UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 50-142
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	)	(Proposed Renewal of Facility License Number R-71)
	)	
(UCLA Research Reactor)	)	June 23, 1983
	)	

UNIVERSITY'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW (Concerning Hearing on Contention II)

DONALD L. REIDHAAR
GLENN R. WOODS
CHRISTINE HELWICK
590 University Hall
2200 University Avenue
Berkeley, California 94720
Telephone: (415) 642-2822

Attorneys for Applicant

THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA

I. BACKGROUND

Contention II, alleging that UCLA has applied for the wrong class of license, was admitted to this proceeding in September 1980. The NRC Staff and University both submitted motions for summary disposition of Contention II on September 1 and 3, 1982, respectively. In accordance with the bifurcated procedure which the Board had established for responses to the motions, CBG responded on January 12, 1983 identifying material facts it asserted were in dispute.

In its Prehearing Conference Memorandum and Order of March 23, 1983 the Board ruled on the summary disposition motions. The Board determined that there were two disputes that would require further proceedings: "(t)he first major disagreement concerns the proper accounting method to be used to determine the costs to UCLA of the commercial operations of the reactor; . . . (t)he second point of contention concerns the actual amount of hours devoted to commercial use." Prehearing Conference Memorandum and Order, at 15. The Board directed CBG to complete its response to the summary disposition motions by submitting its legal arguments in opposition to the motion. CBG responsed with its legal arguments on April 4, 1983.

On April 22, 1983 the Board issued its final ruling on the Contention II summary disposition motions of Staff and University, denying the motions and ordering further evidentiary proceedings. According to the Board, which accepted CBG's interpretation, Section 50.22 states that "if the reactor is used so that more than 50% of the costs are attributable to commercial activity, then it is to be

licensed under Section 103 of the Act. Clearly this does not contemplate that more than 50% of the costs may be attributable to less than 50% of the use." Memorandum and Order (Ruling on Motions for Summary Disposition of Contentions II (Class of License) and XVII (Financial Qualifications)), at 7. The Board directed that further proceedings be held to decide the factual issue "has this reactor been devoted to commercial purposes more than 50% of its operating time." Id., at 8. In an Order of the same date the Board appointed an Alternate Board Member to conduct the further proceedings and to make recommendations to the Board about appropriate relief. By Order of April 22, 1983 the Alternate Board Member established a hearing date of May 24, 1983.

On May 2, 1983 Staff petitioned for reconsideration of the Board's April 22 Memorandum and Order asserting that the Board's interpretation of the pertinent regulation (Section 50.22) was incorrect. In its May 4, 1983 Memorandum and Order the Board deferred consideration of Staff's petition until after it had received the Alternate Board Member's report. However, the Board did direct that certain issues raised in Staff's petition be addressed in the proceedings before the Alternate Board Member. Those issues are set out on page 2 of the Board's Order. On June 2, 1983 University moved for reconsideration of the Board's April 22, 1983 Order. University withdrew its motion at the end of the hearing on Contention II.

The hearing on Contention II began on May 24, 1983 and ended on May 26, 1983. University offered the testimony of four witnesses: Mr. Neill Ostrander, Manager of the Nuclear Energy Laboratory (NEL); Dr. Emil Kalil, the sole non-academic user of the facility; Mr. Charles Ashbaugh, senior reactor operator and lecturer for the NEL; and Mr. Bennett Robinson, partner of the accounting firm

Deloitte, Haskins and Sells, outside auditors for the University of California. CBG offered the testimony of three witnesses: Mr. Dan Hirsch, President of CBG; Mr. Steven Aftergood, researcher at CBG; and Mr. Leo Baefsky, a certified public accountant. The NRC Staff witness was Mr. Jim Peterson, a senior analyst in the NRC Office of State Programs.

At the close of the hearing the Alternate Board Member directed the parties to file final arguments with proposed findings of fact and conclusions of law by June 20, 1983.

II. LEGAL STANDARD

The two general classes of facility licenses get their names from sections 103 ("Commercial Licenses") and 104 ("Medical Therapy and Research and Development" Licenses) of the Atomic Energy Act of 1954, as revised (the "Act"). In accordance with Sec. 50.21 of the implementing regulations, a class 104 license will be issued to qualified applicants to operate

> . . . "(c) A production or utilization facility, which is useful in the conduct of research and development activities of the types specified in Section 31 of the Act, and which is not a facility of the type specified in paragraph (b) of this section or in Sec. 50.22.

"Paragraph (b)" pertains to facilities licensed under subsection 104b of the Act prior to 1970, which does not include University's facility which has been licensed as a "104c" facility. Section 31 of the Act refers generally to "research and development" and "educational and training" activities as well as other "industrial or commercial uses" of atomic energy, including the "demonstration of advances in the commercial or industrial application of atomic energy," conducted by "private or public institutions or persons."

