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) November 9, 1981

APPLICANT'S FOLLOW-UP RESPONSES TO INTERVENOR'S SET THREE AND SET FOUR (FINAL) FOLLOW-UP INTERROGATORIES

PROPOUNDING PARTY: COMMITTEE TO BRIDGE THE GAP

RESPONDING PARTY: THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

SET NUMBER: THREE AND FOUR (FINAL FOLLOW-UPS)

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Attorneys for Applicant

THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA

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Applicant, THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, responds to Intervenor's "Set Three" Interrogatories, dated June 10, 1981, and Intervenor's "Set Four" Interrogatories (as denominated by Applicant), dated October 5, 1981 as follows.

As directed by the Atomic Safety and Licensing Board Applicant has consolidated its responses to all final follow-up questions of Intervenor in this single document which consists of two parts corresponding to the two outstanding sets of Intervenor interrogatories.

Applicant's responses are based on information provided by Applicant's technical staff, specifically C. Ashbaugh, N. Ostrander, W. Wegst, and A. Zane, who functioned as a committee in responding and reviewing responses. No record was kept of the contributions of those particular individuals to specific interrogatories. In addition to the individuals named above certain other individuals were consulted on specific matters: R. O'Neill on academic reviews of the NEL; W. Kastenberg on a remark attributed to him; R. Reyes and M. Thelia on the existence of certain technical records, and various administrative assistants on the existence of various administrative records. In Applicant's responses the reference to Applicant's staff is meant to refer to Applicant's current reactor staff and health safety staff and/or such other personnel as would reasonably be expected to know of the matter(s) questioned.

Applicant objects to all of the interrogatories propounded to the extent that they appear (by the language introductory to the "Set Three" Interrogatories) to call for information in the possession of Applicant's attorneys which is protected by the attorney-client and attorney-work-product privileges.

Applicant objects to all of the interrogatories propounded to the extent that they appear to call for the identification of "all" documents known to and/or in the possession of applicant. In responding to such interrogatories applicant has generally excluded mention of any scientific or engineering texts, journals, monographs, treatises, handbooks, or the like which contain information of general scientific, engineering, or nuclear engineering applicability, wherever such documents may be maintained, whether in possession of applicant's employees or in applicant's offices and libraries, except as such documents relate uniquely and specifically to applicant's reactor.

Applicant is still pursuing discovery with respect to this matter, and the following answers are provided without prejudice to applicant's ability to introduce subsequently discovered information at any time during this proceeding. Each of applicant's responses should be construed as a response to every other interrogatory to which it is relevant.

[RESPONSES TO "SET THREE" QUESTIONS OF JUNE 10, 1981]

(CONTENTION I)

RESPONSE TO FOLLOW-UP NO. 1:

a. Normal technical and administrative review was performed by NEL Staff.

b. No.

c. N .

d. No.

e. On the representations made by Ostrander, Wegst, and the Radiation Use Committee.

RESPONSE TO FOLLOW-UP NO. 2:

None.

RESPONSE TO FOLLOW-UP NO. 3:

See Applicant's Supplementary Responses of June 29, 1981, "Attachment."

RESPONSE TO FOLLOW-UP NO. 4:

The question is speculative; Applicant does not know if any of the courses could be offered without the availability of the reactor because Applicant has never had to study that situation. Certainly the course curriculum would have to change significantly to continue to offer the "courses" without the reactor but then such "courses" as it may be possible to offer would not be the same courses as are presently offered.

RESPONSE TO FOLLOW-UP NO. 5:

Applicant does not need to know the number of graduate students who depend on reactor services to know that even if there was only one such student there would not be a more suitable nor more economical alternative to providing those services at the NEL facility. Since the facility would be operating to support the educational requirements of undergraduate students in any case, very little, if any, additional cost is involved in providing services to graduate students also.

RESPONSE TO FOLLOW-UP NO. 5 [sic]:

Graduate students are generally identified by a Principal Investigator of a department or an institution. The overall programs of the Principal Investigators using the reactor for part of their research, the extent of the dependence of each upon the reactor, and the number of graduate students supported by the research have not been systematically examined by the Applicant.

Applicant has previously provided the names of those graduate students known to the NEL staff to be using the reactor as part of their research.

RESPONSE TO FOLLOW-UP NO. 6:

Not to the knowledge of Applicant's staff.

RESPONSE TO FOLLOW-UP NO. 7:

With highly enriched Uranium-235 fuel, the smallest conceivable value of beta (effective) is 0.0065. Hence 0.023/0.0065 equals 3.54, with 0.023 being the fractional excess reactivity.

RESPONSE TO FOLLOW-UP NO. 8:

The first interpretation is correct.

RESPONSE TO FOLLOW-UP NO. 9:

Assuming the question is limited in application to Argonaut reactors fueled with U-235, the answer is yes.

a. See response to Follow-Up No. 7, above.

RESPONSE TO FOLLOW-UP NO. 10:

The upper and lower limits are both 0.0065.

RESPONSE TO FOLLOW-UP NO. 11:

The lower limit is 0.0065. There is no consensus on the upper limit value; the calculated values have been as high as 0.0080 for this reactor. However, Applicant's staff have used the value 0.0065 for at least the last seven years.

RESPONSE TO FOLLOW-UP NO. 12:

The calculations and rationale are described in the responses above. See "Introduction t Nuclear Reactor Theory" by John R. Lamarsh. See Robles' thesis referred to in Response to Follow-up No. 28 (Contention V) below.

RESPONSE TO FOLLOW-UP NO. 13:

a. Yes.

b. Unknown.

c. Inspection Reports.

RESPONSE TO FOLLOW-UP NO. 14:

There is no specific reference to a heat balance instrument calibration requirement in the proposed technical specifications.

RESPONSE TO FOLLOW-UP NO. 15:

No, the proposed specification does not prescribe how it is to be done. See Application, page V/4-1, item 4.2.

RESPONSE TO FOLLOW-UP NO. 16:

Yes, the Linear Channel, the Log Channel, and the Dual Safety Channels.

RESPONSE TO FOLLOW-UP NO. 17:

None. It would be impossible to perform the heat balance calibration.

RESPONSE TO FOLLOW-UP NO. 18:

None.

RESPONSE TO FOLLOW-UP NO. 19:

The "ALARA" written requirements are contained in 10 C.F.R. Part 20. A copy of 10 C.F.R. Part 20 is contained in the facility manager's office, another copy is located in the reception room (room 2567), and reactor operators and senior reactor operators are given copies.

RESPONSE TO FOLLOW-UP NO. 20:

The ALARA principle is not posted. It is available (see response above) and the methods of implementation are part of the

operator requalification program; see Application, page VI/A-2, item 9.

RESPONSE TO FOLLOW-UP NO. 21:

Two complete, loose-leaf updateable copies; one in the manager's office and one in the reception area. As to the review requirements, see Application VI/A-2, item 9.

RESPONSE TO FOLLOW-UP NO. 22:

Yes, as part of the general reator operator training and requalification program. See response above.

a. The requalification testing is done annually.

b. Individual test scores are priviliged information.

RESPONSE TO FOLLOW-UP NO. 23:

Applicant interpreted the question as asking what was "removed" from the "proposed" technical specifications. If the question was what was "removed" from the "current" technical specifications the answer would be different. The exhaust stack height which appeared in the current technical specifications was inadvertently omitted from proposed "tech specs." There has been

no effort to reinsert the stack height as a "requirement" since it is only descriptive of the facility and does not serve a known safety purpose. The flow rate appeared in the current technical specifications and was described in terms of "capability" in the proposed technical specifications, with no actual change in the exhaust fan system intended by the change in language. The access restrictions were in neither the current or the proposed technical specifications.

RESPONSE TO FOLLOW-UP NO. 24:

a. See response above.

b. See response above.

RESPONSE TO FOLLOW-UP NO. 25:

In preparation of the Application, Applicant had not quantitatively defined "deep" or "vicinity," but relied on its general knowledge and experience that no significant changes had occured since 1960.

RESPONSE TO FOLLOW-UP NO. 26:

[Presumably the question relates to 26"c" not "e."]

The accidental melting of Applicant's Argonaut reactor core was simply inconceivable to Applicant's staff.

RESPONSE TO FOLLOW-UP NO. 27:

a. The language came from the Skovolt memorandum which Applicant's staff chose to repeat without significant modificaiton.

b. Applicant makes no assertion of its own but will rely on the estimates contained in the SER prepared by the NRC staff.

c. No.

d. [Withdrawn].

e. As reworded, destructive earthquake.

f. Core melting is not a credible scenario. Applicant relies on the findings contained in the SER (page 14-10) prepared by the NRC staff.

g. Applicant has not made, nor does Applicant intend to make, any assertions about "what specific fraction of 10 C.F.R. 100 guidelines are [sic] consequential . . . ."

RESPONSE TO FOLLOW-UP NO. 28:

Applicant understands its own educational objectives and relies on its experience and judgment in determining whether there are better alternatives for meeting those objectives. Whether or not Applicant has analyzed alternatives in no way affects the truth value of Applicant's statement.

RESPONSE TO FOLLOW-UP NO. 29:

Yes.

RESPONSE TO FOLLOW-UP NO. 30:

a. No.

b. Not applicable.

c. The statement paraphrased a conclusion of the 1960 Hazards Analysis in terms of the units (dollar value) now used by Applicant's staff. Applicant no longer relies on that Hazards Analysis.

RESPONSE TO FOLLOW-UP NO. 31:

The facts and analysis are contained in the 1960 Hazards Analysis; however, Applicant intends to rely on NUREG/CR-2079, which now supersedes the analogous parts of the 1960 Hazards Analysis, in support of the statement.

a. See response above; Applicant has not made an independent study.

b. Applicant has not studied the question.

c. Not applicable; see responses above.

RESPONSE TO FOLLOW-UP NO. 32:

Applicant made the statement on the basis of the 1960 Hazards Analysis, an analysis which was accepted by the Commission. In view of NUREG/CR-2079 Applicant as no further need to rely on its earlier statements concerning the applicability of SPERT and BORAX tests.

RESPONSE TO FOLLOW-UP NO. 33:

Yes, the SER prepared by the NRC staff and NUREG CR/2079.

(CONTENTION II)

RESPONSE TO FOLLOW-UP NO. 1:

The figures were estimated by the NEL manager.

RESPONSE TO FOLLOW-UP NO. 2:

Applicant has described its budgetary process in its May 20 REsponses and in its June 11 Further Answers. Applicant explained that its "budgeting" is based on "steady-state" base

budgets which do not change unless major staffing changes the permanent personnel are made. Applicant's units (including the NEL) do not engage in "zero-base" budgeting exercises. Occasional requests for augmentations to a base budget are usually made informally. All budget appropriations are recorded on the general ledgers. Notwithstanding that explanation, Applicant has previously objected to the request for all documents related to the budgetary process and the Board in its Order of September 4 denied Intervenor's request to compel the production of additional information.

RESPONSE TO FOLLOW-UP NO. 3:

a. Initial budget requests are made verbally if at all; there are no documents recording such requests. The NEL operates on a nearly fixed budget from year to year. Any initial budget requests were informally made and are now unknown.

b. The final budget appropriation appears on the June general ledger.

RESPONSE TO FOLLOW-UP NO. 4:

The statement was intended in its general sense and is not meant to imply that written documents of such reviews exist. Since its initial response Applicant has determined that no written academic reviews have been conducted of the Nuclear Energy

Laboratory (NEL). The only written documents of which Applicant is aware reviewing the NEL program generally or as an "in-depth" review are the 1975-76 Advisory Committee Review notes and related correspondence which Applicant will make available at its next document production session since these documents do not amount to an "academic review" in the strict sense. As a result of Applicant's discovery that no academic review documents exist (other than those described above) Applicant's earlier objection to Intervenor's questions on proprietary grounds is mooted.

RESPONSE TO FOLLOW-UP NO. 5:

See response to "4" above.

RESPONSE TO FOLLOW-UP NO. 6:

a. Yes.

b. Yes.

c. Weighing samples, sealing them in containers and loading "rabbits" into the rabbit transport.

d. Not for the work done for Dr. Kalil.

e. Not to Applicant's knowledge.

f. Sample preparations is a ccmmon part of many academic laboratory courses, including courses in Chemist.y, Geology and Engineering.

RESPONSE TO FOLLOW-UP NO. 7:

Record counter readings, transfer readings to computer and manipulate data through the computer.

a. Not to Applicant's knowledge.

b. Not to Applicant's knowledge.

c. Not to Applicant's knowledge.

RESPONSE TO FOLLOW-UP NO. 8:

a. Unknown, Applicant has no experience at commercial reactors.

b. Applicant makes no such assertion.

c. Unknown, Applicant has no experience at nuclear power plants.

d. Not applicable.

e. Not applicable.

RESPONSE TO FOLLOW-UP NO. 9:

Yes.

RESPONSE TO FOLLOW-UP NO. 10:

Yes.

RESPONSE TO FOLLOW-UP NO. 11:

No.

RESPONSE TO FOLLOW-UP NO. 12:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 13:

The courses deal with experiments or operations requiring the use of a nuclear research reactor.

a. See "Exhibit A" attached to Applicant's June 29 Supplemental Responses.

b. See response above.

c. Quarter-long classes, various portions require use of reactor (see response above).

d. Of the courses described in the question 135AL, BL and F could not be offered as the courses are presently structured.

e. See "a" above.

RESPONSE TO FOLLOW-UP NO. 14:

UCLA has the only research/training/educational reactor within or near the Los Angeles area and is the only school offering a full nuclear engineering program which requires the use of an "in-house" reactor. Use of any "other facility" would make it entirely impractical to maintain the nuclear engineering program at UCLA.

a. The facts are common knowledge.

b. UCLA student, faculty and staff travel time and expense; unsolvable scheduling problems; inability to prioritize use or control conditions of use at another facility; practical impossibility of coordinating reactor use with related classroom instruction, data acquisition and analysis, and training; increased risk of accidents involved in the transportation of radioisotopes; and paperwork.

c. None.

d. Not applicable.

RESPONSE TO FOLLOW-UP NO. 15:

Yes.

a. USC; Cal Tech; UCSB; Cal State Universities Los Angeles, Long Beach and Northridge; Harvey Mudd; Mt. San Antonio; Pierce College; Cal Poly San Luis Obispo; and Cal Poly Pomona.

b. Applicant does not pretend to know the explanations for the actions of other institutions but notes that UCLA maintains a full nuclear engineering program while the institutions mentioned above apparently depend upon UCLA for the operating reactor aspect of their programs.

