/publications/SL-1Consequences.pdf

2

37-4 DoD and DOE appreciate the history of INL presented by the commenter, but both disagree with the assertion that high-level radioactive and chemical materials have never been properly or legally managed. DOE takes its responsibility for the safety and health of the workers and the public seriously and has managed activities at INL in accordance with regulations. The Stationary Low-Power Reactor Number One accident addressed in the comment is discussed in Section 3.11.2, *Accident History*, of this EIS. Operational occurrences mentioned in the comment are not related to the demonstration of the prototype mobile microreactor. Fuel for the prototype mobile microreactor would not be fabricated at INL. Past microreactor experience and knowledge gained from the Army Nuclear Power Program provides information about operating microreactors. The Hot Fuel Examination Facility (HFEF) hot cells would not require modifications to perform post-irradiation examination. HFEF operations to support the Project Pele mission are within the scope of activities currently performed at the HFEF. The purpose of this EIS is to assess the environmental impacts of the Proposed Action. The scope of this EIS is limited to the construction and demonstration of the prototype mobile microreactor at the INL site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. The potential environmental impacts of deployment and use of these future designs, if they were to occur, would be the subject of additional environmental analyses. SCO used state-of-the-art science, technology, and expertise to assure quality in the accident impacts analyses. Personnel with many years of experience performed the accident analyses using state-of-the-art computer programs approved for use by DOE and the NRC. Section 4.11, *Human Health – Facility Accidents*, of this EIS includes a comprehensive assessment of potential impacts from prototype mobile microreactor accidents that could result during all phases of the project, from initial construction through decommissioning of the project and disposal of materials. The section presents the analysis of impacts from potential radioactivity releases as a result of microreactor accidents, along with cumulative impacts. None of the proposed activities put present and future generations at risk for serious health problems and death.

37-5 The commenter is correct in that these facilities have been identified as locations for demonstration activities. Note that while the MFC and CITRC are identified as locations where activities would be performed (and the impacts of using these facilities have been analyzed in Chapter 4, *Environmental Consequences*, of this EIS), The Idaho Nuclear Technology and Engineering Center is identified as one of several potential locations for the described activity, because the function of the identified facilities is similar to what would be performed in support of the mobile microreactor SNF management. Even if the Proposed Action is selected in the Record of Decision for this EIS, the Idaho Nuclear Technology and Engineering Center may or may not be used depending upon several factors including availability of the facility.

Commenter No. 37: Chuck Broscious

Environmental Defense Institute Page | 3

> prototype that will minimize consequences to the nearby environment and population in case of kinetic or non-kinetic action affecting structural integrity or release of contamination Further, [Strategic Capabilities Office] SCO seeks to utilize nuclear materials in the construction of a prototype microreactor that, if damaged, do not generate and impose excessive training and equipping burdens on forward area first responders, site medical facilities, or supported military personnel and the civilian population." [5]

37-4 (cont'd)

INL is desperate for a new mission to justify its existence other than cleaning-up its' huge legacy nuclear waste. DOD knows that the nuclear power option is the most expensive compared to renewables – plus and more importantly - there is no permanent deep geological disposal site for the high-level waste these reactors will generate. Tragically, nuclear waste production has never been an issue DOD/DOE have ever been concerned about. It's fine to continue to use Idaho as their nuclear waste dump. DOE/DOE 70+ year history of INL mismanagement and total disregard of the health and environmental effects of their operations is prima-facia evidence that they can NOT be trusted for anything other than cleanup of the mess they've already made. [6]

37-6

Since DOE is self-regulated, its nuclear facilities do not come under the full regulatory authority of the Nuclear Regulatory Commission (NRC). Consequently, this new mobile nuclear microreactor will also not be required to meet NRC design/operation/safety specifications; though DOE claims to seek NRC consultation, it "does not require an NRC license."

37-7

DOD claims to need a prototype advanced mobile nuclear microreactor to support DOD domestic energy demands capable of producing 1–10 megawatts of electrical power, DOD operational and mission energy demands, and Defense Support to Civil Authorities mission capabilities. Given DOD/DOE track record their claim below sounds ridiculous:

"The microreactor must keep radiation exposure during power operation, abnormal operations, or upset conditions, as low as reasonably achievable. SCO seeks to produce a prototype that will minimize consequences to the nearby environment and population in case of kinetic or non-kinetic action affecting structural integrity or release of contamination. Further, [Strategic Capabilities Office] SCO seeks to utilize nuclear materials in the construction of a prototype microreactor that, if damaged, do not generate and impose excessive training and equipping burdens on forward area first responders, site medical facilities, or supported military personnel and the civilian population."

37-8

Each of the INL locations DOD/DOE are considering have their own major contamination issues from previous operations. EDI's extensive contamination reports on each site in the following indoor/outdoor locations at INL must be considered in the EIS scoping process before making the decision to select INL.

37-9

[5] 12274 Federal Register / Vol. 85, No. 41 / Monday, March 2, 2020 / Notice of Intent to Prepare an Environmental Impact Statement for Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor

[6] See 1995 Settlement Agreement and Consent Order against DOE/INL for mismanagement of nuclear waste.

3

37-6 As stated in EIS Section 3.9, *Waste and Spent Nuclear Fuel Management*, no high-level radioactive waste would be generated by Project Pele.

37-7 DOE is not self-regulated. As described in Chapter 7, *Laws, Regulations, and Other Requirements*, most aspects of DOE operations are performed under the oversight of Federal and state regulatory agencies. EIS Section 1.3, *Proposed Action and Scope of this EIS*, states that DoD has received authorization from DOE, pursuant to its authority under the Atomic Energy Act and National Security Decision Directive 282, for the acquisition and operation of a prototype reactor. Consistent with the non-commercial nature of the project, the prototype mobile microreactor may proceed under authorization by the Secretary of Energy and does not require an NRC license. The NRC, consistent with its role as an independent regulator, is participating in this project to provide SCO with accurate, current information on NRC's regulations and licensing processes. As described in EIS Section 1.2, *Purpose and Need for Agency Action*, DoD's intent is to develop a mobile microreactor that could be licensed by NRC.

37-8 SCO believes the need to construct and demonstrate a mobile microreactor has been adequately described in this EIS. SCO considered the potential for alternative energy technologies to supply power for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases as part of the process of developing this EIS. Please see Section 2.2, *Purpose and Need*, of this CRD for additional information.

37-9 DOE acknowledges that past activities have led to the contamination of portions of the INL Site. This has led to the designation of portions of the INL Site for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (designation as a Superfund site). DOE, in coordination with the U.S. Environmental Protection Agency and the State of Idaho, is working to control and remediate the impacts from this contamination. The cleanup of existing contamination is outside the scope of this EIS. Chapter 3, *Affected Environment*, of this EIS describes existing contamination of environmental media such as air, water, soil and biota, and DOE's monitoring program to detect releases and movement of contaminants. As described in EIS Section 2.5, *Alternatives Considered and Dismissed from Detailed Analysis*, one of the criteria used to evaluate potential locations for demonstration of the mobile microreactor is that the site be located outside of Comprehensive Environmental Response, Compensation, and Liability Act sites. Therefore, this was considered in selecting the locations analyzed in this EIS. Also, see the responses to Comments 26-1 and 26-4.

Commenter No. 37: Chuck Broscious

Environmental Defense Institute Page | 4

(a) Chemical Processing Plant 691 (CPP–691) situated within the Idaho Nuclear Technology and Engineering Center (INTEC); [7]
(b) Experimental Breeder Reactor II (EBR II) situated within the Materials and Fuels Complex (MFC); [8] [9]
(c) Power Burst Facility 613, situated within the Critical Infrastructure Test Range Complex (CITRC); [10] [11] or
(d) Alternate facilities and infrastructure identified during the EIS process.

37-9 (cont'd)

INL Accident History must be considered in the EIS

"The accident at the Stationary Low-Power Reactor Number One (SL-1) occurred on January 3, 1961. Located in the Auxiliary Reactor Area, **SL-1 was a small compact Army nuclear power plant designed to generate electricity at remote military locations such as the Arctic or Antarctic.** The reactor served both as an experimental prototype and as a training facility for military personnel. On the bitterly cold afternoon of January 3rd, three Army technicians arrived at the facility for the four to midnight shift. The SL-1 reactor had been shut down for routine maintenance, and the task of the three men that evening was to complete certain preparations for nuclear startup. Apparently, in the process of attaching control rods to drive motors, one of the men raised the central control rod too far and too fast. Evidence indicates that the rod might have stuck momentarily. In the past, there had been sticking problems with that rod. When it came unstuck, it moved upward much higher than anticipated and triggered a supercritical power excursion in the reactor core. In a fraction of a second the power reached a magnitude of an estimated several billion watts, melting and perhaps even vaporizing a large part of the core. The water in the core region was vaporized, creating a devastating steam explosion. The remaining water in the reactor vessel was hurled upward at high velocity, striking the underside of the reactor's pressure lid and lifting the whole nine-ton vessel upward, shearing cooling pipes in the process. The three men, who had been standing atop the reactor vessel, were crushed against the ceiling of the building before the huge vessel dropped back into place. One of the men remained impaled on the ceiling by a piece of control rod rammed through his groin. It all happened in a second or so." [Norton] [emphasis added]

37-4 (cont'd)

[7] EDI Review of Idaho Nuclear Technology and Engineering Center CERLCA Cleanup, 2016 http://environmental-defense-institute.org/publications/CERCLA.INTEC.pdf

[8] Public Comment for Class 2 RCRA Permit Modification for Materials and Fuels Complex at Idaho National Laboratory, EPA Number ID4890008952 by Tami Thatcher and Chuck Broscious, September 29, 2017 http://environmental-defense-institute.org/publications/EDIRCRAcomments2017.pdf

[9] EDI Review of ANL-W (Materials and Fuels Complex) CERCLA Cleanup, 12/10/15 http://environmental-defense-institute.org/publications/y2016ANLWcleanup.pdf

[10] EDI Review of Auxilliary Reactor Area (ARA) CERLCA Cleanup http://environmental-defense-institute.org/publications/EDICERCLAARARev9.pdf

[11] Public Comment Submittal for Department of Energy Draft Environmental Statement for Expanding Capabilities at the National Security Test Range and the Radiological Response Training Range at Idaho National Laboratory, DOE/EA-2068, by Chuck Broscious, October 12, 2019 and Public Comment Submittal on DOE/EA-2068 also by Tami Thatcher, October 12, 2019 http://environmental-defense-institute.org/publications/EDINSTR.pdf

4

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See responses on previous pages.

Commenter No. 37: Chuck Broscious

"It [SL-1] was a terrible accident, made even more grisly because the intensely radioactive fission products scattered inside the building by the accident hampered the work of recovering the bodies. Staying in the building for mere seconds resulted in a year's allowable dose of radiation for rescue workers. And it took six days to remove the body that was impaled on the ceiling by use of a remotely operated crane and a closed-circuit television. The bodies were so badly contaminated, the heads and hands of the victims had to be severed and buried with other radioactive wastes at the Radioactive Waste Management Complex." [Norton] The Oil Chemical and Atomic Workers Union protested vigorously that the government refused to provide a proper Christian burial for the workers.

The SL-1 reactor explosion not only resulted in three deaths but also serious exposure of 0.1-0.5 roentgens [rem] to nearly 100 personnel. Over 12 workers received exposure greater than 10 roentgens [rem]. [IDO-19301@138] The maximum acknowledged personnel exposure was 1,000 R/hr. (Rad per hour). [ERDA-1536,p.II-243] The exposed reactor was still emitting 22,000 R/hr. five months after the accident. Readings above the reactor one month after the accident were 410 R/hr. [IDO-19301,p.109] 1,128 Ci including 80 Curies of radioactive Iodine were also released during the SL-1 accident. [ERDA-1536,p.II-243] [DOE/ID-12119@A-53] A temperature inversion kept the radiation plume close to the ground and at 25 miles the radioactive iodine levels were 10 times above background. At 100 miles the radiation levels were above background.

The author interviewed the widow of James Dennis who was a member of the SL-1 involuntary Army demolition crew brought in to dismantle the reactor after the accident. Dennis died of a rare blood cancer called Waldenstrom's micro globulin anemia, which his medical documents confirm, was caused by exposure to 50 rem/hr. for nine hours and ten minutes at the SL-1 site. [Dennis,p.10] Dennis' documents further challenge the government's acknowledged exposure of whole body - 2135 mrem, and skin - 3845 mrem [Dennis citing AEC/SL-1,CAB] as grossly understated. Dr. Charles Miller M.C., hematologist / oncologist, chief of Medical Services at Letterman Army Medical Center and Dennis' internal physician, supports the allegation that Dennis' cancer was caused by exposure to radiation. [Dennis, p.17] The government refused to grant Dennis any compensation for his radiation exposure injuries that caused his early death. John Horan, an INL health physics technician, was an expert witness brought in by the Atomic Energy Commission to refute Dennis' claims to radiation induced injuries. Dennis is only one of thousands of individuals who are victims of the health effects of radiation exposure caused by radioactive releases from DOE facilities. **37-4 (cont'd)**

> **"Proposed Action**
> "The prototype microreactor is expected to be a small advanced gas reactor (AGR) using high-assay low enriched uranium (HALEU) tristructural isotropic (TRISO) fuel and air cooling. TRISO fuel is encapsulated and has been demonstrated in the laboratory to be able to withstand temperatures up to 1,800 degrees Celsius, allowing for an inherently safe prototype microreactor.
> "The Proposed Action includes construction of the prototype microreactor and demonstration activities. The demonstration activities may include testing of project materials, startup and transient testing and evaluation of the constructed prototype microreactor, transportation and operational testing of the prototype microreactor or its

5

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See responses on previous pages.

