UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 29, 1982

John H. Frye, III, Chairman
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. Emmeth A. Luebke
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. Oscar H. Paris
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

In the Matter of
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA
(UCLA Research Reactor)
Docket No. 50-142
(Proposed Renewal of Facility License)

Dear Administrative Judges:

As directed by your Order of October 22, 1982 I am forwarding to you and the parties a copy of the statement of material facts attached to Staff's summary disposition motion filed September 1, 1982 with the citations requested by the Board.

Additionally, also as requested by the Board, the Staff hereby advises the Board that it does not dispute any statement of fact attached to the CBG motion for partial summary disposition of Contention XVII and does not dispute the following material facts attached to the CBG motion for summary disposition of Contention XIII: Nos. 2-10, 12-14; 17-22. Staff will provide citations for the statements opposed according to the Board's schedule.

Sincerely,

Colleen P. Woodhead

Enclosure as stated

cc (w/ encl.): Hirsch
Bay
Meyers
Cormier
Committee to Bridge the Gap
Helwick

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DATE					10/28/82	10/28/82	

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	)	Docket Nos. 50-142
	)	
	)	(Proposed Renewal of Facility License)
	)	
(UCLA Research Reactor)	)	

STATEMENT OF MATERIAL FACTS AS TO WHICH
THERE ARE NO GENUINE ISSUES TO BE HEARD

Contention I

1. The original operating license for the UCLA research reactor was issued in 1960 and renewed for a term of 10 years in 1971. SER pp. 1-2; 1-3. Application pp. III/1-1, 1-3.
2. The application submitted by the University of California for renewal of the UCLA research reactor license was reviewed for sufficiency by the Staff prior to docketing in 1980. Bernard Affidavit, ₱ 5.
3. The vibration test referenced on page II/3-1 of the application is fully reported and available in scientific literature. Application, p. II/3-1.
4. The results of the vibration test were reported to the NRC in 1968. Bernard, ₱ 13.
5. The accident analysis in Appendix III of the amended application was recently performed by the UCLA Staff. Amended Application, Appendix III, June, 1982.
6. The 1974 AEC environmental analysis of research reactors referenced in the application remains valid. Staff EIA; Bernard, ₱ 11.
7. Reference to generic safety studies in applications is permissible under the Commission's regulations. SER p. 14-1, Bernard ₱ 11, 13.

8. There is no requirement by the Commission that applications contain solely original studies and analyses. Bernard, P 11.

9. The UCLA research reactor is used for more than 3000 student hours of instruction for eight engineering and physics courses. Application, p. II/1-6.

10. The UCLA reactor was not significantly affected by the 1968 vibration test or a 1971 earthquake in the Los Angeles area. Application, p. III/3-2. SER pp. 3-1, 3-2, Bernard, P 14.

11. The technical specifications in the Application contain only minor changes from the present ones. Bernard, P 15.

12. No releases to groundwater would result from the maximum credible accident at UCLA. Bernard, P 16; SER § 14.

13. Presence of deep wells on the UCLA campus is not a significant fact for licensing the research reactor. SER §§ 11.1-2; 14.

14. A maximum credible accident would not result in releases to the public in excess of 10 C.F.R. Part 20 limits. SER § 14; NUREG/CR-2079.

15. The use of another University research reactor at a different campus would seriously impede the effectiveness of the UCLA nuclear engineering and physics department. SER § 10; Staff EIA pp. 5-6.

16. Experimental tests showed step insertions of $3.90 will not adversely affect the Argonaut UTR. SER p. 14-4.

17. Docketing of an application by Staff indicates that sufficient information has been provided to begin review. 10 C.F.R. § 2.101

Contention II

1. Less than 2% of the costs of owning and operating the UCLA reactor was incurred from non-academic activities during 1971-81. Petersen Affidavit, P 5.

2. The direct costs to UCLA for use of the research reactor for the fiscal year 1980-81 were $224,000. Petersen, ℙ 5.

3. The 1980-81 total direct and indirect costs for operating the UCLA reactor were $337,958. Application, p. I/2-1 (amended).