Clearly, University qualifies for a class 104(c) license unless it is a facility of the type specified in Sec. 50.22. Under Sec. 50.22 a class 103 license will be issued to qualified applicants to operate . . .

> a production or utilization facility for industrial or commercial purposes; Provided, however, that in the case of a production or utilization facility which is useful in the conduct of research and development activities of the types specified in section 31 of the Act, such facility is deemed to be for industrial or commercial purposes if the facility is to be used so that more than 50 percent of the annual cost of owning and operating the facility is devoted to the production of materials, products, or energy for sale or consumer distribution, or to the sale of services, other than research and development or education or training.

The proviso clause contained in Sec. 50.22, set out above, was not intended to convert "class 104c" University research reactor facilities used for education, training, and research into "class 103" industrial and commercial facilities absent a finding that the activities of such facilities were substantially commercial. This is clear from the legislative history leading to the adoption of this provision in 1971.

Prior to 1971 many reactor facilities which began operations to develop practical industrial or commercial applications of atomic energy were initially licensed as "class 104b" facilities. The Commission was required to make a determination in writing that such utilization or production facilities had been sufficiently developed to be of practical value for industrial or commercial purposes before the Commission would issue a commercial license under Section 103 of the Act. Sections 102, 103 and 104 of the Act were amended in 1970 to eliminate the requirement that the Commission make a special finding of "practical value" before issuing commercial licenses for former "104b" licensees. Public Law 91-560, 91st Cong., 2nd Sess., approved December 19, 1970. The effect of the amendments was that

former "104b" licensees would be "grandfathered" in and remain "104b" licensees but all other applicants for commercial or industrial licenses would be licensed as class 103 licensees. It was explicitly recognized, in the Senate Committee report on the Bill, that university-licensees under subsection 104c, and other licensees under subsections 104a or 104c, sometimes use their reactors for industrial or commercial purposes, but that such insubstantial use was not to affect licensing under Section 104 unless the Commission determined that such uses were sufficiently substantial to require Section 103 licensing. Senate Report No. 91-1247, 91st Cong., 2nd Sess., September 29, 1970.

The practical consequences of being classified as a "103" facility are that applications for such facilities are subject to the special antitrust provisions of Section 105 of the Act and to review by the Advisory Committee on Reactor Safeguards in Section 182 of the Act. 10 CFR Secs. 50.33 and 50.58. None of the Commission's safety or safeguard regulations are based on class of license.

In 1971, the Federal Register published proposed amendments to Secs. 50.21 and 50.22 of the regulations to reflect the changes made in the Act with the adoption of Public Law 91-560 and to define the circumstances under which class 104 facilities would be considered to be used "substantially for industrial or commercial purposes." 36 Federal Register 20051, October 15, 1971.

The proposed amendments were adopted in May, 1973. Among the changes made in Part 50, Sec. 50.22 was amended to substitute the "50 percent of the cost of owning and operating" test for the abandoned "practical value" test. 38 Federal Register 11445, May 8, 1973. As explained in the Federal Register notice, the

legislative history of Public Law 91-560 indicated that the principal purpose of the legislation was to subject new applications for power reactors and fuel reprocessing plants -- which were formerly licensed under Section 104b -- to licensing under Section 103. The educational and training reactors at nonprofit educational institutions would continue to be licensed under Section 104c of the Act. But, certain other research reactors -- mentioned were research reactors designed and used to produce radioisotopes for sale or used for neutron radiography on a commercial basis -- might also be considered "for industrial or commercial purposes" if such reactors had such a purpose to be a significant extent. 38 Federal Register 11445 and 46.

The application of the Commission's regulations to class 104 facilities must be consistent with Section 104c of the Act which specifically directs the Commission

> to impose only such minimum amount of regulation of the licensee as the Commission finds will permit the Commission to fulfill its obligation under this Act to promote the common defense and security and to protect the health and safety of the public and will permit the conduct of widespread and diverse research and development.

III. THE HEARING

University contends that its UCLA NEL reactor facility is not engaged in substantial commercial activity within the meaning of Section 50.22 of the Commission's regulations. In any case, University does not devote more than 50% of the cost of owning and operating its facility to the sale of services other than research and development or education or training. The actual costs associated

with the non-academic use of the reactor are incidental compared to the costs incurred by the University in maintaining the facility as a practical laboratory serving the University's educational purposes. Each of these conclusions is amply supported by the evidence considered during the hearing on Contention II and reasonable inferences that may be drawn from that evidence.

A. THE ACTIVITIES OF THE UCLA REACTOR FACILITY ARE NOT SUBSTANTIALLY COMMERCIAL

Proper characterization of the activities of the UCLA reactor facility requires an understanding of the nature of the educational uses and the non-academic or commercial uses of the facility.