Commenter No. 37: Chuck Broscious

components within the boundaries of the selected site to test and evaluate prototype microreactor mobility, and post-irradiation testing of project materials. The EIS also will cover the planned disposition of the prototype microreactor following operation and demonstration.

"Additionally, there are expected to be ancillary activities necessary to support the Proposed Action. These include the fabrication of reactor fuel, the assembly of test/experimental modules at existing, modified, or newly constructed test/experiment assembly facilities, and the management of waste and spent nuclear fuel. After irradiation of the prototype microreactor, test/experimental cartridges would be transferred to post-irradiation examination facilities. SCO would make use of existing post-irradiation facilities to the extent possible, but existing post-irradiation examination facilities may require expansion or modification." [12]

37-4 *(cont'd)*

Based on Environmental Defense Institute 20-year observation of DOD/DOE terrible track record at INL, EDI can categorically say the US Army and DOE's record of mismanagement of INL nuclear projects has resulted in extensive radiation contamination to the Idaho region. Therefore, we are opposed to this prototype advanced mobile nuclear microreactor for reasons we layout above.

37-1 *(cont'd)*

Because of the existential threat of climate disaster, these DOD/DOE nuclear addicts have ignored, they must add to this EIS alternative renewable energy and offer a demonstration for these energy applications. These renewable energy sources will not – as our above discussion demonstrates – add to the extensive radiation contamination of Idaho's air and water.

37-2 *(cont'd)*

Respectfully submitted,

Chuck Broscious

President of the Board

Environmental Defense Institute

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[12] 12274 Federal Register / Vol. 85, No. 41 / Monday, March 2, 2020 / Notice of Intent to Prepare an Environmental Impact Statement for Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor

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See responses on previous pages.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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DRAFT ENVIRONMENTAL IMPACT STATE
MOBILE MICROREACTOR
PUBLIC HEARING
OCTOBER 20, 2021
SHOSHONE-BANNOCK EVENT CENTER
FORT HALL, IDAHO
3:00 p.m.

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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(The following public hearing was held as follows:)

MS. LOWE: Okay. Good afternoon, everyone. My name is Wendy Lowe. And I'd like to welcome you to this hybrid public hearing being hosted by the U.S Department of Defense.

The Department has completed the process of preparing an Environmental Impact Statement, or EIS, that analyzes the potential impacts of construction and demonstration of a Prototype Mobile Microreactor at Idaho National Laboratory.

In accordance with the National Environmental Policy Act, the Draft EIS also evaluates the impacts of a no-action alternative under which DOD would not construct and demonstrate the Prototype Mobile Microreactor at Idaho National Laboratory.

As we begin, I'd like to acknowledge that this hearing is being hosted in the Shoshone-Bannock Casino Hotel of Fort Hall Indian Reservation. The Shoshones and Bannocks entered into peace treaties in 1863 and 1868 known today as the Fort Bridger Treaty and the Fort Hall Reservation was reserved for the various tribes under the treaty agreement.

The Fort Hall Reservation is located in

Transcript of Proceedings 3 p.m.
October 20, 2021 2

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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the eastern Snake River Plain of southeastern Idaho. It's comprised of lands that lie north and west of the town of Pocatello. And the Snake River, Blackfoot River, and the American Falls Reservoir border the reservation on the north and northwest.

We are grateful to the Tribes for hosting us today. I would like to thank all of you in attendance for silencing your mobile phones and for wearing masks as we comply with the Shoshone-Bannock Tribal regulations for protecting everyone from potential exposures to the pandemic.

Those of us at the front of the room have gotten permission to not wear masks as long as we maintain social distancing protocols to make that you can hear us properly.

The goal of this public hearing is to provide you as members of the public with information about the analysis presented in the Draft EIS and an opportunity to comment on the Draft EIS.

Today is Wednesday October 20th, 2021 and the time is now 3:04 p.m., mountain time. This public hearing is one of two that are being held and the second one will be later today between 6:00 and 8:00 p.m. mountain.

We will begin with a presentation from

Transcript of Proceedings 3 p.m.
October 20, 2021 3

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Dr. Jeff Waksman who is the program manager with the Strategic Capabilities Office in the Office of the Secretary of Defense. Dr. Waksman will provide background information about the Prototype Mobile Microreactor and the National Environmental Policy Act Process. Then he'll review the findings presented in the Draft EIS.

Once Dr. Waksman's presentation has concluded, I will review the ground rules for this hearing and we will begin taking comments.

DR. WAKSMAN: Good afternoon, everybody. So I'm Jeff Waksman. I'm the Program Manager for Project Pele at the Strategic Capabilities Office, and the Office of the Secretary of Defense and we're hear to talk about the Draft EIS for Project Pele.

So Project Pele is a Prototype Mobile Nuclear Microreactor. It has come out of several years of increasing need for more energy for the Department of Defense, for more resilient energy and also clean energy to reduce the carbon footprint of the DOD.

It's a mobile nuclear reactor prototype, which is built around TRISO fuel. I'm going to explain TRISO fuel, TRI-structural ISOtropic fuel in a later slide. But we believe it's a key technology

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

that allows us to be much safer.

The reactor will produce one of five megawatts of electrical power for a minimum of three years and it's transportable by truck, rail, ship, or aircraft.

So we had a two-year design competition at the beginning of March of 2020. So final designs are due 2022. We may choose to go ahead and build the reactor, that would be based on how the NEPA process goes, and also budgetary decisions inside the Pentagon.

If we do build it, it could be turned on by 2024. And then the DOD would make a decision in 2025 about whether to go forward. I do want to emphasize here that the Pele Prototype is only for prototype testing. It will only be used domestically. This reactor will not be used overseas.

So as I mentioned, TRISO fuel. So TRISO has -- the contents of TRISO has been around for several decades, but we are leaning on AGR, Advanced Gas Reactor TRISO, which was started in 2002. So you can see the image there on the right of what looks like a cut away of the earth. The right in the middle is the uranium. It's then surrounded by a

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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green layer, which is a porous carbide material. It is then surrounded by blue, which is silk and carbide layer.

But these are very small. They're less than a milliliter in diameter. And so I actually have an example. When you load them into the reactor, you just don't load the pellets loosely. You have something like this, so you can see a picture of it on the right of the screen.

Here's one in my hand, and there's about 3400 TRISOs in here. It gives a perspective for how small they are. And then you simply load these into your reactor.

So the image on the bottom right is not exactly what the Pele core will look like. But it's a good stand in of it. You see that there's slots and you just put this in.

So it's a rugged resilient fuel. It was tested to 1800 degree celsius for 300 hours, which makes it incredibly resilient to meltdown. We are also not using highly enriched uranium. We're using a variant of Low-Enriched uranium known as High-ASSAY Low-Enriched uranium or HALEU.

It is also by being a very rugged and resilient fuel, it is also very resistant to

Transcript of Proceedings 3 p.m.
October 20, 2021 6

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

proliferation. Not just because it's not easy to use but also because there's no easy way to actually get to the uranium inside the pellets.

I do want to mention here that kinetic testing of TRISO stimulants will be part of Project Pele. It's certainly something that the Department of Defense wants to see and they want to understand that this thing would be safe even if it were struck by kinetic attack.

So this project would not be possible without a whole government collaboration. We need a lot of expertise and help to make this work. So we've laid out some of our key partners here. The Department of Energy and the Nuclear Regulatory Commission are both providing technical support. They are advising us in the design. They're advising us on safety.

And guidance to streamline both current regulatory processes but also future regulatory processes. We would like to make sure that this reactor can get approved to be turned on. But that also that it will be possible to have commercial spinoffs and things like that.

The actual safety oversight authorization for the reactor is being done by the

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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DOE. And that's why we're going to do it at a DOE site, so they will have the oversight there.

For the NEPA effort, what we're here to discuss today, the Army Corp of Engineers has the technical lead on that. In terms of the uranium that is coming from NNSA. They're giving us from their stockpile some highly enriched uranium that they have. We will down blend it to HALEU to -- as part of the manufacturing process to TRISO.

And the TRISO line has been a joint effort that we've done with NASA and DOE. And as mentioned before, this fuel was actually originally developed for commercial applications. The idea is to have effectively meltdown proof commercial fuel, so that's where the DOE's interest lies. And then NASA also has interest in this fuel for space reactors.

So we are here to talk about NEPA, which is the National Environmental Policy Act. Federal agencies are required to prepare detailed analyses and statements assessing the environmental impact of alternatives too. Any federal action that could go significantly impact the environment.

We have chosen to do the full Environmental Impact Statement for Project Pele. And

Transcript of Proceedings 3 p.m.
October 20, 2021 8

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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so as part of that we have to prepare detailed statements laying out the potential of environmental impacts of both of what we plan to do and any alternatives. And -- but we also want to solicit public input. This is important for us. We have certainly put in a lot of effort to receive input from local stakeholders, from the Tribal authorities, from local environmental groups, local government, et cetera.

But there could be something that we're overlooking, so it is very important for us to understand from the folks in the room and online, you know, if there's something that we might have missed. If there's a mistake that we might be making or some, you know, some better way that we can actually get this program or change what we're doing. So soliciting public input is very important and we do look forward to those comments.

So we are required as part of NEPA to hold a public hearing. And as mentioned already, we're holding two of those hearings today. So that allows me to present the background on the Draft EIS. It allows folks here to speak and be heard. If you want to come -- those who are here physically can come to the -- or register in the back and then come

Transcript of Proceedings 3 p.m.
October 20, 2021 9

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

to the front of the room and express a verbal comment.

Or if you're in the room, you can just give us a written comment, if you don't want to speak up, or you can call in the folks who are online, or you can submit e-mail, or you can send snail mail.

The public comment period is a 45-day comment period. It kicked off about a month ago and is ending on November 9th.

Based on this input, we will then make any changes that are necessary and address all the questions, and put that into a Final EIS, and then that will lead to an informed Record of Decision.

So the schedule, so the Notice of Intent to do this EIS was published in March of 2020. We held online scoping meetings two weeks later. They were held online only because it was just after the COVID pandemic started. So we couldn't do events in person.

The Draft EIS was released on September 15th of this year. The EPA Notice of Availability was published on the 24th. And as mentioned, the public comment period goes through November 9th. We are targeting a Final EIS in early 2022. And a Record of Decision in the spring.

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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So the main parts of the Draft EIS. So hopefully the folks who are participating have had a chance to read. We know that it's a long document so because of that we have a summary upfront, which gets through the main topic areas. So if you don't want to read all 300 plus pages, you can just read the summary. But if you do want, we have a whole main body that gets into quite a bit of detail.

We start with an introduction, and purpose, and need; where we talk about why this program is happening; what the need for it is; and what we're looking to achieve out of this prototype.

We describe the action alternatives. So what are the different things that we're considering; including the no-action alternative. And then we get into quite a bit of detail about the potential environmental impacts. And I'm going to talk in a future slide about what the includes. But it's very broad. It goes beyond just, you know, water and air safety, but into other things.

And what the potential environmental consequences are. And I want to emphasize here that we're looking at the environmental consequences not just a regular operation, but also an offset condition. So what are the worst things that can

Transcript of Proceedings 3 p.m.
October 20, 2021 11

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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happen if something was to go wrong.

And then in the back there is an appendices, and that includes the Notice of Intent that was published originally. We have a lot of resources to backup -- or provide more information. And we also lay out the Tribal consultation. As mentioned, we've been engaging quite a bit with the Shoshone-Bannock Tribes because we do think it is very important to understand their concerns because we know that the land at the INL have a lot importance to them culturally and historically.

So when I say environmental impacts, what does that mean? So that includes a lot of different things things that are laid out here. I will just read through them quickly. But that includes land use and anesthetics, geology and soils, water resources, air quality, biological resources, cultural and paleontological resources, infrastructure, noise pollution, waste and spent nuclear fuel management, human health, traffic, socioeconomics, and environmental justice. And I'm going to talk a little bit more about that later.

So the main part of the -- what we are describing that we may choose to do at the site. So we're going to be analyzing in parallel the

Transcript of Proceedings 3 p.m.
October 20, 2021 12

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

construction of the microreactor, and also the fabrication of TRISO fuel. Because the reactor will be built in one location. The TRISO fuel will be fabricated in another location. They would then both be transported separately to the INL site where they would be mated there.

I want to emphasize here that we're still considering two designs. So in the design competition, we originally started with three competitors. We've down selected to two. Those are BWX Technologies and X-energy.

I do want to emphasize that while the designs are not finalized, what we've analyzed here is what we've called an envelope design. So any possible final solution that BWXT or X-energy would produce is going to be covered in the environmental consequences that we analyze here.

