UNITED STATES OF AMERICA

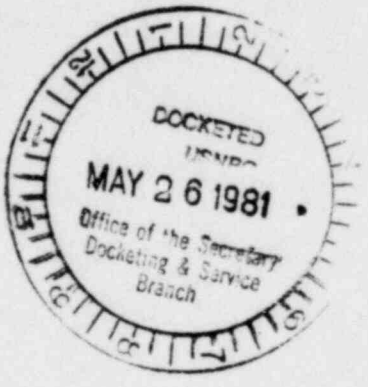
NUCLEAR REGULATORY COMMISSION

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 Number R-71)

ANSWERS OF THE COMMITTEE TO BRIDGE THE GAP TO STAFF'S FIRST SET OF INTERROGATORIES

Dated: May 20, 1981



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INTRODUCTION

On April 20, 1981, the NRC STAFF submitted to Intervenor, THE COMMITTEE TO BRIDGE THE GAP, one hundred and four (104) interrogatories with subparts. These interrogatories are answered in the responses that follow, as per the discovery schedule stipulated to by the parties and ordered by the Board.

Discovery is proceeding on all matters touched on in the Staff's interrogatories. The responses to the Staff's interrogatories that follow represent Intervenor's information relevant to those interrogatories as known at the start of the formal discovery period. The following answers are provided without prejudice to Intervenor's ability to introduce subsequently discovered material at a later date at hearing or any related proceeding.

Although Intervenor views a number of the Staff's interrogatories as harrassing and unduly burdensome, no formal protective order has been requested and no question objected to. Staff is put on notice, however, that should future interrogatories follow the same pattern, relief from the Board will be sought. Intervenor particularly refers to numerous interrogatories wherein Staff has requested detailed calculations, scientific analyses, and computer models for matters which should properly be addressed to Applicant.

Intervenor notes that it received over one hundred interrogatories from Staff whereas Applicant apparently received none. Intervenor reminds Staff that it is Applicant that is up for relicensing, not Intervenor, and that the burden of proof in such a licensing proceeding is with the Applicant. Furthermore, it is the Applicant that is the party most likely to have the information Staff has requested (for example, the fission product inventory by species for this particular facility, computer models of the effect of the new UCLA buildings on consequential doses in case of accident, and the annual cost to UCLA of owning and operating the reactor).

Intervenor does not wish to burden the Board with numerous requests for protective orders. But Staff should be on notice that if Intervenor perceives this harrassment to continue, it will have no alternative but to seek remedy from the Board.

General Matters

Question A

(a) No arrangements have yet been made by Intervenor regarding expert witnesses.

(b) See answer to (a) above.

(c) See answer to (a) above.

(d) Mark Pollock and Daniel Hirsch prepared and/or substantially contributed to the preparation of each of the responses below.

Contention I

Question 1

Intervenor believes that the UCLA application is misleading by its reference to the 1968 report on experimental vibration because the application merely mentions the fact of the performance of the test, not the results of said test.

The test reference in question occurs on page II/3-1 of Application, in a section of the Environmental Impact Appraisal entitled "Environmental Effects of Accidents". The topic sentence of the paragraph in question states: "Accidents ranging from failure of experiments to the largest core damage and fission product release considered possible result in doses of only a small fraction of 10 CFR Part 100 guidelines and are considered negligible with respect to the environment". In defense of that assertion, Applicant cites the vibration test.

The results of that vibration test in no way support the assertion. Applicant's statement implies that the largest core damage and fission product release considered possible is actually quite small, in part because no seismic damage of any significance is considered possible, as evidenced by the shake test cited immediately after the initial assertion.

However, the results of that test indicate that the reactor internals so shifted that control blade operation was apparently impaired and eventually made impossible. The implication of the reference in question is that the reactor "passed the test", lending support to the assertion of minimal core damage being possible. The results indicate that significant damage did occur.

In addition, the article asserts that the problem was addressed by significant alterations of the reactor core after the damage was discovered. This information is important to have been included because it indicates that the reactor that was the subject of the

vibration test in question is not the same reactor up for relicensing, but one significantly modified. The relevance of the reference to the test in support of the preceding statement about safety is further called into question by the fact that the reactor was significantly modified after the test and has apparently not been tested in the condition in which it now is, awaiting relicensing action.

These are all facts important for the Board to have in making a judgment on the environmental effects of accidents and other safety questions and should not have been omitted. The reference to the test without mention of the results of the test is misleading in that it creates the impression that the performance of the test lends support to the assertion of safety.

Question 2

See answer to Question 1 above, incorporated herein by reference.

Question 3

Intervenor relies on interpretations of the following 10 CFR code sections: 50.34(b), 50.36, 50.40, 50.41 or 50.42 (depending upon Board decision regarding which class of license is the appropriate one in this case), 50.57, 50.59 & 50 Appendix D.

Question 4

Intervenor does not assert that applications for license renewals are required to contain only "original" information. Intervenor's contention is that certain material in the Application which should have been original is not. See Intervenor's answer to Applicant's Interrogatory No. 2, incorporated herein by reference.

Question 5

By "original" Intervenor means that the material submitted about a particular reactor up for relicensing must be information about that particular reactor, as it is at the time application is made, not as it once was twenty years previous nor as some other reactor might be.

Question 6

Intervenor assumes that by this question Staff requests information as to the parts of the 1960 Hazards Analysis that were copied verbatim in the 1980 Application. Currently viewed as inaccurate are parts:

hydrology section, page 1; (a) there are wells in vicinity, (b) well map in Supplement

reactor site section, page 1; (a) building has been added to, (b) I&E Report 75-01

Seismology section, pages 1 and 9; (a) 1971 earthquake modified much of the previously-held picture of S. Cal. seismology; Uniform Building Code has changed; certainly doesn't represent "the accumulated wisdom of the engineering profession in this field"; buildings built to that Code have suffered earthquake damage; structural rearrangements could increase reactivity; (b) Science, February 1, 1980; NEL shake tests

Meteorology section, page 9,10; (a) inaccurate representation of current smog and inversion situation, inaccurate discussion of prevailing wind conditions, (b) Applicant's answer to Staff regarding questions on prevailing wind conditions.

Training Reactor Description, intro, page 19; (a) power has changed, there are credible ways for the fission products, no longer below prompt critical; (b) see evidence regarding reactivity, maximum credible accidents

charts, page 23, 24, 25; (a) don't show pneumatic tube, any other modifications since 1960; (b) license amendment on pneumatic tube

reactor core, page 27; (a) degree of confidence regarding similar fuel, Borax extrapolation; deflector, (b) see sections on reactivity

typical fuel cluster, page 29;a)new tie bolts, b) CO Report 68-2

reactivity analysis, page B-1 to 7; (a) see reactivity contention and (b) supporting basis in Supplement

consequential dose analysis, pages C-1 to 7; (a) Contention VIII, and (b) supporting basis in Supplement

Question 7

The environmental information Intervenor currently believes to be omitted from the application:

history of radiation exposure incidents, spills, leaks, mis-calibrations; (a) should be included so Board can guage potential environmental impact of a licensing decision; (b) NA

that tours are taken through the reactor room; (a) because Applicant claims in II/2-1 that entry requires health physics qualification and dosimetry; (b) Application

that background is not (.04 ± .03 mrem/hour); (a) truthfulness is essential in such an application, insensitivity of devices is important for board to know; (b) simple multiplication of .04 mrem/hour into yearly figure

full set of film badge data, including threshholds, sensitivity, and location of controls; gamma devices in stack, neutron figures; (a) essential to a full appraisal of environmental impact, (b) NA

explanation of discrepancy between 1979 figure in application and in annual report regarding Argon releases; (a) accuracy important; (b) Application II.2-5, 1979 Annual Report

full-scale analysis of maximum potential accidents and their environmetal effects, keyed for this particular reactor; (a) impossible otherwise to accurately assess environmental effects of accidents; (b) Application II/3-1

full-scale analysis of unavoidable effects of facility operation; (a) impossible otherwise to accurately assess environmental effects; (b) Application II/4-1

full-scale analysis of alternatives to operation of the facility; (a) impossible otherwise to accurately assess that matter; (b) Application 5-1

full-scale analysis of long-term effects of facility operation; (a) cursory conclusion without supporting data makes Board and staff assessment of impact on the environment impossible, (b) Application II/6-1

full-scale analysis of costs and benefits of facility and alternatives; (a) conclusory statements regarding all such facilities tells nothing to help judge this facility; (b) II/7-1

Actual measurements, competently done, well-controlled, with adequate sensitivity, of the Argon releases. Actual measurements of Argon on roof, in Math Sciences; not just <u>estimates</u> of Argon concentrations. Data based on current reactor usage and maximum licensed usage. (b) II/A-1 to 6; (a) because without actual measurements under current and licensed limit conditions, Board cannot assess with reasonable assurance that emissions will be as low as reasonably achievable and that insult to environment will be minimal.

