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## **Maximizing Long-Term Availability of The Ohio State University Research Reactor for Supporting Research and Education via Replacement Equipment for Crucial Reactor Pool Components**

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**Program:** University Research Reactor Upgrades Infrastructure Support

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### **ABSTRACT:**

The Ohio State University Research Reactor, an NSUF partner, depends upon many old, custom components in and around the reactor pool for which there are no replacements. Failure of any of these would likely result in an extended downtime, so consistent with instructions in the FOA, we are requesting funding to obtain replacement/spare custom facility components to “enhance the institutions’ availability to perform R&D that is relevant to DOE-NE’s mission” by precluding a such a failure. Specifically, the objective of our request is to ensure that the laboratory can continue to support and to expand its avenues of research, including those funded by DOE-NE, by obtaining replacement/spare components to preclude significant downtime from component failures.

To ensure long-term reactor viability, the lab has made a goal of eliminating potential single-point failures and has made great progress in doing so. However, the OSURR has many components in and around the reactor pool for which a failure could cause very significant downtime, including:

- Leakage of a watertight barrier, such as an extension cap, a detector canister, or a dry tube.
- Broken fuel handling tool.
- Failed pool-water process or makeup system.
- Failed pool-top drive system.
- Failed power calibration system.

Watertight components, like the ones that have been in service for the OSURR for decades, become more susceptible to developing leaks as they age, and reactor support systems, like water systems and calibration equipment, become more likely to fail over time. Failure of any of the requested components could result in the suspension of reactor operations for an extended period, so acquisition of these components will help maximize ongoing OSURR availability. In addition, small hardware dropped into or onto core that cannot be retrieved could also result in extended downtime, so replacement of existing pool-top brackets with ones featuring captive screws would be wise, and replacement of the OSURR’s existing rusty fuel-transfer cask with one fabricated using stainless-steel would be prudent. Custom component replacements often take months or more from order to delivery, and with COVID-19, even longer lead times have become common.

Because a failure of any one of the requested components could result in a long reactor outage, acquisition of the components requested in this proposal are essential for decreasing the probability of a single-point failure causing extended downtime. This request is part of a synergistic long-term effort that builds upon DOE’s previous investments in the facility.