(1) Educational Uses of the Reactor Facility

The UCLA research reactor is operated as part of the Nuclear Energy Laboratory (NEL) in the School of Engineering and Applied Science at UCLA. Mr. Ostrander testified that laboratory classes which use the reactor are offered in the School of Engineering and the departments of Chemistry, Physics, and Earth and Space Sciences. Tr. 12-13. With reference to Applicant's Exhibit 5, Mr. Ashbaugh described the course content for each of these classes. Tr. 288-307, 346. With reference to Applicant's Exhibits 5 and 6, Mr. Ashbaugh explained how the NEL arrived at its approximation for annual student hours of reactor-dependent instruction, which appears on Exhibit 6, "Table of Class Use of UCLA Reactor." Tr. 328-330, 346. Both Mr. Ostrander and Mr. Ashbaugh explained that recording class instruction hours in "port-hours" of reactor time misrepresented the educational benefits that are derived from operation of the reactor. Mr. Ostrander stated that the significance of the 31 hours of class instruction reported in 1980 is the "productivity" that results from those reactor hours in terms of reactor-dependent student hours of instruction. Tr. 103-105. The Table of Class Use represents an attempt to quantify certain of the educational benefits of the reactor.

Mr. Ostrander explained that the reactor facility also provides neutron activation analysis services to researchers at UCLA and at other colleges and universities in southern California. Examples of these research projects include the analysis of meteorites, moon rocks and "frozen" raindrops. Tr. 12-16. Researchers at UCLA as well as those from other institutions are charged a uniform fee of $65.00 per "port-hour" for sample irradiations. Tr. 43-44, 49. Student researchers from other institutions receive funds for their research from the Department of Energy's Reactor Sharing Program, which is administered by UCLA. Tr. 151.

(2) Non-Academic Use of the Reactor

Mr. Ostrander also testified that in addition to being used for class instruction and to support research projects, the reactor is used by one non-academic user, Dr. Emil Kalil. Dr. Kalil has his own business analyzing principally uranium samples for various researchers and industrial clients using the delayed-neutron counting technique of activation analysis. Tr. 44-49. With reference to Applicant's Exhibit 2, which reports reactor usage in port-hours for various categories of user, Mr. Ostrander stated that approximately 920 out of the 940 port-hours attributed to non-academic users for the ten year period beginning in 1972 represent sample irradiations performed for Dr. Kalil. Tr. 45.

Dr. Kalil testified as to the reasons for his partnership with the UCLA facility. Dr. Kalil was a student at UCLA, receiving his B.S. degree in 1969 and his Ph.D. degree in geochemistry in 1976. Tr. 190. Dr. Kalil's doctoral dissertation was concerned with explaining the presence of uranium in the oceans. His research required the analysis of core samples of marine sediment which could not be

effectively analyzed using conventional chemical analysis or radioactive measurement techniques because of the very low concentrations of uranium in the samples. Dr. Kalil resorted to a little-known and largely undeveloped technique called delayed-neutron counting, a type of neutron activation analysis. The technique is based on the counting of the neutrons that are emitted a short, delayed time after the primary fission of the Uranium-235 nucleus in a fission event. Tr. 192-195. During the mid-1970's Dr. Kalil explained that he was able to fabricate an electronic counting device capable of accurately measuring the fissions for use with the UCLA reactor. Because the counting must be done a precise number of seconds after the irradiation of the sample in the reactor, he also designed and installed at the reactor a pneumatic transport system which used a rapid transfer capsule called a "rabbit." This rabbit system was able to automatically transfer a sample to one of the vertical ports in the reactor core and back to the counting device in precise time intervals. Tr. 196-197.

Dr. Kalil testified that because of the favorable flux characteristics of the UCLA Argonaut-type reactor, the delayed-neutron counting capability of the UCLA reactor is superior to that which can be achieved at facilities with other research reactors, such as Triga-type reactors. Tr. 276-280. At the time of the installation of Dr. Kalil's delayed-neutron counting system at the UCLA reactor facility there was no other facility in the United States open to the public that possessed similar sample analysis capability. Tr. 201. Dr. Kalil was a post doctoral scholar at UCLA when he began receiving requests to do delayed-neutron counting. About this time the Energy Resource Development Administration (predecessor of the Department of Energy) had funded a nationwide project called NURE (National Uranium Resource Evaluation) to map uranium resources in the United States. Dr. Kalil,

doing business as Uranium West, Inc., became subcontracted to perform sample analyses for the NURE project. Tr. 201-203. About half of Dr. Kalil's business during the period 1979 to 1981 was for the NURE project. Applicant's Exhibit 2 shows the corresponding increase in non-academic user activity that occurred in 1979 and 1980; a high of 360 port-hours was reported for 1980. The decline in port-hours attributable to Dr. Kalil since 1980 coincides with the termination of the NURE project. Tr. 203-206. By 1982 port-hours attributable to Dr. Kalil declined to 100. Aside from the NURE project, Dr. Kalil's customers have included the University of Oregon, the Colorado School of Mines, other universities and governmental agenices, and industrial clients such as Exxon Corp. and Occidental Research. Tr. 211, 223-224, 235.