RESPONSE TO FOLLOW-UP NO. 16:

See Applicant's Supplementary Responses of June 29, 1981.

RESPONSE TO FOLLOW-UP NO. 17:

Applicant has no other definition for the term.

RESPONSE TO FOLLOW-UP NO. 18:

"Uranium West" had 358 port-hours in 1980, 84 in 1981 (to June 15, 1981). S. Green had two (2) port-hours in 1980, none to date in 1981. A. Sirosi had approximately three (3) port-hours in 1980, none to date in 1981. Sirosi and Green are gemologists.

RESPONSE TO FOLLOW-UP NO. 19:

See Response above.

RESPONSE TO FOLLOW-UP NO. 20:

No.

RESPONSE TO FOLLOW-UP NO. 21:

No.

RESPONSE TO FOLLOW-UP NO. 22:

Applicant does not "devote" the "cost of owning and operating the reactor" to the categories asked in the question. The "cost of owning and operating" the reactor is fixed within narrow limits and is essentially independent of the operating hours per year. Applicant "devotes" the cost of owning and operating the reactor to its educational purposes, principally the education of senior undergraduate and graduate students in the School of Engineering and Applied Sciences and has never attempted to break down these devoted costs into the suggested categories.

RESPONSE TO FOLLOW-UP NO. 23:

See response above.

RESPONSE TO FOLLOW-UP NO. 24:

Throughout its licensed period of operation Applicant has devoted 100% of the cost of owning and operating the reactor to

educational purposes. There is no evidence that Applicant has ever devoted any of the costs of owning and operating the reactor to the "sale of services, other than research and development or education or training." The general ledgers for the NEL facility, "The Class Use of the UCLA Research Reactor," and the Reactor Usage Charts for the years 1971 to the present support Applicant's response.

RESPONSE TO FOLLOW-UP NO. 25:

No.

RESPONSE TO FOLLOW-UP NO. 26:

Applicant has no need to know the answer which, in any case, would vary depending on what arbitrary assumptions were made about reactor operations.

RESPONSE TO FOLLOW-UP NO. 27:

Cost per port-hour makes no sense when applied to classroom instruction. The contrast cannot be made.

RESPONSE TO FOLLOW-UP NO. 28:

No.

a. Not applicable.

b. Applicant has no need for such a cost figure.

RESPONSE TO FOLLOW-UP NO. 29:

To the knowledge of Applicant's staff none exist.

RESPONSE TO FOLLOW-UP NO. 30:

a. No, it is a use peculiar to the NEL facility.

b. Unknown, since Applicant does not know of any "standard use of the term at UCLA."

c. Not to Applicant's knowledge.

d. Not applicable.

e. Yes.

f. It was considered "research" because it involved a use of the reactor for sample analysis hich is "research" in the special NEL-defined sense.

g. Yes.

h. See response to "f" above.

RESPONSE TO FOLLOW-UP NO. 31:

Unknown, Applicant makes no such claim.

RESPONSE TO FOLLOW-UP NO. 32:

Unknown, Applicant makes no such claim.

RESPONSE TO FOLLOW-UP NO. 33:

To the knowledge of Applicant's staff none exist.

RESPONSE TO FOLLOW-UP NO. 34:

There are none.

RESPONSE TO FOLLOW-UP NO. 35:

No. Not applicable.

RESPONSE TO FOLLOW-UP NO. 36:

Mr. Sam Green.

RESPONSE TO FOLLOW-UP NO. 37:

Yes.

RESPONSE TO FOLLOW-UP NO. 38:

Not applicable.

RESPONSE TO FOLLOW-UP NO. 39:

Approximately 55 students are in the nuclear engineering section of the Department of Chemical, Nuclear and Thermal Engineering (CNTE) Program.

RESPONSE TO FOLLOW-UP NO. 40:

Not applicable.

RESPONSE TO FOLLOW-UP NO. 41:

Yes.

RESPONSE TO FOLLOW-UP NO. 42:

Approximately 4-12 declared "nuclear" engineering majors and approximately 70 other engineering majors.

RESPONSE TO FOLLOW-UP NO. 43:

The statement is generally correct. However, the number of acceptances has remained relatively constant.

a. Applicant does not keep records of the number who apply to the Nuclear Engineering program.

RESPONSE TO FOLLOW-UP NO. 44:

Only one thesis done in SEAS is known to Applicant's staff; it was a masters thesis done in 1978.

RESPONSE TO FOLLOW-UP NO. 45:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 1:

Not to Applicant's knowledge.

RESPONSE TO FOLLOW-UP NO. 2:

a. There is no contradiction. J. W. Horner performed the audit for calendar year 1979. On a trial basis and upon the recommendation of the RUC the UCLA Office of Internal Audit was asked to perform the audit for calendar year 1980 following the close of that calendar year, that is, in 1981.

b. Internal Audit was asked to perform the audit for calendar year 1980.

c. No, the audit of calendar year 1980 took place in 1981.

d. In March of 1981 arrangements were still being discussed for Internal Audit to perform the calendar year 1980 audit.

e. Yes.

RESPONSE TO FOLLOW-UP NO. 3:

None, except for any rough notes that may be in the possession of J. W. Horner.

RESPONSE TO FOLLOW-UP NO. 4:

The proposed Technical Specifications have not been approved by the Commission and no reports have been made to the NRC as yet under the described section. Applicant notes that since 1975 reportable (abnormal) occurrences have been summarized by date in the Annual Report to the Commission and reported in the minutes of the Radiation Use Committee.

RESPONSE TO FOLLOW-UP NO. 5:

The proposed Technical Specificaions have not been approved by the Commission and no reports have been made as yet under the described section. Applicant notes that the only known reports to the NRC of significant events were the changes in NEL directorship which occurred in October, 1975, and August, 1976.

RESPONSE TO FOLLOW-UP NO. 6:

The question asked for information of a specific event on a specific date. Compiling the same information for the other events would have entailed an unreasonably burdensome records search.

RESPONSE TO FOLLOW-UP NO. 7:

No questions of safety significance are raised by the practice.

RESPONSE TO FOLLOW-UP NO. 8:

Unknown.

a. No.

b. Not applicable.

c. Applicant did not attach any safety significance to the practice and did not believe that Commission approval was required.

RESPONSE TO FOLLOW-UP NO. 9:

Not to Applicant's knowledge.

a. Not applicable.

b. Not to Applicant's knowledge.

c. Not applicable.

RESPONSE TO FOLLOW-UP NO. 10:

a. Response of March 3, 1966 by R. L. Doan.

b. The Doan response purportedly denied an exemption from the regulations. However, the Smith request of February, 1966, did not request an exemption but an interpretation of the applicable regulation. Moreover, the Smith request did not describe the degree of supervision present during the visits and asked for an interpretation on the reaching of the scram trip points which has not been the practice during such demonstrations.

RESPONSE TO FOLLOW-UP NO. 11:

Yes.

a. 10 C.F.R. Part 55.

b. Not applicable.

RESPONSE TO FOLLOW-UP NO. 12:

[Withdrawn, except for "o".]

a. December 12, 1973.

b. Yes.

c. No.

d. Not applicable.

e. Not applicable.

f. R. Bolek and J. Brower of NEL, with J. Gilbert from the school (which is unknown).

g. None.

h. Not applicable.

i. J. Gilbert.

j. Not applicable.

k. Not applicable.

l. Not applicable.

m. Not applicable.

n. Not applicable.

o. None in Applicant's possession.

p. No.

RESPONSE TO FOLLOW-UP NO. 13:

a. No.

b. No.

c. Not applicable.

RESPONSE TO FOLLOW-UP NO. 14:

[Withdrawn.]

(CONTENTION IV)

RESPONSE TO FOLLOW-UP NO. 1:

All inspection reports of which Applicant is aware have been previously made available.

RESPONSE TO FOLLOW-UP NO. 2:

None of Applicant's present staff was in a management/supervisory role or participated in the removal.

RESPONSE TO FOLLOW-UP NO. 3:

No.

RESPONSE TO FOLLOW-UP NO. 4:

Yes. The information is reported in the Annual Reports to the Commission for the years 1971, 1972 and 1974. (There may be other reports of earlier incidents.) For the years cited above, the "incidents" involved core maintenance work, the doses were cumulative and not attributable to a single date.

(CONTENTION V)

RESPONSE TO FOLLOW-UP NO. 1:

Not to the knowledge of Applicant's staff.

RESPONSE TO FOLLOW-UP NO. 2:

a. Applicant's staff have not analyzed the possibility of sample insertions of the stated reactivity.

b. See response above.

RESPONSE TO FOLLOW-UP NO. 3:

a. See response above.

b. See response above.

RESPONSE TO FOLLOW-UP NO. 4:

See response above.

a. See response above.

RESPONSE TO FOLLOW-UP NO. 5:

It is not clear whether the question is about conventional samples or special experiments or experimental conditions designed to test the endurance limits of the reactor.

a. Applicant did not say an answer was "impossible" only that it did not have an answer to the hypothetical question and could not provide an answer without conducting an extensive analysis.

RESPONSE TO FOLLOW-UP NO. 6:

Not applicable.

RESPONSE TO FOLLOW-UP NO. 7:

Not applicable.

RESPONSE TO FOLLOW-UP NO. 8:

Not applicable.

RESPONSE TO FOLLOW-UP NO. 9:

Ignoring the physical possibility considerations of the previous interrogatories, there are no mechanical constraints or interlocks to prevent the proposed removals in either case (a) or (b).

RESPONSE TO FOLLOW-UP NO. 10:

Not applicable

RESPONSE TO FOLLOW-UP NO. 11:

Unknown, see Applicant's responses to "2a" and "9" above.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 12:

Yes.

a. On the basis of the sample's size, weight, placement and likely composition and based upon Applicant's experience with similar samples.

RESPONSE TO FOLLOW-UP NO. 13:

Reactor Use Authorization Forms and the Experimental Safety Analysis Forms.

RESPONSE TO FOLLOW-UP NO. 14:

No.

a. See responses to "2a," "5," and "9" above.

RESPONSE TO FOLLOW-UP NO. 15:

By the change in control rod position between initial start-up and full power operation. Control blade position is converted to reactivity change with the rod calibration curve. The reactivity change is divided by the difference between the average coolant temperature at full power and the averag coolant temperature at start-up.

RESPONSE TO FOLLOW-UP NO. 16:

Unknown; the observable reactivity change is equal to a water temperature coefficient times the water temperature change plus a graphite coefficient times the graphite temperature change. See "Example Measurements of Reactivity versus Temperature and Time; Reactor Runs of 7-31-81 and 8-7-81," attached hereto as "Exhibit A."

RESPONSE TO FOLLOW-UP NO. 17:

Applicant's staff have not calculated the void coefficient of reactivity. Measurements are very difficult to make and interpret and Applicant has little confidence in the accuracy of measured values.

RESPONSE TO FOLLOW-UP NO. 18:

L al measured values have ranged from 1.46 X 10^{-4} k/ml to 9.u X 10^{-4} k/m^1.

RESPONSE TO FOLLOW-UP NO. 19:

No, see response to "17" above.

a. See response to "17" above.

b. Not applicable.

c. Not applicable.

d. Not applicable.

e. Yes.

f. See NUREG/CR-2079.

g. None known.

h. Not applicable.

RESPONSE TO FOLLOW-UP NO. 20:

Applicant has little confidence in the measured values. See response to "17" above. To the extent that the question

suggests that Applicant conduct an analysis that would have the result of establishing generic parameters for Argonaut-type reactors, Applicant states that it is not sanctioned to conduct such studies. Applicant notes that in the initial start-up and evaluation of reactor performance that occurred during 1960 the measured void coefficient was found to be 0.2%. Applicant's staff have no information concerning the origin of the 0.164 value.

RESPONSE TO FOLLOW-UP NO. 21:

a. Yes.

b. Not applicable.

c. See period-reactivity graph attached hereto as "Exhibit B." The differences in specificity can be ascertained by comparing the attached graph with the graph that appears in the Hazards Analysis.

d. $4.16 or 2.70% delta k/k.

e. Not applicable.

RESPONSE TO FOLLOW-UP NO. 22:

No one, the attempt was abandoned due to lack of time and interest and the press of more important matters.

a. Not applicable.

b. Not applicable.

c. Not applicable.

RESPONSE TO FOLLOW-UP NO. 23:

It represents the only possible value for beta.

a. None.

b. Not applicable.

RESPONSE TO FOLLOW-UP NO. 24:

No.

a. See response to "c" below.

b. No.

c. For large reactivity insertions, expressed in percent, the period is quite insensitive to the choice of beta.

RESPONSE TO FOLLOW-UP NO. 25:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 26:

Applicant has never undertaken the analysis because it has judged that the information is not needed.

a. Applicant does not expect that "Wigner energy" will be an issue in this proceeding. The matter is addressed in NUREG/CR-2079.

b. They are not needed.

RESPONSE TO FOLLOW-UP NO. 27:

a. No.

b. Not applicable.

c. Applicant has determined that the reactor has a positive coefficient of reactivity that appears to be correlated with the graphite temperature but this is not equivalent to saying there is a "positive temperature coefficient for graphite," hence the use of the term "hypothetical."

RESPONSE TO FOLLOW-UP NO. 28:

Yes.

a. Applicant has recently become aware of a 1972 thesis by P. Robles on the UCLA reactor which discusses the graphite question and contains relevant information. Also, observation of reactor reactivity changes during routine operations.

RESPONSE TO FOLLOW-UP NO. 29:

Applicant has no informtion other than that contained in the pertinent inspection report.

RESPONSE TO FOLLOW-UP NO. 30:

Applicant assumes so but does not know what final conclusions were reached by the University of Washington.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 31:

Possibly. Applicant notes that Robles (see response to "28" above) used electrical heaters, but the connection between the thesis work and the earlier event is not known.

a. See response above.

b. See response above.

RESPONSE TO FOLLOW-UP NO. 32:

Yes.

a. Not applicable.

b. Observations of reactivity changes during normal reactor operations were made on July 31, 1981 and August 7, 1981. The results of these observations indicate a reactivity coefficient correlated with the graphite temperature in Applicant's reactor of approximately C.0014%/degree Fahrenheit which is consistent with the Robles thesis. See response to "16" above.

RESPONSE TO FOLLOW-UP NO. 33:

See responses "28" through "32" above.

a. The Robles data, page 79, indicate that it is constant over the temperature range investigated.