4. The costs to UCLA for commercial uses of the research reactor for the fiscal year 1980-81 were $3,000. Petersen, ℙ 5.

Contention III

1. The Commission's inspection and enforcement record for UCLA since 1975 shows no violations of safety significance. Johnson Affidavit on IV, ℙ 3.

2. The annual reports by UCLA to the Commission show no occurrence of safety significance. Morrill Affidavit on VII ℙ 4-5.

3. All notices of violation issued by the Office of Inspection and Enforcement to UCLA cite minor deficiencies and infractions without safety significance. Johnson, ℙ 3.

4. UCLA has taken adequate corrective actions in response to all notices of violation. Johnson, ℙ 3.

5. The Commission's records concerning operation of the UCLA research reactor show no evidence of inadequate management or administration which raise a concern for public health and safety. Morrill, ℙs 5; 10, Johnson, ℙ 3.

6. Unlicensed visitors to the UCLA research reactor have been allowed to manipulate the reactor controls only under the direct supervision of licensed operators as permitted by 10 C.F.R. § 55.4(d). Johnson, ℙ 4.

7. The UCLA reactor facility has been inspected at least annually by NRC inspectors for more than 20 years. Docket 50-142 file.

Contention IV

1. Only five items of non-compliance with minor technicalities have been cited against UCLA since 1975. Johnson Affidavit, ¶ 3; I&E Report 50-142/82-01.
2. The inspection record for UCLA shows no items of significant non-compliance with Commission regulations or the UCLA technical specifications. Johnson, ¶ 3.
3. Appropriate actions have been taken by UCLA to correct all items of non-compliance. Johnson, ¶ 3.
4. All licensee corrective actions described in responses to notices of violation are verified by NRC inspectors. Johnson, ¶ 3.
5. The Commission's records show that the UCLA research reactor has operated for 20 years without an incident posing risk to public health and safety. Docket 50-142; Johnson, Morrill, Young Affidavits, Bernard Affidavit for X, ¶ 7.C.; SER pp. 1-3 & 13-4.

Contention V

1. Neither step insertion of 2.6% Δ k/k ($3.90) excess reactivity nor prompt criticality would produce fuel melting at the UCLA research reactor. Hawley Affidavit, ¶ 14.
2. The available excess reactivity in Argonaut reactors is not sufficient to cause fuel melting. Hawley, ¶ 4.
3. The $3.00 amount of excess reactivity allowed by the UCLA technical specifications is well within the margin of safety and poses no threat of fuel melt. Hawley, ¶ 14.
4. The graphite temperature coefficient in the Argonaut affects reactivity more slowly than the negative water temperature coefficient. Hawley, ¶ 6.

5. The negative worth of the control blades in an Argonaut reactor can compensate for an amount of positive graphite temperature coefficient equal to the negative water temperature coefficient. Hawley, P 6.
6. The increase in power level from 10kw to 100kw in 1963 at the UCLA research reactor required only a trivial increase in excess reactivity, and no greater likelihood of a power excursion leading to fuel melt. Hawley, P 7.
7. Only a few elements or isotopes in significant quantities could affect reactivity if inserted into the reactor by the pneumatic sample ("rabbit") system. Hawley P 12.
8. All experiments at UCLA are subject to prior review and approval by the Reactor Use Committee or the Supervisor and Health Physicist and technical specification limits in Section 3.5 of the Technical Specifications. SER p. 15-13 (Section 3.5.1.3.E.).

Contention VI

1. The 10 C.F.R. Part 20 Appendix B release limit for unrestricted areas for ^{41}Ar is 4×10^{-8} μCi/ml. 10 C.F.R. Part 20, App. B.
2. The ^{41}Ar releases from the UCLA reactor into unrestricted areas are 3.8×10^{-9} μCi/ml. Block Affidavit, P 3.
3. The UCLA radiation monitoring system data has been verified by an environmental monitoring program. Block Ps 6, 7.
4. The most conservative interpretation of the UCLA environmental monitoring program is 30 mrem/yr from reactor radiological releases into unrestricted areas. Block P 7.