So any material that they might have in those reactors, any kind of dangerous material is going to be described in this EIS, and any radiation or pollution will end up being less actually than what we've described here. We've described a worst case scenario of all the designs is what we've analyzed here because we want to make sure that anything that we do is covered by this EIS.

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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Anyway, so as I mentioned, they will transported separately to the INL site. At that point it will be fueled at the INL site and then we will also do a demonstration which will potentially include both indoor and outdoor demonstration, all on the INL site. It will not go out on to off-site.

At that point we would temporary storage to decide what we're doing next. For example, if the Army decides, or some other service decides that they would like to use this reactor, you know, we would deal with those at that time.

But it's also possible we'll just do final disposition of the reactor. So we've covered all of that in the EIS including, like I said, permanent system disposition. So the uranium will be covered from cradle to grave in this EIS. Oh, and that also includes possible examination of the fuel. There might be post-radiation examination.

So what we laid out here is what we were looking for in a site. And INL was chosen because it is the only site that we could find that actually had all the things that are listed here. So one of the things I want to emphasize is the independent electrical grid access.

So we need to study the ability of this

Transcript of Proceedings 3 p.m.
October 20, 2021 14

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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reactor to work on a grid, and handle grid disruptions. And -- but it has to be isolated from the commercial grid. This reactor is DOE authorized. It is not NRC licensed. And because of that it can't legally be connected to the grid, but also it just wouldn't be good for the grid to do these sorts of experiments. You want to be able to have an isolated electrical grid.

We also need the site to be under DOE control because the Department of Energy is going to have safety oversight. They have control of -- they have complete control of the location that we're at. It needs to have a site with sufficient support infrastructure for nuclear activities. There's just certain equipment and things you need to handle radioactive material.

It has to be a site that can handle that. It needs to be a site that has current reactor operational experience. So we will want leveraged experienced nuclear reactor operators. We need a lot of testing space. We need to have a big area that we can have in control that's not getting in the way of other people or things.

We need to be at an established control zone. We need to make sure that a member of the

Transcript of Proceedings 3 p.m.
October 20, 2021 15

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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public can't accidentally walk up to it. We need to make sure that where it is it's completely controlled. And we want to have adjacent PIE facilities. So this is the post-radiation examination. We might want to take some fuel out after it's been operated and do testing on it, just to see what's been done. And obviously INL has well established experience at doing PIE.

So this is a map of the INL. I imagine that a lot of folks watching are familiar. So the two main sites that we would be doing this work is at CITRC, the Critical Infrastructure and Test Range Complex. And the MFC, the Materials and Fuels Complex. And any upcoming slides, I'm going to talk about these two sites more and what we intend to do at those locations.

So what we've drawn out here is all the different proposed action activities that we're considering in this NEPA. We're going to go through them section by section. So you see what's circled in green there. And so that's the first part of this.

So this is as I described, we would -- we propose to build a reactor and fabricate the fuel. Those will be at different locations. They will then

Transcript of Proceedings 3 p.m.
October 20, 2021 16

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

be transported separately to the INL site.

At that point they would be fueled and -- or the fuel would be mated inside the reactor. And that would be done at one of two locations, so either TREAT or the HFEF high bay. It would then be transferred to a testing location for initial testing, and that would be either the MFC or CITRC.

So we'll get to the rest of that slide in a minute. So in terms of MFC, you can see here both the TREAT and the HFEF, and you can see that in the middle of those is the EBR II Dome.

So we proposed potentially doing the initial testing inside the EBR II Dome. It's the place where the old EBR II Reactor used to be. It is now being prepared to be a microreactor test site of which Pele could be the first one in there. The dome provides additional defense in depth; although it is not necessary for the reactor to be safe. Once we've demonstrated that it's safe inside the EBR II it would then go outside.

And this is just a zoom in on the EBR II Dome. And I would imagine that a lot of folks that are watching are familiar with it. But if not, you can see -- it's certainly a beautiful looking building. It's interesting to look at.

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

So next on the chart we've now circled in green the next round of activities. So after we do the initial testing of the reactor and demonstrate that it is safe and is working the way that we expect it to, we then need to transport it. So we will disassemble the reactor and transport it the same way we would under normal operations. And it will go to CITRC.

At CITRC there are three potential pads that we've identified as potentially being the locations for this outdoor testing. Pads B, C, or D. And so we'll now go to some pictures of that.

So what you can see here is on the upper right, you can see the MFC. This is where the -- like I said, the initial fueling would be and potentially the initial operation. It would then be transported on the Hall Road, which you can see is marked in with the red dashed line.

And it would go to CITRC. And you can see that the different CITRC pads have been drawn as little gray boxes there. It would not go off-site on to the public highways. So we've listed where the public highways are, but it will not be -- it would not be driving on them.

So this is a zoom in on the CITRC site

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Atkinson-Baker, a Veritext Company
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itself. As you can see in the upper right, a photo that shows the different pads, A, B, C, and D. And then we have a zoom in on one of the pads there. And what's drawn there is where the Conex boxes would go as well as the control perimeter. So hopefully you can see that and make that out.

There are preexisting concrete pads that are there. And so we would hopefully just be able to put the Conex box right on the preexisting concrete pad.

So we now get to the last part of this flow chart, which is what would happen after we're done with the testing. So it would be disassembled at the CITRC, and it would be transported to -- potentially some of the fuel would be used for PIE, or it could be transported for temporary storage, which would be at the RSWF or ORSA, and it would potentially then go into permanent disposition. That's one of the potential options that we're exploring.

So in terms of the locations for the temporary storage. Hold on one second. I'm going to check. Sorry, I'm trying to read through my notes here.

So there are multiple de-fueling

Transcript of Proceedings 3 p.m.
October 20, 2021 19

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

locations. So there are several at INTEC, which is the Idaho National Technical and Engineering Center, where similar things like that are performed. There's the radiated fuel storage facility. The fuel processing restoration facility. The remote analytical facility. Basically there are a lot of places where INL currently will store, temporarily store radioactive material.

I'm going to describe this a bit more over here. So as I mentioned, spent fuel would be removed from the reactor. When it's getting stored, it could be stored at INTEC or the RSWF. And as mentioned, there are various de-fueling locations that are being considered that are all described in the EIS.

Waste would be transported to existing waste management facilities. Disposition will be in existing waste management procedures or processes. So we're not trying to tread any new ground here. We would be using preexisting processes.

Spent fuel when it's removed from the reactor will be packaged in standard containers and/or casks and shipped to a storage location on the INL site awaiting shipment to interim storage facility or geological repository for final

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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disposition.

Any components that are selected for PIE would be removed and packaged separately to the INL hot cells where they would undergo both non-destructive or destructive examinations in order to collect the data that we need to support safety analysis any future technology, technological development activities.

So in terms of facility modifications. Our goal is to do as little modifying as possible. So as mentioned, at CITRC there are preexisting concrete pads. With that said, if those concrete pads are not sufficient, we may have to expand or thicken or add additional concrete pads there.

We would also erect additional radiation shielding. We would erect a security fence as mentioned to control the location. And we would potentially add a temporary mobile office trailer.

So the thing to emphasize here is that these are -- these shall be temporary activities. The goal is not to do any permanent construction. We're not building any new buildings here. We would like as much as possible to minimize any possible impacts on the environment.

And as mentioned, if it goes to a

Transcript of Proceedings 3 p.m.
October 20, 2021 21

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

temporary storage site, we would have to construct some small concrete pads for each of the modules. And potentially have to erect a shed to cover the modules. But, again, as much as possible we're trying to minimize any new construction. We understand that these are important lands both ecologically and culturally. And we do not want to create additional construction there.

So I just want to kind of do a high-level summary of the environmental consequences. So as mentioned, as I mentioned before, we're looking at both consequences for ordinary operation, but also consequences for offset conditions. We want to understand what is the worst that could happen if things go wrong.

So in terms of land use and aesthetics, there would be very minor impacts on land use. There could be localized and temporary visual impacts. There would be temporary storage. But like I mentioned before, we are trying to avoid any permanent change to the aesthetics of the land.

In terms of geology and soils, the area disturbed, potentially disturbed will be less than 2 acres. The total quantities of geologic and soil materials needed during construction would represent

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Atkinson-Baker, a Veritext Company
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only a small percentage of regionally plentiful resources, and should have no adverse impact on geology or soil resources.

In terms of water resources, we don't expect any of our activities to add to or change the constituents in the storm water discharge during construction. No effluent will be discharged directly to groundwater, and so the proposed action would not adversely affect groundwater quality.

In terms of air quality, none of the proposed actions would produce substantial air emissions. The combined annual emissions from all sources would be well below annual indicator thresholds.

For biological resources, we could potentially disturb up to 28 vegetative acres across Pads B, C, D, or CITRC. But we lay out what we believe the appropriate mitigation would be to ensure minimal disruption to biological resources.

From a cultural and paleontological resource, its perspective, we expect that this project would have no effect on significant cultural or paleontological resources from construction and land disturbance. And we have been consulting with the Tribal authorities should anything be discovered

Transcript of Proceedings 3 p.m.
October 20, 2021 23

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

to make sure that that they are coordinated with on that.

From an infrastructure perspective, the requirements for water, fuel, and electricity are very minor, and are well within the current INL site capabilities -- capacities.

From a noise perspective, the noise from operation will be consistent with other existing operations on the INL site. It would be similar to existing levels at the INL site, so there should be no additional loud noises.

From a waste management and spent nuclear fuel management perspective, there would be small amounts of waste and spent nuclear fuel that would be generated during the proposed action. All of this waste would be packaged on site and would be disposed of, or stored at approved INL site facilities or off-site.

From a human health perspective, the radiological impacts to the public from normal operations, or any accident, or any transportation of radioactive materials would be a very tiny fraction of the individual's annual natural background radiation dose. So there should be no radiological risk to the public in regular or off-site conditions.

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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From the perspective of traffic, we expect the impact to be minimal.

From a socioeconomic perspective, the increase in jobs and income from construction operations should have a small and short-term beneficial impact on the local and regional economy.

And from an environmental justice perspective, we believe that no disproportionately high and adverse impacts would be on minority or low income populations.

So just to reiterate what I said at the top. We have a number of different ways for you to provide your comments. We want to make sure that we can hear from everybody. We have done a very thorough study of the impacts, and if you've read the EIS I hope you've seen that. But it's always possible that we could have overlooked something.

And so we are eager to hear from the public on what they have to say. And so as mentioned, one of the ways that you can speak up is at this public hearing. So we're having two public hearings today.

And as mentioned before, if you're in the room, you can go to the back of the room and either register to come up to the mic and speak or

Transcript of Proceedings 3 p.m.
October 20, 2021 25

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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you could just leave a written comment in the back.

We have the -- on the screen, both the snail mail address and e-mail, which by all means send your comments in that way. You can go online to the Web site www.mobilereactoreis.com.

And as mentioned before, the public comment period, which has been open for about a month will close on November 9th.

So that's the end of my slides. So I want to say that, you know, I've very much enjoyed coming out to Idaho for this project and getting to hear from a lot of the local folks, the local stakeholders. And so I'm looking forward to hearing local comments.

As a reminder, please don't ask questions and expect me to answer them today. We're taking these for the record. We will provide written responses, but I will be staying to listen to any comments that people have.

We look forward to addressing all of this, and thank you for taking the time to listen to me today.

MS. LOWE: Thank you, Dr. Waksman. And that concludes the information presentation portion of this hearing.

Transcript of Proceedings 3 p.m.
October 20, 2021 26

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

As the moderator, it's my job to make sure that this hearing is conducted in a respectful manner and that as many people as possible have a fair opportunity to provide oral comments.

Dr. Jeff Waksman will also be serving as the Department of Defense's hearing officer today. And please understand that as the hearing officer he's here to listen and he will not be responding directly to your comments during this hearing.

Your comments will be given consideration during the preparation of the final Environmental Impact Statement and all comments will be given equal consideration regardless of whether they are submitted orally or in writing.

Oh, I missed a slide. Sorry about that. I'd like to emphasize -- oh, we're not there yet. There we go. I'd like to emphasize that providing oral comments during this hearing is only one of the ways that you can provide your comments during the public comment period, which will end on November 9th, 2021.

Written comments may be sent by U.S. mail or by e-mail to the addresses shown on this slide. They can also submitted via the project Web site at the url on the slide.

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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The final EIS and summary will be available online at the same url which is www.mobilemicroreactoreis.com.

If you're interested in providing oral comments this afternoon, you have to signup to do so first. If you're with us here in Fort Hall, you can register at the registration table, which is located just outside this room. You can also provide written comments here using forms, or if you've typed something up, or written something up there's receptacles for those in the back of the room.

If you're participating online and want to provide comments, you must call 1-888-788-0099 using a telephone. When prompted use 95436118970 as the meeting identification number. Reply yes when asked by the operator if you would like to provide comments. And the operator will then put you into the comment queue.

If you're participating via telephone, you will need to press pound -- or excuse me, star six on your phone to unmute your line when it's your turn to speak. You will be muted again when you conclude your remarks.