Mr. Ostrander testified that Dr. Kalil's association with the reactor facility has greatly benefitted the educational program of the facility. Tr. 44. Dr. Kalil has made his equipment available to the students and staff who use the laboratory. Besides the delayed-neutron counting system, Dr. Kalil has installed a digital balance; a high-resolution gamma ray detector with its own analyzer and sample changer; and a microcomputer. Moreover, Dr. Kalil has made himself available to teach and train students from UCLA and from other institutions in his techniques and the use of his sophisticated sample-analysis equipment. Dr. Kalil has also assisted graduate students working on specific research projects. He has also lectured in activation analysis techniques to one of the laboratory classes offered at the facility and to a class in the Physics department. Dr. Kalil does not receive any compensation from UCLA for these educational services. Tr. 44, 214-218, 220, 224.

(3) Conclusion

There is no dispute that Dr. Kalil is a "commercial" user of the NEL and

he was so described in Applicant's Exhibit 1, although it is to be noted that most of the sample analyses Dr. Kalil has performed have been in support of the research and development activities of the Department of Energy and several universities. The fact that Dr. Kalil is a commercial user, however, does not mean that the NEL is engaged in substantial commercial activity. The NEL did not search out or solicit Dr. Kalil's business or otherwise compete with other commercial facilities for his business. As a doctoral student Dr. Kalil had developed the neutron activation analysis capability of the NEL facility. It was only natural, when the business opportunity presented itself, that he would want to conduct his sample analysis business out of the UCLA Facility. Tr. 276-278. Dr. Kalil testified that his arrangement with the UCLA reactor facility was a unique opportunity and that he had no alternatives for conducting his business. Tr. 279-281. Likewise, it was only natural for the NEL to accommodate Dr. Kalil's use of the reactor to take advantage of the more sophisticated equipment that Dr. Kalil would bring to the laboratory as well as his particular expertise. Dr. Kalil's use of the reactor was limited to times when he did not interfere with class instruction or academic research. Tr. 95, 218-219, 249-250, 252.

Dr. Kalil was assessed the same $65 per port-hour fee that was assessed all other academic users of the facility. As Mr. Ostrander testified, of the $33,000 in revenue that was generated by all users in 1980, the year of the most sample irradiation port-hours reported for the non-academic user (Dr. Kalil) and for all users, about $22,000 was attributable to Dr. Kalil. Tr. 71. This is less than 7% of the total reactor operating costs for the 1980-81 year of about $338,000. In 1982, with 100 port-hours reported for Dr. Kalil, his portion of total revenue for sample irradiations would be about $7,000 or about 2% of total

reactor operating costs assuming those costs had not risen since the 1980-81 year. Tr. 74. The NEL facility cannot expect to become profitable on such very small revenue relative to total operating costs. The total number of non-academic port-hours reported for the year would have to increase by at least an order of magnitude before this activity could be viewed as commercially practicable.

B. THE UNIVERSITY DOES NOT DEVOTE MORE THAN 50% OF THE COSTS OF OWNING AND OPERATING ITS UCLA RESEARCH REACTOR FACILITY TO THE SALE OF SERVICES OTHER THAN RESEARCH AND DEVELOPMENT OR EDUCATION OR TRAINING

(1) Categories of Activity

Mr. Ostrander testified that reactor operations at the NEL have been regularly reported in three categories: classroom instruction, maintenance, and research. Tr. 17. The category "research" consists mostly of sample irradiations performed for both academic and non-academic users of the facility. The academic users include UCLA users and users from other colleges and universities in the southern California area. The NEL has reported the level of activity in each of these three categories in units of "port-hours." Tr. 28-30. The reactor has several sample irradiation ports and the three vertical ports could be in use at the same time. A user who had samples in three ports for one operating hour would be billed for three port hours and three port-hours of use would be reported. Port-hours are only appropriate in describing sample irradiation activity and for billing users. Port-hours are an inappropriate measure of the time the reactor is operated in connection with class instruction or maintenance. Tr. 27-28, 30, 33, 35.

The only reactor activities that involve the "sale of services" are the sample irradiations performed for academic and non-academic users. Tr. 42-44. The academic users, from UCLA and from other institutions are engaged in educational

and research activities. Tr. 15-16, 19. The "sale of services" to these academic users is not a "sale of services, other than research and development or education or training" and therefore does not raise questions of commercial activity. It is only the sale of services to Dr. Kalil that may raise questions of commercial activity. However, Dr. Kalil testified that approximately one-half of the port hours attributed to him during the period 1979 to 1981 represented delayed-neutron counting done for the NURE project of the U.S. Energy Resources Development Administration. Additional analyses were done for various university researchers. Tr. 203-205. Clearly, a significant portion of the sale of sample irradiation services to Dr. Kalil ultimately supported the research and development efforts of others.

