

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: Texas A&M Experiment

SECTION B. Project Description and Purpose:

The NSUF Texas A&M experiment is a drop-in fueled materials test to characterize the dimensions, microstructure, and thermal properties of U-Zr fueled materials (3mm diameter x ~0.2mm thick discs) before and after irradiation. The proposed action irradiates about 124 U-Zr disc-shaped specimens in the Advanced Test Reactor (ATR). This experiment uses five sample types: DU10Zr (quenched), DU10Zr (annealed), DU10Zr (extruded), U10Zr (31%) and U10Zr (78%). The Texas A&M experiment uses U-Zr from Experimental Breeder Reactor (EBR)-II remnant fuel located at the Materials and Fuels Complex (MFC). The proposed action fabricates experiment specimens at the Materials and Fuels Complex (MFC) and experiment hardware at the North Holmes Laboratory.

After irradiation, Idaho National Laboratory (INL) ships the experiment capsule(s) to the Hot Fuels Examination Facility (HFEF), the Center for Advanced Energy Studies (CAES), or the INL Research Complex (IRC) for post-irradiation examination (PIE) in compliance with facility radiological limits. The proposed action performs destructive and nondestructive PIE at INL locations such as the Fuels and Applied Science Building (FASB), Experimental Fuels Facility (EFF), and the Electron Microscopy Laboratory (EML), or other locations at INL.

The proposed action has the potential to include PIE at Brookhaven National Laboratory's National Synchrotron Light Source (NSLS)-II, contingent on the availability of an acceptable shipping cask or container. This environmental checklist (EC) will be reviewed and revised prior to any off-site sample shipments.

Design and irradiation of the Texas A&M experiment does not require procurement or installation of new equipment or generation of new waste streams.

After disassembly, experiment hardware would be disposed similar to other DOE-owned irradiated materials. Left over irradiated test specimens would be stored in the Nuclear Science User Facilities (NSUF) Sample Library at HFEF for future studies.

After PIE, irradiated test pin segments and PIE remnants will be stored with other similar DOE-owned irradiated materials and experiments at MFC, most likely in the HFEF or the Radioactive Scrap and Waste Facility (RSWF) in accordance with DOE's Programmatic SNF Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (FEIS) and ROD (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (February 1996). Ultimate disposal of the irradiated test pin segments and PIE remnants will be along with similar DOE-owned irradiated materials and experiments currently at MFC. Irradiated sample debris and secondary waste could total as much as 20-30 Kg. Categorizing this material as waste is supported under Department of Energy Order (DOE O) 435.1, Att. 1, Item 44, which states "...Test specimens of fissionable material irradiated for research and development purposes only...may be classified as waste and managed in accordance with this Order..."

In addition, to complete proposed work activities, it is necessary for the project to use the HFEF hot cell which contains both defense and nondefense related materials and contamination. Project materials will come into contact with defense related materials. It is impractical to clean out defense related contamination, and therefore, waste associated with project activities is eligible for disposal at the Waste Isolation Pilot Plant (WIPP). National Environmental Policy Act (NEPA) coverage for the transportation and disposal of waste to WIPP are found in Final Waste Management Programmatic Environmental Impact Statement [WM PEIS] (DOE/EIS-0200-F, May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, Sept. 1997), respectively. The 1990 ROD also stated that a more detailed analysis of the impacts of processing and handling transuranic (TRU) waste at the generator-storage facilities would be conducted. The Department has analyzed transuranic (TRU) waste management activities in the Final Waste Management Programmatic Environmental Impact Statement (WM PEIS) (DOE/EIS-200-F, May 1997). The WM PEIS analyzes environmental impacts at the potential locations of treatment and storage sites for TRU waste; SEIS-II addresses impacts associated with alternative treatment methods, the disposal of TRU waste at WIPP and alternatives to that disposal, and the transportation to WIPP

Packaging, repackaging, transportation, receiving, and storing used nuclear fuel and R&D for used nuclear fuel management is covered by DOE's Programmatic Spent Nuclear Fuel (SNF) Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (EIS) and Record of Decision (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (February 1996). The analyses include those impacts related to transportation to, storage of, and research and development related to used nuclear fuel at the INL (see Tables 3.1 of the SNF Record of Decision (May 30, 1995) and Table 1.1 of the Amended Record of Decision [February 1996].

