

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: Support of U.S. Department of Defense Strategic Capabilities Office Project Pele

SECTION B. Project Description and Purpose:

Project Pele is a mobile microreactor program using a two-phased approach to mitigate project and technical risk. Phase I is design and Phase II is construction. In Phase I (approximately 24 months), Department of Defense (DoD) intends to award multiple prime contracts. At the conclusion of Phase I, there will be a non-competitive down selection process to identify the team(s) for Phase II (approximately 24 months). Phase I awardees will work to develop a prototype design for a mobile microreactor and will produce programmatic design-to-build and risk reduction plans before a successive Phase II award.

A memorandum of understanding (MOU) between the U.S. Nuclear Regulatory Commission (NRC), DOE, and DoD Strategic Capabilities Office (SCO) on microreactor research development and demonstration was signed on May 10, 2019, outlining cooperation and coordination between the three agencies on Pele. The MOU specifically lists DOE and its national laboratory infrastructure for providing technical, National Environmental Protection Act (NEPA), siting, and safety basis documentation support. INL will provide Project Pele support in the following areas:

- Safety basis preparation
- Procurement and transportation of tristructural isotropic (TRISO) fuel
- Environmental compliance, including any required NEPA analysis.

Potential areas of support are being explored by DoD as options, these include

- SCO microreactor transportation
- Destructive testing of TRISO fuel particles and compacts.

Note that initial funding in FY 19 and FY 20 for the listed activities will be paper studies, supporting calculations, and planning for additional tasks. An environmental checklist has been prepared that supports the scope listed here. (i.e., only paper studies, supporting calculations, and planning). As Project Pele progresses and additional work is planned, the environmental checklist will be updated.

Tasks

Task 1: Safety Basis Preparation

INL will provide safety basis preparation and documentation for the Pele designs. Documentation includes preparation of the safety design strategy (SDS), preliminary safety and design results (PSDR), preliminary documented safety analysis (PDSA), and final documented safety analysis (FDSA).

The SDS will provide the DOE authorization path through the regulatory standards and other guidance and seek DOE concurrence on that path. Initially, an SDS will be prepared for each design with a goal to develop a generic SDS for all Pele designs.

In the PSDR step, a preliminary set of accidents will be identified along with the necessary safety systems to adequately prevent or mitigate accidents. This process will ensure the design safety functions are met. A PSDR is needed for each design concept.

The PDSA will identify the full set of necessary safety systems, associated safety functions, and required performance criteria. It will contain enough detail that procurement specifications and acceptance tests for safety systems can be developed based on the approved criteria.

The FDSA will allow operation of the plant once the safety analysis criteria are implemented and will ensure appropriate startup readiness has been verified. It provides the basis for safe operation of the plant if operations are controlled within the described bounds and according to the approved controls.

Task 2: Reestablishment of US TRISO fuel production capability

The reactor core in the SCO design will use TRISO fuel with uranium-235 enrichment levels of ≤ 19.8 wt%. SCO needs a TRISO fuel line that can produce at least 600 kg of uranium TRISO compacts by 2023 to support their schedule. The first step in that process is to re-establish a TRISO fuel production line in an NRC facility licensed for the production of TRISO compacts in the quantities required by SCO. Funding in FY 19 and FY 20 will be used to procure a subcontract to develop a detailed cost estimate, schedule, list of milestones, and equipment needed to support SCO (this work will not fall outside of the existing NRC license). The subcontractor will also perform studies on the necessary staff and shifts (12 hr, 24 hr) needed to support the SCO timeline.

A subcontract to reestablish a TRISO fuel production capability will be established with an NRC licensed facility. A subcontractor has not been identified yet and as the project matures the EC will be updated.

Task 3: NEPA Support

DoD SCO intends to conduct Pele prototype development in compliance with all environmental laws and regulations, including NEPA. SCO is the lead agency for purposes of conducting any required NEPA analysis, with DOE serving as a cooperating agency. Both NRC and the U.S. Army Corps of Engineers are providing technical support services to the NEPA analysis effort. One of the potential identified locations for construction and testing of the microreactor prototype is INL. INL staff will coordinate with DoD SCO to support the NEPA process and provide siting information if required. SCO will not make any decisions as to siting of the prototype before completion of the required NEPA analysis.

Optional Tasks

Task 4: SCO Microreactor Transportation

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Project Pele is unique in its ability to easily transport the microreactor (both before and after operation) by truck, train, or plane to identified locations. The designs, to the extent possible, should facilitate ease of packaging, transport to the operational site, disassembly, and preparation for transportation from the site. All components are required to fit in a 20 or 40-foot International Organization for Standardization (ISO) 688 container and be transportable. The NRC has regulatory guidance and a licensing process for standard spent fuel transportation packages. The National Nuclear Security Administration (NNSA) can also license the transportation of special nuclear material. However, a licensing pathway has not been identified for the SCO microreactor nor has the necessary analysis and testing been performed to qualify the transportation package.

The activities in FY-20 will be to identify gaps in the regulatory structure for transportation of microreactor systems and make recommendations and plans for addressing these gaps. FY-20 will be only paper studies. Activities beyond gap analysis may require additional NEPA action and an update to the EC.

This activity will outline and document a licensing pathway for shipping the SCO microreactor by truck, train, and/or plane. It will also perform the analysis and testing necessary to qualify the transportation package. In the future, analysis necessary to qualify the transportation package may be required. It is premature at this time to know what that testing would entail. Before decisions are made to qualify the transportation package, additional NEPA review may be required.

Task 5: Destructive Testing of TRISO Fuel Particles, Compacts, and Shielding

To establish the robust performance of TRISO particles during off-normal external events, destructive testing may be performed on TRISO particles. These tests build on destructive testing of surrogate TRISO particles completed in FY-19. In FY-20, a plan for the tests will be written and physical tests will begin.

In FY-20, a plan for the tests will be written. At this time physical testing needs are undetermined and as testing plans develop the EC may need to be updated. R&D modeling and simulation will also be performed to estimate dispersion. The testing may be performed at a site that already has NEPA coverage, or if a new site is used additional NEPA review may be required.

DOE-ID Support

Task 6: DOE-ID Support Services for PELE

DOE-ID will be responsible for providing technical information and subject matter experts to advise, execute, and support SCO, as DOD's lead, on matters within its jurisdiction by law or special expertise. Such matters include, but are not limited to, demonstration micro-reactor design; on-site safety, environmental, and health requirements; site selection criteria and micro-reactor construction; safety basis determination, and future material support to SCO at a DOE laboratory or facility during siting and construction; subject to and consistent with determinations made after appropriate environmental analysis is completed.

The DOD and DOE will coordinate as appropriate, within the scope of their statutory authority, to ensure the following activities are fulfilled:

- Subject matter expert support to DOD's pre-award and source selection contracting activities
- Environmental analysis of alternatives for proposed Project PELE design, siting, construction, operation, and decommissioning in advance of the build phase of the project.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Generating and Managing Waste

Small amounts of common office trash are expected and would be disposed of appropriately. All work is considered office work and routine administrative activities in nature

Using, Reusing, and Conserving Natural Resources

Project personnel will use every opportunity to recycle, reuse, and recover materials and divert waste from the landfill when possible.

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 A to Subpart D, A9 "Information gathering/data analysis/document preparation/dissemination" and Appendix B, B3.6, "Small-scale research and development, laboratory operations, and pilot projects".

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Justification: Project activities described in this EC are consistent with 10 CFR 1021, Appendix A to Subpart D, item A9 "Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)"

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); smallscale 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;"

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: 9/11/19