(2) Purpose for Which Costs are Incurred

Before a cost allocation formula is mechanically applied, a determination must be made of the purposes for which the costs are incurred.

Even if all the sample irradiations done for Dr. Kalil are properly sales of services, other than research and development or education or training, the UCLA reactor facility does not devote any significant portion of its annual operating costs to such sales of services. Mr. Ostrander testified that the major costs of operating the NEL, including the direct costs of the full time staff, were devoted to maintaining the reactor as an educational tool. Tr. 55-56. He stated that the NEL operated on a "steady state" budget with the staffing level fixed at 6 FTE. Tr. 50. He stated further that the NEL budget had been "steady state" as far back as he could find in the records. Tr. 51-55. Mr. Ostrander also testified that if the non-academic, commercial use of the reactor was eliminated there would be no change in the staffing level of the NEL facility or

in any other major NEL cost categories, although there would be some changes in incidental expenses. Tr. 58, 61. Mr. Ostrander explained that Applicant's Exhibit 4, "Incidental Costs of Operations, 1980-81 Fiscal Year - Approximated," was NEL's attempt to estimate the actual costs that would be saved if the 360 port hours of non-academic (commercial) use of the reactor (reported in 1980) were eliminated. Tr. 61-80. Mr. Ostrander stated that approximately $4,000 would be saved if the 360 port-hours of non-academic use of the reactor in 1980 were eliminated. Tr. 88. Mr. Ostrander also stated that if the hours of class instruction reported for 1980 were eliminated (31 port-hours) the NEL would very likely go out of existence and the reactor would be decommissioned. Tr. 70. In explaining these different results Mr. Ostrander stated that the class instruction was the justification for the existence of the NEL. Tr. 70.

With reference to Applicant's Exhibit 2, "Research Usage of the Reactor" for the period 1972 to 1982, it can be seen that non-academic port-hours jumped from an average of 1 hour per year for the years 1972-1976 to an average of about 200 hours per year for the period 1978-1982. Despite this 200-fold increase in non-academic use of the reactor, the costs of operating the NEL remained essentially unchanged over this period according to the testimony of Mr. Ostrander. Tr. 50-51. The absence of any corresponding changes in the actual costs of NEL operations provide additional evidence that the actual costs associated with the non-academic use of the reactor are incidental to the actual costs of owning and operating the facility. If the actual costs of facility operations were devoted to non-academic use in any substantial way, major changes in level of non-academic use such as occurred in the period 1976 to 1982 should have had an observable impact upon those costs.

Moreover, as is readily apparent from Applicant's Exhibit 2, the changes in non-academic use of the reactor in the period 1972 to 1982 have had no discernible effect upon the level of activity in the other categories of use. There is no evidence that the non-academic use of the reactor has displaced any other activities at the facility.

(3) Conclusion

The evidence supports the conclusion that the major portion of the costs of facility operations are incurred to support the continuing educational purpose of the facility. The reactor operates less than 5% of the time, yet the staff salaries and benefits and other major cost elements are incurred whether or not the reactor is operating. Reactor operating time expressed in port-hours cannot be used as the basis for allocating costs between the educational and research uses of the reactor and the non-academic or commercial uses of the reactor.

C. A PROPER COST ALLOCATION METHOD WOULD RESULT IN AN ALLOCATION OF MORE THAN 50% OF FACILITY OPERATING COSTS TO EDUCATION AND RESEARCH PURPOSES

Mr. Bennett Robinson, a partner in the accounting firm of Deloitte, Haskins and Sells, outside auditors to the University, testified that the most suitable method of cost allocation would be to consider the educational benefits that are derived from the use of the reactor and to compare the educational benefits with the non-academic uses of the reactor. Tr. 424-425. Mr. Robinson stated that the cost accounting principle to be observed was to allocate costs on the basis of the benefits that are derived from the unit, in the case of the NEL, educational benefits. Tr. 425.

(1) Class Use of the UCLA Reactor

Mr. Ashbaugh testified as to the various laboratory classes that are

offered that depend on the use of the reactor. Tr. 289-307, Applicant's Exhibits 5 and 6. Exhibit 6, "Table of Class Use of the UCLA Reactor," provides an approximation of the annual student hours of reactor dependent instruction. As Mr. Ashbaugh explained the chart explicitly takes into account the lecture and preparation hours and the laboratory analysis hours that are dependent on the actual operation of the reactor for each of the classes offered. Tr. 374-377. The third column on the chart ("Reactor Academic Hrs/Qtr") records "Console hours" which, as Mr. Ashbaugh explained, are a measure of actual reactor operating time that begins when the control rods are first engaged, and are distinguished from port-hours which are measured from the time the reactor reaches its designated power level. Tr. 366-368. According to Mr. Ashbaugh, much of the instruction that takes place with students at the reactor console occurs at very low power levels and not "at-power." Reporting class instruction in port-hours disregards this console instruction time. Tr. 318-320, 371.

