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## Idaho State University Reactor Laboratory Instrumentation and Physical Facility

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**Collaborators:** N/A

**Program:** Reactor Upgrades

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### ABSTRACT:

This project will modernize radiation detectors and associated instruments used to perform laboratory experiments and research in the Idaho State University Reactor Laboratory. Additionally, the project will provide physical improvements to the sub-critical assembly as well as overall physical improvements in the laboratory bays. These improvements will greatly enhance the ability to perform laboratory experiments, perform fundamental research, and attract high quality students.

The reactor laboratory includes an AGN-201 nuclear reactor and a sub-criticality assembly device. The reactor and sub-critical assembly have served the university well for decades and are expected to continue performing well for quite some time to come. However, some of the radiation detectors and associated instrumentation used when performing experiments and research have reached, or exceeded, their design life. Upgrading the detectors and equipment used in performing the experiments will significantly improve the ability to acquire meaningful measurements as well as improve the reliability of the necessary laboratory equipment. Additionally, improvements associated with the sub-critical assembly will allow much greater fidelity in performing approach to critical experiments as well as decreasing the probability of damaging the fuel plates used in the assembly.

The sub-critical assembly improvements include replacing the aluminum grid plates with polyethylene grid plates. The new polyethylene grid plates will decrease wear on the aluminum cladding of the fuel plates. Modifications to the tank draining and filling mechanisms will reduce the time required to fill and drain the tank.

These reactor infrastructure improvements will have a significant impact on the ability of the university to perform laboratory experiments and research because the instrumentation will be much more reliable and the associated data collected will be of higher quality. Additionally, improvements in the overall appearance of the laboratory area will attract more and higher quality students, which will necessarily lead to greater faculty involvement.

The improvements will greatly enhance student and faculty opportunities for both laboratory experiments as well as research. The instrumentation and physical improvements will attract more and higher quality students. Moreover, the sub-critical assembly improvements (instrumentation as well as grid plates and fill and drain mechanisms) will attract training opportunities for non-university personnel seeking criticality safety training. This is particularly important for personnel seeking to qualify as a criticality safety engineer under the requirements set forth in ANSI/ANS-8.26, Criticality Safety Engineer Qualification, which places great emphasis on hand-on experience.