The comments you provide here in this hearing room and over the phone will be broadcast on

Transcript of Proceedings 3 p.m.
October 20, 2021 28

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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this Web cast and transcribed for the record. We'll be calling on people on a first come first serve basis.

We'll begin by calling on Tribal and elected officials first, and will call on people that are here in Fort Hall first, and then people who are commenting via telephone.

To allow sufficient time for everyone to speak, oral comments will be limited to three minutes per speaker. We recognize that three minutes is a brief amount of time and encourage you to provide more detailed comments in writing to ensure that all of your thoughts, concerns, and suggestions are fully captured in the record.

I'll be calling on people two or three at a time to give you heads up when your turn is coming up. If you're here in Fort Hall, we have two reserved seats at the front of room and you're welcome to come up and wait in those seats while you wait for your turn.

When it is your turn to speak, please come forward to one of the two standing microphones here at the front of the room. Those who provide their comments here in Fort Hall may remove your mask while you're making your comments.

Transcript of Proceedings 3 p.m.
October 20, 2021 29

This side left blank intentionally.

Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

If you're commenting via telephone, please mute the audio on your computer to avoid echoing. If you have a handset or a headset, please use that while speaking as it will provide the best audio quality. Speakerphones, we discovered yesterday, will make it hard for us to hear you. Your three minutes will begin at that point.

Regardless of where you're commenting from, please begin by stating your name and the name of any organization that you're representing in an official capacity during this hearing. Once every one who is interested in providing comments has had a first opportunity, a second three-minute time allotment will be allowed time permitting. We'll need you to register again if you want that second opportunity.

And we'll conclude this hearing at 5:00 p.m. mountain.

I will let you know when you have run out of time. If you're still speaking, I have cards to let you know. If you are still speaking when your three minutes are up, I'll ask you to conclude your remarks, and then I'll call on the next speaker to begin.

Please understand that if I do cut you

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

off, it's because it's my job to make sure that everyone who wants to speak during this hearing has a fair opportunity to do so. We will accommodate as many people as possible until 5:00 p.m. mountain. So this hearing will conclude at 5:00 p.m.

But remember that there will be a second hearing this evening between 6:00 and 8:00 p.m. mountain.

I'd like to introduce a few people who are up at the front of the room with us. Kimberly Swanson and Heather Fultz are serving as sign language interpreters during this hearing. And then Lani Lewis is our court reporter. Lani is responsible for preparing a completely and accurate transcript of this hearing.

I've asked each of these people to let me know if they're having trouble hearing or understanding our commenters, so if they are I may interrupt you to help them understand what you're trying to say.

One final request that I would make of you this afternoon, I know that some of you may have strong opinions about the proposal to build and demonstrate the Prototype Mobile Microreactor. The point of a public comment meeting is to give you an

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Comments and responses resume on page 3-172.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA01: Tami Thatcher

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opportunity to provide your thoughts to the Department of Defense about the Draft Environmental Impact Statement.

We hope that everyone present will treat all others with respect. We're grateful that you've taken time out of your busy schedules to participate in this hearing.

And with that, I will begin taking comments. So we have two people registered here in Fort Hall. Tammy Thatcher will be followed by Richard McPherson.

TAMMY THATCHER: Hi, I'm Tammy Thatcher. I'm a citizen of Idaho. That was a very carefully worded high-level description of the project which emphasized words like temporary storage. It's not temporary.

Yeah, some of the -- some of the waste will be buried at the INL or disposed of out of state, but the spent fuel will have indefinite storage. There is no spent fuel disposal facility. The Department of Energy has no spent fuel disposal program. That's why it can't even collect money anymore to the nuclear waste fund from electricity users who use nuclear power.

It has no disposal program for spent

TA01-1

Transcript of Proceedings 3 p.m.
October 20, 2021 32

TA01-1 The very small quantity of spent nuclear fuel (SNF) that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA01: Tami Thatcher

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nuclear fuel, so the temporary storage discussed is indefinite and permanent. And this proposal doesn't address the repackaging due to aging. It doesn't address the packaging dute (phonetic) that would be needed as a disposable container. It doesn't address the cost of those things.

In fact, the cost of obtaining a disposal facility is so obscene, the Department of Energy refuses to state what, how many trillions of dollars that would possibly be.

TA01-1 (cont'd)

MS. LOWE: Ms. Thatcher, just one second. I wanted to see if the sign language folks are having trouble understanding you with your back. Okay. Go ahead.

TAMMY THATCHER: So, I mean, the waste problem is one problem.

The document actually refers to the INL and the estimated radiation doses to the public from existing ongoing INL radiological releases. And those doses are usually less than a millirem per year.

And the Draft includes the dose you would get from a duck that had visited one of the facilities at the site. And says you'd get a fraction of a millirem if you ate water foul.

TA01-2

Transcript of Proceedings 3 p.m.
October 20, 2021 33

TA01-2 The EIS incorporated the maximally exposed individual estimates from the Annual Site Environmental Reports (ASERs) for the individual dose from existing operations. The parameters used to determine the dose from the consumption of waterfowl are identified in the ASERs and were not reproduced, nor modified for use, in this EIS. There are a limited number of ducks that make the Advanced Test Reactor waste pond their home, so the assumption that only one duck per year is consumed by the same individual is reasonable. Broth from duck bones is not a normal ingestion pathway, and handling of the feathers would not be expected to add significantly to the dose from ingesting the duck.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA01: Tami Thatcher

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What it doesn't say is you can only eat one duck, an 8-ounce portion of the meat. You cannot eat duck broth. You can't have bone broth because the americium and the other radionuclides that collect in the bones would give you a much higher dose than the dose they state in the document. So this is just one example of how they mislead you by not giving you the facts.

TA01-2 *(cont'd)*

They talk about the extensive radiological monitoring program that the Department of Energy has. And I've studied that program a bit. When the release -- when the releases from INL actually ramped up ten-fold in some cases starting in the year 2000, and the last 20 years were much higher than in the '90s.

When the releases ramped up, what the Department of Energy's environmental surveillance program did was it raised the bar for saying, acknowledging that a sample detection was a true detection. It raised the bar.

It also reduced its monitoring capability, where things could be detected at one pico curator per liter, they would raise it to three or to five pico curator per liter because they didn't want detections. These kinds of games are childish,

TA01-3

Transcript of Proceedings 3 p.m.
October 20, 2021 34

TA01-3 In EIS Section 3. 10, *Human Health – Normal Operations*, information is provided on the health effects of airborne emissions for the 6-year period from 2014 to 2019. This recent 6 years of data is more indicative of conditions associated with current operations at the INL Site. As described in EIS Section 4.10, *Human Health – Normal Operations*, DOE maintains compliance with regulations and directives applicable to radiological monitoring at the INL Site. Information about monitoring may be found in the ASER for each location via the following link: https://www.energy.gov/ehss/articles/aser-links. Information presented in the ASERs complies with DOE Order 231.1B, *Environment, Safety and Health Reporting*, and the INL Site Environmental Monitoring Plan is in compliance with DOE Order 458.1, *Radiation Protection of the Public and the Environment*. This EIS presents the most recent information available on the current environment at the INL Site.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA01: Tami Thatcher

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TA01-3 *(cont'd)*

but this is our health.

The thyroid cancer incident rate is mentioned in the Draft EIS. It doesn't point out that, yes, every county around the INL has doubled the thyroid cancer incidents rate from the rest of the state and the country. And I can provide the statistics. I have the statistics. And it's not just for one year, it's for over a decade.

TA01-4

And it is because the Department of Energy refuses to give you the thyroid absorbed dose. It gives you a whole body dose which does not reflect the cancer causing influence to the thyroid organ.

MS. LOWE: Ms. Thatcher, I need you to conclude your remarks, please.

TAMMY THATCHER: Okay. So, you know, the Department of Energy knows the thyroid organ absorbed dose is why we have the elevated rates of cancer incidents. And I will show anyone the data. You can find it online, just google my name, Tammy Thatcher and thyroid cancer incidents.

MS. LOWE: Thank you. Richard McPherson, please. It's your turn to speak.

RICHARD MCPHERSON: Thank you very much for holding this meeting. I've been involved in nuclear power since --

Transcript of Proceedings 3 p.m.
October 20, 2021 35

TA01-4 As noted by the commenter, there are elevated levels of thyroid cancer in the counties surrounding the INL Site. However, the overall cancer rate for the surrounding counties is generally lower than that for Idaho and for the United States in general. This EIS provides information on the cancer rates in the area of interest around the INL Site (EIS Section 3.10.3, *Regional Cancer Rates*). It is not the purpose of this EIS to establish a cause for any of these cancer rates. Cancer is caused by both external factors (e.g., tobacco, infectious organisms, chemicals, and radiation) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism). Risk factors for cancer include age, alcohol usage, exposure to cancer-causing substances, chronic inflammation, diet, hormones, immunosuppression, exposure to infectious agents, obesity, exposure to radiation, exposure to sunlight, and tobacco use. Therefore, determining the cause of any incidence of cancer can be very difficult, as there are many confounding factors.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA02: Richard McPherson

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MS. LOWE: Can you begin my stating your name for the record. Thank you.

RICHARD MCPHERSON: Sorry. Richard McPherson, GHRI, a resident of Idaho.

I have been involved in nuclear power since 1963. I spent 20 years in the Navy Nuclear Power Program. I first came to Idaho when it was the National Reactor Testing Station in 1964.

I came up here in 1975 to retire. I got a call from somebody at the INL. I've now been at the INL over 30 times since I came up here to retire. I also represented the United States for four years at the International Atomic Energy Agency.

I'm very familiar with radiation, radiation doses, and cancers associated with or claim to be associated with radiation from commercial nuclear power or the INL.

I thank you for holding this. I do got some questions. My questions are primarily: What is going to be the post-radiation level at the outside of one of these reactors after it's irradiated?

TA02-1

The other one is -- go ahead, oh, I thought you were going to say something.

MS. LOWE: Well, I just, a reminder that Dr. Waksman is not answering questions today.

Transcript of Proceedings 3 p.m.
October 20, 2021 36

TA02-1 While radiation levels outside the microreactor module during and after operational testing have been estimated, the post-irradiation level outside of the microreactor module is one of the parameters that would be investigated during the demonstration of the microreactor. For the safety of site personnel, the mobile microreactor would be located within a shielded enclosure during testing operations. Access would be strictly controlled to maintain worker doses as low as reasonably achievable (ALARA). Once testing has been completed and the microreactor shut down, radiation levels would be monitored, over time, to determine when the microreactor would be safe to disassemble (disconnect the microreactor module from the other modules) and configure for transport to the temporary storage location. This activity would also be performed adhering to ALARA principles to limit worker exposure. It is possible that the radiation levels outside of the microreactor module would be sufficiently high so that, to meet the requirements for transport, additional temporary shielding could be necessary. DOT regulations require that transportation packages containing radioactive materials have sufficient radiation shielding to limit the radiation dose rate to 10 millirem per hour at a distance of 6.6 feet from the transporter.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA02: Richard McPherson

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RICHARD MCPHERSON: Okay.

MS. LOWE: They will go into the record, though. Thank you.

RICHARD MCPHERSON: I will also submit some questions.

MS. LOWE: Okay. Thank you.

RICHARD MCPHERSON: The other thing is is you talk about -- you talk about waste. I don't know understand using the term waste because it's partially spent fuel. And I don't know why the term waste is even being used.

Partially spent fuel can be re-used again. We have 83,000 metric tons of it around the United States.

TA02-2

I'm glad to see this program. I wish we had a lot more. The INL is being held up from using what has been invested by the public out there since 1995, under the Vat (phonetic) Settlement Agreement. We need to do a lot more testing like this. That's what the INL stood up for in 1949. And I'm happy to see it.

TA02-3

MS. LOWE: Thank you, Mr. McPherson. I'm checking the back of the room to find out if we have any online presenters. Oh, we do. Okay. Thank you.

So we have one person. I understand

Transcript of Proceedings 3 p.m.
October 20, 2021 37

TA02-2 The very small quantity of spent nuclear fuel (SNF) that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

TA02-3 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA03: Gil Arouxex

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he's not made up his mind as he wants to speak. His name is Dillon Pravo. Mr. Pravo, are you interested in providing comments? A reminder that you need to push star six to unmute yourself. Maybe he has not decided to present.

So with that, we will take a recess -- oh, we have another. Sorry. Oh, oh, now, I have to pronounce a last name. Gil Arouxex will be our next speaker.

GIL AROUXEX: Thank you very much. That was actually a very good pronunciation of my last name. It usually gets extremely butchered.

MS. LOWE: So you need to say it yourself, though.

GIL AROUXEX: It's French. In French it's Arouxex.

MS. LOWE: Okay.

GIL AROUXEX: So first off, I want to thank everyone for coming as I think it's very important. Public hearings are very important to have pro and opposition and pro the project, so I really appreciate it.

This presentation was amazing. My name is Gil Arouxex. I am a representative of the Pacific Northwest Regional Council of Carpenters of Local

Transcript of Proceedings 3 p.m.
October 20, 2021 38

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Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA03: Gil Arouxex

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635. I am an Idaho resident as well as a financial secretary for my local.