Question 8

Intervenor contends that the statement on page 5 of the Application regarding the purpose to which the facility will be put is inaccurate because it states that the purpose will be 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. level." The actual primary function of the reactor is commercial, and the use to which it is put for education of students in nuclear engineering is minimal. Research at the M.S. and Ph.D. level is also minimal. The evidence for this is the May 13, 1980 answers by UCLA to Staff questions of April 17, regarding usage of the reactor. The table provided indicates the last year for which data is provided that only 1 hour went to NEL experiments, only 31 for engineering classes, and 60% of reactor usage was commercial. Additional evidence is the financial ledgers, billings and operating logs for NEL. Staff is referred also to pages 1 through 3 of Intervenor's Supplemental Contentions of August 25, 1980, dealing with Contention II, "Wrong Class License", which is included herein by reference. Staff is additionally referred to Applicant's "Answers" and "Further Answers" to Intervenor's First Set of Interrogatories as to Contention II, and to Applicant's Answers II.1-61 and I.17-18 of Interrogatories of April 20, 1981.

Question 9

Intervenor believes that the UCLA research reactor has been used for extremely minimal student education and research.

Question 10

Applicant states (Application, page 7): "No structural weaknesses (earthquake vulnerability) have ever been identified." Intervenor alleges that this statement is inaccurate because: 1) the vibration test did identify structural weaknesses associated with earthquake vulnerability (e.g. the shifting of lead shielding between the graphite and biological shield, leading to binding of the control blade shaft), 2) 1976 Annual (Specialized Activity) Report indicates "The February 1971 earthquake gave rise to minor problems that worsened with time and ultimately required a major maintenance effort in 1972", and 3) Richard Lee Rudman's 1968 study "Simulation of Earthquake-Induced Vibrations in a UCLA Reactor Fuel Bundle" detected (as did the structural vibration tests) power oscillations related to simulated seismic vibrations.

Question 11

Yes.

Question 12

Yes.

(a) Intervenor has not to this date (although future discovery may change this) asserted any specific actual harm to public health and safety occurred at the UCLA reactor during the February 1971 earthquake. Intervenor has, however, contended that stuctural weaknesses and earthquake vulnerability were identified that thus make Applicant's statement to the contray on page 7 of the Application incorrect and that the Board should have been provided the correct information.

(b) See 12 (a) above.

Question 13

(i) Depending on what is the correct for the UCLA reactor (at present and throughout its proposed license period), $3.54 may be in excess of 2.3% k/k, the current licensed limit. Since excess reactivity is closely tied to exponential period, and since period is closely tied to capacity of a reactor to have a damaging power excursion, including fuel melting, and since such an excursion and fuel melting might result in significant release of fission products, posing a substantial threat to the public, any possible increase in the licensed limit on excess reactivity is potentially of great safety significance.

(ii) Instrument calibration is central to the safe operation of a nuclear facility. If instruments are giving false readings, the functions of safety features become unreliable, operator response can be very much impaired, and safety of the facility and surroundings can be threatened. An increase in the calibration interval increases the likelihood of instrument error because the instrument has gone out of calibration in the interval since the last calibration. Applicant has been cited in the past for failure to calibrate at the required interval; one such failure resulted in an underestimation by several orders of magnitude of radioactive emissions. Proposal to relax calibration efforts can thus lead to serious safety problems.

(iii) Heat balance instrument calibrations are essential to assuring that neutron channel instrumentation and power level instrumentation reflect accurately what is going on in the core. If not calibrated, false readings can ensue. Scram systems and other safety systems tied to neutron channel and power level instrumentation can fail to activate because they are receiving false readings of core conditions if those instruments are out of calibration.

(iv) Failure to keep radioactivity released to the environment at levels as low as reasonably achievable clearly can be of safety significance, because radioactivity is potentially severely hazardous to exposed persons.

Because of NEL's history of violating radiation standards, any proposal to remove ALARA requirements from Technical Specifications and possible reduction of the probability of NEL personnel and students to be informed of the ALARA requirement, can only be seen as a move in the wrong direction from a safety standpoint. The ALARA requirement should be posted visibly throughout the NEL facility; it should not be removed from the only location currently written down, the Technical Specifications (aside from the paragraph in the few copies of Title 10 CFR that may be at the facility and rarely if ever looked at).

Keeping emissions and exposures as low as reasonably achievable is central to reactor safety. This facility has evidenced that it needs to be reminded of that responsibility repeatedly. Reducing the presence of that responsibility is a step in the wrong direction from a safety standpoint.

(v) The exhaust stack is too short as it is. Removing the requirement of stack height makes it possible for the stack to remain as is, or to become even shorter. The safety significance of stack height is that the reactor stack is located on a roof readily accessible to the public (meterological station, planeterium, seminar roof, observatories, 7 unlocked entrances) who might be exposed to the plume. Keeping the plume as far as possible from the public is necessary from a safety standpoint to reduce radiation exposures. The higher the stack the lower the chances of someone being enveloped in the plume. Furthermore, given the placement of the downwind airvent for the Math Building, further reduction of the stack's height could significantly increase the amount of Argon-41 and other radioactive emissions entering the air vent and thus exposing the people in Math Sciences. The stack height requirement should be increased, not removed. Finally, the area right around the exhaust stack is supposed to be restricted beause exposures close to the stack are potentially far higher than farther away. Without the access restriction in the Technical Specifications, significantly larger radiation exposures are possible, clearly undesirable from a safety standpoint. Intervenor believes it would be preferable from a safety standpoint for the entire roof to be effectively restricted; clearly removal of the one restriction (the area right around the stack) agreed to by NEL is the wrong direction.

Question 14

Wells in the vicinity of the reactor can be significant from a safety standpoint because in case of accident or other release of radioactivity, ground water can be polluted. If water for public use draws from the ground water near the reactor, or if that ground water can readily migrate to those wells, a substantial pathway for public radioactivity exposure exists. In addition, should Applicant be unaware of all the wells in the vicinity, and should Applicant's emergency plans not take those wells into account and provide a means for identifying each such well and rapidly stopping its use or at least monitoring it routinely, considerable public harm can ensue in the event of an accident at the facility.

Question 15

Yes

Some effluents from the UCLA reactor are normally dumped down the drain into the LA City Sewer System. Should part of that sewer line be broken, radioactively contaminated material could escape into the ground, migrate into water and then to nearby wells.

In case of a major accident involving ground deposition of radioactive materials, perhaps rained out, the material deposited on the ground could migrate downward over time and contaminate ground water.

All of these possibilities have potential safety significance and should have been analyzed by Applicant. At least the Board should have been provided the correct information about wells rather than a denial there were any.

Question 16

The figures given by Applicant in the Application itself (page III/B-6) show estimated thyroid doses considerably in excess of 10 CFR 100 guidelines, even utlizing assumptions that severely underestimate the actual dose.

(a) Staff is referred to Contention VIII and the discussion of its basis in Intervenor's Supplemental Contentions of August 25, 1980, included herein by reference.

Question 17

The facility was used for engineering classes only 31 hours in 1979; only 1 hour of NEL research was conducted. It would be far more suitable and economical for the few hours spent annually in research and education to be done at another reactor. There are 11 other research reactors in California alone. Applicant itself operates at least three other research reactors. When business is declining and research and education funds are tight, as is the case, it makes sense to combine use. Activation analysis samples can as readibly be sent elsewhere as sent to UCLA. UCLA students utilizing the UCLA reactor for their education could continue to take classes at UCLA, continue to do work at NEL, but go to another reactor (say UC Irvine) for those few class hours requiring reactor

operation. This is a standard procedure for other resources systemwide (for example, shuttle buses take students from some campuses to other campuses to use specialized libraries or language facilities or classes not available at their campus). 31 hours per year is about 10 hours per quarter; essentially 1-2 all-day field trips per quarter. Far more suitable and economical.

Another alternative is to simply remove the fuel from the facility and make the reactor into a simulator. Airplane pilots don't start out flying a plane; they use a simulator. The nuclear industry itself is beginning to rely much more heavily on simulator training. Students would continue to be able to learn how to operate a reactor, but the risks to the public would be removed because no error made by those students would result in anything more than a simulated hazard, rather than a real one.

a) evidence regarding other research reactors in California can be found in NRC Facilities License Application Record (FIAR) 06-30-77

Question 18

UCLA's Application itself (Part III, Appendix A) shows that Borax and Spert data requires considerable alteration to produce an estimate of the safe level of reactivity insertions (note error in text) for other reactors. Thus there is no one figure for plate type fuel elements in terms of $ amounts; the figure varies reactor to reactor. In addition, Borax tests never tested fuel at $3.54-- only above and below that level. Above that level, the reactor exploded.