RESPONSE TO FOLLOW-UP NO. 34:

The question is vague. The commonsense answer, based upon Applicant's experience and conventional concepts of "samples" is "no." However, Applicant has no idea what Intervenor means by "sample" and what absorbing materials Intervenor hypothesizes.

RESPONSE TO FOLLOW-UP NO. 35:

Applicant did not say it was unable to answer "48a" but only that it would be unable to answer the interrogatory without conducting an extensive analysis which it regarded as an unreasonably burdensome imposition. Applicant now relies upon NUREG/CR-2079.

RESPONSE TO FOLLOW-UP NO. 36:

"Interpolate," as used in its mathematical sense by Applicant, means to estimate values (of a function) between two known values.

RESPONSE TO FOLLOW-UP NO. 37:

a. See NUREG/CR-2079.

b. Unknown.

c. See "a" and "b" above.

RESPONSE TO FOLLOW-UP NO. 38:

Applicant is not in a position to do nor responsible for generic studies of Argonaut reactors.

RESPONSE TO FOLLOW-UP NO. 39:

Applicant interpreted Interrogatory 50 as asking for information beyond that contained in the 1960 Hazards Analysis. Applicant has no special information beyond that contained in the Hazards Analysis and could not provide additional information without redoing portions of the Hazards Analysis. Intervenor did not make it clear that it simply did not understand the analysis as distinguished from disagreeing with certain of the conclusions reached there. In response to the original question:

a. The energy pulse is consumed in driving the system to the melting point leaving no residual energy to provide the heat of fusion.

b. The analyst's description of the safe limit is given in the first paragraph of the relevant section, Attachment A, page 3.

c. ["d", sic] Not necessarily, but Applicant cannot speculate on the motivations of the analyst. In any event, NUREG/CR-2079 places the safe limit at 2.6%.

RESPONSE TO FOLLOW-UP NO. 40:

$3.54.

a. The Application and a review of the values of the relevant parameters indicate that $3.54 is still a safe and conservative value.

b. NUREG/CR-2079.

(CONTENTION VI)

RESPONSE TO FOLLOW-UP NO. 1:

Yes.

a. Not applicable.

b. At the residence of J. W. Horner, former NEL health physicist, in order to provide a measure of local background at a remote site location with convenient access.

RESPONSE TO FOLLOW-UP NO. 2:

Yes.

a. To measure the radiation background in the manager's office.

b. Not to the knowledge of Applicant's staff.

RESPONSE TO FOLLOW-UP NO. 3:

See Radiation Detection Company reports previously made available (Manager's office - identified as "Control 1"; Culver City - identified as "Control 2").

RESPONSE TO FOLLOW-UP NO. 4:

See Applicant's Supplemental Responses of June 29, 1981 and report attached thereto.

a. to f. See response above.

RESPONSE TO FOLLOW-UP NO. 5:

Because the TLD's in the earlier study were reading radiation from the concrete.

RESPONSE TO FOLLOW-UP NO. 6:

Applicant intends to rely on the SER prepared by the NRC staff, the data from the most recent TLD study, and the determination that Applicant is in compliance.

RESPONSE TO FOLLOW-UP NO. 7:

The second clause of the Interrogatory No. 11 response is saying the same thing as the Wegst statement: the results are valid and accurate but they do not measure Argon-41 stack emissions; that is, they greatly overstate those emissions due to

the contribution to the measurement resulting from the interfering concrete.

RESPONSE TO FOLLOW-UP NO. 8:

The response relates to the usual practice of reporting zero when there is no measurable exposure. When film is "stretched" to the threshold limit, a zero reading can mean no more than "less than 10 mr above background."

RESPONSE TO FOLLOW-UP NO. 9:

Control films of the same batch are kept in the Radiation Safety Office and developed with the regular badges. They are used to establish the zero setting of the densitometer.

RESPONSE TO FOLLOW-UP NO. 10:

In an office within the Center for Health Sciences.

RESPONSE TO FOLLOW-UP NO. 11:

No assumptions are made except that the film sees natural background and as a standard, reflects the normal aging of otherwise unexposed film. Any differences between a control and another badge are attributed to non-background radiation.

RESPONSE TO FOLLOW-UP NO. 12:

a. Yes.

b. 1.1×10^{-5} microcuries per milliliter plus or minus 10%.

c. There is no average value since samples are only taken once per run.

d. No correction factor is currently used.

e. The continuous monitor was reading low relative to the grab samples. An air leak into the sample line was suspected but never located. Replacement of the sample line corrected the problem.

f. Ordinarily, peak values during operation do not exceed 1.0×10^{-5} microcuries per milliliter and lower values are common and are actually expected.

g. Argon-41 charts, Engineering Change Orders for the pipe, group sample evaluations, and operating logs.

[The question numbering sequence omits numbers 13 through 20.]

RESPONSE TO FOLLOW-UP NO. 21:

[Withdrawn]

RESPONSE TO FOLLOW-UP NO. 22:

No.

a. Not applicable.

b. Not applicable.

c. Not to Applicant's knowledge.

d. Not applicable.

e. Not applicable.

RESPONSE TO FOLLOW-UP NO. 23:

Dr. J. Kaufmann and H. Mork.

RESPONSE TO FOLLOW-UP NO. 24:

If by reliability is meant "accuracy," see response to "25" below, which is obviously independent of recovery.

RESPONSE TO FOLLOW-UP NO. 25:

Beta and gamma doses of 100 mr or greater are determined to an accuracy of ±10%. Beta and gamma doses at the threshold of measurement (20 mr) are determined to +25% (anything less than 20 is reported as 0). The accuracy between 20 mr and 100 mr varies from +25% at 20 mr to ±10% at 100 mr.

RESPONSE TO FOLLOW-UP NO. 26:

Every new batch of film is completely calibrated for beta, gamma and x-ray radiation over a wide range of doses. Each time a new series of badges is issued (monthly), five badges are irradiated to specific doses (four known to technician, one unknown) and the technician must obtain results within ±10% of the actual dose.

RESPONSE TO FOLLOW-UP NO. 27:

a. ±25% at 25 mr improving to ±10% at 100 mr and above.

b. Readings below threshold are reported as zero, there are no 5 or 10 mr readings. At 20 mr the accuracy is -20 to +5 mr.

RESPONSE TO FOLLOW-UP NO. 28:

See response to "12" above.

a. The sample line operates below atmospheric pressure. It is believed that a leak developed and diluted the sample stream with ordinary air.

b. See response above.

c. Yes.

d. J. Horner's review of the operating log.

e. No, the problem was with the sample line.

RESPONSE TO FOLLOW-UP NO. 29:

The NEL has utilized a general purpose multichannel analyzer to measure Argon-41 concentration.

a. The equipment has been used to analyze grab samples and did provide the basis for the concentration factors referred to in "12" above.

b. No.

c. Not applicable.

d. Applicant's staff knows of no equipment that will quantitatively measure Argon-41 at the predicted concentrations.

RESPONSE TO FOLLOW-UP NO. 30:

The concept involved delay at atmospheric pressure. There is no place to locate and shield tanks that would be large enough to provide sufficient delay time for the gas at atmospheric pressure.

RESPONSE TO FOLLOW-UP NO. 31:

Threshold: over the energy range from 0.025 eV (thermal) to about 10 MeV; sensitivity: approximately 50 cpm per mrem per hour; linearity: ±8% of the full scale of the decade in which it is reading, when properly calibrated and driven with a repetitive signal.

RESPONSE TO FOLLOW-UP NO. 32:

No. When area surveys are performed, generally on an annual basis.

RESPONSE TO FOLLOW-UP NO. 33:

No.

a. 100%

RESPONSE TO FOLLOW-UP NO. 34:

Observations are made approximately weekly on a random basis. The observations have been noted in the operating log since approximately January 1980. The observational interval is 10 to 15 minutes. During 1980 46 observations were noted in the log; roof top occupancy was noted on four occasions.

a. 91.3%.

b. six.

RESPONSE TO FOLLOW-UP NO. 35:

[Withdrawn]

RESPONSE TO FOLLOW-UP NO. 36:

Occupancy is the fraction, or percent, of the time that an area is occupied by the same individual or group. The addition of a different individual or group does not add to the exposure of an individual.

RESPONSE TO FOLLOW-UP NO. 37:

See response above.

RESPONSE TO FOLLOW-UP NO. 38:

The $1000 figure was a lower bound cost estimate, that coupled with location problems and unestimated shielding costs indicated abandonment of the delay approach being considered.

RESPONSE TO FOLLOW-UP NO. 39:

The response to the NRC staff was made by Applicant's staff prior to discussions with an individual familiar with concrete construction who indicated that the shielding would cost on the order of $20,000.

RESPONSE TO FOLLOW-UP NO. 40:

Pipes, end caps and a compressor are available. The system was not completely designed; the seismic soundness questions were never resolved; the shielding requirements have not been detailed. It is known that the existing compressor is insufficient for the required task; plumbing, valves, flow controllers remain unspecified.

RESPONSE TO FOLLOW-UP NO. 41:

The Applied Nucleonics report was rejected by the NRC on the basis of not conforming to the models then extant and applicable to stacks which were less than twice the height of surrounding buildings.

RESPONSE TO FOLLOW-UP NO. 42:

The model and assumptions that Applicant used to calculate a response to NRC question 8 could not alter the experimental results of Rubin.

RESPONSE TO FOLLOW-UP NO. 43:

All other isotopes known to be produced in the interstitial air are present in much smaller quantities than Argon-41 and Applicant has not attempted to determine the second most common radioisotope at the stack.

RESPONSE TO FOLLOW-UP NO. 44:

On the basis of the general scientific, engineering and technical judgment of Applicant's staff. See also the NRC's SER to Amendment 10.

a. Applicant did not have any precise value in mind when referring to "negligible;" however, in this instance, it may be taken as meaning less than 1%.

RESPONSE TO FOLLOW-UP NO. 45:

It might have been stored anyplace, although Applicant's staff have no reason to believe that it was stored anywhere but in the reactor high bay.

RESPONSE TO FOLLOW-UP NO. 46:

It means the reactor room. Yes.

RESPONSE TO FOLLOW-UP NO. 47:

Mr. Horner once remarked to Mr. Ostrander that he (Horner) thought that the early one was stored, at least part of the time, in one of the spent fuel storage pits and the second one was stored in its own shield and, being too large for the storage pit, rested on the floor approximately halfway between the reactor and the south wall of the reactor room.

RESPONSE TO FOLLOW-UP NO. 48:

No.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 49.

No.

a. See response to "47" above.

b. Not applicable.

c. Not applicable.

RESPONSE TO FOLLOW-UP NO. 50:

See responses to "45" and "47" above; in addition, there is currently a sealed Cobalt-60 source in a fuel storage pit.

RESPONSE TO FOLLOW-UP NO. 51:

Certainly.

a. Presumably, in the usual radiation waste disposal cans.

b. Unknown.

RESPONSE TO FOLLOW-UP NO. 52:

Unknown.

RESPONSE TO FOLLOW-UP NO. 53:

No specific monitoring of the storage sites for leaking Cobalt-60 has occurred since June 1980.

a. Not applicable.

b. Radiation source storage sites are not routinely monitored for contamination unless other evidence indicates a leaking source.

RESPONSE TO FOLLOW-UP NO. 54:

Unknown, see response above.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 55:

Cobalt-60 is occasionally found in water prior to release from the site (see Annual Reports for 1974, 1975, 1976, and 1977). The origin is attributed to activation of corrosion products of stainless steel.

RESPONSE TO FOLLOW-UP NO. 56:

None to Applicant's knowledge.

RESPONSE TO FOLLOW-UP NO. 57:

Not in the last five years; prior to that, unknown. Not applicable.

RESPONSE TO FOLLOW-UP NO. 58:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 59:

Neither remains.

a. Both departed with the Cobalt-60 sources.

b. Not applicable.

RESPONSE TO FOLLOW-UP NO. 60:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 61:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 62:

See 10 C.F.R. Section 20.1 (c).

RESPONSE TO FOLLOW-UP NO. 63:

Applicant applies the concept of ALARA, as defined in response "62" above, to its management, and technical decisions

determining reactor operations on a case by case basis. Applicant's staff, by means of Applicant's general radiation control program, strives to limit all personnel doses to no more than 25% of the maximum permissible doses. This is, in most cases, a reasonably achievable goal; but, it is not a "standard."

RESPONSE TO FOLLOW-UP NO. 64:

Applicant also used the energy ratio 1.49 and the average value of 36 mr per year. However, Applicant took the maximum as 10.8 mr per quarter, equal to 43.2 mr per year, from Figure II/A-2, page II/A-6 of the application. Intervenor used the value 50 mr.

(CONTENTION VII)

RESPONSE TO FOLLOW-UP NO. 1:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 2:

In a cabinet behind the reactor operator's seat in a notebook.

RESPONSE TO FOLLOW-UP NO. 3:

A possible reportable (abnormal) occurrence was reported to the Commission by letter dated January 26, 1981. A copy of the notification is attached (see "Exhibit C" attached). The event is mentioned briefly in the RUC minutes of September 2, 1981.

RESPONSE TO FOLLOW-UP NO. 1:

Applicant's assumption in responding to Interrogatory No. 3, is based upon a reading of the Hazards Analysis and the common "rule-of-thumb" of one curie per watt. The "rule-of-thumb" is consistent with the results indicated in the response to "2" below.

RESPONSE TO FOLLOW-UP NO. 2:

In February, 1980, Applicant made two computer runs to determine the reactor core inventory by means of a computer program known as ORIGEN. The results of those computer runs indicate that the original core inventory as stated in the Application was very conservative. Applicant decided not to modify the more conservative calculations appearing in the 1960 Hazards Analysis.

a. See response above.

RESPONSE TO FOLLOW-UP NO. 3:

A "very long time" is another way of saying that the ultimate equilibrium values are used in the analysis. At seven half-lives, the actual values are about 0.8% less than the ultimate values.

RESPONSE TO FOLLOW-UP NO. 4:

The statement refers to the mean or expectation value of the core inventory given uniformly distributed random sampling times.

a. No.

RESPONSE TO FOLLOW-UP NO. 5:

The basis is that operating at 5% full power hours produces results less than what is produced at 10 kw steady state and practical limitations which result in uniform operation on an annual basis. NUREG/CR-2079 adopts an even more conservative basis.

RESPONSE TO FOLLOW-UP NO. 6:

Applicant's method of annual averaging is that at no time during the "floating" 365-day period of which the last day of that period is the day of operation will the "annual" average power level exceed 5%, which method of averaging precludes the two conditions in question.

