Phase 2 NuScale SMR FOAK Nuclear Demonstration Readiness Project

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Program: First of a Kind Nuclear Demonstration Readiness Projects

ABSTRACT:

Project Objectives: The overarching objective of the Phase 2 NuScale SMR FOAK Nuclear Demonstration Readiness Project is to enhance innovation and competitiveness of the U.S. nuclear industry by enabling timely deployment of the NuScale Small Modular Reactor (SMR). The proposed scope builds on the successes of the Phase 1 NuScale SMR FOAK Nuclear Demonstration Readiness Project and continues to advance the licensing and design maturity, particularly in those related to supporting customer readiness, and shifts the focus to supply chain integration, cost competitiveness, and cost confidence.

The proposed activities are the second phase of the NuScale U.S. product realization program and are required to ensure both design completion and supply chain readiness to meet a commercial operation date (COD) of 2026 for the first-of-a-kind (FOAK) NuScale plant. Specific objectives of the proposed Phase 2 Project are:

- To fully support Nuclear Regulatory Commission (NRC) review of the NuScale design certification application (DCA) to ensure approval of a final safety evaluation report (FSER) by the end of 2020
- To improve plant cost confidence and cost competitiveness through design and supply chain advancement, incorporation of constructability best practices, and margin recovery to increase plant power output
- To accelerate design maturity, technology development, and operational program readiness to support a 2019 customer commitment for plant deployment

The Phase 2 Project objectives will provide direct benefits to NuScale, domestic manufacturers and service providers in the NuScale supply chain, utility customers, and the overall U.S. economy.

Project Description: The NuScale SMR is an elegantly simple advancement of pressurized, light-water-cooled reactor technology that reduces complexity, improves safety and resilience, enhances operability, and reduces costs. Our proactive engagement with NRC, as well as design engagement of suppliers and potential customers, has led to an evolutionary design process that anticipates and solves design, licensing, and modularization issues in advance. The design is backed by extensive testing and simulation to support the design basis. The NuScale design incorporates design innovations that make our SMR safer than currently certified designs, including our “triple crown of safety” - a failsafe emergency core cooling system that requires no operator intervention, no AC or DC power, and no additional water for an indefinite cooling period.

To date, work has progressed through submission of a Design Certification Application, docketing by the NRC, and over one year of NRC review. The Phase 2 Project scope represents the next phase of the U.S. product realization effort required to bring the NuScale design to market. This project

includes advancing the NRC DCA review to achieve major licensing milestones; completing the integrated systems validation efforts; performing additional high-priority I&C and system integration efforts; further developing the design to ensure manufacturability, constructability, and operability;; and ensuring operational program readiness to meet client schedules. These efforts improve cost and schedule certainty, support an initial customer commitment for deployment, and are fundamental building blocks necessary to meet the 2026 COD deployment milestone.

Major Deliverables: The Phase 2 Project will be completed in June 2019 and will result in several key accomplishments that include the following outcomes:

- Integration of design for manufacturing with the manufacturer of NuScale Power Modules™ and fabrication testing for long-lead components
- Confirmatory testing to support design and analyses for innovative components and systems
- Value engineering studies to enhance the cost competitiveness of the plant design
- Completion of the results summary reports to demonstrate the effectiveness of the NuScale operator training and control strategy
- Improved infrastructure for product lifecycle and requirements management to support manufacturing, client requirements, and EPC integration

In addition, the project will continue to progress the review of the design certification application and will advance the design development and demonstration of FOAK systems and the development of the NuScale supply chain.

Potential Impact of the Project: Successful licensing, commercialization, and deployment of NuScale SMRs provide direct and lasting benefit to the U.S. The project utilizes a U.S.-based supply chain, thus creating jobs and economic benefits throughout the nation. Currently, 95% of supplier contracts are with U.S.-based companies. It maximizes the probability of successful and timely certification of the design through a proactive NRC interaction and matures the module and plant design, to reduce customer risk and increase deployment schedule certainty. The project creates a viable SMR technology for domestic and export market deployment, which in turn helps to reestablish a global U.S. pre-eminence in advanced nuclear technology. NuScale is well-positioned to meet potential global demand for SMRs while facilitating future innovations and economic competitiveness within the U.S. nuclear industry.

Major Participants: NuScale offers its response to this FOA as a single entity, NuScale Power, LLC.