

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

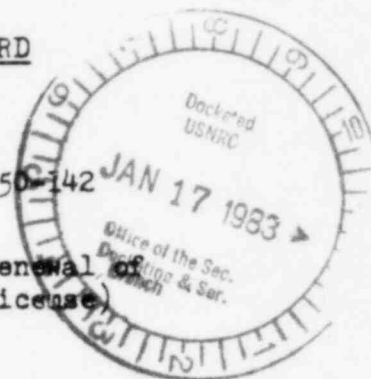
In the Matter of

THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA

(UCLA Research Reactor)

Docket No. 50-142

(Proposed Renewal of
Facility License)



DECLARATION OF STEVEN AFTERGOOD AS TO CONTENTION I

I, Steven Aftergood, do declare as follows:

1. I am a researcher with the Committee to Bridge the Gap and a member of the Southern California Federation of Scientists. A statement of professional qualifications is attached.
2. I have reviewed UCLA records related to reactor use. These records included the reactor supervisor's logs, the operating logs, and annual reports. Based on this review, it is my conclusion that the statement on page 5 of the application regarding the educational and research uses for which the reactor will be used is materially false. I further conclude that the chart on page II/1-6 of the amended Application, detailing supposed current instructional use of the reactor, is likewise materially false.
3. My review indicates that the original purposes for which the reactor was licensed and constructed--instruction in nuclear engineering and related sciences and research at the M.S. and Ph.D. levels--has long since ceased to be a primary or even substantial portion of the activity of the reactor. The use of the facility for these licensed purposes has very markedly declined over the license period to date. In their place, activity unrelated to the licensed purpose of the facility, in particular, commercial activity, has gradually increased to become by far the largest single category of reactor use. Furthermore, the Applicant has acted repeatedly to obscure this fact.
4. The current application states at page 5:

The reactor and its supporting laboratories will be used for the education of senior undergraduate and graduate students in nuclear engineering and related sciences. In addition to formal courses and demonstrations, the reactor will be used to support research at the M.S. and Ph.D. levels.

Without so indicating, the Applicant in its current application merely copied virtually verbatim the same statement of purpose from its 1960 application. However, the statement, which might have been true in 1960, was no longer true in 1980.

5. A review of the early operating logs compared against the most recent ones indicates a steady decline in both the instructional and research uses of the reactor. As the NEL internal Annual Report for 1976 (not the version sent to the NRC) states at page 3, "The reactor is no longer new, and reactor physics research projects with the UCLA reactor have become non-existent." However, that change remained obscured in the use data reported by NEL to the NRC.

6. NEL continued to report its activities in three categories of use-- instruction, research, and maintenance. In 1980, in reviewing the application for license renewal, the NRC noted that classroom instruction accounted for only 8% of usage in 1979 and requested a breakdown of the categories. In Dr. Wegst's May 13, 1980, reply, we see for the first time that what had been reported for years as "research" was primarily commercial activity. Dr. Wegst's table is reprinted below.

REACTOR USAGE					
ACTIVITY	HOURS PER YEAR				AVG.
	1976	1977	1978	1979	
Engineering Classes	17	83	52	31	46
NEL Experiments	4	31	9	1	11
Maintenance	23	14	34	1	18
UCLA Users	109	106	105	91	103
Colleges & Universities	45	47	37	53	46
Demonstrations	10	6	7	5	7
Commercial	1	5	95	264	91
Total Port-Hours*	208	290	340	446	321
Actual Run Time	184	238	271	372	278
Equiv. Full Power Hours	131	159	203	294	197

7. As is readily seen, instruction and research by the Nuclear Energy Lab represents a very small fraction of the actual use of the reactor, less than 20%. The steady increase in commercial usage is noteworthy. So is the admirably frank definition of commercial use (see Attachment A, p. 3), which includes gem coloration and mineral assaying for private firms.

8. With the passage of time, this frankness disappeared. The history of CBG's interrogatories to UCLA requesting data as to commercial usage of the facility, and UCLA's repeated denial that such data existed, along with Board's three Orders compelling truthful answers, as well as a "show cause" order threatening sanctions, need not be detailed here. However, the lack of frankness has continued, as is seen in the tables below, taken from the 1981 NEL Annual Report. Similar tables have now been included in the amended Application. The Annual Report sections are included as Attachment B.