5. A dose of 30 mrem/yr. is 6% of the permissible radiation level in 10 CFR § 20.105(a). Block, ¶ 7.

6. The radioactive emissions from the UCLA research reactor could not be significantly reduced by additional stack height. Block, ¶ 10.

Contention VII

1. The causes and corrections of all events termed abnormal occurrences and unscheduled shutdowns at UCLA have been investigated by NRC inspectors. Morrill Affidavit, ¶ 6.

2. Unscheduled shutdowns are common at research reactors used in student training. Johnson, ¶ 3; Morrill ¶s 5-7.

3. No accidents have occurred at the UCLA reactor causing damage to property or harm to persons. Morrill, ¶ 5, Johnson ¶ 3.

4. No events posing a threat to public health and safety have occurred at the UCLA research reactor during its twenty years of licensed operation. Docket 50-142, Johnson, Morrill, Young, Wenslawski Affidavits, SER p. 1-3.

5. Reliability of reactor operation is not part of the Commission's regulatory responsibility absent a safety consideration. Atomic Energy Act of 1954, as amended.

Contention VIII

1. The Safety Analysis Report submitted with the 1980 UCLA application for the second license renewal rests on the assumption that fuel melting has occurred. 1980 application p. III/B-1.

2. Fuel melting cannot occur in an Argonant-UTR reactor limited to $3.00 excess reactivity and 100 kw power level. Wohl Affidavit, ¶s 4,5; NUREG/CR-2079, pp. 15-21; NUREG/CR-2198, p. 14 SER, p. 14-4.

3. An inadvertent stepwise insertion of $3.90 excess reactivity would produce a fuel temperature of 500°C with possible hot spot of 590°C. NUREG/CR-2079, p. 21.

4. The aluminum fuel cladding of the UCLA fuel plates melts at 660°C and the fuel meat melts at 640°C. Hawley affidavit for Contention III, R 9 SER, p. 14-4.

5. The extremely conservative analysis in the UCLA SER of a worst case accident which crushed the reactor core so that 750 guillotine breaks in the fuel plates occurred, resulted in a calculated release of fission products inside the reactor room causing a dose of 0.047 rem, whole body and 30 rem to the thyroid. SER, p. 14-10.

6. The only chemical reaction which could produce an explosion in the UCLA reactor core is a metal-water reaction between the aluminum in the fuel plates and the coolant water, and resulting hydrogen gas formation. SER, p. 14-4.

7. For a metal-water reaction to occur, the aluminum cladding in the fuel plates must be broken down into aluminum filings. SER, p. 14-4.

8. No credible mechanism could reduce the fuel plate cladding into filings at an Argonant-UTR. SER, p. 14-4.

9. A graphite fire in the UCLA reactor would occur only if an experiment failed and a general building fire occurred and the reactor's graphite blocks were exposed to a free flow of air. NUREG/CR-2079, pp. 41-43.

10. Severe damage to fuel plates due to a fuel handling accident at the UCLA reactor would not produce doses inside the reactor room above 2 rem whole body and 43 rem, thyroid. NUREG/CR-2079, p. 48.

Contention IX

1. A calibration error made in 1975 by UCLA reactor personnel has been corrected and has not been repeated. Wenslawski Affidavit, R 5a.

2. Written procedures for calibration of intruments at the UCLA facility have been developed and reviewed by the Radiation Use Committee. Letter, Wegst to Wenslawski, June 24, 1982.

3. Appropriate actions have been taken by UCLA to correct all items of non-compliance. Wenslawski, R 5a.; Morrill, R 6; Young, R 2; Johnson, R 3.
4. Calibration errors at the UCLA reactor facility have not been significant to public health and safety. Wenslawski, R 5b.
5. The calibration of instruments and maintenance of equipment at the UCLA reactor facility has been inspected by NRC for many years. Wenslawski, R 5a.
6. No risk to public health and safety has arisen from inadequate equipment maintenance at the UCLA reactor facility. Wenslawski, R 5b.

