“Special Purpose Applications” is a technical area under the Advanced Reactor Technologies program that was established in FY18 to:

• Develop and demonstrate technologies and manufacturing approaches that will enable the near term deployment of Megawatt class, very small modular reactors (vSMR) (<20 MWt) for non-traditional applications
  – Development areas include core structural materials, heat exchangers, power conversion systems, reactor control and shutdown system

Key features and use-cases:

• Defense application
  – Uninterrupted mobile power without cyber vulnerabilities
  – Heat and power to support various operational needs

• Commercial application
  – Support for remote communities, mining sites, etc.
  – Features similar to defense applications, but with emphasis on economics
Current R&D Objectives

• Conduct fundamental R&D to reduce uncertainty and risk in the design and development of vSMRs; R&D selected to benefit multiple concepts.

• DOE-funded R&D is selected to support technology maturation that is broadly applicable to multiple vSMR concepts to ensure that concepts can be licensed and deployed to meet specific use-case requirements.

• Key R&D areas include (as they apply to this class of reactor):
  – Advanced manufacturing (AM) for components and systems
  – Heat exchanger design and PCU integration
  – Moderator options; e.g. high temperature hydride development
  – Instrumentation and control
  – Unique licensing challenges (e.g. transportation, semi-autonomous control, AM materials)
FY19 Scope

- Applications are sought for technologies that support portable compact reactors that would be used to produce electricity in a microgrid configuration, and/or to use heat directly for other applications.

- The program seeks technologies that advance existing concepts toward market readiness or improve on their economic performance, safety, security, and/or environmental impact.

- Specific areas of interest, specific to special purpose reactors, include:
  - Advanced manufacturing to support factory manufacture of reactor and system components
  - Advanced instrumentation and control approaches that support semi-autonomous or autonomous control
  - Novel power conversion systems, static or dynamic, that improve on the current state of the art, as well as the associated heat exchanger designs

- Though proposals are not limited to the example work areas above, applicants should indicate how their proposed work will support current DOE, national laboratory, and/or U.S. nuclear industry deployment and commercialization R&D initiatives.

Federal POC – Rebecca Onuschak: Rebecca.Onuschak@nuclear.energy.gov
Technical POC – Shannon Bragg-Sitton: shannon.bragg-sitton@inl.gov