Question 19

The basis for this assertion is found in the Supplement, Part II, and the answer to Question 21, below, both of which are incorporated herein by reference.

The operating logs and financial ledgers and billings provided to date to Intervenor by Applicant confirm the heavy commercial use of the facility, and that commercial use has been increasing year-by-year for the last few years.

The information requested here by Staff as to use of reactor for various purposes is information Intervenor has attempted to get from Applicant for six months. Despite Intervenor's First Set of Interrogatories as to Contention II, which asked precisely for the information Staff now requests of Intervenor, and despite three Motions to Compel and two Board Orders, full answers to those interrogatories still have not been provided by Applicant to Intervenor. Intervenor suggests that Staff, should it require more information than has to date been provided Intervenor by Applicant on this matter, attempt to obtain the information from Applicant, in whose possession said information remains.

(a) Intervenor still lacks Applicant's definitions for such terms as sale of services and commercial activity, so it is difficult for Intervenor at this time to properly divide the commercial activity into the categories you have here requested. For the purposes of this interrogatory, however, Intervenor will respond by calling diamond coloring and ore assaying through activation analysis sales of services other than services for research and development or education and training, rather than referring to them as sales or commercial distribution of materials, products or energy, and thus listing those services under (c) below. The commercial activity of which Intervenor is currently aware thus falls into category (c) below.

(b) See (a) above.

(c) Intervenor has not been provided ledgers or billings for 1976, so no listing can be made at this time for 1976. Intervenor has not been provided financial billing statements for 1977, and thus likewise cannot make listing as requested for that year. Intervenor has been provided ledgers and billings from mid-1978 through mid-1980, so that information is listed below:

mid-1978 - end-1978	Emil Kalil Uranium West
1979	Emil Kalil Gems and Minerals of Sarosi
1980 - mid-1980	Emil Kalil

Kalil and Uranium West utilize neutron activation services of the reactor for assaying uranium ore samples in a commercial venture. Gems and Minerals uses the neutron activation services of the reactor for coloring commercial jewelry.

(d) That evidence is sought in Intervenor's April 20, 1981, Interrogatories to Applicant, II.1-61, and in the First Set of Interrogatories, still awaiting full answer. Until Intervenor knows whether academic credit is received for work for Kalil, and whether the student pays or Kalil pays, and related questions are answered, Intervenor cannot make a determination on this question.

Contention II

Question 20

a) The financial figures and data Intervenor uses for annual costs to UCLA of owning the research reactor at present time are zero, as the Applicant states that construction of the reactor facility was done through a grant from USAEC, with funds expended on construction and reactor equipment.

b) The financial figures and data Intervenor uses at this time for annual costs to UCLA of operating the research reactor is $167,000.

c) The source of item (a) is Application, page III/1-1. The source of item (b) is Application, page I/2-1.

d) Intervenor at this time allocates owning and operating costs among the various activities of the reactor on the basis of reactor usage for each function in terms of hours or port-hours of usage.

Question 21

Applicant's revised Table III/1-3, provided to NRC staif on May 13, 1980, indicates Reactor Usage in hours per year; for 1979, the last year reported, 264 hours were listed as commercial, 31 as enginnering classes, 1 as NEL experiments, with maintenance, UCLA Users, Colleges and Universities, and Demonstrations taking up the rest. The total port-hours were 446; the actual run time 372. The commercial use alone represents 59.19% of port-hours. Since a review of the relevant billings and operating logs indicates that virtually all of the commercial use was for Emil Kalil's firm, and that Kalil's runs were exclusively or virtually exclusively utilizing one port (the pneumatic tube port), actual run time for commercial use is nearly the same as the total port-hours, thus making the commercial percentage of actual run time even higher than the 59.19% figure for port-hours.

Question 22

Intervenor stated on page 1 of Part II of its Supplemental Contentions that 52.5% of the NEL income in 1979 came from "reactor earnings" and "other income." This is a computational error, which Intervenor hereby acknowledges.

Contention III

Question 23

Intervenor does not believe that the UCLA Application should provide information required by 10 CFR 50, Appendix B concerning power reactors and reprocessing plants. Contention III makes no mention of said Appendix.

Question 24

Intervenor at this time has no evidence on way or the other indicating either compliance with or failure to comply with requirement of obtaining Reactor Use Committee, Director, or Commission approval for changes in reactor systems, non-standard experiments or facility changes. Intervenor to date has not been provided access to Applicant's Reactor Use Committee minutes nor other records where such approval would be noted; Intervenor directs Staff to Applicant, which is in possession of the information requested in this question.

Question 25

1. The present management responsible for the reactor is essentially the same individuals as past management. Mr. Zane, Professor Kastenberg, and Mr. Hornor have been associated with the facility for close to twenty years each. Mr. Ashbaugh has been with the facility for roughly ten years. Mr. Ostrander and Dr. Catton have been with the facility at least five years each.

2. Emissions have increased, rather than decreased, over the last few years; decay tanks remain uninstalled; the reactor exhaust stack remains too short, there is no accelerator nozzle on top, and exhaust fans remain too weak to exhaust emissions at the required rate with the nozzle on, the reactor roof remains unrestricted in terms of physical restrictions; the June 1980 fuel shipment clearly evidences failure of management organization to follow adequate safety procedures; inspection report 80-02 indicates numerous log-keeping errors, failure of supervision, failure to report reportable incidents, failure to have necessary safety procedures (i.e. cracked rabbit).

3. Intervenor is not in possession of any evidence to indicate that the present situation is qualitatively different from the management problems evidenced earlier in the facility's operating history.

Question 26

Intervenor does not contend that NEL personnel allowed "unauthorized" persons to operate the UCLA reactor, but that they permitted unlicensed visitors operate the reactor. Instances whereupon these incidents occured as referenced in operating logs are as follows: (a&b)

Date-4-1-76, Run No.2101, a Demostration for Harvey Mudd College, "2030 hr.- students operating at various powers". Page 76-96 of operating logs. Power level was variable, so it would appear that students manipulated controls which would affect reactivity and power.

Date-5-28-76, Run No. 2115, a Demonstration Run for Culver High, "1402- student operations of reactor", power level was variable, so it would appear that students manipulated controls which would affect reactivity and power. Page 76-197 of operating logs.

Date-9-11-76, Run No.2138, Demonstration run for ANS, students will operate reactor, "1550-student operation will continue, 1628-Auto 100kw-student operation ceases." Reactor power was up to 100 kw, so it would appear that students manipulated controls which would affect reactivity and power. Page 76-338 of the operating logs.

Date-5-21-77, Run No.2213, Class experiment for Mt. San Antonio College, "1032-student operation". Power level variable, so it would appear that students manipulated controls which would affect reactivity and power. Page 77-180 of the operating logs.

Date-5-31-77, Run No. 2220, Demonstration for Pierce College and Sample irradiation for Marian Furst, "0911-student operation" at "0928-Manual scrams". Power level was variable, so it would appear that students manipulated controls which would affect reactivity and power. Page 77-207 of the operating logs.

Date-6-10-77, Run No.2228, ROTC run and demonstration run for class from Southern California Edison, "1344-student operations began". Power level was up to 100kw, so it would appear that students manipulated controls which would affect reactivity and power. Page 77-244 of the operating logs.

Date-12-7-77, Run No. 2275, Demonstration and student operations run for Cal. State Northridge, "1806-student operations begin, 1940-Ashbaugh relives students". Power level variable to 100kw, so it would appear that students manipulated controls which would affect reactivity and power. Page 77-334 of the operating logs.

Date-1-7-78, Run No.2281, Reactor Demonstration and Au Activation, user-Mt. SAC, "1128-student operator takes over". Power level-100kw , so we are not sure which instruments students manipulated. Page 78-8 of the operating logs.

Date-4-21-78, Run No. 2309, Reactor Demonstration for Taft High Physics Students, "1505-Taft H. students take over". Power level variable, so it would appear that students manipulated controls which would affect reactivity and power. Page 78-127 of the operating logs.

Date 4-28-78, Run. No.2311, Reactor Demonstration for Culver High Physics and check out for 135F, "1440 student operations". Power level was variable, so it would appear that students manipulated controls which would effect reactivity and power. Page 78-135 of the operating logs.

Date 3-16-79, Run No. 2441, Class demonstration for Calabasas High School, "11:10 student operation". Power level 10kw, so we are not sure which instruments students manipulated. Page 147-79 of the operating logs.

Date-5-7-79, Run No. 2459, Demonstration for CSULA, "1545-students operating". Power level variable, so it would appear that students manipulated controls which would effect reactivity and power. Page 237-79 of operating logs.

Date-5-18-79, Run No.2463, Demonstration for Culver High, "1453-student operation commences". Power level was variable, so it would appear that students manipulated controls which would effect reactivity and power. Page 258-79 of the operating logs.

