
Safety and Reliability Enhancements for the UC Irvine TRIGA Reactor

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Program: Reactor Upgrade

ABSTRACT:

The TRIGA Reactor in the Chemistry Department of the University of California Irvine is strongly utilized in our research and education programs in radiochemistry, nuclear fuels, and materials for extreme environments at the undergraduate, Master's, and Ph.D. levels. UCI is committed to educating the next generation of nuclear scientists, engineers and academics in which the TRIGA reactor plays a crucial role. Since its inception over 50 years ago it has continuously been utilized in research projects by faculty and students in the field of nuclear science, engineering, and technology. Thus, the reactor plays a central role at UCI to develop a workforce capable of supporting the design, construction, operation, and regulation of nuclear facilities and the safe handling of nuclear materials. Due to the age of the TRIGA reactor facility, the modernization of several parts is pressing. The requested upgrades represent the first phase of modernization that is expected to continue through further grant applications. The current proposal will increase the reliability of the reactor instrumentation and control systems, increase the radiation safety for experiments while expanding research capabilities, and improve the fuel surveillance and management program.

The requested upgrade from a paper log recorder to a digital console chart recorder will not only provide more reliable and higher precision of logging of data, but will at the same time enhance the capabilities due to the upgrade from two to eight data logging channels that can simultaneously log data with much higher accuracy such as the pulse energy and fuel temperature. UCI has been approached by users that rely on higher accuracy data logging than currently possible at UCI, thus the proposed digital recorder upgrade would open up new research opportunities for internal as well as external users.

In our role as the only educational institution in Southern California with such a facility we are committed to providing all students the best opportunities and environment to learn. During reactor tours we educate them about nuclear energy and its opportunities as well as nuclear science research opportunities in our facility. Thus, the upgrade of our dosimetry system would be highly beneficial as it will allow for higher participation rates during these tours and make the safety related documentation more efficient and reliable.

Finally, the upgrade of an underwater camera will improve the safety operations of our facility by making fuel inspections easier and more efficient. The proposed camera system will also be used to monitor experimental set ups in the reactor pool and to record video footage of the fuel inspections as well as monitoring ongoing experiments. Videos showing the core and fuel manipulations will also be utilized for educational purposes in both UCI classes and outreach activities.