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DEPARTMENT OF DEFENSE

Office of the Secretary

Notice of Availability of Draft Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement

AGENCY: Strategic Capabilities Office (SCO), Office of the Secretary, Department of Defense (DoD).

ACTION: Notice of availability and public hearings; request for comment.

SUMMARY: The DoD, acting through SCO and with the United States (U.S.) 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 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).

DATES: Comments are due by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

Public hearings:

1. October 20, 2021, 3:00 p.m. to 5:00 p.m. Mountain time, Fort Hall, ID (livestreamed)

2. October 20, 2021, 6:00 p.m. to 8:00 p.m. Mountain time, Fort Hall, ID (livestreamed)

ADDRESSES: You may submit written comments on the Draft EIS by any of the following methods:

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

E-mail: PELE_NEPA@sco.mil

Online: https://www.mobilemicroreactoreis.com

The Draft EIS is available for review online at the website listed above. Send requests to be placed on the Draft EIS distribution list to receive future updates to the email listed above.

FOR FURTHER INFORMATION CONTACT: Dr. Jeff Waksman, Program Manager; Mail: Strategic Capabilities Office, 1155 Defense Pentagon, Washington, D.C. 20301-1155; E-mail: PELE_NEPA@sco.mil.

SUPPLEMENTARY INFORMATION:

Background

The DoD consumes around 30 terawatt hours of electricity per year and more than 10 million gallons of fuel per day. Additionally, military operational projections predict that energy demand will continue to increase significantly over the next few years. Prioritizing climate change considerations in national security will require explorations of energy-generating resources that create a sustainable climate pathway. Energy delivery and management continues to be a critical defensive risk. The challenge is to develop more sustainable methods to provide reliable, abundant, and continuous energy. Inherent dangers, logistical complexities, and overwhelming costs of sustaining power demands at Forward Operating Bases, Remote Operating Bases, and Expeditionary Bases using diesel generators continue to constrain operations and fundamental strategic planning. Additionally, technologies currently under development, such as unmanned aerial vehicles, new radar systems, new weapon systems, and the electrification of the non-tactical vehicle fleet, will require even greater energy demands. The Defense Science Board, commissioned by the DoD, recommended further engineering development and prototyping of very small modular reactors with an output less than 10 MWe. Before this technology can be deployed, a prototype mobile microreactor must be tested to ensure it can meet DoD specifications and requirements.

A related Notice of Intent to Prepare an EIS for Construction and Demonstration of a Prototype Advanced Mobile Nuclear Microreactor was previously published in the Federal Register, 85 FR 12274 (March 2, 2020).

On March 22, 2021, SCO announced two teams—led by BWXT Advanced Technologies, LLC, Lynchburg, Virginia, and X-energy, LLC, Rockville, Maryland—would proceed with development of a final design for a mobile microreactor under Project Pele. The two teams were selected from a preliminary design competition, and each continues design development independently. After a final design review in early 2022 and completion of this EIS under the National Environmental Policy Act (NEPA) of 1969, as amended, one of the two companies may be selected to build and demonstrate a mobile microreactor.

Alternatives

SCO evaluated a range of reasonable alternatives for the Proposed Action (mobile microreactor construction and demonstration) in this EIS, including a No Action Alternative that serves as a basis for comparison with the action alternatives. The Idaho National Laboratory (INL Site) was identified as the preferred location for the Proposed Action based on siting requirements for the mobile microreactor. Other sites, including the Oak Ridge National Laboratory (ORNL) did not meet all of the siting criteria. Specifically, these sites either lacked sufficient supporting infrastructure or lacked an independent electrical distribution system capable of scheduling and operation independent of and isolated from the local commercial utility grid.

Proposed Action

The Proposed Action in the Draft EIS consists of constructing and demonstrating a prototype mobile microreactor at the INL site that would be capable of producing 1 to 5 MWe. The mobile microreactor is expected to be a small, advanced gas-cooled reactor using high-assay low-enriched uranium (HALEU) tristructural isotropic (TRISO) fuel. TRISO fuel is encapsulated and has been demonstrated to be capable of withstanding temperatures up to 1,800 degrees Celsius (°C), allowing for a reactor design that relies primarily on simple passive features and inherent physics to ensure safety.

Mobile microreactor fuel loading, final assembly, and demonstration would be performed at the INL Site using DOE technical expertise and facilities at the Materials and Fuels Complex (MFC) and Critical Infrastructure Test Range Complex (CITRC). 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 down blended to HALEU and fabricated into TRISO fuel at the BWXT facility in Lynchburg, Virginia.

Demonstration Activities at the INL Site

The Project Pele activities to be performed at the CITRC and MFC facilities on the INL Site, would involve demonstration that the proposed mobile microreactor could produce reliable electric power onto an electrical grid that is separate from the public utility grid and that the mobile microreactor can be safely disassembled and moved. At the end of an approximately 3-year demonstration, current plans are that the mobile microreactor would be shut down and placed into a safe storage mode at the INL Site.

The mobile microreactor would arrive at the INL Site for installation at MFC without reactor fuel. The possible locations to perform the fueling of the mobile microreactor are either the Transient Reactor Test Facility (TREAT) or the Hot Fuel Examination Facility

(HFEF). Final assembly of the mobile microreactor modules would be performed at the site of the initial startup testing. The initial startup testing of the mobile microreactor could be performed at the Demonstration of Operation Microreactor Experiments (DOME) facilities in the Experimental Breeder Reactor II (EBR II) building. Improvements to the DOME are planned in support of other programs at the INL Site. These improvements to the DOME, while not a part of Project Pele, are necessary for the DOME to be capable of supporting the initial startup testing phase of the mobile microreactor demonstration. Should these improvements not be made in time to support Project Pele schedule, final assembly and startup testing would be performed at CITRC. At either location, final assembly entails connecting the mobile microreactor modules. The modules within the CONEX containers would be attached via cables, conduit, and pipes that would have been transported with the mobile microreactor to the INL Site. During this phase of the demonstration, the mobile microreactor would not be connected to an electrical distribution grid. Startup testing would be performed to verify that the mobile microreactor would perform as designed. The startup and initial testing phase is anticipated to take 6 months to complete.