Contention X

1. The maximum credible accident at the UCLA research reactor would result in doses within the reactor room of less than 2 rem whole body and 43 rems to the thyroid. SER p. 14-7.
2. The gaseous effluent dose from normal operation of the UCLA reactor is 1.4 mrem/year. EIA, p. 3; SER p. 11-6.
3. The dose monitored inside the UCLA reactor room during full power operation is 1 mrem/hour. EIA, p. 3.
4. Only one 700 gm spent fuel shipment has been made by UCLA since obtaining its license in 1960. EIA, p. 3.
5. Low level solid waste created at the UCLA facility is less than $0.5m^3$ annually. EIA, p. 3.
6. Low level liquid waste at the UCLA facility is monitored and passed through a 225 gallon 10 minute delay tank and released to city sewer or storm drains in concentrations less than 10 CFR Part 20, Appendix B limits. EIA, p. 4.
7. Secondary coolant discharges are not more than 30° above the city water supply temperatures. EIA, p. 5.
8. The UCLA research reactor operates a maximum 8.5 hours per week. EIA p. 1, SER p. 1-34 & Table 1-6-1.

9. The UCLA research reactor is licensed to operate at power levels up to 100 KW. SER p. 1-2.

10. No new construction is proposed by the UCLA application for license renewal. EIA, p. 5.

11. About 60,000 gallons of city water per month is used by UCLA for the reactor. EIA, p. 5.

12. The amount of U^{235} used by UCLA since 1960 was 700 gm. EIA, p. 3.

Contention XII

1. No significant releases would result from the maximum credible accident at the UCLA research reactor. SER § 14.

2. Containments at power reactors are constructed to prevent release of highly radioactive effluents in the event of accident. Bernard affidavit, P 6.

3. The inherent safety of the Argonant UTR reactor requires only structural housing. Bernard, Ps 7-8.

4. The reactor building is kept at negative pressure by an exhaust fan of 14000 CFM. SER p. 6-1.

5. The stack monitor at the UCLA reactor serves as a back-up for the high radiation monitor system. Bernard, P 9.

6. Boron injection systems, radioactivity removal systems, emergency holding tanks, HEPA filters, emergency core cooling systems and spare motors are not necessary for safe operation of Argonaut UTR research reactors. Bernard, P 10.

7. Water is the moderator in an Argonant UTR. SER, 1-5.

8. Loss of coolant water in an Argonaut results in termination of fission. SER, p. 6-2; p. 17-3.

9. The characteristics of the Argonaut UTR are an inherently safe design, low operating temperatures and low radiation effluent levels. Bernard, P 15; EIA, pp. 1-4; SER, p. 1-3.

10. The concrete biological shield surrounding the UCLA Argonaut UTR effectively protects persons in the reactor room from significant exposure. Bernard, ℞ 11.

11. An interlock system at the UCLA reactor facility would not increase safety since reactor room radiation is 1 mr/hr. Bernard, ℞ 12; EIA, p. 3.

12. The UCLA research reactor has no turbine or other component which could create missles. Bernard, ℞ 13.

13. The control blades at the UCLA research reactor are not subject to the force necessary to become missiles. Bernard, ℞ 13.

14. Any increase in positive graphite reactivity in an Argonaut-UTR would be minimal in relation to the negative worth of the reactor coolant. Bernard, ℞ 14.

15. The inherent design safety; low power part time operation; and effluent monitoring at the UCLA research reactor preclude risk from fuel failure. Bernard, ℞ 15.

16. The control blades at the UCLA research reactor have performed safely for twenty years. Bernard, ℞ 16.

17. If damage occurs to control blades at Argonaut UTRs they may be safely repaired or replaced. Bernard, ℞ 17.

18. The Argonaut UTR may be safely shut down without control blade operation by dumping the moderator coolant water. SER, pp. 5-1; 6-2.

Contention XIII

1. The 93% enrichment level of fuel in use by the UCLA reactor is necessary to maintain the optimum flux because of the reactor design. Bernard Affidavit, ℞ 7.

2. The amount of SNM at the UCLA reactor facility is less than 5 kg. Letter, Wegst to Bernard, August 6, 1982.

3. No low-enriched fuel plates sufficient for the Argonaut UTR design are available. Bernard, ℞ 8.

4. Some excess reactivity is required at an Argonaut UTR to overcome inherent neutron reaction poisons, burnup trade-offs, personnel safety in fuel manipulations and negative reactivity experiments. Bernard, ℞ 5.