I am commenting for the project. I believe that this would create many good union wages. It would provide a lot of workforce needs for the project. A lot of good union benefits with full family health care and pension and provide -- stimulate the local economy; not only for our carpenters and for our union members but as well as other building trades that are all going to be under the SSA, the Site Stabilization Agreement, that provides really good liveable wages for a lot of building trades.

TA03-1

So I am here to comment for the project. And I appreciate the public hearing. Thank you. And that is it.

TA03-2

MS. LOWE: Thank you, Mr. Arouxex.

So with that, I believe everyone who has registered to speak has had an opportunity to do so. We will recess, but all of -- everyone associated with the hearing will stay and if additional people register to speak, we will reconvene.

So thank you.

(Recess.)

MS. LOWE: We have another presenter or one

Transcript of Proceedings 3 p.m.
October 20, 2021 39

TA03-1 Thank you for your comment regarding the potential beneficial impacts of the proposed project on the local economy. INL is a major economic contributor to the southeastern Idaho economy, and the proposed project is expected to bring additional new jobs and good wages to the area as indicated in Section 4.14, *Socioeconomics*, of this EIS.

TA03-2 DoD acknowledges your support for the construction and demonstration of a prototype mobile microreactor. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA01: Tami Thatcher

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of our presenters is going to present for a second time. Tammy Thatcher, when you're ready you may begin. A reminder that you can take your mask off when you're up here.

TAMMY THATCHER: Tammy Thatcher, a citizen of the State of Idaho.

Again, the -- what is called temporary storage of the spent fuel is basically indefinite storage because there is no disposal facility. **TA01-5**

There probably is no way to reprocess this type of fuel either. **TA01-6** Here in Idaho, we have Three Mile Island Unit 2 debris in leaking casks, open gaskets that release Island 129 to the environment on a continuous basis.

Iodine 129 actually exceeds our Iodine 131 doses from the site. Unlike Iodine 131, which has an eight day half life. Iodine 129 has a 16 million year half life. So continually releasing that to the State of Idaho.

The Department of Energy actually listed it for over ten years as something it was monitoring. It had stated a minimum detectable concentration for Iodine 129. And for all those years, it never once presented results of such monitoring if it ever did such monitoring. **TA01-7**

Transcript of Proceedings 3 p.m.
October 20, 2021 40

TA01-5 The very small quantity of spent nuclear fuel (SNF) that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

TA01-6 Reprocessing the very small quantity of spent nuclear fuel generated is not in the scope of this document. The very small quantity of SNF that would be generated under the Proposed Action would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS. Please see the discussion in Section 2.4, *Radioactive Waste and Spent Nuclear Fuel Management, and Reactor Disposition*, of this CRD for additional information.

TA01-7 Environmental monitoring is performed at all DOE sites, including INL. The monitoring programs record and document the impacts of activities at the site. Information about monitoring may be found in the Annual Site Environmental Reports (ASERs) for each location via the following link: https://www.energy.gov/ehss/articles/aser-links. Information presented in the ASERs complies with DOE Order 231.1B, *Environment, Safety and Health Reporting*, and the INL Site Environmental Monitoring Plan is in compliance with DOE Order 458.1, *Radiation Protection of the Public and the Environment*. This EIS presents the most recent information available on the current environment at the INL Site. The concerns expressed by the commenter regarding the current monitoring program at the INL Site, and specifically the monitoring of the Three-Mile Island (TMI)-2 fuel storage casks (since the storage of TMI-2 fuel is an NRC-licensed activity, air monitoring reports are regularly submitted to the NRC), are not within the scope of this EIS.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA01: Tami Thatcher

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It dominates the iodines, the 131, and the 129 dominate the thyroid dose. The americium 241 that the INL releases is also a very significant thyroid cancer incidents dose contributor.

So, again, the absorbed dose to the thyroid organ is not stated when you see the whole body millirem dose, which is a millirem dose targeted to only the end point of fatal cancer; not shortened lifespan; not infertility; not infant mortality; not birth defects.

It is targeted -- it actually waters down the doses on the basis of the belief how much a particular tissue or organ contributes to cancer fatalities.

So it's very misleading. The Department of Energy knows better. It should be providing absorbed doses to the thyroid, not just whole body rem doses, which simply are not roentgen equivalent man. They are actually doses weighted on the belief of the cancer death causing potential to certain organs.

TA01-8

So the monitoring program the Department of Energy conducts for the Idaho National Laboratory ongoing radiological releases is biased to tamp down any detections.

TA01-9

Transcript of Proceedings 3 p.m.
October 20, 2021 41

TA01-8 The latent cancer fatality estimates presented in this EIS use the dose conversion factor of 0.0006. This factor conservatively estimates latent cancer fatalities from the range of cancers that can be caused by radiation. Therefore, radioactive iodine's relationship to thyroid cancer is incorporated into this conversion factor. Presenting individual organ doses would not provide any additional useful information that could be used in differentiating between alternatives. Potential cancer fatalities summed by individual organ (cancer type) would be less than the total latent cancer fatality numbers presented in this EIS. The commenter's statement that this EIS presentation of dose "waters down" the doses (and presumably the consequences of those doses) is incorrect. It is well known that different organs respond differently to radiation, a point the commenter has made. The use of effective dose is an accurate and accepted means (by organizations including the International Commission on Radiological Protection and the National Research Council and National Academy of Sciences) to quantify radiological health impacts. This EIS (as is common practice in EISs) uses population and maximally exposed individual dose and latent cancer fatality as the measure of health impacts on the public. DOE recognizes that these are not the only potential impacts from radiation exposure. Cancer incidence is also an impact, and the morbidity rate is higher than the mortality rate. With regard to radiation exposure to a developing child in utero, the Centers for Disease Control and Prevention (CDC) (2011) states a dose that is equivalent to 500 chest x-rays, the equivalent of 5 rem (the dose from a single chest x-ray is about 10 millirem), would increase the lifetime risk of cancer for that child by about 2 percent (CDC 2011, Radiation and Pregnancy: A Fact Sheet for the Public). The CDC does not identify any non-cancer health effects from doses of less than 10 radians to the embryo or fetus. Doses to members of the public from prototype mobile microreactor demonstration activities at the INL Site are well below these doses and are not expected to result in any fatalities or health effects. Consistent use of the cancer mortality rates allows for an assessment of the impacts. See the response to Comment 24-10 for a discussion of the relationship between americium and thyroid cancer. The cancers identified as most prevalent due to exposure to americium are associated with bone tissue, the lungs, and liver; americium is not a significant thyroid cancer source.

TA01-9 The DOE monitoring program is not designed to "tamp down any detections." Information about monitoring may be found in the ASER for each location via the following link: https://www.energy.gov/ehss/articles/aser-links. Information presented in the ASERs complies with DOE Order 231.1B, *Environment, Safety and Health Reporting*, and the INL Site Environmental Monitoring Plan is in compliance with DOE Order 458.1, *Radiation Protection of the Public and the Environment*. This EIS presents the most recent information available on the current environment at the INL Site. The overall cancer rate for the surrounding counties is lower than that for Idaho and for the United States in general. It is not the purpose of this EIS to

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

Commenter No. TA01: Tami Thatcher

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It actually can be seen if you look at the reports. That -- that Web site server hasn't been functional for several weeks, but those reports are important. Our health kind of depends on them. Those reports actually explain why we do have the elevated cancer rates around the INL that we have. And we've had them for a long time.

MS. LOWE: Ms. Thatcher, the second allotment of time has been concluded. Thank you. No, you're out of time. Thank you.

So we will recess again until such time as someone else identifies themselves interested in speaking. Thank you.

(Recess.)

MS. LOWE: Okay. On behalf of the U.S. Department of Defense, I want to thank you very much for your time and attention. Let the record reflect that it is now 5:00 p.m. mountain. All registered speakers have been called upon to speak.

This final slide shows the way that you can comment after this hearing, and I would like to remind you that all comments, regardless of how they're submitted will be given the same level of consideration.

We will now adjourn this hearing, and

Transcript of Proceedings 3 p.m.
October 20, 2021 42

TA01-9 (cont'd)

TA01-9 (cont'd)

establish a cause for any of these cancer rates. Cancer is caused by both external factors (e.g., tobacco, infectious organisms, chemicals, and radiation) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism). Risk factors for cancer include age, alcohol, cancer-causing substances, chronic inflammation, diet, hormones, immunosuppression, infectious agents, obesity, radiation, sunlight, and tobacco use. Therefore, determining the cause of any incidence of cancer can be very difficult, as there are many confounding factors. Potential impacts from the operation of the mobile microreactor are presented in EIS Chapter 4, *Environmental Consequences*; impacts on human health are presented in EIS Section 4.10, *Human Health – Normal Operations*. As stated in this EIS, no additional cancer fatalities would be expected among the general population.

Comments from the Public Hearing 3:00 – 5:00 p.m. (October 20, 2021)

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thank you so much for participating. We will have a second hearing between 6:00 and 8:00 p.m. tonight.

(The public hearing concluded at 5:00 p.m.)

Transcript of Proceedings 3 p.m.
October 20, 2021 43

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Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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DRAFT ENVIRONMENTAL IMPACT STATE
MOBILE MICROREACTOR
PUBLIC HEARING
OCTOBER 20, 2021
SHOSHONE-BANNOCK EVENT CENTER
FORT HALL, IDAHO
6:00 p.m.

Transcript of Proceedings 6 p.m.
October 20, 2021 1

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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(The following public hearing was held as follows:)

MS. LOWE: Good evening, everyone. My name is Wendy Lowe and I'd like to welcome you to this hybrid public hearing hosted by the U.S. Department of Defense.

DOD is hosting this hearing as both an in-person hearing for people who are here in Fort Hall, Idaho and live streamed online -- excuse me. Line for -- excuse me.

DOD is hosting this hearing as both an in-person hearing for people who are here in Fort Hall, Idaho, and live streamed online for others who are not able to participate in person. Thank you so much for joining us this evening.

The Department has completed the process of preparing an Environmental Impact Statement, or EIS, that analyzes the potential impacts of construction and demonstration of a Prototype Mobile Microreactor at the Idaho National Laboratory.

In accordance with the National Environmental Policy Act, the Draft EIS also evaluates the impacts of a no-action alternative under which DOD would not construct and demonstrate the Prototype Mobile Microreactor at Idaho National Laboratory.

Transcript of Proceedings 6 p.m.
October 20, 2021 2

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

As we begin, I'd like to acknowledge that his hearing is being hosted in a Shoshone-Bannock Casino Hotel on Fort Hall Indian Reservation. The Shoshones and Bannocks entered into peace treaties in 1863 and 1868 known today as the Fort Bridger Treaty. The Fort Hall Reservation was reserved for the various tribes under the treaty.

The Fort Hall Reservation is located in eastern -- in the eastern Snake River Plain of southwest -- of southeastern Idaho. Sorry about that. And it's comprised of lands that lie north and west of the town of Pocatello. The Snake River, Lake River, Blackfoot River, and the American Falls Reservoir border the reservation on the north and northwest.

We're grateful to the Tribes for hosting us this evening. I'd like to thank all of you in attendance for silencing your mobile phones and for wearing masks as we comply with the Shoshone-Bannock Tribal regulations for protecting everyone from potential exposures to the pandemic.

We have gotten permission for those of us at the front of the room to not wear masks as long as we maintain social distancing protocols to help make sure that you can hear us properly.

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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The goal of this public hearing is to provide you as members of the public with information about the analysis presented in the Draft EIS and an opportunity to comment on the Draft EIS.

Today is Wednesday, October 20th, 2021 and the time is now 6:05 p.m. mountain. This public hearing is one of two that are being held. The first one was held earlier today between 3:00 and 5:00 p.m. mountain.

We will begin with the presentation by Dr. Jeff Waksman, who is the Program Manager of the Strategic Capabilities Office in the Office of the Secretary of Defense. Dr. Waksman will provide background information about the Prototype Mobile Microreactor and the National Environmental Policy Act process. And then he'll review the findings presented in the Draft EIS.

Once Dr. Waksman's presentation has concluded, I will review the ground rules for this hearing and we will begin taking comments.

DR. WAKSMAN: Thank you. So there we go. So as mentioned, I'm Jeff Waksman. I'm the Program Manager for Project Pele at the Strategic Capabilities Office, you know, the Secretary of Defense. And we're here to talk about the Draft EIS

Transcript of Proceedings 6 p.m.
October 20, 2021 4

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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for Prototype Mobile Microreactor.

So as a bottom upfront slide of -- Project Pele is a Prototype Mobile Nuclear Reactor. This came out of several years of analysis going back to 2016. The Defense Science Board report earlier stating that energy is increasingly a problem for the DOD.

Energy resilience is needed increasingly. It is becoming increasingly difficult to get energy where it needs to be for what the Department of Defense to do. There is also a need for clean energy to reduce the carbon emissions of the Department of Defense.

So to that end, Project Pele was initiated as a design and potential construction of a mobile nuclear reactor that will produce one to five megawatts electrical power for a minimum of three years, a full power operation. It needs to be transportable by truck, rail, ship, or plane.