Disassembly and transport would occur between the startup testing phase and the operational testing phase at CITRC regardless of where startup testing would be performed. In either case, the disassembly and transport would provide proof-of-concept of the mobility of the mobile microreactor. The mobile microreactor would be disassembled at the startup testing site with minimal temporary laydown requirements. The mobile microreactor would be placed in a safe shutdown mode in which decay heat would be removed via the passive heat removal systems. This phase is anticipated to take around 5 weeks to complete.

Mobile Microreactor Activities at CITRC

CITRC is part of the INL's 61-mile 138-kilovolt (kV) power loop electric test bed and supports critical infrastructure research and testing. CITRC includes a configurable and controllable substation and a 13.8-kV distribution network. Four test pads are located at CITRC within the CITRC distribution grid. Some testing connects multiple test pads using the CITRC microgrid distribution infrastructure. These graveled/paved test pads furnish areas to place test equipment (e.g., transformers, circuit breakers, switches). Test pads also serve as parking areas for personnel performing setup and testing.

Preparation of the CITRC site would be performed over the course of up to 6 months prior to the arrival of the mobile microreactor at the site. Preparation would involve construction of a 200-foot by 200-foot concrete pad about 8 inches thick to create a level surface for the CONEX containers.

Upon arrival at CITRC test pad area B, C, or D, the mobile microreactor would be offloaded from the transports to the new concrete pad at the test pad area and the mobile microreactor modules reconnected. The temporary shielding, consisting of concrete T-walls, steel-reinforced concrete roof panels, concrete wall blocks, steel bladders for water shielding, and HESCO® bags, would be installed. The completed shielding structure would be about 5,000 square feet and up to 30 feet tall around the microreactor module.

A limited version of the startup tests performed at DOME (or CITRC) would be performed to verify that no modules were damaged during transport.

At CITRC, the mobile microreactor system would be connected to the CITRC microgrid which is separate and distinct from the INL/commercially supplied electrical grid. Diesel generators and load banks would be attached to the microgrid. The generators and load banks would apply realistic loads and supplies to the microgrid to test the mobile microreactor in a realistic setting**.** Additional pads would be used to house the load banks and diesel generators to simulate a microgrid (electrical power loads for the mobile microreactor) during testing.

At-power testing, performed according to test procedures yet to be developed, would verify the ability of the mobile microreactor to operate at its rated power level for an extended period under normal, off-normal (but expected), and upset (not expected but anticipated) conditions. Transient tests performed would demonstrate mobile microreactor features, not push it to damage conditions. Transient testing would demonstrate upset conditions that would last at most a couple of days but more likely hours. In addition, the CITRC site would require a mobile office trailer that could contain a restroom, potable water, donning/doffing facilities, equipment storage, charging stations, etc. The mobile microreactor operations phase at CITRC is anticipated to take around 2.5 years to complete.

Temporary Storage

After operational testing, the mobile microreactor would be disassembled and placed in temporary storage, awaiting eventual disposition. There are two options for temporary storage of the mobile microreactor system (within their CONEX containers) at the INL Site: the RSWF receiving area (MFC–771) and ORSA (MFC-797). A reinforced concrete pad would be constructed at either of the temporary storage locations, and minor upgrades in fencing and instrumentation would be required if stored at ORSA.

Post-irradiation Examination and Disposition

After the mobile microreactor's useful life is complete and after a period of temporary storage, all of the materials would be disposed. The mobile microreactor components would be disposed of through the appropriate waste streams. It is anticipated that the mobile microreactor would be deconstructed and parts and/or fuel removed to aggregate like-class wastes. After deconstruction, irradiated materials would be safely stored with other similar DOE-irradiated materials and experiments at MFC, most likely in the HFEF or the RSWF. 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.

Public Hearings

SCO will host two public hearings regarding the Draft EIS. Meetings will be held in-person with simultaneous livestream over the Internet. A toll-free number will be available for commenters not at the in-person meeting. Interested parties are invited to join either or both of the public hearings, each with identical presentation content, planned to be held at the Shoshone Bannock Hotel and Event Center, 777 Bannock Trail, Fort Hall, Idaho 83203. An American Sign Language interpreter will be present**.** A recording of the public hearings will be made available to the public at the online website listed above. Individuals attending the hearings in person will be required to wear appropriate face coverings and to follow social distancing guidelines. Ongoing health concerns as a result of the evolving COVID-19 restrictions could result in changes or cancellation of the in person public hearings. Further public announcements will be made in the event of a postponement or cancellation. In the event of cancellation of the in-person hearings, the online virtual hearings would still occur on the scheduled dates and at the scheduled times.

The hearings will begin with a presentation providing an overview of the project, information on the NEPA process, and highlights of the Draft EIS content and analysis. Following the presentation, individuals participating both in-person and remotely will be offered an opportunity to provide oral comments on the Draft EIS. The hearings will conclude after two hours or when there are no additional commenters, whichever occurs first. Public comments will be addressed in the Final EIS. You may pre-register to comment by sending an email to PELE_NEPA@sco.mil. A court reporter will be present to transcribe all comments.

Dated: September 17, 2021.

Aaron T. Siegel,

Alternate OSD Federal Register Liaison

Officer, Department of Defense.

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