Table I

Reactor Usage (Operating Hours)

CATEGORY	1977	1978	1979	1980	1981
CLASSROOM INSTRUCTION	83	52	31	46	61
DEMONSTRATIONS	6	7	5	2	3
RESEARCH	135	178	335	295	284
MAINTENANCE	<u>14</u>	<u>34</u>	<u>1</u>	<u>38</u>	<u>15</u>
TOTAL OPERATING HOURS	238	271	372	381	364
EQUIVALENT FULL POWER HOURS	159	203	294	289	239
MEGAWATT-HOURS	15.9	20.3	29.4	28.9	23.9

Table II

Research Usage* (Port Hours)

USER CATEGORY	1977	1978	1979	1980	1981
UCLA ACADEMIC USERS	106	105	91	101	67
OTHER UNIVERSITIES & COLLEGES	47	37	53	20	38
OTHER EXTRAMURAL USERS	5	95	264	360	211
NEL STAFF	31	9	1	27	113
TOTAL PORT HOURS	189	246	409	508	429

9. Note that the figures categorized as commercial in the 1980 letter have now been redesignated as "research" once again, and this time subcategorized as "other extramural users." In response to CBG interrogatories, UCLA on September 18, 1981, admitted that all "extramural users" to date had been commercial firms. Furthermore, the "NEL Staff" category under "Research Usage" is vastly inflated for 1981, with 82 of the reported 113 hours actually an effort to reduce Argon-41 measurements as part of the relicensing effort. Corrected for this miscategorization, 61% of the so-called "research" services provided in 1981 were for commercial mining assayers and gem colorers. Note also the return to the less-than-frank definitions (e.g., "research") in Attachment B.

10. Classroom instruction, on the other hand, accounts for only 7 to 12% of the total port hours for the most recent three years. Apparently in an effort to portray classroom instruction as something other than a peripheral function of the reactor, in the light of the mere 10-20 hours of operation per quarter for instructional purposes, the NEL staff has contrived a rather elaborate accounting scheme. This approach yields thousands of "student reactor hours." I used the word "contrived" advisedly, since the figures on which the accounting is based are tremendously inflated, as I will show.

11. The Applicant's tables of "Class Use of UCLA Reactor" for the school years 1980-1981 (Attachment C) and 1981-1982 (Attachment D) are attached hereto. I compared these supposed summaries of instructional use against the actual reactor logs for the same period. Those logs list every reactor run, including the user's name, purpose of run, and length of run. When used for a class, the course number is listed.

12. I went through those logs and added up the length of time the reactor had been used for each class. The results are listed below, alongside the hours claimed by the NEL staff in its presentations to the NRC (taken from Attachments C and D):

1980-81 Annual Reactor Hours, Class Use

<u>Course Number</u>	<u>Hours Claimed by NEL</u>	<u>Actual Use</u>
Engr 135AL	9	3.3
Engr 135BL	9	3.45
Engr 135F	>100	33.63
Engr 139A	12	4.5
Phys 180A	4	1.3
Chem 184	12	1.6
Chem 221K	10	0.0
ESS 298	6	3
Engr X497.17	3	2

1981-82 Annual Reactor Hours, Class Use

<u>Course Number</u>	<u>Hours Claimed by NEL</u>	<u>Actual Use</u>
Engr 135AL	40	5.37
Engr 135BL	40	1.7
Engr 135F	40	7.7
Engr 139A	60	7.6
Chem 184A	10	3
E & SS 298	48	0
Phys 180A	24	0.24
Engr X497.17	30	1.7

13. In its 1980-1981 table (Attachment C), NEL claimed 172-190 students per year. In its 1981-1982 table (Attachment D), they claimed 138 students over the course of the year. So it is interesting to note that as of August 1979, UCLA claimed only thirty students per quarter or ninety per year. (Letter, Brown to Miller, answer #12, Attachment E). Note also that UCLA indicates in that letter that only about a dozen graduate students are in facility-related programs, and that reactor shutdown would not directly affect them (answer #13).

14. Thus, based on its own unreported records, Applicants thousands of "annual student-reactor hours" are seen to be grossly inflated. They reduce in reality to just a few tens of ordinary hours. And, as noted above, these amount to a mere 7 to 12% of total reactor port hours, which are devoted primarily to commercial activities.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.



Steven Aftergood

Executed at Los Angeles, California, this 12th day of January, 1982

Statement of Professional Qualifications

STEVEN AFTERGOOD

My name is Steven Aftergood. I am an environmental researcher on the staff of the Committee to Bridge the Gap. I am also a member of the Southern California Federation of Scientists.