Mr. Ashbaugh testified that for students in the student reactor operator training class it takes from 20 to 60 hours of console time per student to gain sufficient experience to pass the qualifying exam. Part of this training experience is gained at the console at the same time the reactor is being used for another category of activity. For example, student reactor operator training can occur as part of a reactor run for a commercial user. The use of the reactor would be recorded in terms of non-academic port-hours and the concurrent reactor training would go unreported. Tr. 324-325.

The use of the reactor for classroom instruction has first priority at the facility. Tr. 327. When the reactor is off, students can be conducting

instrument analysis, operating health physics instrumentation, learning about decontamination or reactor plumbing. Tr. 328-330, 332-335. Most of the demonstrations or tours that are conducted of the facility are done when the reactor is not operating. Tr. 331-332. The Table of Class Use of UCLA Reactor represents the typical class and student usage of the reactor as estimated by the course instructors.

(2) A Proper Cost Accounting Method

With reference to Applicant's Exhibits 2 and 6, Mr. Robinson testified that the most appropriate basis for allocating costs between the academic and non-academic uses of the reactor would be to compare the non-academic use measured in port-hours on Exhibit 2 with the educational use measured as the total of the academic port-hours from Exhibit 2 and the total "class hours" per year taken from column 6 of Exhibit 6 ("Total Hrs/Qtr") corrected to state hours per year. Tr. 425-427. In comparing uses by this method for the year 1980, Mr. Robinson concludes that total academic use of the reactor was 440 hours, consisting of 292 class hours and 148 academic port-hours, and the non-academic use was 360 port-hours. Tr. 425-427.

Mr. Robinson explained that there were alternate acceptable methods that could be employed, including a detailed analysis of each element of cost or an allocation of cost based on total student hours of instruction as reported on Exhibit 6. Another method he suggested was to deem the reactor to be used primarily for educational use and to allocate only the incremental costs to commercial use, which would be only those costs over and above that which is required had there been no commercial use whatsoever. Tr. 432-433. Mr. Robinson stated that it would not be appropriate to allocate costs solely on the basis of the time the

reactor operates because that would not take into account the educational benefits that are derived when the reactor is not operating. Tr. 434-435.

(3) Conclusion

A proper cost accounting method for allocating costs for the UCLA reactor must recognize the educational benefits derived by students during console time at the reactor and during lecture/preparation and laboratory analysis time that takes place while the reactor is not operating. Costs allocated on the basis of usage requires that usage be defined in terms of benefits derived or services rendered. An alternate method would be to deem the reactor used primarily for educational purposes and to allocate only the incremental costs to commercial use.

(4) Proposed License Limitation

University submits that its "commercial" activity is clearly insubstantial and that a specific license limitation based on the adoption of some method of allocating costs between commercial and non-commercial activity is not warranted. The Commission purposes will be served by having the licensee report yearly the sample irradiations performed for the various categories of users in units of "port-hours" and the student-reactor-dependent hours of instruction. This reporting requirement can be made a license condition.

IV. FINDINGS OF FACT AND CONCLUSIONS OF LAW

1. The Nuclear Energy Laboratory Facility (NEL) provides laboratory class instruction in support of the educational programs of the School of Engineering and Applied Science as well as the Departments of Chemistry, Physics and Earth and Space Sciences at UCLA. Tr. 12-13, 289-307, Applicant's Exhibits 5 and 6.

2. The reactor is used for various experiments, demonstrations and reactor operator training in the following courses offered by the School of Engineering: Engineering 135AL - Nuclear Analysis Laboratory I; Engineering 135BL - Nuclear Analysis Laboratory II; Engineering 135F - Experimental Reactor Operations, Control and Safety; Engineering 139A - Introductory Chemical, Nuclear, and Thermal Engineering Laboratory. Tr. 288-307, 346, Applicant's Exhibit 5.

3. The reactor is used for various experiments and demonstrations in the following laboratory courses which are offered by departments outside the School of Engineering: Chemistry 184 - Instrumental Analysis; Earth and Space Sciences 298 - Neutron Activation Analysis; Physics 180A - Nuclear Physics Laboratory. Tr. 288-307, 346, Applicant's Exhibit 5.

4. The reactor facility supports research of the University as well as other institutions primarily by providing sample irradiation services to principal investigators and graduate student researchers conducting research in areas generally outside the area of basic reactor physics. Tr. 19.

5. Applicant's Exhibit 2 shows the number of port-hours by various users in the research category of activity for the NEL.