5. The UCLA reactor excess reactivity limit in the proposed technical specifications is $3.00. SER, p. 15-7.

6. A $3.00 excess reactivity limit provides a conservative margin of safety. Bernard, ℞ 6; NUREG/CR-2079, p. 21.

Contention XIV

1. No significant safety problems in Argonauts have developed in 20 years of operation. Hawley Affidavit, ℞ 8.

2. The positive graphite temperature coefficient in an Argonaut is produced by heat transferrence. Hawley, ℞ 4.

3. Heat transferrence to graphite in Argonauts occurs only after several hours of operation. Hawley, ℞ 4.

4. The Argonaut secondary water system is designed on a site specific basis. Hawley, ℞ 5.

5. The secondary coolant for an Argonaut does not come into contact with the primary coolant. Hawley, ℞ 5.

6. The secondary coolant system of an Argonaut has higher pressure than the primary system. Hawley, ℞ 5.

7. If the secondary coolant system pressure is insufficient to maintain core cooling, the increase in temperature will decrease the power level in an Argonaut-UTR. Hawley, ℞ 5.

8. In the event of primary coolant boiling, the Argonaut reactor will shut down due to loss of moderator from evaporation. Hawley, ℞ 5.

9. In the event of loss of all water in an Argonaut during operation, the residual decay heat would not be sufficient to cause fuel melting. Hawley, ℞ 5.

10. In the event of failure of control blade motors at the UCLA reactor, the control blades would fall into the core by force of gravity. Hawley, ℞ 6.

11. Inability to withdraw control blades from the UCLA reactor core maintains shutdown. Hawley, ℞ 6.

12. Research concerning Argonauts demonstrates no generic safety problems because of the reactor design and composition. Hawley, ℞ 8; NUREG/CR-2079; NUREG/CR-2198.

Contention XV

1. The maximum credible accident at the UCLA research reactor would not produce significant radiological releases outside the reactor building. SER § 14.

2. The dose limits in 10 CFR § 20 for releases into unrestricted areas are based on doses to the individual. Wohl Affidavit, ℞ 3.

3. The number of persons in the nearby population is not relevant to Part 20 calculations. Wohl, ℞ 3.

4. The accident considerations for research reactors are based on dose calculations in 10 CFR Part 20. Wohl, ℞ 4.

5. The addition of classroom and office buildings near the UCLA reactor has no affect on individual dose limits in 10 CFR Part 20. Wohl, ℞ 3, 7.

6. The maximum dose to an individual in a nearby classroom from the UCLA reactor radiological releases is 1.0 mrem/yr. Block Affidavit, ℞ 4.

Contention XVI

1. The UCLA technical specifications require the equipment at the UCLA reactor to be regularly inspected, maintained, repaired and replaced. Bernard Affidavit, ℞ 7.
2. Reactor components are commonly fabricated at machine shops. Bernard, ℞ 7.
3. The UCLA reactor operates an average 8.5 hours per week. SER, p. 1-3.
4. The UCLA reactor has operated the equivalent of one year of full time operation since 1960. Bernard, ℞ 7.
5. The low power level and part time operation of the UCLA reactor do not produce a significant amount of component wear. SER p. 17-1.
6. Power reactors are licensed for 40 years of full time, high power operation. Bernard, ℞ 7; 10 C.F.R. § 50.51.
7. The Commission's regulations require compliance with performance criteria for reactor components. Bernard, ℞ 6.

Contention XVII

1. It is well known that California is a seismically active area.
2. The SER § 14 analysis of possible damage to the UCLA reactor as a result of a severe earthquake shows such damage would produce a dose of less than 1 rem. SER, p. 14-10.
3. The SER analysis of hypothetical damage to the UCLA reactor from earthquake rests on the assumptions that the reactor is operating at 100 KW; that the fission product inventory is that reached at 100 KW; a loss of coolant has occurred; the core is crushed in vertical or horizontal axes, and 10,5000cm^2 of fuel surface is exposed as if 750 guillotine breaks in fuel plates had occurred and 100% of the gaseous activity produced in the recoil range of the particles

instantaneously escapes from the fuel containing the maximum inventory. SER. pp. 14-8 to 14-10.