While the research test specimens described in the EC are not spent nuclear fuel, they are similar in environmental hazards, except the test specimens contain less radiological material than a normal spent nuclear fuel shipment. Therefore, the potential environmental impact of transportation of the test specimens to Brookhaven National Laboratory can be conservatively estimated to be equal to or less than a spent nuclear fuel shipment. The potential for transportation accidents was analyzed in the 1995 PSNF EIS (Section 5.1.5 and Appendix I-5 through I-10). In the record of decision for the 1995 PSNF EIS, DOE determined and stated "the evaluated potential impacts resulting from all alternatives were found to present no significant risk to potentially affected populations." Based on DOE's statement for the entire DOE SNF program, the proposed action would not have the potential for significant impact or have any unique or unknown risks.

The environmental impacts of transferring low level waste from the INL to the Nevada National Security Site were analyzed in the 1996 Nevada Test Site EIS (DOE/EIS-0243) and supplemental analysis (SA) (DOE/EIS-0243-SA-01) and DOE's Waste Management Programmatic EIS (DOE/EIS-200). The fourth

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ROD (65 FR 10061, February 25, 2000) for DOE's Waste Management Programmatic EIS established the Nevada National Security Site as one of two regional low level waste (LLW) and mixed low level waste (MLLW) disposal sites. The SA considers additional waste streams, beyond those considered in the 1996 NTS EIS that may be generated at or sent to the Nevada National Security Site for management.

The potential for transportation accidents was analyzed in the SNF EIS (Section 5.1.5 and Appendix I-5 through I-10).

In addition, the experiment has the potential to generate industrial, mixed, and low level waste, including grinding and polishing consumables; plastics, sleeves, and swipes needed for radiological and contamination control; construction waste for facility modifications and equipment installation; molds; and sample residue from analytical chemistry. This waste will be classified and disposed in accordance with INL procedures and DOE regulations/requirements.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

The proposed action has the potential to generate radiological and chemical emissions from irradiation in ATR and the destructive and non-destructive PIE at MFC. Air emissions are anticipated to be minor, and concentrations would not exceed the current monitored air emissions from these facilities. An Air Permit Applicability Determination (APAD) will be required.

The irradiation activities in the ATR are not modifications in accordance with Idaho Administrative Procedures Act (IDAPA) 58.01.01.201 and 40 Code of Federal Regulation (CFR) 61 Subpart H. ATR radionuclide emissions are sampled and reported in accordance with Laboratory Wide Procedure (LWP)-8000 and 40 CFR 61 Subpart H. All experiments will be evaluated by Environmental Support and Services staff. All radionuclide release data (isotope specific in curies) directly associated with this proposal will be calculated and provided to the Environmental Support organization.

The irradiated specimens will be delivered to the MFC HFEF for disassembly and then undergo routine PIE. All radionuclide release data associated with the PIE portion of this experiment will be recorded as part of the HFEF continuous stack monitor. The PIE examination in HFEF is not a modification in accordance with Idaho Administrative Procedures Act (IDAPA) 58.01.01.201 and 40 Code of Federal Regulation (CFR) 61 Subpart H.

In 2017, the effective dose equivalent to the offsite maximally exposed individual (MEI) from all operations at the INL Site was calculated as 8.02 E-03 mrem/yr (8.02 E-08 Sievert/yr), which is 0.08% of the 10-mrem/yr federal standard and was calculated using all sources that emitted radionuclides to the environment from the INL site. The additional increment in emissions from the proposed action would not significantly change the total site-wide MEI dose. Therefore, the emissions are bounded by the analysis in the 1995 EIS, which estimated the annual cumulative doses to the maximally exposed worker, offsite maximally exposed individual (MEI), and the collective population from DOE's decision to implement the preferred alternative (DOE 1995a, Volume 2, Table 5.7-4). The potential air emissions and human health impacts associated with the proposed action would be smaller than and are bounded by the impacts presented in the 1995 PEIS.

Generating and Managing Waste

Hazardous/Radioactive Material or Waste Handling and Transportation: Project personnel will work with Waste Generator Services (WGS) to properly package and transport regulated, hazardous or radioactive material or waste according to laboratory procedures.

Industrial Waste Generation and Management: Project activities would likely result in the generation of small amounts of industrial waste.

TRU Waste: Irradiated sample debris and PIE waste are expected to generate TRU waste and mixed TRU waste. Irradiated sample debris and secondary waste could total 0.1 gram of TRU waste. Project personnel would work with WGS to characterize and properly dispose of all waste.

Releasing Contaminants

Chemicals will be used and will be submitted to chemical inventory lists with associated Safety Data Sheets (SDSs) for approval prior to use. The Facility Chemical Coordinator will enter these chemicals into the INL Chemical Management Database. All chemicals will be managed in accordance with laboratory procedures. When dispositioning surplus chemicals, project personnel must contact the facility Chemical Coordinator for disposition instructions.