Date-7-1-79, Reactor Demonstration for Pierce College, " 1545- student operation begins". Power level was variable to 100 kw, so it would appear that students manipulated controls which would affect reactivity and power. Refer to operating logs.

Contention IV

Question 27

a) 10 CFR 50.40 mandates that the Commission not grant a license unless the operating procedures, the facility and equipment, the use of the facility, and other technical specifications, or the proposals collectively provide reasonable assurance that the applicant will comply with the regulations in 10 CFR 50 and 20, and that the health and safety of the public will not be endangered. Contention IV, in part, goes directly to the question of whether reasonable assurance can be given that regulations will be obeyed in the future, since there is such a persistent history of violation of regulations in the past. It may well be true that lax managerial and administrative controls have contributed to some or all of these violations, and that some or all of these violations may be evidence of lax controls, but the two are different issues. Some lax controls do not result in violation of regulations but nonetheless may provide evidence that reasonable assurance of future protection of public health and safety can be made. Some regulation violations are due to lack of money for equipment improvement or some other factor unrelated to managerial control. In addition, some I&E reports criticize applicant's managerial controls while not formally citing it for violation of regulations.

b) The evidence for this contention comes from the I&E reports, all of which are in Staff's possession, and from the Department of Transportation study of the NEL incident of June, 1980, and from the documents on continued emissions referenced in the Supplement, Part VI. The same documents may be useful evidence regarding several different matters before the Board, and since the issues are so interrelated, this is likely to be the case. Were the managerial and administrative controls not so lax, the number of violations would likely be lower; were there fewer violations, and better management, and better instrument calibration, it is likely emissions would be lower; were the management better, the risks from excess reactivity insertion would be lower; were the applicant more financially capable, better management organization and more staff could be hired, safety instruments could be better maintained, and nonexistent safety features could be added where needed. Each contention does relate to each other; because, as 10 CFR 50.40 makes clear, it is a collective finding that must be made by the Board.
In response to the question as to which I&E reports Intervenor currently believes support its contention on violations of regulations that have not previously been mentioned in support of its contention on managerial controls:

IE Inspection Report 50-142/69-01
50-142/73-01
50-142/74-01
50-142/75-01
50-142/77-01
50-142/80-02

CONTENTION V

Question 28

a) Intervenor has contended that the excess reactivity licensed limit is large enought that, when inadvertently inserted under certain conditions, it could create a power excursion sufficient to raise the temperature of the fuel and/or the cladding to the melting point of either. Those calculations are included in the Supplement, part V, which is included herein by reference. The calculations at this point are based on Applicant's calculations in Application, Part III, Appendix A. For clarification, the calculation will be summarized here in addition to being contained in the Supplement.

Applicant's analysis in Application was able to estimate from Borax data that 41 MW-sec of energy release would have been sufficient at the Borax to raise the maximum temperature of the fuel plate from the temperature of boiling water to the melting point of aluminum, a temperature change of approximately 1000°F, through the formula

$$\frac{1000^{\circ}F}{24.4^{\circ}F/MW\text{-}sec} = 41 \text{ Mw-sec.}$$

Using a table included in the orginal Hazards Analysis and taken from one of the early Borax articles, references in the Application, Applicant states that a reciprocal period of 150 sec^{-1} "would give an energy release of 41 MW-sec in addition to the energy necessary to raise the fuel plate temperature to the saturation temperature of water." That period corresponds to 6.7 milliseconds; Applicant interprets the calculation to mean 6.7 milliseconds was the estimated safe limit for the Borax reactor, while Intervenor interprets the same calculation to mean that 6.7 milliseconds was the estimated danger point for the Borax. A debate over whether the glass is half full or half empty.

Applicant then proceeds to transpose the Borax safety/danger point to the UCLA situation. Correcting for differences in plate spacing, void coefficients, and figure of merit regarding heat flux, and without including error bars for each transformation, Applicant concludes (page III/A-5) that the corresponding exponential period for the UCLA reactor is 9.1 milliseconds, corresponding to excess reactivity of 2.3% k_{eff}. These caluclations are shown on page 5 of Intervenor's Supplement part V.

Since the void coefficient reported by Applicant (Application III/6-5) currently at the reactor has changed from the one used in the calculations included in Applicant's analysis, the substitution of the void coefficient Applicant asserts is presently correct changes the safe/danger point to 10 milliseconds and 2.1% excess reactivity. The other factors mentioned in the contention (e.g. lack of error bars, questions about correct Beta, effects of positive temperature coefficient for graphite) all indicate a degree of uncertainty about either the 2.1% or 2.3% figures sufficient to warrant a substantially lower licensed limit, to be on the safe side.

b) There are numerous possible scenarios by which excess reactivity could be inserted into the UCLA reactor sufficient to potentially cause a power excursion. The pneumatic tube could insert a sufficiently large positive worth sample; or a large negative worth sample could be inserted and the control blades not reinserted before ejection of the sample. Or an earthquake could force a sample to move out of the core area, removing neutron absorption and increasing reactivity.

Question 29

The 1960 Hazards Analysis indicated that a safe level for this facility was .6 % delta k/k, which would be less than that necessary for "prompt criticality". Prompt critical is, of course, simply above Beta. The figures for Beta for this reactor Intervenor has seen to date vary from .6% to .74%. Thus keeping excess reactivity below .6%, as the original hazards analysis recommended and as the Commission initially mandated, seems to Intervenor prudent. In addition, Saul Levine, Chief, Test and Power Reactor Safety Branch, Division of Reactor Licensing, AEC, by letter to H.V. Brown of UCLA, February 18, 1966, stated, "It is noted that experiment worths are now limited to 0.6% $\Delta k/k$, and that only about 0.18% $\Delta k/k$ is needed to achieve the authorized maximum power level of 100 Kw." UCLA's response was that they needed more excess reactivity because of pile oscillation experiments then in use and 16-hour/day operation because of extensive reactor demand, neither of which is currently the situation at the facility, so far as Intervenor knows.

Question 30

(a), (b) and(c) Intervenor has no information regarding changes in the level of excess reactivity since February 1976.

(d) Reference: Page 27 of UCLA 1960 Hazards Analysis. Intervenor does not know on what calculations UCLA made the assertion, suggests Staff contact Applicant for answer to this question.

(e) The calculations and references are included on pages 2 and 3 of Supplement, Part XI, which are included herein by reference.

(f) (i) Intervenor has made no contention that the power level increase has had an effect on the amount of excess reactivity available, and has no information about any such effect.

(ii) the margin of safety is diminished by the increase in fission product inventory at 10 kw. Intervenor has no calculations or references at present to indicate precisely by how much the margin of safety is so diminished.

(iii) Intervenor has no calculations or references at present regarding effect of power level increase to increase of fuel temperature

(iv) Intervenor likewise has no calculations or references at present regarding effect of power level increase to cladding melting

(v) Fission product inventory generally is proportional to power; no calculations available nor references regarding exact amounts of species

(va-c) Intervenor at this time has no calculations or references regarding these questions.

Intervenor directs Staff to Applicant if Staff wishes answers for these questions. Applicant, far more likely than Intervenor, will know the effect of its power increase on its fission product inventory, fuel temperature, etc. NRC Staff is further directed to Applicant's answers to Intervenor's interrogatories VIII/1-52 if it wishes the information requested.

Question 31

As the UCLA 1960 Hazards Analysis section on reactivity accidents is simply xeroxed into the 1980 Application, this question has been answered in the response to Question 28, which is incorporated herein by reference.

Question 32

(a), (b), + (c) Intervenor has no information regarding this question of void coefficient change since 1976. NRC Staff is directed to Applicant for an answer.

Question 33

Intervenor has not contended that the change from % delta k/k to dollars and cents has changed the excess reactivity calculations, but rather may have changed those calculations. The conversion from percents to dollars and cents is made by use of β. Since four figures for β occur throughout the Application and the Hazards Analysis, depending on which is the correct figure, the conversion may or may not have altered the excess reactivity limitation.

If β is.74%, as indicated on page D-12 of the Hazards Analysis, then $3.54 (the newly proposed limit) actually equals 2.3% delta k/k.

$3.54 x .74% = 2.6196% delta k/k

Question 34

(a), (b) & (c) Intervenor has no opinion at present time as to what error bars (numerically) should have been utilized in using the Borax data for the UCLA calculations. Intervenor contends that the burden to do accurate and reasonable and complete calculations as to safety limits falls to the Applicant and that the Applicant has not met that burden. Intervenor has merely contended error bars should have been included in the calculations and that those error bars, given the nature of the Borax data, should have been significant. Intervenor contends that reasonable error bars can only reduce the figure arrived at for a safe excess reactivity licensed limit, but has no information to determine by precisely what margin.