4. The UCLA reactor does not operate for long enough intervals to achieve fission product equilibrium for fission products of safety concern. SER, p. 14-10.

5. Complete breaks in fuel cladding release fission products more rapidly than fractures. SER, 14-10.

6. In the event of collapse of all structures surrounding the UCLA reactor, some plate-out or mixture of the radioactive iodines with water, vapor and rubble would occur. SER, p. 14-10.

7. The complete collapse of both Boelter Hall and the UCLA reactor's biological shield is a remote possibility. Bernard, ℞ 7.

8. It is unlikely that the UCLA reactor core would suffer damage equal to 750 guillotine breaks as a result of a severe earthquake. Bernard, ℞ 7.

Contention XVIII

1. The University of California has obtained funds from the State Legislature sufficient to safely operate the UCLA research reactor for twenty years. Karlowicz Affidavit, ℞ 15; Docket 50-142

2. The UCLA research reactor has been maintained in safe condition for twenty years. Bernard Affidavit on X, ℞ 7.C.

3. The 1980-81 total direct and indirect reactor operating costs for the UCLA research reactor were $337,958. Karlowicz, ℞ 7.

4. The estimated cost of "mothballing" the UCLA reactor upon decommissioning is $233,300 for fuel removal and $35,400 annually for maintenance and radiation monitoring. Karlowicz, ℞ 8.

5. For the fiscal year 1981, the funds distributed to UCLA from the Regents of the University of California was $692.1 million. Karlowicz, ℞ 10.

6. The funds provided by UCLA to the School of Engineering and Applied Sciences for 1981 were $19.3 million. Karlowicz, ℞ 10.

7. The funds received by the Nuclear Engineering Laboratory (NEL) in 1980-81 totaled $283,843. Karlowicz, ℞ 12.

8. The direct costs of operation of the UCLA reactor for 1980-81 were $224,000. Karlowicz, ℞ 7.

9. Indirect financial support is provided to NEL by UCLA. Karlowicz, ℞ 7.

10. The University of California is one of the largest state operated educational institutions in the United States and has very substantial financial resources. Karlowicz, ℞ 15.

Contention XIX

1. The SER § 14 analysis of the consequences of the collapse of the Boelter Hall Classroom building and collapse of the UCLA reactor biological shield which crushes the core resulted in finding radiological releases would not exceed 10 C.F.R. Part 20 limits. SER, p. 14-7.

2. The most serious common mode failure possible at the UCLA reactor is a simultaneous failure of the coolant dump valve and control blade insertion. Bernard Affidavit, ℞ 9; SER, p. 17-3.

3. The simultaneous failure of the coolant dump valve and control blade insertion would result in loss of moderator due to evaporation from boiling. Bernard, ℞ 9; SER, p. 17-3.

4. Loss of coolant water-moderator in an Argonaut results in loss of fission. Bernard, ℞ 9, SER, p. 17-3.

5. The design of the Argonaut control panel is such that operator error causes reactor scram. Bernard, ℙ 10; SER, pp. 7-3 & 7-4.

6. The Argonaut controls are designed to compensate for student error. Bernard, ℙ 10, SER § 7; pp. 1-2 & 1-3; NUREG/CR-2079 p. 1.

7. The SER § 14 Analysis of severe core damage is equivalent to damage possible to the UCLA reactor from a heavy aircraft crash, or explosives placed in the reactor by a saboteur. Bernard, ℙs 6 & 8.

8. A credible accident at the UCLA research reactor is a fuel handling accident. Amended Application, p. III/8-1.

9. The UCLA proposed technical specification 3.6.3.4. prohibits fuel handling prior to 21 days of shutdown condition. Amended Application, p. III/8-7.

10. Twenty-one days of decay time reduces fission product inventory significantly. Amended Application, p. III/8-8.

11. The accident analysis in the UCLA Application concludes that doses of 0.2×10^{-3} rem (whole body) and 1.58 rem (thyroid) would be produced within the reactor room from a fuel handling accident. Amended Application, p. III/8-12.