I received my Bachelor of Science degree, cum laude, from the School of Engineering at the University of California at Los Angeles in 1977. In 1977 I was also elected to Tau Beta Pi.

In 1978 I was employed by Meret Opto-Electronics, a fiber optics firm, as an applications engineer. In 1980 I was employed as a research physicist at the Technion, in Haifa, Israel, working on the development of photovoltaics from amorphous silicon. In early 1981 I joined the staff of the Committee to Bridge the Gap.

My responsibilities at the Committee to Bridge the Gap include research into local environmental issues and, in particular, coordination of the technical review of the UCLA reactor license application.

Attachment A

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UNIVERSITY OF CALIFORNIA, LOS ANGELES

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO



SANTA BARBARA · SANTA CRUZ

OFFICE OF ENVIRONMENTAL HEALTH AND SAFETY
THE CENTER FOR THE HEALTH SCIENCES
LOS ANGELES, CALIFORNIA 90024

May 13, 1980
ROS C1510

Robert W. Reid, Chief
Operating Reactors Branch #4
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Reid:

RE: DOCKET NO. 50-142

Enclosed is the additional information you requested in your letter of April 17, 1980, regarding the application for the license renewal of the UCLA reactor. The information provided is clearly keyed to the fifteen (15) items posed in your letter.

The enclosed information has been reviewed by various members of UCLA's Radiation Use Committee and by myself. If you need further details concerning these, or other points, please let me know.

Very truly yours,

Walter F. Wegst
Director, Research
& Occupational Safety

WFW/lc
Enclosure

Table III/1-3 provides hours/year of reactor operation for research, class instruction, and maintenance. Class instruction accounts for only 8% of the total hours of operation. Please provide a breakdown in hours/year of the types of research programs conducted and the types of customers for whom this service was performed.

Table III/1-3 will be retitled REACTOR USAGE and will be replaced with the table and explanations which follow here
Detailed figures for years prior to 1976 are not available.

REACTOR USAGE					
ACTIVITY	HOURS PER YEAR				
	1976	1977	1978	1979	AVG.
Engineering Classes	17	83	52	31	46
NEL Experiments	4	31	9	1	11
Maintenance	23	14	34	1	18
UCLA Users	109	106	105	91	103
Colleges & Universities	45	47	37	53	46
Demonstrations	10	6	7	5	7
Commercial	1	5	95	264	91
Total Port-Hours*	208	290	340	446	321
Actual Run Time	184	238	271	372	278
Equiv. Full Power Hours	131	159	203	294	197

*Port-Hours are a measure of user demand, two concurrent users for one hour contribute two port hours. Instructional and maintenance hours are counted as one port-hour per hour.

Engineering Classes include both graduate and undergraduate laboratory work which includes basic counting, activation analysis, reactor parameter determinations and operator training and requalification.

NEL Experiments are conducted by the reactor staff and include seed irradiations, gem coloring experiments, activation analysis, tracer studies, isotope production using the N-P reaction.

UCLA Users include the Chemistry, Geology, Geophysics, Meteorology, and Nuclear Medicine Departments. The types of experiments include activation analysis, tracer studies, delayed neutron counting.

California Institute of Technology, California State University - Northridge, Harvey Mudd College, Los Angeles, California State University - Northridge, University of California - Santa Barbara and University of California - San Diego. The types of experiments performed are activation analysis, fission track counting, tracer studies, reactor parameter determinations, reactor operating characteristics, reactor operations, shielding studies and health physics training.

Demonstrations were actual reactor runs in which the reactor was taken critical to demonstrate reactor parameters, characteristics or operation. Tours in which the reactor was shut down are not included. High schools, Pierce College, the press, Southern California Edison Co. and the University of California Extension were recipients of reactor demonstrations.

Commercial Users include geochemists, gem dealers and engineering firms. Mineral assay through activation analysis and delayed neutron counting, gem color alterations, and radiation shielding studies typify the types of experiments performed.

NOTE: Total Port-Hours, Actual Run Time and Equiv. Full Power Hours are included in this table. Deviations between the reported port-hours and the Total Port-Hours are due to round off errors.