Question 35

Intervenor's contention is that Applicant should have included a survey of new data on reactivity questions since the Borax tests utilized in its Application and Hazards Analysis. The burden to do that analysis, should the contention be approved, is on the Applicant, not the Intervenor. In the Supplement, Part V, pages 9 and 10, incorporated herein by reference, identifies a number of reactors whose experience provides important data for possible consideration in reviewing the accuracy of UCLA's 20yearold analysis. As an Appendix to that part of the Supplement, a chart from Thompson and Beckerley, Technology of Reactor Safety, is reproduced regarding some of the newer data that should have been considered. The analysis Intervenor contends Applicant should do, would include, but not be limited to the reactor experience identified above.

Question 36

These assumptions are detailed in pages 10 to 13 of Part V of the Supplement, which are included herein by reference.

Question 37

This contention is not based at this time on calculations or references; it simply states that the pneumatic "rabbit" system, given the excess reactivity limit in the proposed license, provides a means of rapid insertion of excess reactivity capable of causing a severe power excursion. The calculations and references regarding the excess reactivity limit are included in answer to question 28, included herein by reference.

Question 38

(a) Reference regarding removal of beam tube, and related calculations, are found in Hazard Analysis page B-6.

(b) Removal of the beam tube increases reactivity above the previously measured level. Reactor core has x % excess reactivity installed; thereafter beam tube is removed; neutron absorption is lessened; reactivity increases. Thus if the core has precisely the Technical Specifications limit installed with the beam tube in place, removal of the beam tube increases excess reactivity over the Technical Specifications limitations.

Question 39

(a) Page 15 and 16 of Part V of the Supplement are hereby incorporated by reference by way of answer.

(b) Intervenor's contention is that, even were safe excess reactivity limits imposed by the license, it is impossible to prevent possible excursions at this facility, given its history of violation of its license, technical specifications, and Commission regulations, because Applicant may once again violate excess reactivity limits, this time disastrously. Applicant cannot give reasonable assurances that it will obey whatever limits there are in its license; thus reasonable assurance of protection of public health and safety cannot be given.

Question 40

(a) through (d) no information available.

CONTENTION VI

Question 41

If Applicant's effluent monitor is now correct (and independent samples referred to in I&E Report 80-03 indicate that possibility that the readings remain low), Applicant's radioactivity releases have increased significantly since the time in the mid-70s when the Commission determined (prior to Amendment 10) that UCLA was in excess of 10 CFR 20 Appendix B limits. See Application II/2-5, and Annual Report 1979, page 9, and UCLA's Ashbaugh letter to NRC's David Jaffee, April 23, 1975.

Corrected (by Ashbaugh) figures for emissions '73 and '74:

52.9 Ci released instead of .248 reported 1973

56.2 Ci released instead of 2.39 reported

1979 figures: 82.9 Ci (1979 Annual Report)

The concentration at the reactor stack is, whenever the reactor is running at full power, over the 10 CFR 20 Appendix B limits for concentration by several orders of magnitude; even when averaged over a year's time, the concentration remains over that limit.

1×10^{-5} μ Ci/ml (concentration of Argon/at only place where it has been measured) compared to 4×10^{-8} μ Ci/ml indicates that the concentration is 250 times MPC. The provisions of the Amendment 10 permit reduction by 18.8% for operating time which still puts the facility at roughly 47 times MPC. The dispersion factor approved in Amendment ten of .115 still puts the facility over MPC by a factor of 5.4. The occupancy factor for the roof was estimated to be 10%--a figure which Intervenor disputes--but as required by the Amendment, Applicant has reported changes in that factor. For example, on October 23, 1979, by letter from Neill Ostrander to Director, Division of Operating Reactors, informing the Commission of new information about use of the meteorological station on the roof which alone, without any other occupancy of the roof, brings the occupancy factor to 33.3% at least. With this new, more correct occupancy factor, exposure on the roof is 1.8 times MPC.

Question 42

Reactor stack too short, no decay tanks in place, no accelerator nozzle on stack, roof not restricted, reactor run too long at too high power, no containment structure.

Question 43.

No TLDs in place. Effluent monitor does not match readings from independent samples (former too low); see I&E Report 80-03. No Argon concentration readings are taken anywhere except stack, thus there is no information available to demonstrate safety on nearby roof or inside Math Science building.

Question 44

(a) Lower emissions/exposures could reasonably be achieved: move the math sciences' air vent, raise the stack height, increase the flow rate, put the accelerator nozzle on, put in decay tanks; thus emissions are not as low as could be reasonably achieved. In addition, Applicant's own extrapolation of its TLD data indicate (8-27-80 response to Staff question 2) that if scaled up to 1979 operating level, estimated beta and gamma dose is about 97 mr/year, averaging the TLDs. If the highest TLD is taken, for the highest dose in unrestricted area, (page V/3-10 indicating the highest level being 50 mRem per year), scaled-to-1979 becomes

$$\frac{50}{36}\left(\frac{\text{max TLD}}{\text{ave. TLD}}\right) \times 97 \text{ mr/yr} = 134.7 \text{ mr/year}$$

If the scaled-to-1979 figures are scaled to maximum permitted levels under the license

$$\frac{.05 \times 365 \text{ days/year} \times 24 \text{ hours/day} \times 100 \text{ kw}_{th}}{294 \text{ hours} \times 100 \text{ kw}_{th}} = \frac{43800 \text{ kwhours}}{29400 \text{ kwhours}}$$

$$\frac{\text{licensed limit}}{1979 \text{ output}} = 1.49$$

Thus 134.7mr. x 1.49 = 200.7 mr/yr in unrestricted areas.

That is many times background, clearly not ALARA, which is supposed to be generally considered as some small fraction of background.

(b) 20.106(b)(1) requires that applicant make a reasonable effort to minimize the radioactivity contained in effluents to unrestricted areas; Answer to Question 42, incorporated herein by reference, indicates that those reasonable efforts have not been made.

20.106(b)(2) requires that applicants demonstrate that it is not likely that radioactive material discharged in the effluent would result in exposures to concentrations in excess of Appendix B, Table II limits; Intervenor contends (see answer to question 43 above, incorporated herein by reference) that no such demonstration can be made by Applicant due to its inadequate monitoring. Averaging of emissions over a year in no way is a reasonable effort to minimize radioactivity nor of making adequate demonstration that excessive exposure in unlikely.

(c) In applying for license renewal, Applicant is requesting higher limits for emissions than is contained in 10 CFR 20.106(b), as is evidenced by the calculations and references in answer to Question 41, included herein by reference.

Question 45

(a) Intervenor means by the word "practicable" what is now meant by the term "reasonable". Intervenor understands the current ALARA principle and requirement formerly was known as ALAP--As Low As Practicable. The term "practicable" is not Intervenor's but is quoted from Applicant's current Technical Specifications.

(b) Since ALAP and ALARA are used here interchangeably, answers to questions 41 and 44 are included herein by reference.

CONTENTION VII

Question 46

(a) Intervenor's contention does not allege that unscheduled (reactor) shutdowns endanger public health and safety. Intervenor's contention is that the reactor's history of persistent pattern of numerous unscheduled shutdowns, abnormal occurrences, and accidents are so pervasive that they evince a pattern of unreliability which makes it impossible for Applicant to reasonably assure that the reactor will, if relicensed, be operated in a manner which does not endanger the public health and safety. It is the pattern of unreliability, evidenced by the high level of such occurrences, that is at issue in this contention, not the individual occurrence.

(b) see (a) above.

Question 47

(a) Intervenor is not in possession of the Energy Reorganization Act of 1974 and thus cannot answer the question. If Staff can quote the definition in question from that Act, Intervenor can respond.

(b) An abnormal occurrence is a non-standard incident at the facility.

(c) Abnormal occurrences and unusual events which we are currently aware are identified and described in:

-Annual Report-UCLA Nuclear Reactor, Jan.1,1975 through Dec.31,75, pages 4-6.
-Annual Report-UCLA Nuclear Reactor, Jan.1,1978 through Dec.31, 1978, page 3.
-Annual Report-UCLA Nuclear Reactor, Jan.1,1979 through Dec.31, 1979, page 3.
-Inspection Report-CO Report No. 50-142/68-2, page 2.
-Inspection Report-RO Report No. 050-0142/73-01, page 1.
-Inspection Report-RO Report No. 50-142/74-01, page 1.
-Inspection Report-IE Report No. 50-142/75-04, page 1 and 6.
-Inspection Report-IE Report No. 50-142/76-02, page 1.

(d) Intervenor has made no contention to date one way or the other as to whether or not harm occurred from these past abnormal occurrences. Intervenor's contention is that the high number of these occurrences evidence a pattern of operational unreliability which make it impossible for Applicant to assure that health and safety will be protected if license is granted.