RESPONSE TO FOLLOW-UP NO. 7:

Items "c" and "d" do not specify the frequency (days per week or days per year). Items "e" and "f" do not specify the number of hours that the reactor is to operate on each of the proposed days. In none of the proposed operating conditions was

the purpose for the proposed operation identified and in particular the extraordinary circumstances that would require operation under any of the conditions "c" through "j", which is a relevant consideration in determining whether such experimental uses are permissible.

RESPONSE TO FOLLOW-UP NO. 8:

License condition 1.c and 10 C.F.R. 20.106 (a) preclude "h" and "j." License condition 1.c and 10 C.F.R. 20.1 (c) would preclude "c" through "j" absent the extraordinary circumstances which would require operation under such conditions. Moreover, it is highly probable that any proposed Experimental Safety Analysis of experiments requiring such operating conditions would indicate violation of various of Applicant's technical specifications, which ones cannot be ascertained without knowing the specific experimental proposal.

RESPONSE TO FOLLOW-UP NO. 9:

Applicant is not staffed, could not ever be staffed, and can conceive of no reason it would want to be staffed to support the operating conditions proposed in "c" through "j."

RESPONSE TO FOLLOW-UP NO. 10:

The current Technical Specification is V.E. The 10 C.F.R. citation is 20.106 (a).

RESPONSE TO FOLLOW-UP NO. 11:

See responses to "6," "7," "8," and "9," above.

RESPONSE TO FOLLOW-UP NO. 12:

See response above. The question and operating conditions are entirely speculative and no more precise response can be given.

RESPONSE TO FOLLOW-UP NO. 13:

See response to "6" above.

RESPONSE TO FOLLOW-UP NO. 14:

See response to Interrogatory No. 13, May 20, 1981.

RESPONSE TO FOLLOW-UP NO. 15:

The body of the work was written by R.D. MacClain; author of the appendices is unknown.

a. Yes, NEL, UCLA until approximately 1965.

RESPONSE TO FOLLOW-UP NO. 16:

Nothing.

RESPONSE TO FOLLOW-UP NO. 17:

No, see NUREG/CR-2079.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 18:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 19:

Applicant understands that it was a pool-type reactor. If the question is referring to biological shields other than water, Applicant has no knowledge of such shields or whether they were "blown off."

RESPONSE TO FOLLOW-UP NO. 20:

Applicant intends to rely on NUREG/CR-2079.

RESPONSE TO FOLLOW-UP NO. 21:

Approximately 2360 Ci.

RESPONSE TO FOLLOW-UP NO. 22:

See response to "20" above.

RESPONSE TO FOLLOW-UP NO. 23:

Applicant's determination was based on the scientific, engineering and technical judgment of its staff and the fact that there was no other generic analysis of Argonaut-type reactors.

RESPONSE TO FOLLOW-UP NO. 24:

See response to "20" above.

RESPONSE TO FOLLOW-UP NO. 25:

No.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 26:

No.

a. Not applicable.

b. Unknown.

RESPONSE TO FOLLOW-UP NO. 27:

Applicant does not intend to rely on the 1960 Hazards Analysis which involved the use of extremely conservative, unrealistic and totally unreasonable assumptions. It is meaningless to ask if the estimate or the analysis is "correct"

since the estimate is clearly incredible. Applicant relies on NUREG/CR-2079.

(CONTENTION IX)

RESPONSE TO FOLLOW-UP NO. 1:

New Argon measuring instrumentation was purchased, installed and calibrated which facilitated more accurate determinations of argon emissions. During the changeover, an estimated calibration factor was used pending final calibration of the new instrumentation.

RESPONSE TO FOLLOW-UP NO. 2:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 3:

The places where the operators keep their own copies of the technical specifications are unknown to Applicant.

RESPONSE TO FOLLOW-UP NO. 4:

The requirements in question are the responsibility of the reactor supervisor not of all the other NEL employees. The review and monitoring of the exercise of this responsibility has been done informally and to the satisfaction of the Director and the Radiation Use Committee.

RESPONSE TO FOLLOW-UP NO. 5:

See Applicant's response to Interrogatory No.2 (Contention I), May 20, 1981.

RESPONSE TO FOLLOW-UP NO. 6:

The actual "logged" time may be four hours or less, but the total calibration including preparation, start-up, and reaching equilibrium temperature is generally six to eight hours; however, there is no specified duration for the heat balance. Additionally, heat balances are sometimes performed for instructional purposes without reference to calibration.

RESPONSE TO FOLLOW-UP NO. 7:

Assuming 25 "b" was intended, see response to "17" (I) above.

RESPONSE TO FOLLOW-UP NO. 8:

Some control blade warpage due to non-uniform heating of the control blades.

RESPONSE TO FOLLOW-UP NO. 9:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 10:

Reasonable efforts.

RESPONSE TO FOLLOW-UP NO. 11:

Incomplete scram (one blade failed to drop, approximately May 1974). Earlier experience is beyond the recollection of Applicant's current staff.

RESPONSE TO FOLLOW-UP NO. 12:

Applicant's staff prefer to have all control rods inserted upon shutdown. The concern was that they would not.

a. Yes.

b. Unknown, see Operating Logs.

c. See Operating Logs.

d. See response to "8" above.

RESPONSE TO FOLLOW-UP NO. 13:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 14:

Applicant's response to Interrogatory No. 32 referred to an event that probably occurred in the early 1970's, not 1968 as stated, although none of Applicant's staff recall clearly. The nature of the problem was apparently sticking control blades.

RESPONSE TO FOLLOW-UP NO. 15:

[Withdrawn].

RESPONSE TO FOLLOW-UP NO. 16:

In order to verify alignment of the control blades after core re-stacking, but prior to refueling, Applicant has rotated blade drive shafts by hand with a pipe wrench.

RESPONSE TO FOLLOW-UP NO. 17:

Not to Applicant's knowledge; but see Operating Logs for years prior to 1975.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 18:

Rod calibration, approximately 10 hours; instrument check-out, approximately one or two hours; heat balance, approximately 4-8 hours.

RESPONSE TO FOLLOW-UP NO. 19:

a. Yes.

b. No specific efforts. Applicant's staff keep themselves informed on nuclear reactor technology and if a "Wigner problem" had been identified for low power research reactors they

RESPONSE TO FOLLOW-UP NO. 2:

Applicant's staff have not measured the "leak rate" of the reactor high bay.

RESPONSE TO FOLLOW-UP NO. 3:

None.

RESPONSE TO FOLLOW-UP NO. 4:

The NEL fire doors are steel-plated, double-sided doors either hinged or sliding. The hinged doors, which provide redundant protection generally, are opened and closed manually. The sliding doors close when the fusable metal link that normally holds the door open against a counter balance weight melts. To open, the sliding doors must be manually pushed open to counterbalance the weight. The location of the fire doors is given in "Exhibit D," which is attached hereto.

RESPONSE TO FOLLOW-UP NO. 5:

Applicant does not contemplate using cadmium sheets to shut down the reactor.

RESPONSE TO FOLLOW-UP NO. 6:

The staff study has been completed, equipment has arrived and installation is in progess. The study considered the following factors: flow rates, sizing, filter flow rates, pressure drops, cost, availability.

would be aware of it. Moreover, based on the scientific, engineering and technical judgment of Applicant's staff and their experience that Wigner problems only occur with very high fast flux reactors.

RESPONSE TO FOLLOW-UP NO. 20:

See response above and NUREG/CR-2079 is relevant.

(CONTENTION X)

RESPONSE TO FOLLOW-UP NO. 1:

"Environmental Impact Appraisal by the Office of Nuclear Reactor Regulation of Renewal of the Operating License for the Research Reactor at the University of California at Los Angeles," dated July, 1981.

(CONTENTION XII)

RESPONSE TO FOLLOW-UP NO. 1:

The response was based on the general scientific, engineering and technical judgment of Aplicant's staff and not on any specific references or documents. However, Intervenor is directed generally to "Nuclear Reactor Engineering" by Glasstone and Sesonske or any other basic text.

RESPONSE TO FOLLOW-UP NO. 7:

Because no radioactive particulates have ever been measured in the sample environmental filters, which were installed approximately 1960, and consequently there was no perceived need for NEPA filters.

RESPONSE TO FOLLOW-UP NO. 8:

Applicant's response to Interrogatory No. 13C (2) is an editorial mistake. The correct response is that such a system is unnecessary because emissions (concentrations and radiation levels) are well below all known guide line values.

a. See response above.

b. Holdup tanks are not being considered for installation.

RESPONSE TO FOLLOW-UP NO. 9:

Applicant does not know and does not attach any importance to knowing its operational capability.

RESPONSE TO FOLLOW-UP NO. 10:

Applicant attaches no safety nor emergency significance to the readiness of the motor.

RESPONSE TO FOLLOW-UP NO. 11:

In the control room.

RESPONSE TO FOLLOW-UP NO. 12:

Nc, except that the walls are of 14 inch thick concrete.

a. Not applicable.

b. Radiation surveys indicate that no additional shielding is necessary.

RESPONSE TO FOLLOW-UP NO. 13:

Maintenance personnel who service the equipment housed in that room. The reactor is the source of radiation.

a. See standard text on nuclear engineering.

b. Annual survey data indicate that there is no hazard to individuals outside of the exclusion area.

RESPONSE TO FOLLOW-UP NO. 14:

No.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 15:

Yes.

a. It is both.

b. See radiation surveys previously made available.

RESPONSE TO FOLLOW-UP NO. 16:

As a precautionary measure protecting against a future "Tokamak" radiation potential. It has nothing to do with the research reactor.

RESPONSE TO FOLLOW-UP NO. 17:

The area is not fenced for radiation protection with respect to any research reactor operations. Controlling the area has been a conservative precautionary measure taken to protect against a future "Tokamak" radiation potential.

RESPONSE TO FOLLOW-UP NO. 18:

Unrecorded and undocumented personal observations made by the NEL staff.

RESPONSE TO FOLLOW-UP NO. 19:

See Applicant's response to Interrogatory No. 29, May 20, 1981.

RESPONSE TO FOLLOW-UP NO. 20:

On the basis of the scientific, engineering, technical and aesthetic judgment of Applicant's staff.

RESPONSE TO FOLLOW-UP NO. 21:

Pages III/5-13, 14, and 15. A summary is given on III/6-4 of the Application.

RESPONSE TO FOLLOW-UP NO. 22:

No.

a. Not applicable.

RESPONSE TO FOLLOW-UP NO. 23:

Applicant has not maintained that there is no hazard in entry into the reactor room; but, in any case, the reactor room is also locked and entry is supervised.

RESPONSE TO FOLLOW-UP NO. 24:

Applicant objects to the question on the grounds that the information sought is privileged information or material that has been held in strict confidence by Applicant in order to insure the security of the facility and its contents, including its critical records and documents.

RESPONSE TO FOLLOW-UP NO. 25:

Yes.

a. See RUC minutes of December 10, 1979.

b. David Bishop on one known occasion, other occasions unknown.

c. See response to "a" above.

RESPONSE TO FOLLOW-UP NO. 26:

Not applicable.

RESPONSE TO FOLLOW-UP NO. 27:

A single key operates both the reactor and unlocks the third-floor equipment room. Maintenance personnel sign the key out in the operating log.

RESPONSE TO FOLLOW-UP NO. 28:

The bolts were probably under-designed. The incident may have been discussed in an early inspection report.

RESPONSE TO FOLLOW-UP NO. 29:

The Martin Co., Nuclear Division, Baltimore, Maryland.

RESPONSE TO FOLLOW-UP NO. 30:

See Applicant's response to "24" above.

RESPONSE TO FOLLOW-UP NO. 31:

One was dropped and on a separate occasion one was dented.

a. None to Applicant's knowledge.

b. It was dented on both occasions.

c. No.

d. Not applicable.

RESPONSE TO FOLLOW-UP NO. 32:

Not to knowledge of Applicant's staff.

a. Not applicable.

b. Not applicable.

RESPONSE TO FOLLOW-UP NO. 33:

Although none of Applicant's current staff has personal knowledge of the event, presumably it was to provide more clearance between the graphite and the magnesium shrouds.

RESPONSE TO FOLLOW-UP NO. 34:

No.

RESPONSE TO FOLLOW-UP NO. 35:

Unknown, but see May 20 response to "43c" of this contention.

RESPONSE TO FOLLOW-UP NO. 36:

Presumably radiation damage.

RESPONSE TO FOLLOW-UP NO. 37:

Thermal expansion, possibly differential with a bimetallic strip effect.

a. A good post-graduate engineering education, years of experience, and common sense.

RESPONSE TO FOLLOW-UP NO. 38:

The extent of the information possessed by Applicant's staff is contained in its response to "11" (IX) above.

RESPONSE TO FOLLOW-UP NO. 39:

See response to "19" (IX) above.

RESPONSE TO FOLLOW-UP NO. 40:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 41:

Not applicable. The uranium in the reactor is in the form of an aluminum-uranium alloy. Moreover, ignition temperatures are dependent upon the properties of the particular system in question and are not characteristic of the igniting substance alone. Intervenor is referred to any handbook of chemistry and physics.

RESPONSE TO FOLLOW-UP NO. 42:

Unknown, see general response above.

(CONTENTION XIII)

RESPONSE TO FOLLOW-UP NO. 1:

Applicant has made no such contention.

RESPONSE TO FOLLOW-UP NO. 2:

None.

RESPONSE TO FOLLOW-UP NO. 3:

Applicant does not know if it is "unknown;" it is simply unknown to Applicant's staff.

RESPONSE TO FOLLOW-UP NO. 1:

See Applicant's Application, page III/7-2.

RESPONSE TO FOLLOW-UP NO. 2:

See Applicant's Application, page III/6-2.

RESPONSE TO FOLLOW-UP NO. 3:

See response to 2 above.

RESPONSE TO FOLLOW-UP NO. 4:

Applicant is not interested in the answer.

RESPONSE TO FOLLOW-UP NO. 5:

Operational flexibility--ability to do experiments within limits of the license; this would require 1.8% excess reactivity. Seasonal temperature variations means the changes in ambient temperature throughout the year; this requires approximately 0.13% excess reactivity. Power level variations means varying the power output of the reactor up to its licensed limit; this requires approximately 0.35% excess reactivity. Samarium poisoning is the neutron absorption effect of the buildup of Samarium-149 over the lifetime of the reactor; this requires 1.2% excess reactivity. Burn-up is the decrease in the amount of uranium-235 as the reactor operates; the amount required is uncertain but estimated at 0.16%

excess reactivity. Multiple experiments means more than one experiment at a time; this requires 1.8% excess reactivity.