Reactor Usage (Operating Hours)

CATEGORY	1977	1978	1979	1980	1981
CLASSROOM INSTRUCTION	83	52	31	46	61
DEMONSTRATIONS	6	7	5	2	3
RESEARCH	135	178	335	295	284
MAINTENANCE	<u>14</u>	<u>34</u>	<u>1</u>	<u>38</u>	<u>16</u>
TOTAL OPERATING HOURS	238	271	372	381	364
EQUIVALENT FULL POWER HOURS	159	203	294	289	239
MEGAWATT-HOURS	15.9	20.3	29.4	28.9	23.9

CLASSROOM INSTRUCTION COMPRISES USE OF THE REACTOR IN SUPPORT OF UCLA UNDERGRADUATE AND GRADUATE LABORATORY WORK INVOLVING BASIC COUNTING, ACTIVATION ANALYSIS, REACTOR PARAMETER DETERMINATIONS, AND OPERATOR TRAINING. OPERATOR REQUALIFICATION IS INCLUDED IN THIS CATEGORY. HOURS ARE REACTOR OPERATING HOURS IN SUPPORT OF CLASS INSTRUCTION.

DEMONSTRATIONS ARE OF VARIOUS KINDS; THEY ARE PERFORMED FOR EDUCATIONAL GROUPS AND OTHER TOUR GROUPS.

RESEARCH IS A BROAD CATEGORY DOMINATED BY SERVICE IRRADIATIONS IN WHICH THE REACTOR IS USED AS A TOOL WITHOUT REFERENCE TO REACTOR THEORY OR OPERATIONAL PROPERTIES. (SEE TABLE II).

MAINTENANCE REPRESENTS THE HOURS FOR WHICH THE REACTOR IS OPERATED FOR CALIBRATION PURPOSES, AND DOES NOT IMPLY TOTAL MAINTENANCE HOURS.

Table II
Research Usage* (Port Hours)

USER CATEGORY	1977	1978	1979	1980	1981
UCLA ACADEMIC USERS	106	105	91	101	67
OTHER UNIVERSITIES & COLLEGES	47	37	53	20	38
OTHER EXTRAMURAL USERS	5	95	264	360	211
NEL STAFF	31	9	1	27	113
TOTAL PORT HOURS	189	246	409	508	429

*RESEARCH USAGE OF THE REACTOR IS DOMINATED BY SAMPLE IRRADIATIONS. CERTAIN
NEL STAFF RESEARCH DOES NOT INVOLVE SAMPLE IRRADIATIONS.

UCLA NUCLEAR ENERGY LABORATORY

Table of Class Use of UCLA Reactor

1981 - 1982 Academic Year

USE → ↓ CLASS	UNITS PER QUARTER	STUDENTS PER QUARTER	² REACTOR ACADEMIC HRS/QTR	³ LABORATORY ANALYSIS HRS/QTR	⁴ LECTURE & PREPARATION HRS/QTR	TOTAL HRS/QTR	STUDENT HRS/QTR	OFFERINGS PER YEAR	STUDENT HOURS/YEAR	
ENGR 135 AL	2	8	9	12	29	40	320	1	320	
ENGR 135 BL	2	8	9	4	27	40	320	1	320	
ENGR 135 F	2	5	28 (100) ⁵	0	12	40	200	1	200	
ENGR 139 A	4	25	1	12	7	20	500	3	1500	
CHEM 184 A	4	16	1	7	2	10	160	1 ⁶	160	
ECSS 298	4	6	1	32	15	48	288	1	288	
PHYS 180 A	4	10	1	12	11	24	240	1 ⁶	240	
ENGR-EXT. 497.17	4	10	3	0	27	30	300	1	300	
TOTAL:			ANNUAL STUDENT HOURS OF REACTOR DEPENDENT INSTRUCTION							3328

¹ CLASSES LISTED ARE THOSE WHICH USE THE REACTOR FOR THE INSTRUCTION OF UCLA STUDENTS IN THE SCHOOL OF ENGINEERING, AND THE DEPARTMENTS OF CHEMISTRY, EARTH AND SPACE SCIENCE, AND PHYSICS IN REACTOR CHARACTERISTICS, BOTH FUNDAMENTAL AND OPERATIONAL, ACTIVATION ANALYSIS, AND REACTOR OPERATIONS. THE TABLE DOES NOT INCLUDE CLASSES FROM OTHER COLLEGES AND UNIVERSITIES WHICH USE THE REACTOR. STUDENT ENROLLMENT IN THESE COURSES AND THE SPECIFIC COURSE CONTENT VARIES FROM ACADEMIC QUARTER TO ACADEMIC QUARTER. THE TABULATED ENTRIES REPRESENT THE CURRENT TYPICAL USAGE AS ESTIMATED BY THE COURSE INSTRUCTORS.