Question 48

(a) By "accident" Intervenor means an untoward incident such as a radiation spill, pipe break, coolant leak.

(b) These accidents are identified in the Supplement, Part VII, which is included herein by reference. In addition, the shipment incident involving contamination, and the cracked rabbit incident reported in I&E Report 80-02.

(c) The consequences involve damage to control panel (demineralizer leak), potential radiation exposure to the public (leaking start-up sources, shipment incident, shield tank and coolant leaks, cracked rabbits).

CONTENTION VIII

Question 49

(a) Because 1800 rem is a very high dose. The whole body dose received from the average chest X-ray is about .029 mrem by comparison, and even X-ray doses that low are such as to have physicians carefully assess the risks of the exposure weighed against the medical need for the diagnosis.

(b) Yes.

(c) Intervenor at this time interprets 10 CFR 100 sections dealing with doses as based on the worst possible meteorological conditions at the particular site. Los Angeles is known for its inversions; that is a big part of the cause of Los Angeles' smog problem.

(d) The precise reasons why the UCLA severe inversion calculation is not a valid upper limit are given in the Contention, parts 1a through e, incorporated herein by reference, and the the Supplement, Part VIII, likewise incorporated.

Question 50

(a) Far more than 10% of the volatile fission products may potentially be released in the maximum accident. Far greater figures than 10% of volatile fission products are assumed to be released through damaged or melted cladding when similar analyses are done for other facilities.

(b) For example, WASH-740 based its calculations on 100% volatile release; The Summary Report on the Hazards of the Argonaut Reactor by Lennox and Kelber (ANL-5647) regarding the original Argonaut assumed 50% release.

(c) Intervenor at this time has no conclusion as to the fission product release it deems valid.

Question 51

(a) Because to do so the SAR assumed "that the incident is not violent enough to blow off the top and side biological shields so as to cause an intense spray of water-steam-radioactivity mixture into the building air."

(b) The assumption identified in (a) above is invalid by a simple review of the Borax experience (see references cited in Application; plus Thompson and Beckerley; and the film of the Borax self-destruct). A reactivity accident certainly can be violent enough to blow off the biological shields and cause an intense spray of water steam-radioactivity. In addition, the sources cited in answer to Question 60 (b) all assume significant release of non-volatiles.

Question 52

(a) Intervenor has not contended the statement attributed to it in the question.

(b) and (c) Intervenor cannot answer for the reasons stated in (a) above; the statement cited in the question is not the assumption Intervenor believes to be invalid.

Question 53

(a) Because it is now in a 7-story building.

(b) Because maximum exposures may be inside the building.

Question 54

(a) This question is answered in the Supplement, Part VIII, page 5-6, included herein by reference. In addition, assumption assumes reactor room undamaged, whereas that may not be the case.
(b) 1960 Hazards Analysis indicating efforts assumed to be taken to minimize potential leakage versus physical evidence made upon inspection indicating significant leakage under doors, etc.
(c) Intervenor has no formal opinion at this time as to what leak rate would be valid. Intervenor's contention is that Applicant's SAR assumptions are invalid; it is not Intervenor's burden to write an adequate Application for the Applicant, but merely to call to the attention of the Board the areas where the Application before them is invalid.
(d) We do not challenge the assumption of a 30 mile an hour wind; we challenge the assumption of a 20% leak rate at 30 mph wind, with a proportionately assumption lower leak rate at lower wind speeds. We do not necessarily support the 30 mph/either
(e) As we do not challenge an assumption about wind velocity of 30 mph, there can be no answer here. see (d) above.
(f) Should part of the reactor room be destroyed, fission products would not "leak out" at all, but just be released; leak rate into the parts of Boelter Hall now next to the reactor when none was there when Hazards Analysis was built would not necessarily be tied whatsoever to wind velocity outside the building.

Question 55

(a) Because the assumptions are critical to an accurate analysis; because Applicant's previous assumptions (e.g. regarding Argon emissions) turned out to be vast underestimations when actually measured; because the central principle of science is that a hypothesis has little weight until its validity is conclusively demonstrated through carefully controlled experimentation.

(b) Intervenor is precisely asserting that common scientific principles must be used in the SAR calculations, and the principal scientific principle to be used is the one described in (a) above.

(c) Intervenor's contention is that the burden to do a current review of nuclear safety literature is the Applicant's. The burden of proof that the twenty-year-old references Applicant employed in 1960 are still valid with what is known today is upon the Applicant. As basis for its contention that there is new dose data available different from that used by Applicant in 1960, Intervenor cites Reg Guide 1.109, which also provides some dispersion data. It is Applicant's burden, should the contention be approved by the Board, to do such an analysis, not Intervenor's.

CONTENTION IX

Question 56

(a) Inspection Reports 80-02 and 80-03.

(b) Inspection Reports 80-02 and 80-03.

(c) Inspection Report 80-03.

(d) Inspection Report 80-03.

(e) Failure to calibrate instruments properly pose a threat to health and safety as described in answer to Question 13 ii and iii, incorporated herein by reference. The calibration errors regarding emissions pose a grave threat to public health and safety because of the potential for dangerous doses of radiation being received by the public.

(f) CO Report 68-1; I&E Report 80-02

Question 57

(a) "Adequate time" is the amount of time sufficient to thoroughly and responsibly, within a significant margin of safety, maintain and calibrate equipment and instruments.

(b) We intend no specific form of maintenance in this contention but rather all forms of maintenance necessary for safety to be adequately assured and reliability insured.

(c) We refer to all components of the facility which require maintenance.

(d) Contention IX.6, about which this question is asked, does not go to the question of whether individual instruments have been adequately calibrated, but to whether Applicant has devoted adequate time to calibration of its instruments.

(d) The basis for this contention is found in the Applications listing of overall maintenance time requiring operation of reactor. Intervenor's contention is that the amount of time reported by Applicant is insufficient to adequately maintain the facility. Specific components and safety systems can only be determined when access is granted to the maintenance logs that haven't been lost by Applicant, access to which Intervenor has not at this time been granted.

CONTENTION X

Question 58

(a) This question is answered in response to Question 17, answer to which is incorporated herein by reference.

(b) 3 of the other reactors in the state mentioned as alternatives already existing are operated by the Applicant and available for use in education and research by any UC student.

(c) Intervenor has at this time no specific cost figures.

Question 59

(a) DBA as used in this contention is defined as the maximum accident that could occur at the facility, should the worst event or series of events credible occur.

(b) This Question is answered in Intervenor's response to Applicant's Interrogatory No. 42a, which is included herein by reference.

(c) The likelihood of a design basis accident is based on a collective showing of all the evidence referenced in support of all the other contentions. The evidence of violation of regulations, inadequate monitoring and calibration and maintenance, lax managerial controls, history of operational unreliability, all provide a collective showing of unacceptable likelihood of accident.

(d) Intervenor at this time has no calculations regarding i-v, aside from those calculations Applicant has provided in Application, which, although based on numerous assumptions that make the estimates too low, still show dose estimates that are what Intervenor calls dangerous.

(e) see (d) above.

Question 60

(a) "inherent safety features" are instrinsic safety features, those that are inherent in the physical nature of the reactor concept being considered. "Engineered safety features" are systems that are added to the basic reactor concept. The features intended and their explanation are included in Contention XII 1-9 and Supplement, Part XI, both of which are included herein by reference.

(b) Intervenor at this time has no opinion of the configuration of the containment structure that should be built by UCLA.

(c) 10 CFR 50.40

(d) Intervenor at this time has no such calculations.

Question 61

(a) Student operation of the reactor; students involved in maintenance and calibration; students involved in activation analysis, pneumatic tube operation, tours; ready access by its training nature of large numbers of people capable of sabotage.

(b) (i) Supplement, Part III, and Annual Reports and Inspection Reports, from 1976 through 1981.

(b) (ii) See answer to question 47c in Intervenor's answers to NRC staff's interrogatories.

(b) (iii) Refer to Annual Report-UCLA Nuclear Reactor:

Jan.1, 1972 through Dec.31, 1972, page 1-2
Jan.1, 1971 through Dec, 31,1971, pages 1-2
Jan.1, 1973 through Dec. 31,1973, page 1
Jan.1, 1974 through Dec. 31,1974, page2
Jan.1, 1975 through Dec. 31, 1975,pages 3-4
Jan.1, 1976 through Dec. 31, 1976,pages 2-4
Jan.1, 1977 through Dec. 31, 1977,pages 2-3
Jan. 1,1978 through Dec. 31, 1978,page 2
Jan.1, 1979 through Dec. 31, 1979,page 2

Applicants

The above references describe all information regarding unscheduled shutdowns currently in Intervenor's possession.

(b) (iv) See answer to question 48b in Intervenor's answers to NRC staff's interrogatories. Intervenor has made no contention to date and has no information at this time, as to the consequences of these accidents, one way or another, to University personnel, students, and the public.