RESPONSE TO FOLLOW-UP NO. 6:

See response above.

RESPONSE TO FOLLOW-UP NO. 7:

a. No.

b. Not applicable.

c. No.

d. Not applicable.

RESPONSE TO FOLLOW-UP NO. 8:

Unknown.

RESPONSE TO FOLLOW-UP NO. 9:

Yes.

a. No record is kept; however, see Inspection Report 80-03 for waste disposal and anti-siphoning matter. See also N. Ostrander memo of December 17, 1980 ("Exhibit E" hereof).

b. To the knowledge of Applicant's staff no such documents have been retained.

RESPONSE TO FOLLOW-UP NO. 10:

Applicant does not know all of the routine methods of the NRC; the question can only be directed to the NRC.

(CONTENTION XV)

RESPONSE TO FOLLOW-UP NO. 1:

Unknown.

RESPONSE TO FOLLOW-UP NO. 2:

Unknown.

a. Not applicable.

b. Not applicable.

(CONTENTION XVI)

RESPONSE TO FOLLOW-UP NO. 1:

Yes, it is one device.

RESPONSE TO FOLLOW-UP NO. 2:

No. Yes.

RESPONSE TO FOLLOW-UP NO. 3:

There are no major pieces of console or reactor equipment for which Applicant does not have original drawings and tech manuals.

(CONTENTION XVII)

RESPONSE TO FOLLOW-UP NO. 1:

a. Unknown.

b. Unknown.

c. Unknown.

RESPONSE TO FOLLOW-UP NO. 2:

Applicant is unaware of the relevance of the Imperial Valley Earthquake to this facility. Applicant has not relied on the seismic invulnerability of its buildings in its Application for license renewal.

RESPONSE TO FOLLOW-UP NO. 3:

No.

a. Not applicable.

b. Applicant's response makes no mention of power oscillation.

RESPONSE TO FOLLOW-UP NO. 4:

Core volume.

RESPONSE TO FOLLOW-UP NO. 5:

Applicant's response to Interrogating No. 10 (May 20, 1981) was unrelated to oscillatory behavior of the fuel bundles.

RESPONSE TO FOLLOW-UP NO. 6:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. 7:

Applicant was not unaware, see page III/3-1 of the Application.

RESPONSE TO FOLLOW-UP NO. 8:

No.

a. Not applicable.

b. Not applicable.

RESPONSE TO FOLLOW-UP NO. 9:

It does not hang from, nor is it supported by, the roof; it is supported by the vertical walls and columns of the building.

RESPONSE TO FOLLOW-UP NO. 10:

Applicant does not claim "seismic invulnerability."

RESPONSE TO FOLLOW-UP NO. 11:

No.

RESPONSE TO FOLLOW-UP NO. 12:

Unknown.

RESPONSE TO FOLLOW-UP NO. 13:

Unknown.

RESPONSE TO FOLLOW-UP NO. 14:

Seismic zones catagorize land areas with respect to size of earthquake potentials. Uniform building codes offer certain standards in the seismic strength of buildings.

RESPONSE TO FOLLOW-UP NO. 15:

The reports in question were specialized reports for which the NEL had established no routine review process. The writer of the report, reporting this insignificant event, relied on a simple, seemingly obvious explanation for the event based on the

coincidence of the earthquake without seeking to test that explanation by reviewing the matter with other NEL staff members. In fact, other NEL staff members had performed a thorough "borescope" analysis of the piping and confirmed the explanation Applicant currently accepts as correct (corrosion in piping below the core). But because the report writer was unaware of this analysis and the technicians who performed the analysis did not routinely review the reports in question (which were written five years after the event), the simple but mistaken explanation was carried forward.

RESPONSE TO FOLLOW-UP NO. 16:

Yes.

a. To the reactor sump at the east end of the process pit.

b. No.

c. The leak was a very small percentage of the 16 gpm standard primary water flow rate.

RESPONSE TO FOLLOW-UP NO. 17:

No, see Applicant's explanation in response to "15" above.

RESPONSE TO FOLLOW-UP NO. 18:

Unknown, Applicant cannot explain the coincidence between the earthquake and the leak.

RESPONSE TO FOLLOW-UP NO. 19:

It is possible.

RESPONSE TO FOLLOW-UP NO. 20:

It is possible.

RESPONSE TO FOLLOW-UP NO. 21:

Unknown, but circa 1967-1970.

RESPONSE TO FOLLOW-UP NO. 22:

Applicant is not aware of any Maximum Design Earthquake for this reactor.

RESPONSE TO FOLLOW-UP NO. 23:

Unknown.

RESPONSE TO FOLLOW-UP NO. 24:

Application, Appendix II, pages II/1-1, 2-1, 2-1a, 2-2, 2-3, 2-4, 2-5, 2-6, 3-1, 4-1, 5-1, 6-1, 7-1, II/A-1 to 6, and Appendix III, pages III/3-1 to 3.

RESPONSE TO FOLLOW-UP NO. 25:

No.

a. See response to "24" above.

(CONTENTION XVIII)

RESPONSE TO FOLLOW-UP NO. 1:

Not relevant; see response to "4" (Contention II), above.

RESPONSE TO FOLLOW-UP NO. 2:

See response above.

a. See response above.

b. See response above.

RESPONSE TO FOLLOW-UP NO. 3:

The questions calls for a legal conclusion which Applicant does not have the authority to make.

a. Applicant does not speculate on such matters.

b. See response to "a" above.

c. See response o "a" above.

RESPONSE TO FOLLOW-UP NO. 4:

If the individual with discretionary responsibility for making confidential information public does so, then the information is no longer "confidential" and hence no longer privileged. The fact that a written academic review is confidential does not mean that a responsible official cannot provide any "academic review information" on the subject of the review.

(CONTENTION XIX)

RESPONSE TO FOLLOW-UP NO. 1:

See 10 C.F.R. 50.2 (u).

RESPONSE TO FOLLOW-UP NO. 2:

Unknown.

(CONTENTION XX)

RESPONSE TO FOLLOW-UP NO. 1:

Unknown.

RESPONSE TO FOLLOW-UP NO. 2:

The uc[illegible]redure is that for tours of more than two individuals, the[illegible]ders, sponsor, or responsible party will provide the signa[illegible]

(CONTENTION XXI)

RESPONSE TO FOLLOW-UP NO. 1:

By November 30, 1981.

RESPONSE TO FOLLOW-UP NO. 2:

Random, unscheduled, undocumented observations of equipment.

RESPONSE TO FOLLOW-UP NO. 3:

Yes; the UCLA Emergency Plan which is a draft document currently under review and which when completed will identify individuals in each campus building who are responsible for coordinating emergency response actions.

RESPONSE TO FOLLOW-UP NO. 4:

Assistant Vice Chancellor John Barber.

a. Reliance is placed on his extensive experience as a campus chief of police.

b. Dr. Walter Wegst, Director of Research and Occupational Safety or, in his absence, the watch commander of the campus police.

c. Reliance is placed on his extensive experience as a director of environmental health and safety programs for various institutions.

RESPONSE TO FOLLOW-UP NO. 5:

It is a collective responsibility of the NEL staff and the Office of Research and Occupational Safety.

a. Relevant data.

RESPONSE TO FOLLOW-UP NO. 6:

See response to "5" above.

[RESPONSES TO "SET FOUR" QUESTIONS OF OCTOBER 5, 1981]

(roman numerals correspond to divisions of Oct. 5 document)

RESPONSE TO FOLLOW-UP NO. I-1:

The conference room interior was treated the same as all other building interiors proximate to the reactor. Exposure to the interior was assumed to occur through the ventilation system with its intake generally upwind of the reactor stack. The principal exposure was expected to occur during transit exterior to that room.

RESPONSE TO FOLLOW-UP NO. I-2:

a. Location was at the J. Horner address previously provided.

b. Unknown.

c. Unknown.

d. Unknown.

e. Applicant agreed to follow the vendor's program.

f. Because that procedure would bias the data.

RESPONSE TO FOLLOW-UP NO. I-3:

Yes; see the ORIGEN data.

RESPONSE TO FOLLOW-UP NO. I-4:

Four hours of class per week.

a. Student would have four hours per week for ten weeks per quarter.

b. Forty.

c. Class 135AL is the optional laboratory portions of Engineering 135A.

RESPONSE TO FOLLOW-UP NO. I-5:

Applicant has not observed any specific trends and has not gathered data sufficient to present trending information.

RESPONSE TO FOLLOW-UP NO. II-1:

See response to "IV-3" below.

RESPONSE TO FOLLOW-UP NO. II-2:

Unknown.

RESPONSE TO FOLLOW-UP NO. II-3:

Applicant hereby amends its statement made in its June 29, 1981 response to now read: "The recently released NRC Safety Analysis Report supersedes Attachments A and B to Appendix III of the Application."

Applicant is substituting by reference NUREGS/CR-2079 and CR-2198 for Attachments A and B of Appendix III and will amend the rest of the Application to ensure proper indexing and cross-referencing.

RESPONSE TO FOLLOW-UP NO. II-4:

Applicant has no additional information other than the ORIGEN data and the information contained in NUREG/CR-2079.

RESPONSE TO FOLLOW-UP NO. II-5:

Applicant has determined that the Project Planning Guide containing the design criteria for the reactor facility has not been retained.

RESPONSE TO FOLLOW-UP NO. II-6:

See response to "II-3" above; Applicant amends its statement to state that it has no further intention of defending Attachments A and B of Appendix III which were taken from the 1960 Hazards Analysis. See W. Wegst letter to J. Miller of October 14, 1981, attached hereto as "Exhibit F."

a. See response above.

b. See response above.

c. The estimated effects of large reactivity insertions were unrealistically conservative and the postulated core melting was totally unrealistic. The factual basis is contained in NUREGS/CR-2079 and CR-2198 and the NRC SER (Docket No. 50-142, July 1981).

RESPONSE TO FOLLOW-UP NO. III-1:

a. See the C. Ashbaugh report on the "Class Use of the UCLA Reactor" previously provided.

b. The current curricular objectives for each of the courses programs use of the reactor.

RESPONSE TO FOLLOW-UP NO. III-2:

a. Unknown.

b. Some samples are sent elsewhere for irradiations of long-lived isotopes; the irradiations for short-lived isotopes, which are required, cannot survive the transportation delays.

c. None, although Applicant considers fission-track production and delayed-neutron counting to be generalized forms of activation analysis.

RESPONSE TO FOLLOW-UP NO. III-3:

a. Crushing, grinding, sifting, packaging and weighing.

b. Punching the correct buttons on a multi-channel analyzer and recording numbers in a notebook.

c. For Kalil's samples, either Kalil or the students who work for Kalil.

RESPONSE TO FOLLOW-UP NO. IV-1:

Data for the fourth quarter of that TLD program is attached hereto as "Exhibit G."

RESPONSE TO FOLLOW-UP NO. IV-2:

a. The technical staff of the Oakridge National Laboratory.

b A UCLA Nuclear Engineering Student, T. McKone.

c. Applicant has not represented the ORIGEN data as giving a maximum iodine inventory.

d. Computer printouts of the ORIGEN data will be made available.

RESPONSE TO FOLLOW-UP NO. IV-3:

a. Possibly yes (maybe junior high school students) although Applicant is unable to find any records of such incidents in its Operating Logs and Visitors Logs.

b. Possibly yes. Class 139A regularly, Southern California Edison employees, and certain professors from other academic institutions who attended a seminar at UCLA's NEL (c. 1976) sponsored in cooperation with the American Nuclear Society, regarding whom it is not known what "previous experience in nuclear reactor physics" each had.

c. See response above.

d. Applicant's staff do not recall what was discussed during the inspection but certainly the representation was not made to the inspectors that only high school students had manipulated the controls.

RESPONSE TO FOLLOW-UP NO. IV-4:

a. Unknown.

b. Unknown.

c. Unknown.

d. Unknown.

e. Unknown.

f. Unknown.

g. None is known.

RESPONSE TO FOLLOW-UP NO. V-1:

Unknown, but apparently the batteries were okay on the previous run.

RESPONSE TO FOLLOW-UP NO. V-2:

To reduce exposures to workers to as low as reasonably achievable.

RESPONSE TO FOLLOW-UP NO. V-3:

Nuclear heating.

a. Unknown; not known that any graphite thermal expansion was observed.

b. Unknown.

c. Unknown.

RESPONSE TO FOLLOW-UP NO. V-4:

Identity unknown; it might refer to a calibration/ maintenance record.

RESPONSE TO FOLLOW-UP NO. V-5:

Unknown.

RESPONSE TO FOLLOW-UP NO. V-6:

Unknown.

RESPONSE TO FOLLOW-UP NO. V-7:

a. [The page reference is incorrect.]

b. See response above.

RESPONSE TO FOLLOW-UP NO. V-8:

See Applicant's previous response hereof.

RESPONSE TO FOLLOW-UP NO. V-9:

Unknown; generally, when other possible causes have been eliminated the conclusion is that the cause was an electrical transient.

RESPONSE TO FOLLOW-UP NO. V-10:

Brower was a new employee at the time, not yet licensed to operate the UCLA research reactor.

a. Not at the UCLA reactor.

b. No.

c. No.

d. Whenever a new reactor supervisor is hired from outside the campus, it is necessary that he be licensed to operate the UCLA research reactor.

RESPONSE TO FOLLOW-UP NO. V-11:

Unknown.

RESPONSE TO FOLLOW-UP NO. V-12:

a. Unknown.

b. Any manufacturer of gate valves, see Crane catalogs or the Yellow Pages.

c. See "b" above and also vendors of pneumatic control equipment.

d. No.

RESPONSE TO FOLLOW-UP NO. V-13:

No.

RESPONSE TO FOLLOW-UP NO. V-14:

Unknown, but see the Maintenance Log for the "last" (most recent) calibrations.

RESPONSE TO FOLLOW-UP NO. V-15:

Neither.

RESPONSE TO FOLLOW-UP NO. V-16:

It was believed that manipulation of the switch produced electrical transients leading to scram.

RESPONSE TO FOLLOW-UP NO. V-17:

The following page of the log indicates that it was out of calibration but that it was adjusted.

RESPONSE TO FOLLOW-UP NO. V-18:

Unknown how much out of calibration, but apparently it was okay on the prior run.