² REACTOR ACADEMIC HOURS - INCLUDES OPERATING HOURS "AT-POWER" AS REPORTED ANNUALLY TO THE NRC AS WELL AS "NON-POWER" HOURS SUCH AS THE "APPROACH-TO-CRITICAL" EXPERIMENT IN ENGR 135 AL AND THE PRE-START CHECK-OFF IN THE OPERATOR TRAINING COURSE ENGR 135 F.

³ LABORATORY ANALYSIS HOURS - RECOGNIZES THE USE OF THE REACTOR IN THE PRODUCTION OF VARIOUS RADIOACTIVE MATERIALS OR SUBSTANCES WHICH SUBSEQUENTLY ARE SUBJECTED TO LABORATORY ANALYSIS BY STUDENTS, FOR EXAMPLE, TO PRODUCE MATERIALS USED IN GAMMA RAY SPECTROSCOPY.

⁴ LABORATORY LECTURE AND PREPARATION HOURS - RECOGNIZES THE STUDENT INSTRUCTION THAT OCCURS IN CONNECTION WITH THE OPERATION OF THE REACTOR IN REACTOR PHYSICS AND OPERATIONS, REACTOR INSTRUMENTATION, EXPERIMENTAL PROCEDURES AND TECHNIQUES, MEASUREMENT TECHNIQUES, AND METHODS OF DATA REDUCTION.

⁵ INCLUDES APPROXIMATELY 100 ADDITIONAL TRAINING HOURS REQUIRED FOR OPERATOR LICENSING, THE TRAINING TAKING PLACE CONCURRENTLY WITH OTHER REACTOR OPERATIONS.

⁶ GENERALLY TWO COURSES WITH DIFFERENT COURSE CONTENT BUT WITH THE SAME COURSE NUMBER ARE OFFERED ANNUALLY, ONLY ONE OF WHICH REQUIRES THE USE OF THE REACTOR.

Prepared by UCLA NUCLEAR ENERGY LABORATORY



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

Attachment E

JUL 30 1979

University of California
ATTN: Mr. Harold B. Brown
Environmental Health & Safety
Officer
Los Angeles, California 90024

Gentlemen:

Background

Your reactor facility license authorizes you to possess special nuclear material (SNM) of types and amounts that exceed the "threshold" quantity defined by 10 CFR Part 73, §73.1(b). Authorization limits will establish physical protection requirements under 10 CFR §73.47 and the Safeguards Upgrade Rule. The maximum possession limit will mandate that you comply with the requirements of the proposed safeguards upgrade rule (see enclosure A) which will be issued in the Federal Register within the next few days and will be implemented 120 days from its effective date. All nonpower reactor facilities have been deferred from the implementation of the upgrade rule for 120 days. During this 120 day period the staff has been directed to determine for the affected facilities (1) the status of physical protection at each, (2) the impact of closure of some or all as applicable, (3) what plans are being taken to implement the upgrade rule. After acquisition of this data the staff must report to the Commission with appropriate recommendations.

Requirements

The purpose of this notice is to inform you of our program to comply with the Commission's directive (see enclosure B) and to request certain information from you.

Program

- July 27, 1979 Issue this Notice
- August 15, 1979 Licensees to provide requested data
- August 27, 1979 Meeting of all affected nonpower licensees with NRC staff representatives at NRC Region III headquarters. Agenda will be provided separately.
- August -
- September 1979 Visit facilities not previously visited
- October 5, 1979 First draft of Report

Information Required


Information is required that only you can provide to develop the aforementioned report. Therefore, provide the following as a minimum. This list is by no



means complete and additional data from you is solicited.