Question 62

By "significant damage" Intervenor means damage sufficient to require a major maintenance effort thereafter. Intervenor has made no contention one way or the other regarding whether a threat to public health and safety did or did not result at the time; Intervenor's contention goes to possible future threat to public health and safety from earthquake vulnerability in case of major earthquake should the license be renewed.

Question 63

A far smaller volume or mass of fuel is necessary at high enrichment to cause a criticality accident. One cupful of U-235 at UCLA's enrichment is sufficient, under the right circumstances.

Question 64

Same definition as in 59(a) above, incorporated herein by reference.
(a) Intervenor has no opinion at this time as to the specific manner in which fission products would be released as a result of the DBA. No DBA has yet been determined for this reactor; one of Intervenor's contentions is that Applicant should determine such a DBA after serious analysis and then adequately estimate fission product releases.
(b) see (a) above. All Intervenor can base its judgment on at present is Application, the estimates in which Intervenor believes are far too low, and yet nonetheless would endanger the public health and safety.

Contention XII

Question 65

(a) The evidence is the consequential dose estimates of Applicant without containment; any reduction of those doses would be a significant protection to the public.

(b) Intervenor has at this time no such calculations.

Question 66

(a) has been too extensively shielded and moved too far from its proper location to perform its job correctly; this because it kept scramming reactor too often. Rather than reduce its sensitivity the radiation problem should be taken care of.

(b) Rather than reduce the sensitivity of the monitor the radiation levels should be reduced; the shielding should be removed and the monitor returned to its original location.

(c) CO Report 69-1.

Question 67

I. These questions are answered in Intervenor's response to Applicant's Interrogatory 43.c, incorporated herein by reference. The addition Intervenor believes should be made is the addition of systems a-f.

II. No calculations or material of an evidentiary nature is available at this time.

Question 68

(a) "Adequate shielding" means barriers between radiation sources and the public capable of keeping public exposures as low as reasonably achievable.

(b) "access restrictions" are physical barriers to people entering certain areas

(c) physical locations wherein a member of the public may be situated and might be exposed merely through presence at that location to radiation or radioactivity from the reactor; such locations are Math Science-Boelter Hall roofs, inside of Math Science Building; inside of Boelter Hall; Boelter courtyard and walkway.

(d) Intervenor at this time has no firm opinion of precise radiation exposures in the above areas, because the only measurements taken to date of which Intervenor is aware are measurements taken by Applicant, which are badly flawed, contradictory, have large margins of error, and otherwise inadequate (see Contention VI). Answer to Question 41 and 44 above, provide some extrapolation of data currently available, and are incorporated herein by reference. In addition, the Rubin thesis indicated Argon concentrations inside Math Sciences of roughly 60% of those on roof; utilizing the dispersion factor and operating time limit approved in Amendment 10 and the concentration at the stack, the only known concentration (if the monitor is accurate), gives Argon concentrations inside Math Sciences in the area of 3.24 times MPC. Accurate figures for public exposures can only be given when adequate monitoring has been done, which Intervenor contends has not been done to date and is a burden the Applicant must meet before relicensing is granted. The few film badges placed have such high threshholds and, Intervenor believes, such poor controls, that doses of biological significance could be being imparted.

(e) Applicant's TLD and film badge data; Rubin thesis.

Question 69

(a) The reactor should have an interlock system which prevents operation of the reactor when someone is in the 3rd floor void area and when the high level radiation monitor is not connected to the scram system, and both systems should be adequate to effectively prevent operation under those conditions.

(b) When NEL personnel have noticed keys to 3rd floor void area missing, they have had to chain the door shut after visual inspection of the area. NEL personnel have run the reactor with the radiation monitor by-passed.

(c) The system should make reactor operation impossible (prevention of start-up and immediate scram if running) whenever someone is in 3rd floor void area or potentially in area and whenever that door is unlocked; likewise for conditions in which the high level monitor has been bypassed or over-shielded.

(d) CO Report 69-1; operating logs notations regarding 3rd floor key missing and need to visually check it and chain it.

Question 70

(a) The diagrams of the reactor provided in the Application; visual inspection.
(b) NA

Question 71

(a) No information available at this time regarding operating experience of 100 kw graphite moderated research reactors as to graphite changes.

(b) see (a) above.

Question 72

(a) page 8-9 of Supplement, Part XI, incorporated herein by reference.
(b) Intervenor has made no contention, one way or the other, about past control blade problems having caused damage to public health or safety; Intervenor's contention is that the control blade problems evidence an unreliability of a key safety feature making it impossible for Applicant to adequately assure that operation during the next twenty years, if relicensed, can be done without undue threat to public health and safety.

Contention XIII

Question 73

Intervenor believes the SNM license request is for an excessive quantity and enrichment of SNM because the amount requested is for more than a fresh core and a present core & because only a present core is needed for operation.

Question 74

Intervenor does not agree with implication of Staff's question that the SNM request is for one irradiated core and one fresh core. Nonetheless, it believes that the request for 4700 grams irradiated and 4700 grams fresh is dangerous because it increases the availability for diversion of bomb-grade uranium, particularly through its placement at a facility with inadequate security, and because it increases the risk to the public, and the consequences from that risk, of damage due to radiological sabotage or some other event causing release of the fission products in the irradiated fuel. The risk to the public from diversion of the SNM is that some group (subnational or national) could thus acquire part or all of what it needed for an atomic bomb; the consequences of that are dire.

Question 75

(a) The original Argonaut reactor and the University of Florida Argonaut both have run with lower enrichment fuel

(b) Hazards Analyses for both reactors

CONTENTION XIV

Question 76

(a) Intervenor's contention is not about specific problems common to Argonaut reactors. Intervenor's contention is that an analysis of problems at other similar research reactors as the UCLA reactor should be included in the Application in order for the Board to adequately judge the safety of this reactor. As basis for the contention, Intervenor identified three problems to show that such an analysis would be useful. Those problems are identified in the Supplement, Part XIII, incorporated herein by reference.

(b) the evidence is identified in the Supplement part referenced above.

(c) positive temperature coefficient for graphite throws off excess reactivity calculations if not included in those calculations, making power excursion potentially more likely; lack of replacement control blade motors may make the reactor uncontrollable in event of failure of the existing motors; coolant system tied in with potable system creates public exposure potentials and reactivity and coolant problems if water level drops because of water pressure changes.

(d) see (b) above.

Question 77

Intervenor's contention is that a review of these problems by Applicant is necessary. It is not Intervenor's burden to perform that analysis for Applicant. Inspection Reports 68-1 and April 1975 indicate at least 2 of the above-identified problems exist or existed also at UCLA.

Contention XV

Question 78

(a) through (e) Intervenor has made no such calculations at this time of an independent nature. Applicant's own estimates of radiation dose (Application III/A) indicate to Intervenor that consequences would be significant. Intervenor contends it is Applicant's burden to produce adequate and accurate accident consequence estimates.

Question 79

Those buildings increase the likelihood of exposure and increase the magnitude of the number of people so exposed. There are many more people immediately around the reactor than before, and the new construction makes possible exposures to the public inside the building rather than merely outside it a reality, reducing dispersion, increasing concentration of radioactivity, and thus significantly increasing dose. Precise figures estimating the effects of these changed conditions are Applicant's burden to produce.

Question 80

Reactor building was initially a separate building. Now it is part of an entire building complex built around and on top of it. These air systems interface by necessity because they are right next to each other. The actual architectural plans are available from Applicant, which has not yet yet made them available to Intervenor; Staff is directed to Applicant for those detailed plans.

Question 81

The safety significance is described in response to Question 79, included herein by reference. Intervenor has calculated no doses at present and directs Staff to Applicant for such calculations.

CONTENTION XVI

Question 82

(a) This is answered in Intervenor's response to Applicant's Interrogatory 50.a, which is incorporated herein by reference.

(b) See (a) above.

Question 83

If it is difficult to repair or replace parts because of their age and because the manufacturer is no longer in the business, reliability of instrumentation can severely suffer, improper "make-shift" repairs or use of parts not quite appropriate can occur, and there is increased risk of safety systems failing and accidents occurring.

Question 84

Parts are difficult to acquire, R & D into safety improvements for that kind of reactor have stopped, support services normally provided by manufacturers to operators of functioning plants are not available, no one entity is keeping track of safety-related matters of Argonaut type reactors, and there is no one place where continuity of knowledge about Argonauts is maintained.

Contention XVII

Question 85

Intervenor has no belief regarding this matter at this time as to specific Richter scale or accelerogram shape for the SSE at this site, but believes it to be well beyond what this facility can withstand.

Question 86

(a) This depends very much on the accelerogram for the quake and the particular response of the building and/or reactor. The worst consequences of an earth-quake induced reactor accident at this facility are the release of significant quantities of fission products, and exposure of significant numbers of people to radiation.

