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DOE GRANT No. DE-FG07-90ER12990
FINAL REPORT

FRS Account 306900

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Funds were provided under the DOE University Reactor Instrumentation Program for the University of Arizona Research Reactor to update and enhance its instrumentation. During the first year of the Grant, 1990-1991, the equipment procured was to enhance the radiation protection program. Two items of equipment were purchased: a hand and foot exit monitor and a portable neutron survey meter.

HAND AND FOOT EXIT MONITOR SYSTEM

The monitor purchased, from Eberline Corporation, allows hands and feet to be scanned simultaneously, while making an appropriate correction for background radiation. Although it is not usual for persons in the Reactor Laboratory to become contaminated with radioactive material, reactor procedure require this type of monitoring when irradiated experiments and samples are handled. A portable hand-held monitor is also used for this purpose. The equipment is of a type similar to that used in the nuclear industry, and familiarization with its use provides student with valuable experience. The equipment operates satisfactorily and has enhance the ability of the Laboratory to control the possible spread of radioactive material.

NEUTRON SURVEY METER

The instrument purchased, Eberline ASP-1/NRD replaced and obsolete instrument which could no longer keep a reliable calibration. The new instrument is easier to use and more accurate. It is also similar to instruments currently used in industry. It is used when neutron sources are in use in the Laboratory and when a neutron beam port is installed near the reactor. Laboratory classes routinely use the instrument during instruction in radiation protection. the instrument has performed satisfactorily and has proved able to remain in calibration.

During the second year of the Grant, 1991-1992, the equipment procured was to enhance the instrumentation for the reactor and for an associated gamma irradiation cell. Items of equipment purchased were: a linear/log power chart recorder, a computer based data acquisition system and an electrometer with probes for measurement of gamma dose.

CHART RECORDER

The chart recorder replaced an old instrument centrally located in the reactor control console. The previous instrument was susceptible to noise, electromagnetic interference and drift of its calibration. It was also becoming difficult to maintain. After

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licensing review by the reactor safety committee, the new instrument was installed and has operated reliably and accurately.

COMPUTER BASED DATA ACQUISITION SYSTEM

The computer based data acquisition system, together with interface cards, has been used to enhance laboratory classes for undergraduate and graduate student using the reactor. The equipment permits the recording of time dependent signals during reactor transients, and is also used for the analysis of data. Approximately 20-25 Nuclear Engineering students use the equipment extensively each year.

ELECTROMETER AND IONIZATION CHAMBER PROBES

A calibrated ionization chamber provides the laboratory with the ability to perform precise irradiations in its gamma irradiation facilities and to check the calibration of other gamma dosimetry systems used in reactor irradiations. The Radocon instrument purchased under this grant has improved the utilization of these facilities because of its precise calibration, traceable to NIST. An additional gamma irradiation facility has been developed at the reactor laboratory for low dose rate exposures and this has been calibrated using a probe purchased under this Grant.

SUMMARY

The equipment provided by this DOE grant has improved the reactor operations at the University of Arizona, and provided improved service to students and researchers using our facilities.

John G. Williams
Reactor Laboratory Director
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