1. What additional features will be constructed walls, vaults, CAS, protected area and costs associated with these.
2. What is the expected total cost to upgrade hardware? - one time cost - alarms, CCTV, guns, uniforms, badges, detectors.
3. What is the expected cost annually - guards, material, screening, two man rule - for an upgraded physical security plan - manpower and hardware?
4. What is the cost of shutting down the facility?
5. What is the annual cost of maintaining possession only status?
6. Effect of loss of program on US industry - (i.e.) engineers and operators for U.S. Nuclear Power Plants.
7. Effect of loss on medical research, medical treatment.
8. Cost of new plans - security, contingency, guard training.
9. Considering the impact of implementing the Safeguards Upgrade Rule will you continue to operate your facility?
10. Describe the impact of closing the facility on the educational program at your facility (school) - Loss of program and courses.
11. What is the size of the facility staff? - Will it be cut?
12. How many students are in the classes? - Will they finish their degrees?
13. How many graduate students are in facility - related programs? - Will they be able to finish?
14. What is the typical annual operating budget?
15. With 100 r/hr at 3 feet exemption criteria, can you meet and maintain the SNM at such a level continuously? What would the impact be on current financial and operating resources? How would it maintain the self-protection criteria affect fuel replacement and costs therefore?
16. How many courses utilize the facility - will they be cut?

Sincerely,


James R. Miller, Acting Assistant Director
for Site and Safeguards



THE FACTS AND FIGURES IN THIS DOCUMENT ARE NO LONGER
TIMELY OR ACCURATE. THEY SHOULD BE CONSIDERED ONLY
IN A HISTORICAL CONTEXT.

OFFICE OF ENVIRONMENTAL HEALTH AND SAFETY
THE CENTER FOR THE HEALTH SCIENCES
LOS ANGELES, CALIFORNIA 90024

August 15, 1979
EHS: C1251

50-224
326

James R. Miller
Acting Assistant Director for
Site and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Miller:

Due to the sensitive nature of the contents of this letter, we
request that this document be withheld from public disclosure pursuant
to Section 2.790 of 10 CFR Part 2. This letter is our response to your
letter dated July 30, 1979.

It is not our intention to possess greater than a formula quantity
of non-exempt SSNM because greater amounts would entail financial costs,
manpower requirements, and restrictions which could not be met at this
facility. Our Argonaut Reactor contains approximately 3.6 Kgs of SSNM.
We also have 0.7 Kg of irradiated SSNM in the process of being shipped
to the Idaho Chemical Reprocessing Plant and another 4.6 Kg of non-
irradiated fuel in storage. We have three alternatives.

- a. Ask for a variance on the 3.6 Kgs of SSNM in the core of the reactor due to the difficulty in retrieving it from the reactor.
- b. Store the 4.6 Kgs of non-irradiated SSNM elsewhere off-site.
- c. Remove all the irradiated fuel from the reactor and send it to ICRP for reprocessing and place the non-irradiated fuel in the reactor.

With the above comments in mind, the following are our responses to your sixteen questions answered in the same order as submitted in your letter:

- 1. None planned.
- 2. None except change of locks, keys, and combinations in the near future.
- 3. Uncertain, depends upon alternatives.
- 4. Approximately \$500,000 to \$1,000,000.
- 5. Approximately \$25,000 to \$35,000.

~~SAFEGUARDS INFORMATION
DETERMINATION MADE BY~~

~~Signature-Title-Office-Date~~

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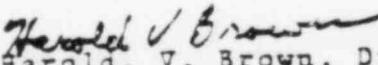
~~SAFEGUARDS INFORMATION~~

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6. Uncertain, but would result in a reduction in the number of graduate nuclear engineers entering industry. Our reactor also supports uranium assay work related to the search for uranium resources.
7. None.
8. None planned.
9. Yes, conditionally.
10. The reactor serves as a major part of five laboratory courses offered by the School of Engineering and Applied Science. Closing the facility will cost UCLA at least three job openings, five classes, and several research programs here and at other Universities. Closure would diminish not only our total educational program, but would diminish educational programs at other schools because our reactor is a part of the Reactor Sharing Program of DOE.
11. Seven. Yes. We will have to cut approximately three people.
12. Approximately 30 per quarter. Yes.
13. Approximately a dozen. Reactor shutdown would not directly affect them.
14. \$120,000.
15. It does not seem possible to meet the 100 r/m at 3' at all times for the reactor fuel. The impact of the upgrade rule would result in prohibitive costs if unfavorably interpreted in our case.
16. There are five courses which utilize the reactor, and two courses on reactor licensing (on a one-time-only basis) are beginning this fall.

We hope that the answers to these questions meet with your approval.

Sincerely,


Harold V. Brown, Dr. P.H.
Environmental Health and
Safety Officer

HVB/jac

cc: Charles E. Ashbaugh
Ivan Catton
John Evraets