RESPONSE TO FOLLOW-UP NO. V-19:

Unknown, but apparently the batteries were okay on the previous run.

RESPONSE TO FOLLOW-UP NO. V-20:

The Argon monitor senses ions and gasoline-powered engines produce free ions. the "new high bay" refers to the "Tokamak" high bay.

RESPONSE TO FOLLOW-UP NO. V-21:

Cancer research.

RESPONSE TO FOLLOW-UP NO. V-22:

See response above.

RESPONSE TO FOLLOW-UP NO. V-23:

It was implicit in the experiment. See ESA/E-23, November 22, 1966 for approval.

RESPONSE TO FOLLOW-UP NO. V-24:

Unknown.

RESPONSE TO FOLLOW-UP NO. V-25:

The pile oscillator is used to measure the reactor transfer function.

RESPONSE TO FOLLOW-UP NO. V-26:

Not repaired. Yes.

RESPONSE TO FOLLOW-UP NO. V-27:

Unknown. Unknown. Unknown, but see Maintenance Log.

RESPONSE TO FOLLOW-UP NO. V-28:

[There is no reference to a heat balance on this page.]

RESPONSE TO FOLLOW-UP NO. V-29:

Upgrading of system.

a. Yes; a more modern Keithley was substituted in 1975 or 1976.

RESPONSE TO FOLLOW-UP NO. V-30:

Applicant can add nothing to the log entry.

RESPONSE TO FOLLOW-UP NO. V-31:

Unknown, but the heat balance can be done at any time for demonstration and not calibration purposes.

a. TC2 monitors the primary water outlet temperature and is located on the primary water outlet; TC7 monitors the upper end of a fuel plate and is located on a fuel plate. The readings are reasonable for late summer operation at 100 kw. TC1-primary water inlet; TC3-secondary water inlet; TC4-secondary water outlet; TC5-fuel plate near inlet; TC6-fuel plate near core center.

RESPONSE TO FOLLOW-UP NO. V-32:

MG means motor generator, which is a machine used to damp out or attenuate electrical transients. Apparently a brush was failing.

RESPONSE TO FOLLOW-UP NO. V-33:

a. Probably 11 or 12 years.

b. No.

c. Not applicable.

d. None to Applicant's knowledge.

RESPONSE TO FOLLOW-UP NO. V-34:

Unknown.

a. Yes; whenever necessary.

RESPONSE TO FOLLOW-UP NO. V-35:

Unknown, but possibly part of the Robles work; see previous responses referencing the Robles work.

RESPONSE TO FOLLOW-UP NO. V-36:

Apparently a demonstration or experiment conducted for a San Fernando Valley State College class.

a. None evident.

b. Not applicable.

c. Not applicable.

RESPONSE TO FOLLOW-UP NO. V-37:

The heat balance is no better than plus or minus one part in forty, or about 3%.

RESPONSE TO FOLLOW-UP NO. V-38:

See Robles thesis.

RESPONSE TO FOLLOW-UP NO. V-39:

It was a demonstration/training activity; see response to "V-31" above.

RESPONSE TO FOLLOW-UP NO. V-40:

[Event not sufficiently described.]

RESPONSE TO FOLLOW-UP NO. V-41:

Start-up, or low-count-rate meter, used for start-up at power levels below 0.022 watts.

RESPONSE TO FOLLOW-UP NO. V-42:

a. Unknown.

b. Unknown.

c. Unknown.

d. Unknown.

RESPONSE TO FOLLOW-UP NO. V-43:

a. Unknown.

b. None.

c. It is probably original equipment (c. 1960).

d. See response above.

e. General Atomic Company, San Diego.

RESPONSE TO FOLLOW-UP NO. V-44:

a. Footnote on page 118 says a transistor was replaced.

b. Possibly.

c. Unknown.

d. Unknown.

RESPONSE TO FOLLOW-UP NO. V-45:

Unknown, but operation was normal on the previous run.

RESPONSE TO FOLLOW-UP NO. V-46:

A small tube containing U-235 used to measure flux. Checking probably means calibration relative to console instrumentation.

RESPONSE TO FOLLOW-UP NO. V-47:

Major electronic components were unchanged, but the scram-inhibit logic system was changed from 110v to 28v and much of the switching converted to solid state elements.

RESPONSE TO FOLLOW-UP NO. V-48:

Unknown.

RESPONSE TO FOLLOW-UP NO. V-49:

A new rod calibration procedure was developed.

RESPONSE TO FOLLOW-UP NO. V-50:

Unknown; Unknown.

RESPONSE TO FOLLOW-UP NO. V-51:

[Page 8 makes no reference to repairs.]

RESPONSE TO FOLLOW-UP NO. V-52:

He had an obsidian sample irradiated. Unknown. No address known.

RESPONSE TO FOLLOW-UP NO. V-53:

Unknown; Unknown; the oldest component is the approximate age of the reactor and they have never been replaced.

RESPONSE TO FOLLOW-UP NO. V-54:

[The referenced page is incorrect.] The "poor man's hot cell" is built up from components over a storage pit for the purpose of inspecting fuel.

RESPONSE TO FOLLOW-UP NO. V-55:

Approximately 15 cents and 28 cents for the two "rabbit" sizes used.

RESPONSE TO FOLLOW-UP NO. V-56:

The explanation for the bypassing is explained in the log (avoidance of spurious scrams). Special approvals are not required.

RESPONSE TO FOLLOW-UP NO. V-57:

It is logically interlocked to prevent multiple "rabbit" additions.

RESPONSE TO FOLLOW-UP NO. V-58:

a. Bad vacuum tubes.

b. Unknown.

c. No.

d. Two tubes were replaced.

e. Possibly.

RESPONSE TO FOLLOW-UP NO. V-59:

a. Spurious scram.

b. The problem was attributed to a spurious signal.

c. Reactor Supervisor.

RESPONSE TO FOLLOW-UP NO. V-60:

No.

RESPONSE TO FOLLOW-UP NO. V-61:

a. See Facility Change Order, October 22, 1974.

b. Not known for sure, but possibly to facilitate sealing the reactor with duct tape.

RESPONSE TO FOLLOW-UP NO. V-62:

Automatic control at a power level of one watt.

RESPONSE TO FOLLOW-UP NO. VI-1:

No.

RESPONSE TO FOLLOW-UP NO. VI-2:

Three borated paraffin blocks (two "L" shaped and one flat block) at east end of reactor, and two blocks added over vertical irradiation ports were added sometime prior to 1970 (thicknesses varied from one to three feet depending on the block). Relationship between shielding changes and increased power or building construction is unknown.

RESPONSE TO FOLLOW-UP NO. VI-3:

The Reactor Supervisor and the Health Physicist, who may, in their discretion, seek Director approval and/or Radiation Use Committee approval. The Technical Specifications indicate generally which kinds of ESA's require approval, but do not attempt to anticipate in detail each and every experiment that might be proposed.

RESPONSE TO FOLLOW-UP NO. VI-4:

a. Calibration data, review of analytical (readout) techniques, and professional judgment.

b. Yes.

c. Not applicable.

RESPONSE TO FOLLOW-UP NO. VI-5:

a. A photographic darkroom in the Center for Health Sciences (Rm A6-060D).

b. No.

c. None.

d. Various radioactive materials are handled by the Radiation Safety Office and other units in the Center for Health Sciences.

RESPONSE TO FOLLOW-UP NO. VI-6:

Neutron fading - up to 50% per month; Beta/gamma fading is negligible.

RESPONSE TO FOLLOW-UP NO. VI-7:

The 1979 Annual Report indicates that three month beta-gamma badges were provided, but that a one month neutron badge was also issued.

RESPONSE TO FOLLOW-UP NO. VI-8:

None, if the film is properly packaged.

RESPONSE TO FOLLOW-UP NO. VI-9:

a. Yes.

b. Yes.

c. See 1960 Hazards Analysis, figure II-8; they are located on top of the fuel boxes.

d. Not applicable.

e. See responses above.

RESPONSE TO FOLLOW-UP NO. VI-10:

Both modes exist. The high radiation monitor provides an automatic shut-down; other initiators require operator action.

RESPONSE TO FOLLOW-UP NO. VI-11:

a. Unknown, see area surveys.

b. See "Exhibit H," attached hereto.

c. Applicant is unaware of any neutron surveys beyond the NEL perimeter other than those described in the question.

RESPONSE TO FOLLOW-UP NO. VI-12:

a. Not previously considered necessary.

b. No.

c. None.

RESPONSE TO FOLLOW-UP NO. VI-13:

a. They are cadmium tipped.

b. Aluminum.

c. The cadmium is sandwiched between Aluminum plates.

d. Neither alloyed nor jacketed.

e. None known.

RESPONSE TO FOLLOW-UP NO. VI-14:

a. Alloy.

b. 13.5% by weight Uranium in Aluminum.

c. Unknown.

RESPONSE TO FOLLOW-UP NO. VI-15:

a. See response to "12" (Contention VI) in Set Three above.

b. See response above.

c. Unknown.

d. The higher figure was the correct figure.

RESPONSE TO FOLLOW-UP NO. VI-16:

The stack operates at below atmospheric pressure; air can only leak in, not out.

RESPONSE TO FOLLOW-UP NO. VI-17:

a. Both are "safety amplifiers," components that provide outputs proportional to reactor power (flux) and provide scram signals to the scram logic circuit if the reactor exceeds 125% of licensed power.

b. See response above.

c. See response above.

d. Desire to modernize the console.

e. See responses above. See also minutes of December 15, 1980, Radiation Use Committee for details of differences that arose in coupling the new amplifier into the scram and inhibit logic circuitry.

RESPONSE TO FOLLOW-UP NO. VI-18:

No health safety consideration was perceived by Applicant's staff.

RESPONSE TO FOLLOW-UP NO. VI-19:

No; not applicable.

RESPONSE TO FOLLOW-UP NO. VI-20:

[Applicant cannot locate the cited reference.]

RESPONSE TO FOLLOW-UP NO. VI-21:

The speaker had no specific contentions in mind.

RESPONSE TO FOLLOW-UP NO. VI-22:

17 CAC states that personnel monitoring is required if ar individual is likely to receive in any calendar quarter a dose exceeding 300 mr to the whole body. UCLA's more restrictive criteria was to require personnel monitoring if an individual was likely to receive any detectable radiation exposure. Historically,

the majority of UCLA film badge wearers never receive any dose and therefore it was felt that the criteria of 17 CAC were more realistic and UCLA's criteria were unnecessarily restrictive.

RESPONSE TO FOLLOW-UP NO. VI-23:

N. Ostrander and W. Wegst; see response to "40" below.

RESPONSE TO FOLLOW-UP NO. VI-24:

See responses to "15," "16," "27," "28," and "32" (V) in Set Three above.

a. See response above.

b. See response above.

c. See response above.

RESPONSE TO FOLLOW-UP NO. VI-25:

High level radiation monitor and system response to "inhibit."

RESPONSE TO FOLLOW-UP NO. VI-26:

Applicant has not re-studied the analysis contained in the Battelle study but agrees with the significant parameters, "beta" and "1" used by Battelle and all assumptions, calculations, and conclusions except for the postulated fuel accident scenario,

which goes beyond the imagination of Applicant's staff and results in overly conservative (high) estimates of fission product releases.

RESPONSE TO FOLLOW-UP NO. VI-27:

Applicant has made no such calculation.

RESPONSE TO FOLLOW-UP NO. VI-28:

Yes. The reactor period for 2.6% delta k/k is now longer than the critical period identified in the 1960 Hazards Analysis which had ruled out fuel melting as implausible.

RESPONSE TO FOLLOW-UP NO. VI-29:

See response to "40" below.

RESPONSE TO FOLLOW-UP NO. VI-30:

None of the individuals whose names appeared at the front of the document participated in the writing of the document; they were the names of the Radiation Use Committee and the Dean of SEAS.

RESPONSE TO FOLLOW-UP NO. VI-31:

[Withdrawn.]

RESPONSE TO FOLLOW-UP NO. VI-32:

Applicant at this time has not made a determination as to the experts or consultants it intends to use in this proceeding.

Applicant expects that most of the issues in this relicensing action will be resolved by summary adjudication procedures and only after that stage of the proceedings will Applicant be able to decide what experts or consultants are needed for the issues that remain unresolved.

RESPONSE TO FOLLOW-UP NO. VI-33:

Applicant at this time has not made a determination as to the witnesses it intends to call in this proceeding. Applicant expects that most of the issues in this relicensing action will be resolved by summary adjudication procedures and only after that stage of the proceedings will Applicant be able to decide what witnesses will be required to resolve material factual matters that remain in dispute.

REPONSE TO FOLLOW-UP NO. VI-34:

Yes. Applicant does not rely on specific incidents but on its entire operating history and the fact that any of the incidents which Intervenor may rely upon as indicative of inadequate controls, monitoring, maintenance of equipment, or calibration of equipment (Applicant remains unaware of what incidents Intervenor intends to rely on) are of little, if any, significance.

RESPONSE TO FOLLOW-UP NO. VI-35:

Yes. See response above.

RESPONSE TO FOLLOW-UP NO. VI-36:

Yes. See response above.

RESPONSE TO FOLLOW-UP NO. VI-37:

Yes. See response above.

RESPONSE TO FOLLOW-UP NO. VI-38:

Yes. The NEL staff, or available manufacturing facilities can fabricate needed parts or electronic equipment that are non-standard and cannot otherwise be obtained and such replacement parts would have the advantage of incorporating whatever technological advances had occurred since the facility was originally licensed.

a. See response above.

b. See response above.

RESPONSE TO FOLLOW-UP NO. VI-39:

Applicant has been unable to locate pre-1969 Radiation Hazards Committee minutes; Applicant does not know if any reactor committee from that period kept recorded minutes.

RESPONSE TO FOLLOW-UP NO. VI-40:

C.E. Ashbaugh III, M.S. (Nuclear Engineering), ten years with the UCLA reactor, last five years as lecturer.

N.C. Ostrander, B.S. (Chemical Engineering), seven years with the UCLA reactor as laboratory manager. W.F. Wegst, Ph.D. Environmental Health), twenty-two years of experience in health physics, the last two years as Director, Research and Occupational Safety at UCLA. A. Zane, M.S. (Environmental Science), with NEL since 1963, last five years as reactor supervisor.