The program started with the design competition in March of 2020. It's a two-year design competition. So final designs are due this coming March.

If we do choose to go ahead and build the reactor, that construction could begin as early

Transcript of Proceedings 6 p.m.
October 20, 2021 5

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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as 2022. And if it does, then reactor power testing could start in 2024, which would allow the Department of Defense to make a decision in 2025 about whether to purchase more and acts to deploy these systems.

And I want to emphasize that the EIS that we're discussing is only in regards to Project Pele. And Project Pele is just a prototype that will be used only domestically. This reactor will not be deployed overseas.

So the reactor is built around TRISO fuel, so TRISO's concept has been around for several decades; however, the variant that we're using is advanced gas reactor, a variant of TRISO which was initiated in 2002 by the Department of Energy.

You can see an image of TRISO in the upper right of the slide where it looks like it cut away of the earth. The red at the center is the uranium. It's then surrounded by a green porous carbide layer, and then around that is a blue silk carbide layer.

The silk and carbide layer keeps this very strong and resilient to high temperature and pressure. It's been tested to 1800 degrees celsius for over 300 hours with very few breaking. And was designed originally with the purpose of creating a

Transcript of Proceedings 6 p.m.
October 20, 2021 6

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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effectively meltdown proof commercial reactor with the hope that that would drive down costs.

The fuel has two other benefits for the Department of Defense. One is that it is rugged and resilient, which will help protect the system in case of a kinetic strike.

It will help reduce -- significantly reduce the amount of radiation released. It is also very resistant to proliferation. Getting the uranium out of these pellets is very difficult.

We are also planning to use non-highly enriched uranium, so we will use a variant of Low-Enriched uranium known as High-Assay Low-Enriched uranium or HALEU. These pellets are very small. They're less than a millimeter in size.

So I have here an example of what is drawn in the picture on the -- on the right side there. These little cylinders. It's 12 milliliters by 25 milliliters inside which is about 3400 TRISOs. So within the reactor, you would probably have millions of them, millions of TRISOs in total.

And then what you do is you load these cylinders into the reactor core. So that imagery on the bottom right is not exactly what the Pele reactor core will look like, but it's a good example of

Transcript of Proceedings 6 p.m.
October 20, 2021 7

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

something close to it.

And I want to emphasize that some kinetic impact testing of TRISO stimulants will be a part of Project Pele because certainly that will be something that the Department of Defense will be interested to see the results of.

Project Pele is a whole of government approach. Interagency collaboration is crucial to our success. So the Department of Energy and Nuclear Regulator Commission are collaborating with us to provide technical support, advice on the designs, and safety to help us and help our vendors to come up with the best and safest designs possible.

And also guide us to streamline both the current of licensing process, but also any future licensing processes that might be coming down the road including NRC licensing.

The Department of Energy, the DOE, is providing reactor safety oversight and authorization for the reactor. That's why we want to do it at a DOE site. In regards to NEPA, which we're discussing today, the Army Corps of Engineers is serving as the technical lead on the EIS Draft effort.

The uranium that we're going to use is coming from the NNSA. It is from their high-enriched

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

uranium stockpiles. When we get it, we will down led it to HALEU as part of the TRISO manufacturing process.

And in regards to the TRISO line itself, it's a joint effort between NASA and DOE and us. DOE has interest in TRISO, obviously, for its commercial purposes. And NASA has interest in it for potential space reactors in the future.

So the National Environmental Policy Act is what we're doing here today. NEPA requires federal agencies to prepare detailed statements assessing the environmental impact of any actions and action alternatives for any federal action that might significantly affect the environment.

You can do an Environmental Impact Statement or an Environmental Assessment. We are doing an Environmental Impact Statement in this case, which is more thorough.

As part of that, in addition to providing the detailed statement assessing the Environmental Impact, it is important to us to solicit public input, and so that is what we're doing here today as well as the other formats. And later on, there will be a slide where we lay out all the different ways that we're seeking input from the

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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public to make sure that there's nothing that we've missed, or any questions that we need to answer in order to help senior leaders better evaluate whether to go ahead with Project Pele or in what manner.

So in terms of public outreach. So the purpose of the public hearing is to allow someone like me to provide an overview of the Draft EIS, provide some background information. It allows the public to also speak up in person. If you'd like to speak, you can come to the microphone, or you can call in if you're watching online and express your comments there, or there's plenty of written formats. Again, we'll describe that later for you to provide your comments.

As mentioned earlier, we're holding two public hearings. One was earlier today, and this is the second one. And both of these live streams will be recorded and put on the Web site.

And as mentioned, the public input is helpful to us. It allows us to understand any environmental, or cultural, or other issues that we might have overlooked. As mentioned, there's a -- this is a 45-day comment period. We're about a month into it. And that 45-day comment period ends on November 9th. And again, we'll lay out all the

Transcript of Proceedings 6 p.m.
October 20, 2021 10

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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different ways that you can comment between now and November 9th.

So in terms of the schedule, we published our initial Notice of Intent to the federal register on March 2nd, 2020. We held the online scoping meeting on March 18th. We held that one online only because that was right after the COVID pandemic started, and it was impossible to hold public events at that time.

The Draft EIS was released on September 15th. The EPA Notice of Availability was published on the 24th. And those were the activities that kicked off the public comment period, which as I mentioned goes through November 9th.

Based on those comments, we will put them into a final EIS, which will be released in early 2022, which we then intend to lead to a Record of Decision in the spring.

So in regards to the -- what is in the Draft EIS? So hopefully you've had a chance to read some of it online. Up front is just a summary. We know that this is a document that is over 300 pages long, and not everybody is going to want to read the entire thing.

So we have a summary up front that lays

Transcript of Proceedings 6 p.m.
October 20, 2021 11

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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out at a high level all the main topic areas discussed in more detail in the main body. In the main body we obviously go into a lot more detail. It starts with the introduction and purpose and need. We describe why Project Pele was created. What the potential benefits are of nuclear reactors to the Department of Defense. And we describe the action alternatives. What we're considering in addition to the no-action alternative, which is also broken down.

We talk about the environment that may or may not be affected. And what we believe the impact will be, any environmental consequences. And to be clear: We're covering both the environmental consequences of regular normal activity and also offset conditions. So what are the worst things that could happen if something went wrong?

And in the back in the appendices we have the Notice of Intent and as well as the environmental resources. And we also describe our consultation with the Tribes. We have had extensive communication with the Shoshone-Bannock Tribal leadership. We know that the lands at the INL are important to them for both environmental, and cultural, and historical reasons.

And so it's important to us that they be

Transcript of Proceedings 6 p.m.
October 20, 2021 12

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

a close part of the process and so we make sure that we're not doing it in a place that they have a problem, or that we're doing anything that they have a problem with.

So in terms of what do we mean by environmental impacts. I've just laid them all out here. I'll just read them very quickly with the -- and I'll get into more detail in a later slide.

But overall by environmental impact we refer to land use and aesthetics, geology and soils, water resources, air quality, biological resources, cultural, and paleontological resources, infrastructure, noise, waste, and spent nuclear fuel management, human health, traffic, socioeconomics, and environmental justice. And as I said in a later slide, I'll go into each of these in a little bit more detail.

So the terms of the proposed action and preferred alternative. So I want to be clear that there are still two designs that we're considering. One is the BWX Technologies, Advanced Technologies Reactor. The other is X-energy.

And I want to be clear that what we studied in this EIS is an enveloped reactor that covers all possible final solutions that either BWXT

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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or X-energy will come up with. The radiation levels that we describe in the EIS are higher than what we will actually have in the final design, and any material that might be in one of these two designs is described in the EIS. So nothing that we do with these designs will be out of the scope of the EIS.

Now, this reactor will be built at one location and the TRISO fuel will be fabricated somewhere else. And so the reactor and the TRISO fuel will both be separately transported to the INL.

At the INL, the reactor will be fueled. The uranium will be put in the reactor. And we would do demonstration of a Microreactor there. After that it will be put in temporary storage to determine what we might want to do with it next, which might be permanent disposition of the system.

We also might potentially take some of the used fuel out of the core to do post-radiation examination of the fuel.

So in terms of what were we looking for in a site. So we laid out these characteristics as what we felt was necessary for us to have. One was independent electrical grid access. And the reason for that is we need to see how the reactor handles changes in the electrical grid, changes in load. It

Transcript of Proceedings 6 p.m.
October 20, 2021 14

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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needs to be able to test significant changes in currents.

And so you need a microgrid to do that. And you don't want to have that microgrid connected to the commercial grid both (a) for practical reasons. You don't want to potentially mess with the commercial grid, but also for legal reasons because this is not an energy licensed reactor. It cannot mingle its electrons with the commercial electrical grid.

The site also needs to be subject to DOE control. So since DOE is providing oversight, they need to have control of the location. The site needs to have sufficient support infrastructure for nuclear activities. There's just a lot of infrastructure and equipment that's necessary to do radioactive work, and so it needs to be a site that can do that.

It needs to be a site that has current nuclear reactor operational experience. We are going to want to lean on experienced reactor operators for this initial testing and to train future operators.

We need sufficient testing space. We need a large space for both the operation and the transportation. We need to make sure that, you know, we can the keep public far away. And we also need an

Transcript of Proceedings 6 p.m.
October 20, 2021 15

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Atkinson-Baker, a Veritext Company
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established control zone, by which I mean that we need to make sure that members of the public can't walk up. We need to be on a control of who gets near the reactor and have the appropriate security and emergency response available.

And we also need adjacent PIE facilities. So, you know, we're going to potentially want to pull some material out of the reactor when it's radioactive to do a post-radiation examination. And so it needs to be a site that has adjacent PIE facilities.

So the locations that we're looking at at the INL are CITRC the Critical Infrastructure Test Range Complex, and MFC, the Materials and Fuels Complex. And so these two sites combined have all of the things that we are looking for. So the MFC has site for fueling, and potential initial startup locations.

The CITRC has outdoor testing locations that are remote and controlled. We have locations for temporary storage on-site. We certainly have PIE facilities on site. And the INL at CITRC has an isolated electrical grid that will allow us to do the work that I described on the previous slide.

So we have a slide here that breaks down

Transcript of Proceedings 6 p.m.
October 20, 2021 16

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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all the proposed action activities. And we're going to take this piece by piece. So first I'm going to describe what's circled in green here, which are the initial activities. So as described, we start with the design fabrication of the reactor and the fabrication of the fuel.

They are shipped separately to the INL site, where the fueling would happen at either TREAT or the HFEF High Bay. And then it would be transferred to the initial startup site which would either be the EBR II Dome or CITRC.

So you can see here a map of the locations at the MFC that we're looking at for these initial activities. You can see the TREAT at HFEF are marked in yellow. Those are potential sites for initial fueling. In-between them, you can the EBR II Dome, which is being considered for the initial operations of the reactor.

The EBR II Dome was where the EBR II reactor used to be. It is now empty. The DOE is preparing it to be a microreactor test bed for microreactors to go through their initial testing. And the Pele reactor may be the first microreactor to use the EBR II Dome for that purpose.

On the next slide, we have a zoom in on

Transcript of Proceedings 6 p.m.
October 20, 2021 17

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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the EBR II Dome. And just to kind of emphasize what we're going to do during the initial start up testing, potentially in this location, it's just to confirm that all the basic structure system and components are working as we expect them to do; that we're meeting the design criteria as set up; validate reactor neutronics and thermite hydraulic models of the core. Just verify that everything is meeting the design requirements.

And to emphasize, the EBR II Dome is not required for safety. Obviously we can do this outdoors, but the EBR II Dome provides defense and depth, so it provides just an extra layer of safety.

So the next part of this flow chart is now what's circled in green which is what comes up next. And so after the initial testing, it will then be disassembled and transported to test transportation of the reactor, where it will either be just moved around CITRC or it will be moved from MFC to CITRC depending on which option we choose.

It will then go to CITRC where we've chosen Pads B, C, or D. One of those three pads would be the location that we would choose and we would do the outdoor testing, full power testing there.

Transcript of Proceedings 6 p.m.
October 20, 2021 18

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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So what we're showing here is how the reactor -- if we do the initial testing at -- in the MFC in the EBR II Dome, how we would get the reactor to the CITRC. So the design is being -- was set to contain sufficient shielding to protect co-located workers and public from exceeding the limits in 10 CFR 20 following ALARA principle.

We would most likely transport it via the Hall Road, which is a private road. It's marked in a red dashed line there. I do want to mention that it is possible that we could transport it by Highway 20, which is marked in the kind of like the aqua test color there.

But I want to mention, if we did transport it on Highway 20, that the road would be closed to the public. So the reactor will not be on a public road with the public driving nearby for these testing.

And I should note that U.S. 20 does occasionally get shut down for stuff like this. It would be done during the hours of midnight to 4:00 a.m., so it would not seriously impacting traffic or the public.

So the CITRC site where we would be doing outdoors testing. So in the upper right there

Transcript of Proceedings 6 p.m.
October 20, 2021 19

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Atkinson-Baker, a Veritext Company
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you can see an overhead shot of CITRC. You can see Pads A, B, C, and D marked out. You can then see in the rest of this image, it's a zoom in on one of those pads.