6. Classified under the category research in NEL reactor usage charts are NEL (staff) experiments, UCLA users, other college and university users, and non-academic (commercial) users. Tr. 31.

7. The reactor has been used from time to time in support of educational programs at other colleges and universities in the southern California area, including: California Institute of Technology, California State University at Los Angeles, California State University at Northridge, Cal Poly Pomona, Cal Poly San Luis Obispo, Harvey Mudd College, Occidental College, the San Diego and Santa Barbara campuses of the University of California and the University of Southern California. The Department of Energy provides UCLA with Reactor-Sharing Program funds to support the research of students from institutions other than UCLA who use the reactor. Tr. 14-15, 151, 327.

8. The NEL provides sample irradiation services, categorized as "research" in the NEL's record-keeping, to both academic users from UCLA, academic users from other institutions, and to non-academic users. A uniform fee of $65 per port-hour is assessed for academic and non-academic users. Tr. 43, 44, 49, 139.

9. Tours of the reactor facility and demonstrations of reactor operations are conducted for high school students and various engineering organizations. Most of the tours of the facility occur while the reactor is shut down and the hours would not be reflected in any of the reactor usage charts. Tr. 20, 331-332.

10. The use of the reactor for educational purposes is not limited to the time it is actually operated. Reactor operator training activities require that student operators be instructed in the operation of the entire facility: the ventilation and plumbing systems; the process pit; the control system; basic health physics and reactor physics. Similarly, nuclear engineering and analysis classes entail lecture preparation and laboratory analysis time for the students. This instruction takes place mostly in classrooms. Tr. 18, 79, 288-307, 328-330, 346, Applicant's Exhibits 5 and 6.

11. Approximately 20 to 60 hours of reactor console operating time is required to qualify each student reactor operator for an operator's license. Students get some of this experience by being present at the console during reactor runs conducted for other users, both academic and non-academic. Time spent by these students at the console during runs for other users is not recorded nor reported as class instruction port hours. Tr. 164, 323-324, 328-330.

12. Students using the NEL facility, including students from other campuses in the southern California area, receive instruction in health physics and radiation safety. Tr. 14.

13. Maintenance of the reactor when it is not operating is vital to the use of the facility in support of the educational programs. Maintenance costs are incurred whether or not the reactor is operating. Tr. 77-78.

14. The UCLA reactor functions like other educational tools of the University in that it supports the education program even when it is not actually operating. Tr. 12-14.

15. The principal function of the reactor and the justification for its existence is the support of education. Tr. 13.

16. Reactor operation is limited by the terms of its license to no more than 440 operating hours a year, or about 8.5 hours per week. Tr. 23.

17. The reactor actually operates, on average, about 5 hours per week. Tr. 23.

18. Reactor operations are recorded chronologically in the operating log by the reactor operator. Tr. 23.

19. Reactor operating hours are recorded in this operating log "at-power"; that is, the period recorded begins with the time the reactor reaches the designated power level for the particular run and ends at the time the rods are dropped and the power falls. Tr. 25.

20. The purpose of recording hours "at-power" is to facilitate calculating equivalent full-power hours (cumulative power), which must be reported yearly to the NRC. Tr. 25, 130.

21. "Port-hours" is the unit used to bill users for reactor sample irradiations. The reactor has several sample irradiation ports and the three vertical ports could be in use at the same time. Both academic and non-academic users are billed on the basis of the number of ports they use per operating hour. A user who had samples in three ports for one operating hour would be billed for three port-hours, and three port-hours of use would be reported although the reactor only ran for one hour. Port-hours are measured "at-power." Tr. 27-28, 30, 33, 35.

22. Port-hours are only appropriate in describing sample irradiation activity and for billing users. Port-hours are to be distinguished from operating hours ("at-power"). Port-hours are an inappropriate measure of the time the reactor is operated in connection with class instruction or maintenance. Tr. 27, 28, 30, 33, 35, 364-365.

23. The reactor supervisor maintains his own records, referred to as the supervisor's log, which record port-hours of use for the purpose of billing the various users for service irradiations. Tr. 740.

24. The convention of reporting hours "at-power" is an inadequate measure of the use of the reactor in that it does not account for time spent by students at the reactor console during start-up procedures, instrumentation checks, and low-power instructional exercises. Moreover, it does not account for lecture/ preparation time nor laboratory analysis time spent by students as a consequence of operating the reactor. Tr. 25, 318-319, 367-368.

25. Approximately 920 of the 940 port-hours reported for non-academic users for the period 1972-1981 were for sample irradiations done for a single user, Dr. Emil Kalil. Tr. 45, 205.

26. There was a total of 100 port-hours for the non-academic user in 1982 which, without considering the hours to be attributed to class instruction for the year, is less than 30 percent of just the port-hours reported for "research" users. Tr. 37, 38, Applicant's Exhibit 2.