Dated: November 9, 1981

DONALD L. REIDHAAR
GLENN R. WOODS
CHRISTINE HELWICK

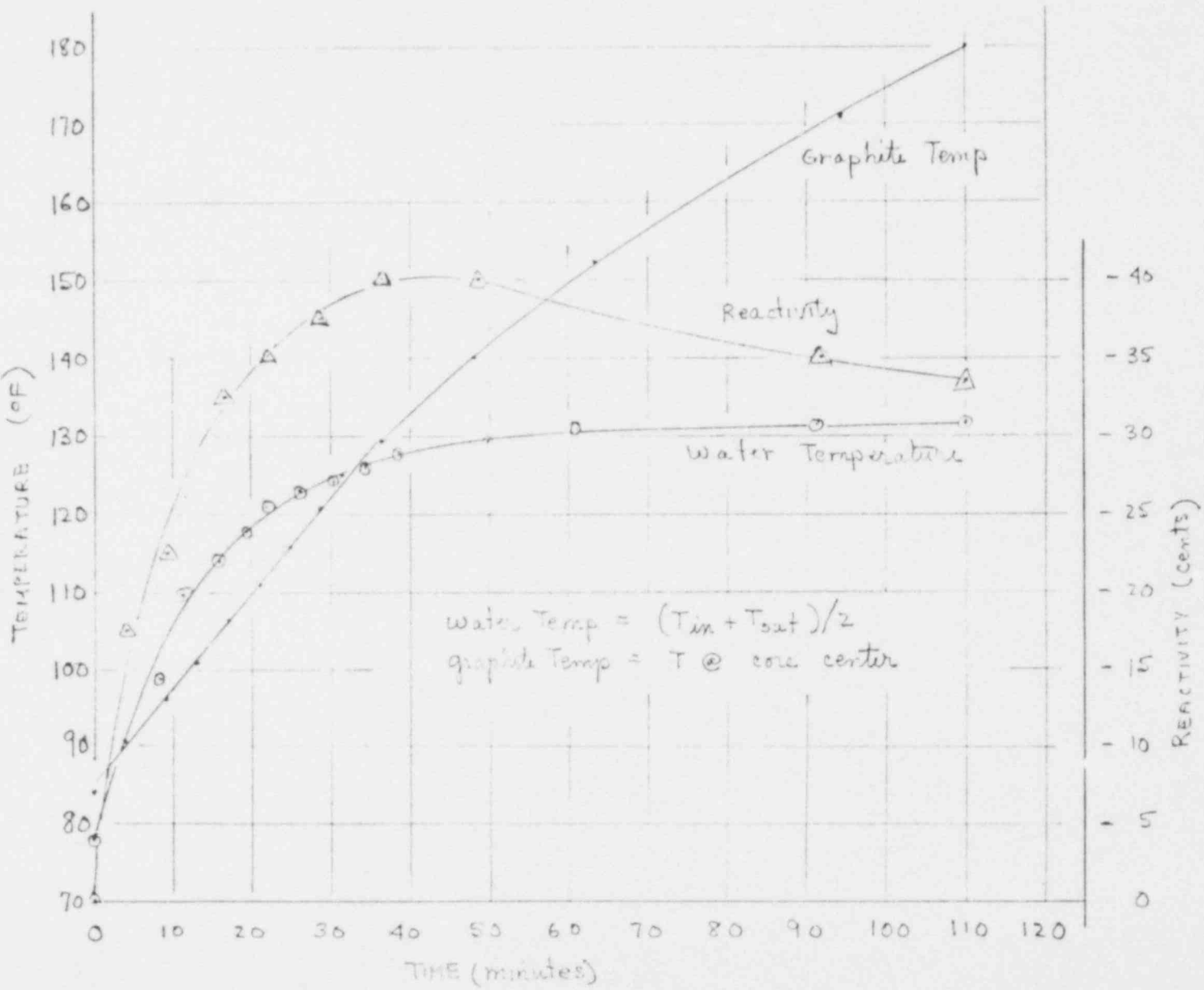
By W. H. Cormier
William H. Cormier
UCLA Representative

THE REGENTS OF THE
UNIVERSITY OF CALIFORNIA

EXHIBIT A

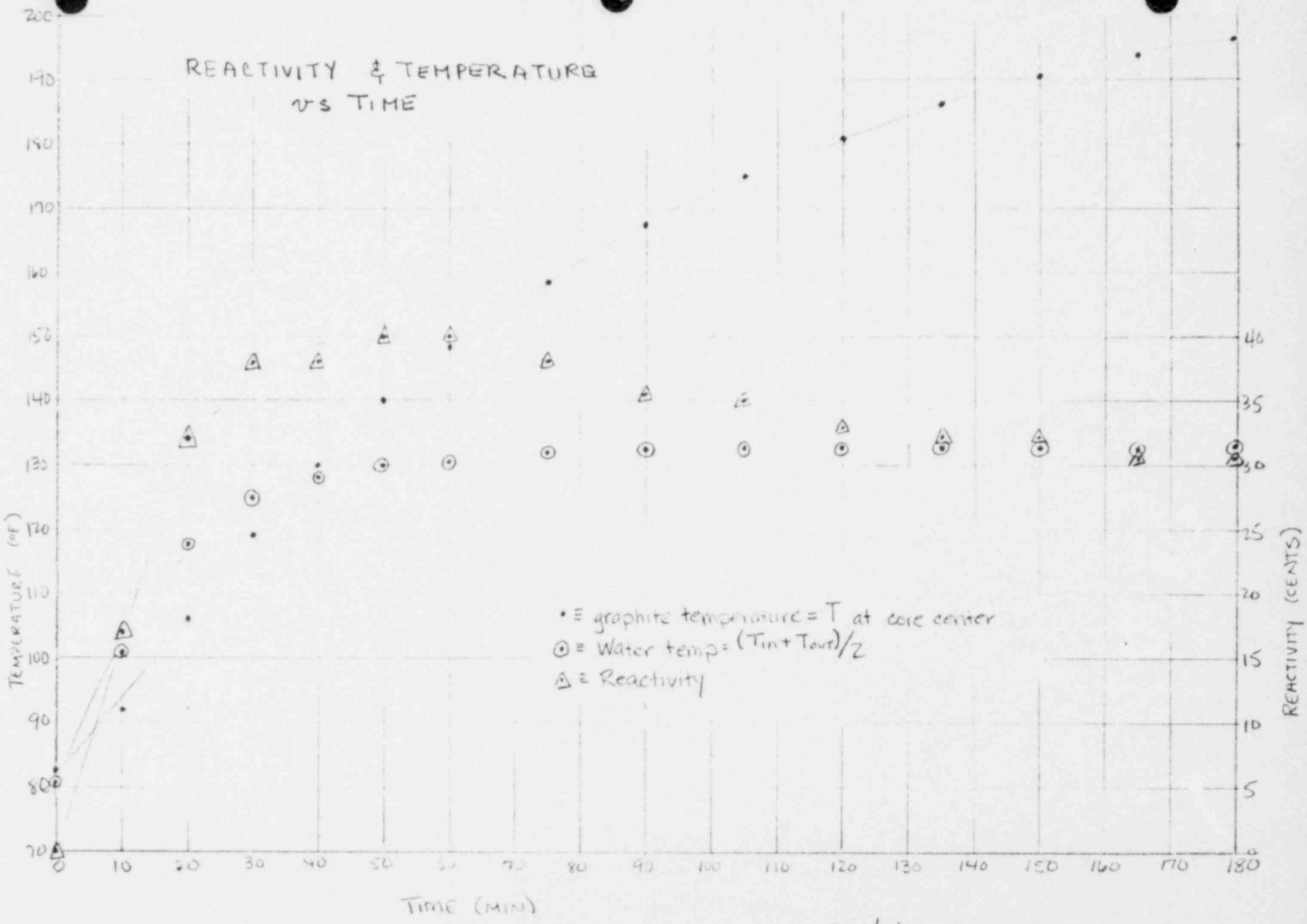
EXAMPLE MEASUREMENTS OF REACTIVITY

VERSUS TEMPERATURE AND TIME



REACTIVITY & TEMPERATURE vs TIME

Data of 7-31-81
N.C. Ostrander



Data of 8/7/81
K L. Sime

EXHIBIT B

PERIOD-REACTIVITY GRAPH

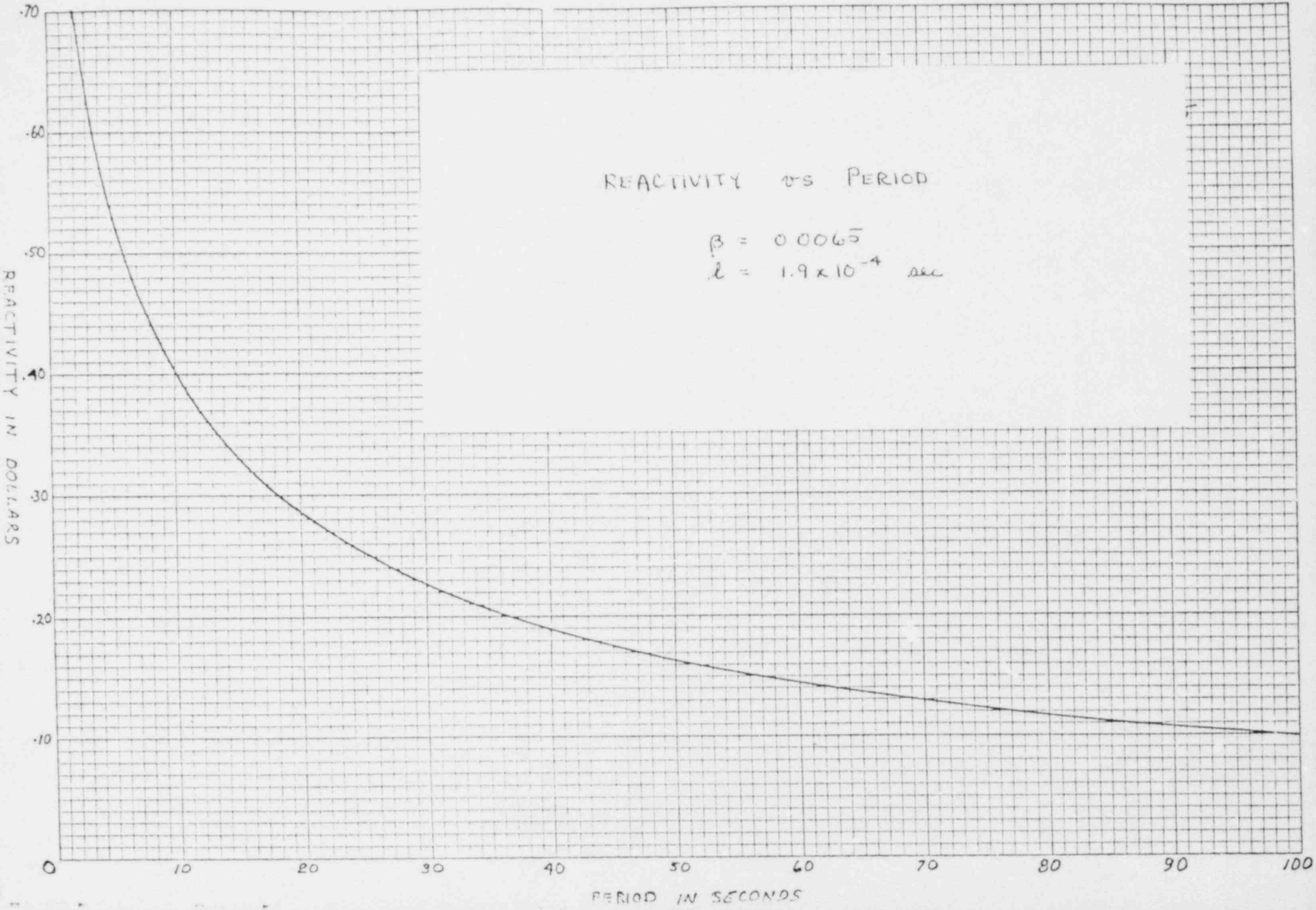


EXHIBIT C

ZANE TO (NRC) LETTER OF JANUARY 26, 1981

UNIVERSITY OF CALIFORNIA, LOS ANGELES UCLA

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO SANTA BARBARA · SANTA CRUZ

SCHOOL OF ENGINEERING AND APPLIED SCIENCE
LOS ANGELES, CALIFORNIA 90024

January 26, 1981

Director, Division of Operating Reactors
USNRC
Washington, DC 20555

Dear Sir:

The UCLA R-1 Reactor experienced a possible abnormal (reportable) occurrence on January 20, 1981 at 0850 when rods number 1 and 4 dropped to zero causing the reactor to shut down (from 100 kw). The reactor operator touched nothing and allowed the power to drop so that the reactor supervisor could better assess the problem.

The reactor supervisor noted the following:

1. Rods 1 and 4 were at the zero position and the down limit lights were lit. The red LED that signifies than an inhibit had caused rod 4 to drive down was extinguished showing that no inhibit had occurred. Rods 2 and 3 were still at their set position of 48%.

2. All magnet currents were 60 ma or greater.

3. An attempt to drive rod 1 up and down showed that the rod functioned normally.

4. The reactor operator stated that the horn had not sounded, and no reset was required.

5. A scan of the console showed everything normal except that the power was decreasing with the reactor in manual (normal when rod 4 hits either the 100% or zero limit).

A drop rod scram was then initiated and the remaining rods dropped to zero. The safety amplifier was checked; all voltages were normal, and all tubes satisfactory. A maintenance calibration was done and the unit returned to service. No problems could be identified. All rod drives were checked for operability in both directions, inhibits were checked in the up direction for all rods and found to be functioning properly.

Tests were conducted to ascertain the current level that would cause the magnetic clutches to release. Rods 1 and 4 began slipping at approximately 15 ma whereas rods 2 and 3 did not slip even with the current adjustment at its lower limit of 10-15 ma. Since the normal magnetic current is 60 ma, the magnet power supply would have had to decrease to 25% of its normal operating voltage of 160 V. Close examination of the charts showed no glitches in any of the charts at the time of scram. There are no common conditions that would cause two out of four rods to drop, either all four drop or one independently fails.

After several operational checks, the problem could not be identified or reproduced, and the console was normal, the reactor was returned to power and the run completed.

The problem was further investigated on the following day with attempts being made to induce a momentary interruption of the magnet AC power supply to examine the effect on the rods. The 4 rods were withdrawn to 40% and the magnetic AC power supply interrupted momentarily. All rods moved indicating that a failure from this mode could not have caused rods 1 & 4 to fall with 2 & 3 remaining at their original position.