And if you can see in the imagery, we've marked where the boxes of the reactor would go as well as the fencing that would be set up to keep the public out.

Other pads of CITRC would be used for load banks and potentially a diesel generator to create a realistic microgrid. And so at this location we would be testing the reactor at full power. We would be testing the different systems under different scenarios. Test load following. Testing its ability to sync with other power generating sources. And, you know, just the full spectrum of testing the reactor will be done at this site.

So the last part of the flow chart is what happens after dome testing. And so that will include disassembly and transport to temporary storage. At that point, it might stay in temporary storage for a while. We might want to take it out and do something else with it, or we might do permanent disposition. And the EIS will break that

Transcript of Proceedings 6 p.m.
October 20, 2021 20

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

down, both the temporary sites and how permanent disposition would work.

So after the test at CITRC are complete, the system would be packaged and shipped to a temporary storage. We may choose to take select reactor components and do post-radiation examination on them.

And the -- two potential storage locations are identified in this imagery. The RSWF and the ORSA at MFC.

So in terms of various locations that are being explored for decontamination disposition at the end of life. So there's various de-fueling locations that we are considering. There are several at INTEC, the Idaho National Technical Engineering Center where other similar activities are performed.

And we've listed a few of the potential locations that are there. There are additional facilities at MFC that have been used for these purposes before. Again, these are laid out in more detail in the EIS.

Any waste would be transported to existing waste management facilities, and disposition the existing waste management processes and procedures. We're not going to be doing anything

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

knew here that isn't regularly done at the INL.

Spent fuel will be recovered from the reactor and packaged in standard containers or casks and shipped to a storage location at the INL site, INTEC, or RSWF awaiting shipment to an interim storage facility or to a geological repository for a final disposition if such exists at that time.

Any reactor components and fuel selected for PIE would be removed during this process and will be separately packaged and sent to the INL hot cell facilities where they can undergo either nondestructive or destructive examinations to collect any performance data to help with the safety approval or any future technology development and activities.

Whoops, sorry about that. I got a couple slides behind on the clicker. Anyway so one of the things we want to emphasize is facility modifications. So one of our goals is to minimize the amount of modifying of INL that we're doing. We want to avoid any permanent buildings or structures as much as possible.

So as mentioned at CITRC there are existing concrete pads. And ideally we would be able to just put the reactor on those concrete pads and that is potentially what will happen. However, it's

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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a possibility that it will be determined that the concrete pad can't quite hold the weight, in which case we might have to construct a new concrete pad or expand existing concrete pad.

We will also erect a radiation shielding and security fence. We will potentially add a temporary mobile office trailer, possibly other test equipment that will be necessary there. But those are all as I mentioned temporary.

So when we're done doing the testing those shall be removed, and the goal is to minimize as much as possible any permanent environmental impacts there. Any kind of permanent structures, we want to avoid doing any of that. We know that this is sensitive land. And we want to avoid anything that's going to stay for a while.

In terms of the temporary storage site, at any of those locations, we may have to construct concrete pads for the modules. We might have to potentially erect a shed to cover the modules, but again we're going to try to do as minimal as we can.

So -- whoops. I double clicked. So in term of the environmental consequences. So these are all the same environmental consequences I listed earlier. I just want to just describe in a just

Transcript of Proceedings 6 p.m.
October 20, 2021 23

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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little bit of detail what we've concluded on each of these.

So in terms of land use aesthetics, there would be some minor impacts on land from the temporary structures that may have to be placed there. So it is possible there will be some localized temporary visual impacts to result from that. But as I said, we're trying as much as possible to minimize that; particularly in the long term.

For geology and soils, the area disturbed will be less than 2 acres. The total quantities of geologic and soils materials needed during construction would represent a small percentage of regionally plentiful materials and are unlikely to adversely impact geology and soil resources.

In terms of water resources, we do not expect to add or change the constituents in the storm water discharge during construction. No effluent will be discharged directly to groundwater. And so we would not in any way adversely affect groundwater quality.

In terms of air quality, none of the proposed operations would produce substantial air

Transcript of Proceedings 6 p.m.
October 20, 2021 24

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

emissions. The combined annual emissions from all sources would be well below annual indicator thresholds.

In terms of biological resources, we could disturb up to 28 vegetative acres across the CITRC pads. So we have -- we will work to do the appropriate mitigations to try to minimize that, and that's laid out in more detail in the EIS.

From a cultural and paleontological resource perspective, we do not expect to have any significant cultural or paleontological impact from construction or land disturbances. And we are coordinating with the Shoshone-Bannock Tribes to ensure that should a cultural object turn up during any of these activities that they would be consulted and we would make sure that we were consistent with their wishes.

In terms of infrastructure, the requirements for water, fuel, and electricity are minor and well within current INL site capacities.

From a noise and vibration perspective, the noise would be consistent with other existing operations on the site and so should have no significant impact on the noise levels at the INL site.

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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From waste management and spent nuclear fuel management perspective, there will be some small generation of waste of spent nuclear fuel. All of it will be packaged on site and will be disposed of. Either stored at approved INL site facilities or disposed of off-site.

From a human health perspective, the radiologic impacts to the public from normal operations, or an accident, or transportation will be a small fraction of their annual and natural background radiation.

In terms of traffic, we would expect the impacts to be minimal in that respect.

In terms of socioeconomics, we estimate that there would be an increase in jobs and income from construction operations that should have a small short-term benefit impact on the local and regional economy.

And from an environmental justice perspective, no disproportionately high and adverse impacts on minority or low income populations.

So there are many ways to give your comments. So as mentioned, we do seek these comments out. We're not just doing this because we have to, but we do want to hear from the public. We've been

Transcript of Proceedings 6 p.m.
October 20, 2021 26

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

trying as much as we can to engage with local stakeholders.

And we want to hear if there's anything that we might have overlooked. Anything that we should keep in mind as we make decisions on how to proceed with Project Pele.

So as mentioned, the 45-day comment period started about a month ago. It closes on November 9th. As part of that, we are doing these public hearings. We had one earlier today. And we're this one. And anyone in the room is welcome to either register in the back and come and speak publically at the microphone, or you can just leave a written comment in the back.

Anyone who is online is welcome to call in. The number was put up earlier and it's going to get put up again. If you want to submit via snail mail or e-mail, their addresses are written here and are also on the Web site online at www.mobilemicroreactoreis.com.

So many different ways to contact us. And, again, we welcome that. So just to conclude, definitely happy to be here. It's always good to come to Idaho and meet the local folks here, and make sure that what we're doing is -- you know, that we're

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

hearing all of the concerns that Idaho residents might have.

We do want to make sure that what we're doing here is sensitive. We know that this is environmentally beautiful land. We also know there's a lot of history here and cultural history here, and so we want to make sure that we're respecting all of that.

So we are very much seeking input and look forward to any questions that are going to be coming tonight or in the next few weeks. So with that, thank you for listening to me and I will turn it back over.

MS. LOWE: Thank you, Dr. Waksman. That concludes the information portion of this meeting. As the moderator, it's my job to make sure the hearing is conducted in a respectful manner, and that as many people as possible have a fair opportunity to provide oral comments.

Dr. Waksman will also be serving as the Department of Defense's hearing officer tonight. And please understand that the DOE -- as the DOE -- DOD's hearing officer, he's here to listen and he will not be responding directly to your comments during this hearing.

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Your comments will be given consideration during the preparation of the final EIS, and all comments will be given equal consideration regardless of whether they're provided orally or in writing.

I have got a different slide that is showing. There we go. Okay. I'd like to emphasize that providing oral comments during this hearing is only one of the ways that you can submit your comments during the public comment period, which will end on November 9th, 2021.

Written comments may be sent to the U.S. mail -- sent via U.S. mail or e-mail to the addresses that are on the slide. And they can also be submitted via the project Web site at the url on this slide.

The final EIS and summary will be available online at the same url. It is www.mobilemicroreactoreis.com.

If you're interested -- oh, I'd like to emphasize -- where am I? I'm sorry. Just a second.

If you're interested in providing oral comments this evening, you must register to do so. If you're here with us in Fort Hall, you can register at the registration table outside of this room.

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

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You can also provide written comments using the forms or if you've typed up a written note, something that you'd like considered, you can submit those at the table at the back of the room.

If you're participating online and want to provide oral comments, you must call 1-888-788-0099 using a telephone. When prompted use 95436118970 as a meeting identification number.

Reply yes when asked by the operator if you would like to provide oral comments. The operator will then place you into a comment queue. If you're participating via telephone, you will need to hit star six on your phone to unmute your line when it's your turn to speak. And when you finish your remarks, you will be muted again.

The comments that you provide here in this hearing room and over the phone will be broadcast on this Web cast and transcribed for the record.

We will be calling on people on a first come first serve basis. And will begin by calling on any Tribal or elected officials and then people who are present, and then every one else, and then we'll call on people here in Fort Hall first, and then people who are commenting via telephone.

Transcript of Proceedings 6 p.m.
October 20, 2021 30

This side left blank intentionally.

Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

To allow sufficient time for everyone to speak, oral comments will be limited to three minutes per speaker. We recognize that three minutes is a brief amount of time and we encourage you to provide more detailed comments in writing to ensure that all of your thoughts, concerns, and suggestions are fully captured in the record.

I'll be calling on two or three people at a time to let you know when your turn is coming up. When it's your turn to speak, please come forward to one of the standing microphones at the front of the room. Those of you who provide your comments here in Fort Hall may remove your mask while you're making your comments. If you're commenting via telephone, please mute the audio on your computer to avoid echoing.

If you have a handset or a headset, we would ask that you use that while you're speaking because it will provide the best audio quality. Speakerphones may make it harder for us to hear you. Your three minutes will begin at that point.

Regardless of where you're commenting from, please begin by stating your name and the name of any organization that you're representing in an official capacity during this hearing.

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Once everyone who is interested in providing comments has had a first opportunity, a second three-minute allotment will be allowed time permitting. We'll conclude this hearing at 8:00 o'clock p.m. mountain.

I have gotten ahead of myself again, I think. I'll let you know when your time has run out. If you're still speaking when your three minutes are up, I'll ask you to conclude your remarks and then I'll call on the next speaker to begin.

Please understand that if I have to cut you off it's because it's my job to make sure that everyone who wants to speak during this hearing has a fair opportunity to do so. We will accommodate as many people as possible until 8:00 p.m.

I'd like to introduce a few people who are at the front of the room with us today. Kimberly Swanson and Heather Fultz are serving as our sign language interpreters for us during this hearing. And then Lani Lewis is our court reporter. Lani's responsible for preparing a complete and accurate transcript of this hearing, so I've asked each of these folks to let me know if they're having trouble hearing you or understanding your comments.

So if I need to interrupt you, it's

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Comments and responses resume on page 3-216.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Commenter No. TB01: Tami Thatcher

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because I want to help make sure that they're getting your comments.

So one final request I'd like to make of you this evening, and that is I know that some of you have strong opinions about the proposal to build and demonstrate the Prototype Mobile Microreactor.

The point of a public comment hearing is to give each of you the opportunity to provide your thoughts to the Department of Defense about the Draft Environmental Impact Statement. We hope that everyone present will treat all others with respect. We're grateful that you've taken time out of your busy schedules to participate.

And with that, we'll begin taking comments. As of right now I have one registered speaker in the room and that is Tammy Thatcher. A reminder that you can remove your mask.

TAMMY THATCHER: Thank you. Tammy Thatcher from Idaho Falls.

This reactor proposal continues to evolve. And it was stated that it wasn't the intention that this reactor would provide power at foreign military bases. Anyone who understands this means -- what this means is either leaving stranded spent fuel in foreign countries, or having to fly by

TB01-1

Transcript of Proceedings 6 p.m.
October 20, 2021 33

TB01-1 The scope of this EIS is limited to fabrication of a prototype mobile microreactor off-site and demonstration of the microreactor at the INL Site. Deployment at domestic bases and Forward Operating Bases, Remote Operating Bases, or Expeditionary Bases in foreign countries and U.S. territories is not included in the scope of this EIS. The potential environmental impacts of deployment, if it were to occur, would be the subject of additional environmental analyses. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Commenter No. TB01: Tami Thatcher

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airplane high fission products, high radiotoxic material over other countries and you risk having an airplane accident, and creating exclusion zones where people can no longer live where you have an accident.

It's -- it creates a military target at a base that can easily be assaulted by a missile and create fission product release that disables troops, disables the base. **TB01-1 (cont'd)**

It's a horrendously bad idea, and I think they know it. I think they -- this is simply a way to funnel money into this commercial development. **TB01-2** It has no practical military need. Perhaps they'll get away with siting one in Alaska. **TB01-1 (cont'd)** That's it. This has no practical military use. **TB01-2 (cont'd)**

As far as the releases, they're already -- they have already tested TRISO fuel at the Advanced Test Reactor and released a high amount of fission products to the air that weren't detected. That were creating higher detections of cesium astronium than normal, which, they, of course, tried to read back and said, you know, weren't really -- weren't really detected. And it wasn't really higher than what we had in the '60s or '50s, so don't worry about it. So there's a problem. **TB01-3**

The Department of Energy's 100 millirem **TB01-4**

Transcript of Proceedings 6 p.m.
October 20, 2021 34

TB01-2 DoD acknowledges your opposition to the Proposed Action. Considering public comments on the Draft EIS is an important step in the EIS process. The Defense Science Board evaluated available energy technologies before concluding that electrical generating capability for Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases can best be met by a less than 10-MWe microreactor system that can be safely and rapidly moved by road, rail, sea, or air for quick setup and shutdown. This EIS addresses the need to demonstrate such a prototype mobile microreactor. Please see the discussions in Sections 2.1, *Support and Opposition*, and 2.2, *Purpose and Need*, of this CRD for additional information.

