
Underground Waste Storage Tanks Removal and Installation of New Above Ground Waste Storage Tanks and Waste Evaporator Pit at the Radiation Science and Engineering Center

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Collaborators: N/A

Program: Reactor Upgrades

ABSTRACT:

The Penn State Breazeale Reactor (PSBR), the centerpiece of the Radiation Science and Engineering Center (RSEC), first went critical in 1955 and is the nation's longest continuously operating university research reactor. The PSU RSEC has a vision to become one of the nation's premier neutron science facilities. To this end we have leveraged DOE NEUP, RSEC, and University funds to complete major infrastructure projects, notably the core-moderator and beam port assembly renovation in 2018, in order to correct a beam port alignment issue that was present since 1965. The construction of a new beam hall will enable these improvements to be fully realized. The University recognizes the importance of the RSEC's mission and vision, as evidenced by the commitment of \$5M of University funds to complete the beam hall project. This proposal will enable the realization of this vision by eliminating the underground wastewater storage tanks and waste evaporator pit that impede the construction of the new beam hall, replacing them with a safer, more modern and secure tank farm. These funds will allow progress to continue toward the goal of massively expanding the number of neutron experiment stations available to RSEC users.

In order to fully utilize the new beam ports with a cold neutron source and the installation of neutron guides for various experiments we need to expand our existing neutron beam hall from about 1,000 sq ft area to 5,000 sq ft. This new expanded space will be above the existing underground storage waste tanks and a waste evaporator pit that they were installed in 1955.

In this application, we ask DOE NEUP reactor infrastructure funds for the amount of \$782,343 to remove, dispose, and environmentally remediate the antiquated underground storage tanks and evaporator pit. Both the waste storage tanks and evaporated pit with its shed will be replaced with above ground facilities within the expanded new beam hall space. The new expanded beam hall is essential for the development of new neutron beam techniques. Our new upgraded and improved facility with a cold neutron source and supermirror neutron guides will offer unparalleled research opportunities for PSU faculty and graduate students in multiple disciplines while providing an excellent test-bed for the development of instruments and experiments for researchers at PSU, as well as other regional and national university researchers, industry, and national laboratories. The addition of new neutron beam port facilities including a Small Angle Neutron Scattering (SANS) instrument that is donated to Penn State by The Helmholtz-Zentrum Berlin (HZB), Berlin Reactor II, Very Small Angle Neutron Scattering (HZB BERII VSANS) (over \$9M value), new time-of-flight neutron depth profiling, prompt gamma activation analysis system and neutron imaging system in the existing RSEC capabilities will expose students to a range of important applications. Both undergraduate and graduate students will be educated in neutron beam techniques via cutting edge and innovative applications. We also intend to include the PSU SANS facility as a user facility within the DOE-NSUF program.