27. There are different ways to measure reactor operating time depending on when it is assumed reactor operations start and end. Reactor operations can be said to begin at the start of the pre-start check-off list when the first reactor console instrument is checked; or, when the key is inserted to start the running time meter; or, when the reactivity check is done at one watt; or, when the reactor is taken to the designated power level for the run ("at-power" hours). When "at-power" hours are being measured the run terminates when the rods are driven down or dropped. Sometime after that the actual shut-down of the reactor would occur. Tr. 320, 329-330, 364.

28. The educational productivity of the reactor cannot be measured by reactor hours "at-power." It is the number of student hours of instruction derived from an hour of reactor operation that defines the productivity. Tr. 103-105, 318-319, Applicant's Exhibit 6.

29. Significant educational benefits are derived from the reactor even when the reactor is not operating "at-power." Tr. 25, 318-319, 367-368.

30. Reactor console time begins when the control rods are first engaged. Tr. 368.

31. The NEL has operated with a fixed staffing level at least since 1974. Tr. 50.

32. The NEL employs six full time staff. Tr. 105.

33. The costs of staffing the NEL are incurred in order to maintain the reactor as an educational tool. Tr. 55.

34. If the non-academic use of the reactor was eliminated there would be no change in the staffing level nor in the other major cost categories, but there would be changes in incidental costs to the NEL such as utilities and student reactor operator wages. Tr.

35. The single non-academic or commercial user of the UCLA reactor is Dr. Emil Kalil. Tr. 44-48.

36. Dr. Kalil fabricated and installed at the reactor facility special activation analysis equipment while a doctoral student at UCLA. Tr. 44, 189-191, 198-203.

37. Dr. Kalil's use of the reactor is not permitted to interfere with class instruction or academic research. Tr. 95, 249-250.

38. About 50% of the non-academic port-hours attributed to Dr. Kalil during the period 1979 to 1981 represents sample analysis services performed for the Federal government's NURE project. Tr. 203-206.

39. Dr. Kalil provides benefits to the educational program at the reactor facility by making his special equipment available to students, by instructing students in its use, by lecturing to classes, and by assisting students with specific research projects. Tr. 224-227.

40. Conclusion of Law. In view of the unique relationship between Dr. Kalil and the UCLA reactor facility and the fact that total revenues to the UCLA facility from commercial activity is a very small percentage of facility operating costs, the UCLA facility cannot be deemed to be engaged in commercial activity to any significant extent.

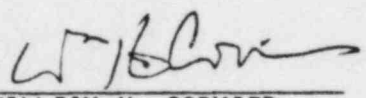
41. Conclusion of Law. The activities of the UCLA reactor facility, considered in light of all the circumstances, are not substantially commercial and a detailed allocation of the costs of the various activities is not required.

42. Conclusion of Law. With the exception of certain small incidental costs, the costs of operating the UCLA reactor facility are devoted to educational purposes.

43. Conclusion of Law. Substantially less than 50% of the costs of owning and operating the UCLA reactor facility are devoted to the sale of services, other than research and development or education or training.

Dated: June 23, 1983.

DONALD L. REIDAAR
GLENN R. WOODS
CHRISTINE HELWICK

By 
WILLIAM H. CORMIER
Representing UCLA

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 50-142
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	)	(Proposed Renewal of Facility License Number R-71)
	)	
(UCLA Research Reactor)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the attached: UNIVERSITY'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW (Concerning Hearing on Contention II) in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, postage prepaid, addressed as indicated, on this date: June 23, 1983.

John H. Frye, III, Chairman
Administrative Judge
ATOMIC SAFETY AND LICENSING BOARD
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Emmeth A. Luebke
Administrative Judge
ATOMIC SAFETY AND LICENSING BOARD
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Glenn O. Bright
Administrative Judge
ATOMIC SAFETY AND LICENSING BOARD
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Ms. Carole F. Kagan, Esq.*
ATOMIC SAFETY AND LICENSING BOARD
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Counsel for the NRC Staff*
OFFICE OF THE EXECUTIVE LEGAL DIRECTOR
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Judge James A. Laurenson*
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. Daniel Hirsch*
Cte. to Bridge the Gap
1637 Butler Avenue, #203
Los Angeles, CA 90025

Mr. John Bay, Esq.
3755 Divisadero #203
San Francisco, CA 94123

Mr. Daniel Hirsch*
Box 1186
Ben Lomond, CA 95005

Nuclear Law Center*
c/o Dorothy Thompson
6300 Wilshire Blvd., #1200
Los Angeles, CA 90048

Ms. Lynn G. Naliboff*
Deputy City Attorney
City Hall
1685 Main Street
Santa Monica, CA 90401

Chief, Docketing and Service Section
OFFICE OF THE SECRETARY
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

*Express Mail

WILLIAM H. CORMIER
UCLA Representative

THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA