ANNUAL REPORT

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NUCLEAR ENERGY LABORATORY

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

UNIVERSITY OF CALIFORNIA, LOS ANGELES

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ANNUAL REPORT: 1984

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REACTOR OPERATING EXPERIENCE

Reactor operations were suspended on February 2, 1984, when the drop time of rod number 2 deviated above the acceptable limit of the Technical Specifications. Rod number 4 also displayed an extended drop time although within the acceptable Technical Specification limit.

The reactor remained dormant pending a management decision concerning the future of the reactor. The decision was announced to the Nuclear Energy Laboratory faculty and staff by a memorandum dated June 14, 1984, from Dean George L. Turin, School of Engineering & Applied Science. The memorandum reported Chancellor Young's announced intent to withdraw the operating license renewal application.

The brief operations of 1984 are summarized below.

Number of runs	3
Thermal energy produced, Kwh	442
Reactor run time, hrs	6.7

CHANGES TO THE REACTOR FACILITY

June 22, 1984: The following measures were implemented to insure inoperability of the reactor: (1) The control blade shafts were severed at the surface of the biological shield, (2) The primary pump suction valve was closed, and (3) Power to the primary pump was locked out at the transformer vault.

June 25, 1984: The secondary water supply was disabled.

July 5, 1984: All unirradiated fuel was returned to the Department of Energy.

July 18, 1984: All beam port plugs, including those of the thermal column, were welded in place. The rod drive stubs were also welded to their penetration liners.

August 30, 1984: The primary water system was reactivated and the reactor fuel removed and transferred to dry storage.

September 7, 1984: The primary water was released to the sanitary sewer. See RADIOACTIVE MATERIAL RELEASES (liquids, tritium).

September 20, 1984: Professor William E. Kastenberg replaced Professor Ivan Catton as Director of the Nuclear Energy Laboratory.

October 10, 1984: The reactor shield tank water was released to the sanitary sewer. The water contained no discernable activity.

November 26, 1984: The first of four shipments of irradiated fuel left UCLA for return to the Department of Energy. Subsequent shipments departed UCLA at intervals of approximately one week. The fourth and final shipment was completed on December 19, 1984. This last shipment closed out UCLA's inventory of enriched uranium reactor fuel.

RADIOACTIVE MATERIAL RELEASES TO THE ENVIRONMENT

Total releases of radioactive material to the environment in calendar 1984 were:

Gaseous:	Argon-41	0.31 Ci
Liquids:	Tritium	2.34 mCi
Solids:	None	

Gaseous Effluents:

The principal gaseous effluent as monitored in the building exhaust stack is argon-41. The actual concentration is determined with a 4.3 liter gas-flow ion chamber calibrated in microcuries per milliliter versus ion current. The data are recorded on a strip-chart recorder whenever the reactor is operating.

Airborne radioactive particulate monitoring is done by the filtration method for air sampling analysis. The system uses Whatman #41 filter paper to sample both the supply and exhaust air ventilation ducts that serve the reactor room. The sampling pump and filters are located on the 3000 level above the reactor room.

Particulate air samples were analyzed for long-lived beta and possible alpha activity with a 2 PI gas-flow proportional counter located at the Radiation Safety Office. Results for 1984 of fifty simultaneous intake and exhaust samples showed no beta activity in excess of the minimum detectable activity (MDA) of approximately 11.4 dpm, equivalent to a concentration of 3.8E-13 micro-Ci/ml. Of these fifty samples, seven (beginning June 1, 1984) were also tested monthly for alpha activity. These samples did not exceed the MDA of 3.2 dpm, or 9.4E-14 micro-Ci/ml.

Liquid Effluents:

On September 7,1984, approximately 190 gallons of primary water containing 2.34 mCi of tritium was released to the sanitary sewer. Identification and quantification of the radionclides was

done with a liquid scintillation counter. The concentration was within the limits of 10 CFR 20 Appendix B, Table II, Column 2.

A release of 2560 gallons of shield tank water on October 8, 1984 contained no measurable radioactivity as observed with a sodium iodide crystal scintillator system.

Solid Waste:

No solid wastes were released to the environment. A fifty-five gallon drum containing 7.9 micro-Ci of natural uranium was shipped for disposal in 1984.

ENVIRONMENTAL SURVEYS

Periodic radiation surveys of controlled and uncontrolled areas are made by the reactor health physicist assigned by the Radiation Safety Office to the Nuclear Energy Laboratory. The surveys are performed routinely to indicate levels of contamination and general radiation. In 1984 there were no levels discernable above the natural radiation background. Complete results of current surveys are on file in the health physicist's office.

Contamination Surveys:

Monitoring of the reactor room and environs for contamination is performed routinely. Since the official closure of the reactor in June 1984, surveys were done periodically to assure personel exposures ALARA. Special surveys were made before, during, and after fuel handling (transfer to storage pits, marking, and shipping operations) to assure that control of contamination was effective in all efforts. No discernable fixed or removable radioactivity was identified. Complete observations and findings are on file at the reactor health physicist's office.

Radiation Surveys:

Annual area radiation surveys have normally been made in past years during June or July and with the reactor at full power. The reactor became inoperable after January 1984, and no annual survey was performed. Radiation exposure levels at all accessible surfaces of the reactor and control rooms, and including the third floor area above the reactor room (outside the equipment room), did not exceed the prescribed protection limits of 10 CFR 20.

Area Monitoring Program:

Until October 1984, radiation monitoring badges were placed in specific locations in both Boelter Hall and the Math Sciences Addition. These devices contained a photographic emulsion with varying sensitivity to beta, gamma, and x-rays. The program for the Math Sciences Addition was discontinued in September 1984, as by that time the reactor had been permanently shut down.

Radiation monitoring has been continued on a monthly basis in areas peripheral to the reactor room. Calibration, processing, reading, and reporting of these badges is performed by the R. S. Landauer, Jr., and Co. The current locations of these badges are shown in Table I. No measurable exposures were detected on any of the badges.

Table I: Area Monitor Locations

Badge	Location		Period
0203	BH 8000 Level	Inside Exhaust Plemum	1 mo
0265	BH 8000 Level	Exhaust Stack Grill	1 mo
0302	MS 9000 Level	MS Air Intake Grill	1 mo
0820	BH 8000 Level	South End Cooling Tower	1 mo
1581	BH Rm 2000A	Health Physics Office	1 mo
0218	BH Rm 2001	Reactor Control Room	3 mo
0219	BH Rm 1005	Electronics Shop	3 mo
0220	BH Rm 2567	NEL Business Office	3 mo
0230	BH Rm 1561	Outside South Wall of Reactor Room	3 mo
2048	BH Rm 1000B	Outside North Wall of Reactor Room	3 mo

The last column of Table I shows the badge exposure period (in months) employed at each of the specific locations.

PERSONNEL DOSIMETRY

The personnel dosimetry program is administered by the UCLA Radiation Safety Office. Film badges for beta-gamma exposure, and thermoluminescent dosimeters for fast neutron exposure, were issued to personnel who might be occupationally exposed to ionizing radiation. Five staff members of the Nuclear Energy Laboratory and the reactor health physicist were included in the personnel dosimetry program reported here. A review of the records for the calendar 1984 reporting period indicates that whole body occupational exposures were within the limits set forth in Title 10, Code of Federal Regulations, Part 20. The records indicate that one individual received an exposure of 5080 millirem to his right hand. This exposure occurred during the fuel marking effort, and for which the pre-operational exposure was estimated to be 4250 millirem.

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COMMUNITY SAFETY DEPARTMENT
OFFICE OF RESEARCH & OCCUPATIONAL SAFETY
LOS ANGELES, CALIFORNIA 90024

June 20, 1985

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Docket 50-142
License R-71

A copy of the annual report for the UCLA reactor for the calendar year January 1 through December 31, 1984 is enclosed.

Sincererly,

Walter F. Wegst, Jr.

Walter F. Wegst, Jr.
Director, Research &
Occupational Safety

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