

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

L-77 TRAINING REACTOR

ANNUAL REPORT OF OPERATIONS

January 1, 1984 through December 31, 1984

License R-124

Docket No. 50-433

A.E. Profio, Reactor Director

February 14, 1985

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Operating Experience, Changes and Tests

This is the tenth annual report for the 10 watt, L-77 training reactor at the University of California, Santa Barbara. The reactor is operated mainly for instruction in nuclear engineering.

The L-77 reactor is the principal facility for the NE125 Neutronics Laboratory course. The course is required for all B.S. degree majors in nuclear engineering, and may be taken as an elective by graduate students or majors in other fields. In 1984, six students took the course for credit. Experiments include power calibration by flux plotting, control rod reactivity calibrations by subcritical multiplication and super critical period measurements, reactivity worth (importance) of neutron absorbing and scattering samples at different positions within the through-core tube, and approach to critical. The students operate the reactor under supervision of a licensed operator. The lab is offered in the Spring Quarter, once a week for 4 hours. Senior Operator is Professor A.E. Profio. An operator trainee (Stuart Scheffel) performs the weekly alarm checks as well as maintenance of the reactor and instruments, with the help of other department employees.

There were no significant changes in the facility in 1984, except for improved security precautions during the Olympic Games, with some measures remaining after the games.

Tests and Calibrations Performed:

Annual

Power calibration	5-16-84	ok
Control rod worth	5-2-84	ok
Control inspection	2-8-84	ok
Radmon/CAM cal.	2-16-84	ok
Seismic calib.	1-23-84	ok
Tank/console maint.	2-29-84	ok

Semiannual

Rod drop times	5-24-84	(1-16-85)	ok
Pressure scram/cal.	1-5-84	10-17-84	ok
Shield water scram	1-5-84	10-17-84	ok
Flux instr/rec. cal.	7-20-84	due 1985	ok
Rad/cont. survey	4-17-84	12-17-84	ok

Radiation and security alarms were checked weekly.

Unscheduled Shutdowns and Scrams

2-21-84: Spurious period scram from electrical transient on switching rod drive.
3-16-84: Spurious period scram on moving rod down to level at 8.3 watts.
3-26-84: Spurious period scram on raising reg. rod, still subcritical.
Note: maintenance 4-8-84 greatly reduced tendency to scram from rod switching.
12-17-84: Scram on improper range switching on picoammeter.

Preventive and Corrective Maintenance Operations

Spurious period scram problem was solved when shunt resistor in picoammeter, inadvertently left out when last calibration was made, was replaced.

Normal preventivemaintenance was carried out.

There were a number of false security and radiation alarms, some of which were related to momentary power outages:

- 1-30-84: False radiation alarm, probable electrical power transient.
- 4-16-84: False security (motion detector) alarm, cause not determined.
- 4-17-84: False motion detector alarm. Sensitivity may be too high, reduced.
- 4-29-84: False air monitor radiation alarm: trip point set too low.
- 6-9-84 : False security alarm. No signs of entry. Cause not determined.
- 9-11-84: False area radiation alarm: power outage.
- 10-14-84: False security alarm. No sign of entry. Cause unknown.
- 10-15-84: False security alarm. No sign of entry. May be faulty sensor.

Changes Under 10 CFR 50.59

None.

Radioactive Effluents Discharged

Liquid wastes: none.

Solid wastes: Very low level contaminated gloves and similar items disposed to radwaste container for pickup and off-site disposal by contractor, through Environmental Health and Safety Office on campus.

Gaseous Wastes: Not discharged during operation as core-recombiner vessel is sealed and under vacuum. The core-recombiner vacuum (pressure) gage is recalibrated, and the loss-of-vacuum alarm and trip are tested semiannually, by admitting air and then reevacuating into a holdup tank, for decay over the 6-8 months between tests. Short lived activities in the vessel gas space decay between tests. Long lived activity, in particular 10.4-year half-life krypton-85, is discharged to the atmosphere (mixed with room exhaust air) when the holdup tank is evacuated. Calculations based on watt-hours of operation, fission yield of krypton-85, and conservatively neglecting radioactive decay, give for activity discharged in 1984: 0.13 microcurie, negligible health effect.

Environmental Surveys Done Outside Facility

Radiation levels are measured immediately outside the facility as part of the semiannual radiation-contamination surveys. All were background level or lowest measureable (less than 0.1 mR/hr).

Significant Radiation Exposure

None.

Energy Output in 1984

15.7 watt-hours

Hours Critical in 1984

16.2

Energy Output Since Initial Criticality

343.1 watt-hours (14.3 watt-days).

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Chancellor at Santa Barbara

February 21, 1985

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commission Members;

Please find enclosed the University of California at Santa Barbara L-77 training reactor annual report of operations for 1984, reference License R-124, docket no. 50-433.

If further information is required, please contact Dr. A.E. Profio, Nuclear and Chemical Engineering, UC Santa Barbara (805) 961-3788.

A handwritten signature in cursive script, appearing to read "Robert J. Kroes".

Robert J. Kroes
Vice Chancellor
Administrative Services

cc: A.E. Profio

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