TB01-3 Please see the response to Comment 24-25. As indicated there, the releases from the tristructural isotropic fuel were not released to the atmosphere, but released within the test capsule. The response to Comment 24-12 provides a discussion of the adequacy and compliance of the INL monitoring program with DOE standards.

TB01-4 The DOE dose limit for a member of the general public, which is 100 millirem per year from all pathways, is prescribed in DOE Order 458.1, *Radiation Protection of the Public and the Environment*. DOE orders and standards are continually reviewed to determine whether these documents and the requirements and guidance within the documents should be revised. To date, DOE has not identified a need to update the 100 millirem requirement in DOE Order 458.1. (This order was last updated in September of 2020.) The latent cancer fatality risk to an individual who receives this dose, using the 0.0006 conversion factor, is 0.00006. The 100 millirem requirement is consistent with national and international standards for the protection of the public.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Commenter No. TB01: Tami Thatcher

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per year dose is actually -- was actually based on .0001 fatal cancers per rem, that they assumed in the 1970s.

Now, even this document, DOE knows that that risk is at least six times higher .0006 fatal cancers per rem. We still have the 100 millirem per year limit. That's how much they care about our health.

There's plenty -- radiology of radiation workers that show the doses far below the annually allowed doses still result in elevated levels of cancer.

TB01-4 *(cont'd)*

There's a great deal of diverse evidence that shows very low doses in the dozens of millirem perhaps absorbed dose affect infant mortality and birth defects that they're ignoring, which is very troubling.

TB01-5

Let's see --

MS. LOWE: Ms. Thatcher, I need you to conclude your remarks, please.

TAMMY THATCHER: Okay. This document actually points to the SO1 accident that happened in 1961. Never acknowledging that the primary cause was regulatory failure. And they're on track to have poor regulatory oversight of this reactor.

TB01-6

Transcript of Proceedings 6 p.m.
October 20, 2021 35

TB01-5 The dose conversion factors used in the analysis of human health impacts are designed to estimate the impacts from radiation to a population as a whole, considering the different impacts to men, women, and children. With regard to radiation exposure to a developing child in utero, the Centers for Disease Control and Prevention (CDC) (2011) states a dose that is equivalent to 500 chest x-rays, the equivalent of 5 rem (the dose from a single chest x-ray is about 10 millirem), would increase the lifetime risk of cancer for that child by about 2 percent (CDC 2011, Radiation and Pregnancy: A Fact Sheet for the Public). The CDC does not identify any non-cancer health effects from doses of less than 10 radians to the embryo or fetus. Doses to members of the public from prototype mobile microreactor demonstration activities at the INL Site are well below these doses and are not expected to result in any fatalities or health effects.

TB01-6 The root cause of the 1961 incident was not a regulatory failure, rather a combination of human error and the insufficiency of the emergency planning documents during that time to handle the type of event that occurred. Knowledge gained from past reactor experience, including the operation of Stationary Low-Power Reactor Number One (SL-1) and this accident, has been used to improve safety requirements and the design and operation of reactors. The reactor design and operating conditions that resulted in the SL-1 accident would not be allowed under present DOE safety regulations. As stated in Section 3.11.2, *Accident History*, of this EIS, the SL-1 accident, which occurred on the evening of January 3, 1961, was due to the center rod being improperly withdrawn, causing a steam explosion and meltdown. Based on this human error, considerable emergency planning improvements have been made since the 1961 event and can be found in DOE Order 151.1D, *Comprehensive Emergency Management System*.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Commenter No. TB02: Leigh Ford

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Thank you.
MS. LOWE: Thank you, Ms. Thatcher.
And it looks like we have a commenter online, so...
So online we have Leigh Ford representing the Snake River Alliance. Ms. Ford, hit star six to unmute your phone and then you can begin your remarks.
LEIGH FORD: Hello, can you hear me?
MS. LOWE: We can. Please introduce yourself first.
LEIGH FORD: Hello, my name is Leigh Ford. That's L-e-i-g-h, F-o-r-d. I work with Snake River Alliance. We're based in Boise, Idaho, Shoshone-Bannock occupied land. I was born in Idaho Falls. And both my grandfathers actually worked at INL and like Ms. Thatcher was saying before me, they did both die of cancer, but that's not why I'm calling.
I do agree with Ms. Thatcher's comments earlier. There is no permanent repository. I think it was mentioned once in this EIS. There's no EIS. Right now Texas is fighting it. They don't want the waste nuclear space and it seems like it's been forced upon them. And inevitably it goes to

TB02-1

Transcript of Proceedings 6 p.m.
October 20, 2021 36

TB02-1 Current radioactive waste and spent nuclear fuel (SNF) management for the INL Site is described in Section 3.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. The potential environmental consequences associated with radioactive waste and SNF management are described in Section 4.9, *Waste and Spent Nuclear Fuel Management*, of this EIS. Very small quantities of radioactive waste and SNF would be generated during operation. The entire Project Pele is expected to generate approximately 350 cubic meters of radioactive waste, not including the container express (CONEX) containers and the reactor, which also must be disposed of. No high-level radioactive waste would be generated, and all low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) would be managed in compliance with regulatory and permit requirements and shipped off-site for treatment and disposal at permitted licensed facilities. During reactor disposition, the reactor vessel and internal components would be managed as LLW. All waste would meet the receiving facilities' waste acceptance criteria. In recent years, the INL Site has disposed of LLW and treated MLLW at the DOE Nevada National Security Site or at the following two commercial facilities: Waste Control Specialists in Andrews County, Texas and Energy*Solutions* in Clive, Utah. The INL Site's on-site LLW and MLLW facilities have restrictions on the wastes that can be treated and disposed, and the Radioactive Waste Management Complex at the INL Site stopped receiving any low-level waste in April 2021. This site will be closed in accordance with the *Record of Decision for Radioactive Waste Management Complex Operable Unit 7-13/14* (DOE-ID, EPA, and IDEQ, 2008). SNF would be managed in compliance with regulatory and permit requirements and other agreements. It is estimated that less than 3.4 cubic meters of SNF would be generated during microreactor operations and would be removed during microreactor disposition. The SNF removed from the mobile microreactor would be packaged in standard DOE SNF canisters. SNF generated by operation of the mobile microreactor (a single core) would be managed along with other SNF at the INL Site until it was transported off-site to an interim storage facility or a permanent repository. Although a national repository for SNF is not yet licensed, DOE remains committed to meeting its obligations to safely dispose of SNF. However, this activity is beyond the scope of this EIS.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Commenter No. TB02: Leigh Ford

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environmental injustice communities; people with no money and no power.

Yesterday, in fact, WIPP announced that they are slowing down, shipments that they're taking to safety issues. There is no place for this waste, and I believe it will stay here above our water, which happens to be the sole drinking source of water for all of southern Idaho and our agriculture water.

TB02-1 (cont'd)

And I don't think the EIS took into account that we have a multitude of reactors facing us. Up to six new scale small modular units nuclear reactors, a marble microreactor, an Oklo microreactor, a versatile test reactor.

TB02-2

There's a lot going on. I think that -- I think this needs to stop. We need to have some more time to analyze this, you know, through the lens of everything that's coming at us.

And so I would like to request more time. I will submit written comments, but I wanted to tell you my initial thoughts.

TB02-3

Thank you so much for allowing me to comment and for your presentation.

MS. LOWE: Thank you, Ms Ford.

I just want to touch base with the folks at the back of the room. Do we have anybody? Okay.

Transcript of Proceedings 6 p.m.
October 20, 2021 37

TB02-2 As described in EIS Section 5.2, *Reasonably Foreseeable Actions*, the cumulative impacts analysis for this EIS includes consideration of the Versatile Test Reactor; Utah Associated Municipal Power Systems small modular reactors; the Oklo Power LLC, AURORA micro-reactor; Molten Chloride Reactor Experiment (MCRE); and the Microreactor Applications Research, Validation and Evaluation (MARVEL) Project. Please see the discussions in Section 2.7, *Nuclear Reactor Research and Development*, of this CRD for additional information.

TB02-3 DoD and SCO followed the guidelines for timing of agency actions and allowed at least 45 days for comments on the Draft EIS, as prescribed in 40 Code of Regulations 1506.11(d). The public comment period for this Draft EIS began on September 24, 2021, with publication of the Notice of Availability in the Federal Register, and continued to November 9, 2021, for a total of 47 days.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Commenter No. TB03: Julie Hofnagle

We will now recess. We will stay in the facility until 8:00 p.m. If anyone would like to register to comment either call on the telephone line or register at the desk. And if anyone would like to comment again, please register again, and we'll take your comments a second time. Thank you.

(Recess.)

MS. LOWE: So we have another person online who would like to speak. Her name is Julie Hofnagle. And, Julie, you need to press star six to unmute your phone. Please start, introduce yourself, and then I'll start the timer.

JULIE HOFNAGLE: Okay.

MS. LOWE: Okay. I need you to mute your computer so that there won't be an echo. Are you still there?

JULIE HOFNAGLE: Yes, my name is Julie Hofnagle, and I am the co-president of the board of the Snake River Alliance that's in Boise.

And I'd just like to -- first, I'd like to thank you for having this comment period and for giving us this opportunity.

I can see why the INL would have been chosen for this project with all of the infrastructure and experience that's already

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Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

Commenter No. TB03: Julie Hofnagle

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TB03-1 available there. But I think the idea of a mobile nuclear reactor is a singularly bad idea. Any time that nuclear materials are moved, there's risk and danger to people and to the environment.

TB03-2 It has long been the position of the Snake River Alliance and other environmental groups that nuclear material should not be moved around. The whole premise of these reactors is that -- that they are mobile and so it seems to be a contradiction in terms of logic and just common sense.

TB03-3 And, finally, this new project just puts additional amount of nuclear activity and materials above the Snake River Plains aquifer, which as Ms. Ford said is the sole source drinking water for most of the inhabitants of southern Idaho.

TB03-1 (cont'd) The comments that I'm making just now are preliminary ones. They're not technology as Ms. Thatcher's were, but it's just to voice that there are people and organizations in our state who are looking at this, this idea and all the other ones that are -- were mentioned earlier by Ms. Ford with a great deal of alarm and concern.

Thank you very much for giving me this opportunity.

MS. LOWE: Thank you, Ms. Hofnagle. Just

Transcript of Proceedings 6 p.m.
October 20, 2021 39

TB03-1 DoD acknowledges your opposition to the Proposed Action. Considering public comments on the Draft EIS is an important step in the EIS process. Please see the discussion in Section 2.1, *Support and Opposition*, of this CRD for additional information.

TB03-2 DOE acknowledges the commenter's concern regarding the risks associated with the mobility of small reactors. It should be emphasized that the scope of this EIS is limited to the construction and demonstration of the microreactor at the INL Site. After completion of the demonstration, the knowledge gained from the testing may be used to facilitate mobile microreactor design modifications that would meet DoD's ultimate goals for an effective mobile power source that could be supplied to support DoD's worldwide missions. The potential environmental impacts of deployment and use of these future designs, if they were to occur, would be the subject of additional future environmental analyses. Please see the discussion in Section 2.3, *Scope of the Proposed Action*, of this CRD for additional information.

TB03-3 EIS Section 3.3.1.2, *Wastewater*, describes the local INL Site hydrology, including the Snake River Plains Aquifer. This discussion includes details regarding the established site groundwater monitoring program and the performance of analyses and studies of the Snake River Plains Aquifer under and adjacent to the site. The groundwater monitoring has generally shown long-term trends of decreasing concentrations for radionuclides, and current concentrations are near or below the U.S. Environmental Protection Agency maximum concentration limits for drinking water. The decreases in concentrations are attributed to discontinued disposal above the aquifer, radioactive decay, and dilution within the aquifer. This groundwater monitoring program is planned to continue into the future, including during operation of Project Pele, to detect changes in groundwater quality.

Comments from the Public Hearing 6:00 – 8:00 p.m. (October 20, 2021)

confirming around the room that we don't have anyone else interested in speaking, so we will recess again until such time as somebody indicates an interest in providing comments.

(Recess.)

MS. LOWE: On behalf of the U.S. Department of Defense, I want to thank you very much for your time and attention. Let the record reflect it is now 8:00 p.m. mountain. All registered speakers have been called upon to speak.

This final slide shows the ways that you can comment after this hearing. And I would remind you that all comments regardless of how they have been submitted will be given the same level of consideration.

We will now adjourn this public hearing and thank you so much for participating.

(The public hearing concluded at 8:01 p.m.)

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Section 4
References

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