Although not anticipated, there is a potential for spills when using chemicals or fueling equipment. In the event of a spill, notify facility PEL. If the PEL cannot be contacted, report the release to the Spill Notification Team (208-241-6400). Clean up the spill and turn over spill cleanup materials to WGS.

Using, Reusing, and Conserving Natural Resources

All materials will be reused and recycled where economically practicable. All applicable waste will be diverted from disposal in the landfill where conditions allow.

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SECTION D. Determine Recommended Level of Environmental Review, Identify Reference(s), and State Justification: Identify the applicable categorical exclusion from 10 Code of Federal Regulation (CFR) 1021, Appendix B, give the appropriate justification, and the approval date.

For Categorical Exclusions (CXs), the proposed action must not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, or similar requirements of Department of Energy (DOE) or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; (3) disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no extraordinary circumstances related to the proposal exist that would affect the significance of the action. In addition, the action is not "connected" to other action actions (40 CFR 1508.25(a)(1) and is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1608.27(b)(7)).

References: 10 CFR 1021, Appendix B to subpart D, items B3.6, "Small-scale research and development, laboratory operations, and pilot projects"

Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement and Record of Decision (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (1996)

Final Environmental Impact Statement for the Waste Isolation Pilot Plant (DOE/EIS-0026, October 1980) and Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant (SEIS-I) (DOE/EIS-0026-FS, January 1990)

Final Waste Management Programmatic Environmental Impact Statement [WM PEIS] (DOE/EIS-0200-F, May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, September 1997)

Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (DOE/EIS-0243) and supplemental analysis (SA) (DOE/EIS-0243-SA-01).

Final Environmental Assessment for the Multipurpose Haul Road Within the Idaho National Laboratory Site (DOE/EA-1772, 2010).

Final Environmental Assessment and Finding of No Significant Impact for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site (DOE/EA-1793, December 2011)

Justification: The proposed R&D activities are consistent with CX B3.6 "Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment."

Transportation, receiving, and storing used nuclear fuel, as well as, research and development for used nuclear fuel management is covered by DOE's Programmatic Spent Nuclear Fuel (SNF) Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement and Record of Decision (DOE/EIS-0203, 1995) and supplemental analyses (DOE/EIS-0203-SA-01 and DOE/EIS-0203-SA-02) and the Amended Record of Decision (February 1996). The analysis includes those impacts related to transportation to, storage of, and research and development related to used nuclear fuel at the INL (see Tables 3.1 of the SNF Record of Decision (May 30, 1995) and Table 1.1 of the Amended Record of Decision [February 1996]. The EIS limits the number of shipments to the INL, and the proposed activities would fall within the limits of the EIS.

The potential for transportation accidents has already been analyzed in the SNF EIS (Section 5.1.5 and Appendix I-5 through I-10). NEPA coverage for the transportation and disposal of waste to WIPP are found in Final Waste Management Programmatic Environmental Impact Statement [WM PEIS] (DOE/EIS-0200-F, May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, Sept. 1997), respectively. The 1990 ROD also stated that a more detailed analysis of the impacts of processing and handling TRU waste at the generator-storage facilities would be conducted. The Department has analyzed TRU waste management activities in the Final Waste Management Programmatic Environmental Impact Statement (WM PEIS) (DOE /EIS-200-F, May 1997). The WM PEIS analyzes environmental impacts at the potential locations of treatment and storage sites for TRU waste; SEIS-II addresses impacts associated with alternative treatment methods, the disposal of TRU waste at WIPP and alternatives to that disposal, and the transportation to WIPP.

The environmental impacts of transferring low level waste from the INL to the Nevada National Security Site were analyzed in the 1996 Nevada Test Site EIS (DOE/EIS-0243) and supplemental analysis (SA) (DOE/EIS-0243-SA-01) and DOE's Waste Management Programmatic EIS (DOE/EIS-200). The fourth Record of Decision (ROD) (65 FR 10061, February 25, 2000) for DOE's Waste Management Programmatic EIS established the Nevada National Security Site as one of two regional LLW and MLLW disposal sites. The SA considers additional waste streams, beyond those considered in the 1996 NTS EIS, that may be generated at or sent to the Nevada National Security Site for management.

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The impacts of transporting spent fuel, special nuclear materials, and research fuels between MFC and other INL Site facilities using the Multi-Purpose Haul Road were analyzed Final Environmental Assessment for the Multipurpose Haul Road Within the Idaho National Laboratory Site (DOE/EA-1772).

Onsite disposal of RH-LLW was analyzed in the Final Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site (DOE/EA-1793, 2011).

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on: 12/06/2018