(b) Intervenor relies at this time on an interpretation of Applicant's radiation dose estimates in time of accident, included in Application. Intervenor has made no specific calculations and has no computer. If Staff wishes an adequate earthquake analysis to be done, including computer modeling, Intervenor suggests Staff ask Applicant to produce such an analsysis. It is Applicant's reactor; it is Applicant that is requesting a license; it is Applicant which has the burden of proof that an earthquake will not result in severe reactor damage or produce a threat to public health and safety if damaged. Intervenor contends Applicant should have done such an analysis and has not done so. What limited information it has provided (Application, III/A) shows consequences Intervenor views as unacceptable. Intervenor's review of that analysis by Applicant is that its estimates are, furthermore, way too low. Applicant should do an adequate analysis. It is not Intervenor's burden to write an adequate application for Applicant.

Question 87

(a) Applicant has described the damage as requiring a major maintenance effort to repair. Intervenor views this as significant damage. Intervenor has requested in its Interrogatories to Applicant details of that damage, but is not yet in possession of a response. Staff is directed to Applicant for that information, as it is in Applicant's possession at present.

(b) Intervenor has made no contention as to actual consequences of the 1971 damage to public safety; Intervenor's contention is that the damage evidences seismic vulnerability that could pose a threat in a maximum earthquake should the facility be relicensed.

Question 88

We know of no studies, literature, or reports that UCLA has produced to comply with 10 CFR 50.34(b)(1). That is precisely our contention--that the information required to be provided by UCLA by 10 CFR 50.34(b)(1) has not been. We have not contended that UCLA has produced studies and reports that it has not included in the Application; we have contended that they have not done the studies and reports that would provide the required information.

CONTENTION XVIII

Question 89

Part XVII, page 1-4, of the Supplement is included herein by reference by way of answer.

CONTENTION XIX

Question 90

(a) We have made no assumption at any time to date regarding specific explosive and amount to be considered in the hazard scenario identified in Contention XIX. Our contention is that such hazard scenarios as sabotage, including the use of explosives, should be analyzed by Applicant in determining a maximum credible accident or design basis accident for this reactor. Intervenor has made no such analysis at this time; Intervenor's contention is precisely that it is the Applicant's burden to do such an analysis.

(b) See (a) above.

Question 91

Were a saboteur to throw explosives or place explosives on or near the reactor, the saboteur could readily escape unharmed, depending on the time delay of the explosion and other factors. It would be quite possible, in Intervenor's view, for a saboteur to use explosives to destroy the reactor and for the saboteur to be in a safe location when that destruction occurred. A saboteur could also conceivably be hurt in such an act; a suicidal act that kills many others is no less a tragedy.

Question 92

Intervenor has made no such calculation and suggests Staff ask Applicant to make such a calculation, as it is their burden. An explosion could kill and wound a relatively small number of people; an explosion at a reactor would potentially add to that a great many additional deaths and injuries and latent health effects.

Question 93 ..

This information is not at present in evidentiary form. Intervenor's investigators have spoken to local FAA officials and local airport officials by phone, who inform Intervenor's investigators that airliners, private planes, and helicopters fly over or near Boelter Hall. Helicopters and private plans do not have standard routes but rather are permitted to fly in certain air spaces, which includes that space near and over UCLA.

Airliners coming in to land at Los Angeles International Airport, our investigators were informed, routinely fly within a few miles of UCLA as they pass over Santa Monica on approach; in addition, when airport is backed up at night, planes are put on circles for holding, some of which circles may pass over UCLA. Additional information should be obtained by requesting Applicant to present proof that planes never fly ,over or anywhere near the campus. The presence of commercial, private, and helicopters in the airspace over or near the campus has been confirmed by visual sighting by CBG volunteers.

Question 94

(a) Depends precisely where the aircraft hits the building, what direction, speed, etc. it is traveling, and the building's response. The maximum accident possible from this hazard scenario, in Intervenor's preliminary view, would be major release of fission products.
(b) Same as above. The effects from fission product release may well be the same from a small plane crash as a big one, or even from a helicopter crash, depending upon point of impact. Result for both (a) and (b) depends upon where crash occurs--crash could be directly into reactor room leaving Boelter intact and fission products escaping throughout it. Or it could bring Boelter Hall down, killing some, and trapping and wounding many others, forcing them to be exposed for far longer periods of time to the fission products released because they are immobilized by the rubble.
(c) Plane crash or helicopter crash into any other building on campus could only cause death and injuries related to the crash (perhaps in Chemistry or other labs some release of toxics); crash into Boelter would be those effects magnified by the addition of major radiation release.
(d) Intervenor has made at this time no mathematical calculations. Intervenor's contention is precisely that Applicant should do such an analysis.

Question 95

(a) scenarios in which not merely one thing goes wrong, but several which are interdependent.
(b) Intervenor has made no estimate of the consequences of such a series of events, nor determined what is the worst possible such series of events. Intervenor's contention is precisely that Applicant should perform such an analysis.
(c) The statistical probability of each multiple failure mode is dependent upon the particular failure mode in question. Again, it is Intervenor's contention that Applicant should do an analysis that determines which multiple failure mode that could possibly occur would result in the maximum accident. Site characteristics and safety features cannot be fully assessed absent such an analysis.

Question 96

(a) We have made no contention as to which operator error or errors would lead to a DBA. Intervenor has, however, contended in this Contention that Applicant should make such an analysis.
(b) See (a) above
(c) See (a) above

Contention XXI

Question 97

One cannot know in minutes precisely the time delay unless ten accidents occurred over the years and data was available to show the delay was inconsequential or consequential. In absence of such evidence, the prohibition, Intervenor contends, is an unnecessary delay.

Question 98

(a) What if you can't locate the Vice Chancellor?

(b) The person on the scene should have the authority to order the evacuation; or there should be clear alternative lines of authority in case Vice Chancellor can't be reached; and there should be clear guidelines established and procedures routinely worked over by which the person with authority to order evacuation would judge whether to so order

(c) To reduce public radiation exposures in case of accident.

Question 99

(a) (b) and (c) See answers to Question 98 above, incorporated herein by reference.

Question 100

Alternative personnel to carry out that role should be established, with chain of responsibility readily understood and people readily on call.

Question 101

Intervenor's organization has been at the campus, as have many of its members, for a decade, and are aware of not a single evacuation drill, training program, or other program for evacuating the entire campus. In addition, no such provision is made in Applicant's emergency plan submitted with Application.

Question 102

(a) Intervenor has not contended that the UCLA medical center should be shutdown in case of a major accident, but that it is possible that a particular form of major accident would make such shutting down prudent, desirable, or necessary. The medical center is only a short distance from the reactor.

(b) An accident which releases significant quantities of fission products and in which the wind direction is not away from the medical center (although even with the wind being away from the center, emergency officials might prudently and properly choose such an evacuation because of fear of the wind shifting).

(c) Intervenor has not contended that the UCLA medical center would be adversely affected; merely that it could be. Intervenor suggests Staff ask Applicant for calculations showing the medical center could not be adversely affected in an accident. Intervenor has no such calculations at this time beyond the ones in Application; it is Applicant's burden, Intervenor contends, to take the hospital into consideration and prove that there is no possible way the medical center could be adversely affected.

Question 103

The Emergency plan does not make clear precisely which pieces of radiation and emergency equipment and what quantities of each piece of equipment are available at each equipment location; without knowing that, how can emergency officials or officers obtain the necessary equipment with which to respond rapidly?

Question 104

(a) Intervenor is aware of no evacuation drill for Boelter and Math Sciences ever being conducted (Emergency Plan, 5.2).
(b) See (a) above.

Respectfully submitted,

Mark Pollock
Attorney for Intervenor
COMMITTEE TO BRIDGE THE GAP

Dated at Los Angeles, California
this 20th day of May, 1981

VERIFICATION

I, DANIEL O. HIRSCH, say:

1. I am the President of the COMMITTEE TO BRIDGE THE GAP, Intervenor in this action, and I have been authorized to sign this verification on its behalf.

2. All of the information provided in the attached ANSWERS OF THE COMMITTEE TO BRIDGE THE GAP TO STAFF'S FIRST SET OF INTERROGATORIES represents the information currently possessed by the Intervenor relevant to those Interrogatories.

3. I have read all said ANSWERS and do believe them to be true and correct.

Signed on May 20, 1981, at Los Angeles, California.

I hereby affirm that the foregoing is true and correct.

Daniel O. Hirsch

Daniel O. Hirsch

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)
	)	
(UCLA Research Reactor)	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "ANSWERS OF COMMITTEE TO BRIDGE THE GAP TO NRC STAFF'S FIRST SET OF INTERROGATORIES" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, this 20th day of May, 1981.

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