The voltages across each magnetic clutch were measured at the specified 60 ma magnet current and found to be well within tolerance.

Circuit checks of the console revealed all circuits functioning normally.

Since no safety system failed to perform its safety function, the reactor is considered operational. The staff will continue to seek a solution to the event and report it if found.

Sincerely, A. Zane
Reactor Supervisor

CC: RUC: I. Catton
R. Conn
J. Garrick
J. Hornor
W. Wegst
A. Zane
Faulkenberry Region V

Neither Conn nor Garrick were available to review this matter. It was reviewed by Catton, Hornor, Wegst, and Zane, and therefore by the available members of the RUC.
M. C. Ostrander
Jan 27, 1981

EXHIBIT D

FIRE-DOOR LOCATION DIAGRAM

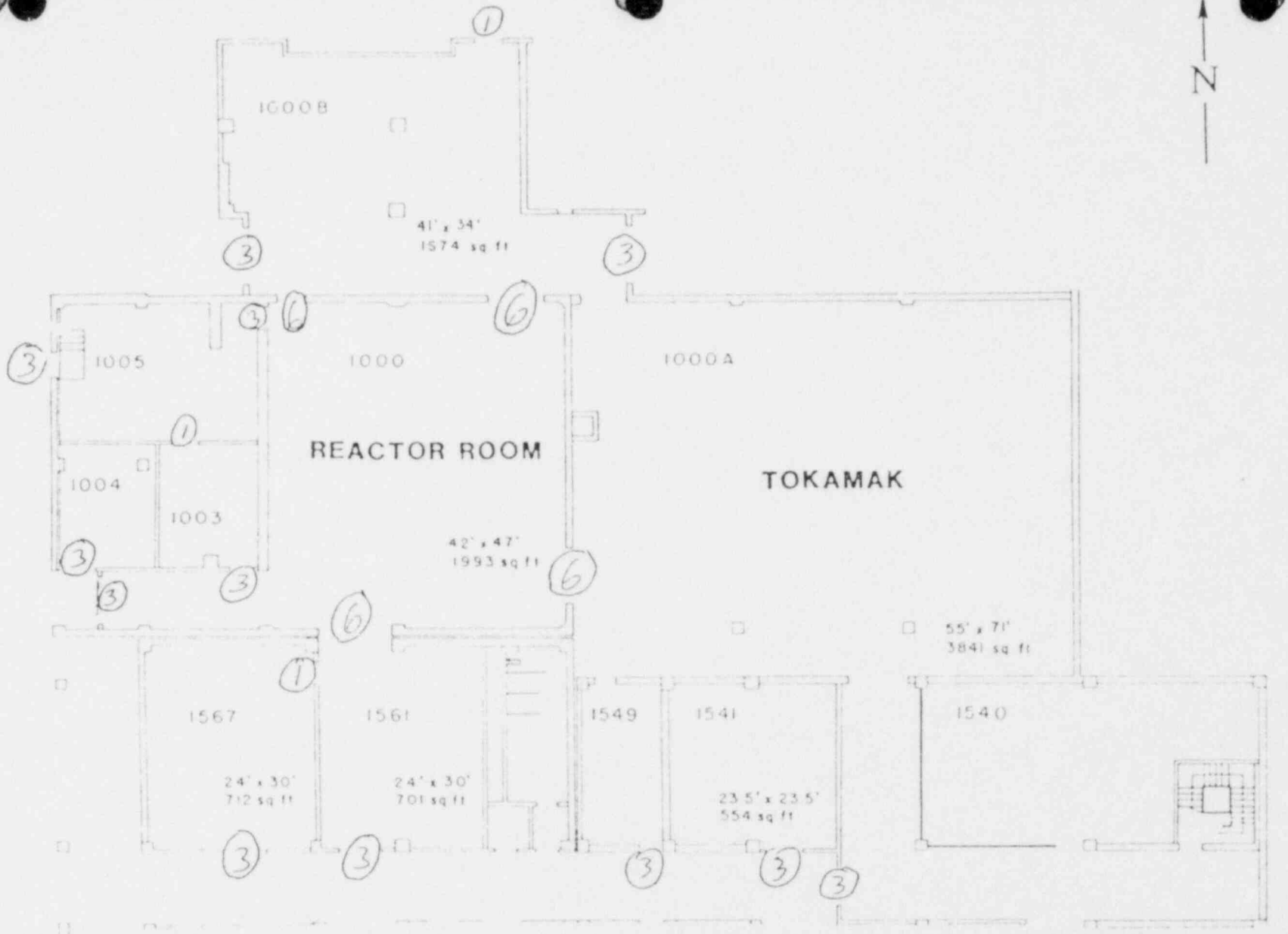


FIGURE III/4-3 NUCLEAR ENERGY LABORATORY - 1ST FLOOR (GROUND LEVEL)

(1), (3), (6) hour doors

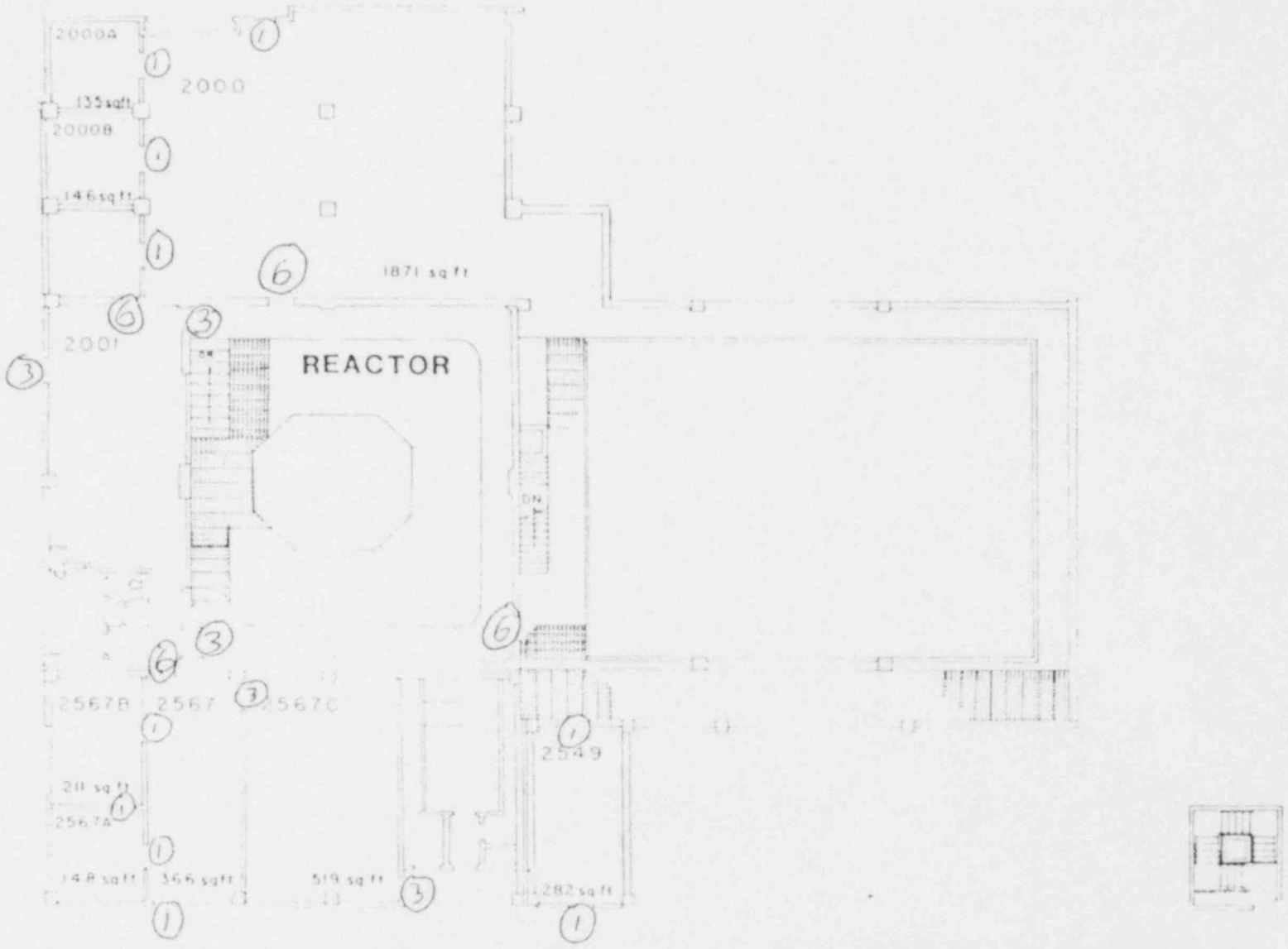


FIGURE III/4-4 NUCLEAR ENERGY LABORATORY - 2ND FLOOR

(1), (3), (6) hour doors

EXHIBIT E

OSTRANDER TO HORNER MEMO OF DECEMBER 17, 1980

LOS ANGELES: SCHOOL OF ENGINEERING
AND APPLIED SCIENCE

MEMORANDUM

17 December 1980

TO: Mr. J. W. Hornor

FROM: N.C.Ostrander, Manager
Nuclear Energy Lab

NCO

SUBJ: Anti-siphon valves on demineralized water

This will supplement and document present and prior reviews of siphoning possibilities in the demineralized system.

The prior review focused upon the possibility of back siphoning via the shield tank fill line to other laboratory outlets within the NEL. The fill line exit is always above the shield tank water level. That is, the maximum water level is dictated by overflow apertures at elevations below the fill line exit. Thus there is always an air gap at the exit point to preclude accidental back siphoning.

More recently, Mr. Zane suggested the possibility of back siphoning via the dump tank fill line through the demineralizer (in reverse flow) into the utility water supply system. As the dump tank is lower in elevation than any other demineralizer outlet in the laboratory, local back siphoning of demineralized water is not possible. Thus the suggestion pertains to a hypothecated reverse flow of demineralized water from the process pit through the demineralizer, the water softener and into the common water supply to some unspecified line break at an elevation below that of the process pit.

A number of natural factors mitigate against the hypothecated reverse flow or the consequences thereof.

1. The demineralizer is coupled to the primary water system only when make up water is added to the system; a rare occasion of brief duration.

2. The lift of 31.4 feet from the process pit to the demineralizer is near the theoretical maximum of 33.4 feet for water at 60 F.

3. The quantity of potentially siphonable water is limited to that contained in certain process piping, a quantity of approximately 0.12 CF resident in 19 feet of one inch pipe.

    a) Emptying the 19 feet of one inch line automatically couples the demineralizer to the air space above the dump tank, and the siphon is broken.

    b) The quantity of potentially siphonably water is small relative to the hold-up in the demineralizer and water softener.

In addition to the natural factors indicated above, the common water

MEMO from Ostrander to Hornor
December 17, 1980

supply is protected by a city registered, anti-reverse flow valve (currently the valve is by Backflow Engineering and Equipment Company, 1", model 10, Serial Number: 1 BP 10-246).

I believe that the combined natural and engineered features are adequate to protect our own laboratory and the general public from the possibility or effects of backflow-by-siphoning.

I am not aware of any other modes of siphoning, but will follow up on any further suggestions you may offer.

EXHIBIT F

WEGST TO MILLER LETTER OF OCTOBER 14, 1981

UNIVERSITY OF CALIFORNIA, LOS ANGELES

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO · SANTA BARBARA · SANTA CRUZ

DEPARTMENT OF COMMUNITY SAFETY
LOS ANGELES, CALIFORNIA 90024

October 14, 1981

Mr. James R. Miller, Chief
Standardization and Special Projects Branch
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docket 50-142
License R-71

Dear Mr. Miller:

This is in response to your letter of September 23, 1981 concerning Appendix III, Attachment B (ASAR) of the UCLA application for renewal of license number R-71.

UCLA has been unable to conceive of any credible accident scenario that leads to core melting, and indeed the author(s) of Attachment B note in the fourth paragraph that "...such an event is not even considered plausible". In fact, our staff at UCLA considers the accidental melting of an Argonaut core to be an incredible accident. The loss of coolant event postulated to initiate a meltdown in power reactors, is in fact a designed safety feature in Argonaut reactors.

These matters were known to UCLA at the time the application was in preparation, and occasioned considerable discussion over how both attachments A and B to Appendix III were to be handled. On balance, it appeared that both were Commission approved documents of generic proportions that were part of the original licensing agreement, and were neither ignorable nor alterable by UCLA.

The situation was entirely changed by the work of Hawley, et al, "Analysis of Credible Accidents for Argonaut Reactors" (NUREG/CR-2079) and Cort, "Fuel Temperatures in an Argonaut Reactor Core Following a Hypothetical Design Basis Accident (DBA)", (NUREG/CR-2198). Accordingly, UCLA moves to (a) withdraw Attachments A and B to Appendix III, (b) substitute, by reference, NUREG/CR-2079 and NUREG/CR-2198 in that place, and (c) otherwise amend the Application in indexing and cross-referencing to provide a consistent document.

As a second matter, UCLA moves to withdraw the Technical Specifications proposed in the Application, adopting in that place the revised form as written by the Commission technical staff, July, 1981. This will have the effect, among other

things, of fulfilling UCLA's commitment to withdraw references to intended future actions (Intervenors Contention XXXII).

Sincerely,

Walter F. Wegst Jr.

W. Wegst
Director
Research & Occupational Safety

WW/jr
cc: W. Cormier

EXHIBIT G

FOURTH QUARTER TLD DATA

RADIATION DETECTION COMPANY

162 Wolfe Road • P.O. Box 1414 • Sunnyvale, California 94088 • (408) 735-8700

Account Number 9108-00

Samples Recd: September 3, 1981
Samples Read: September 3, 1981

UCLA Nuclear Energy Lab.
2567 Boelter Hall
405 Hilgard Ave.
Los Angeles, CA 90024
Attn: Neil Ostrandar

ENVIRONMENTAL THERMOLUMINESCENT DOSIMETRY REPORT

Exposure Period: 6/01/81 - 8/31/81 (updated 3/23/81)

Sample No.	Obs.	Avg.	UCLA Bkg.	Net	Exposure, mR	
1	6.67,7.33	7.00	6.16	0.84	B ~~3~~	0 *
2	8.11,8.01	8.06	6.16	1.90	C ~~7~~	3
3	6.06,6.56	6.31	6.16	0.15	D ~~1~~	0
4	6.24,6.08	6.16	6.16	0	E ~~0~~	0
5	7.61,7.57	7.59	6.16	1.43	H ~~5~~	1
6	7.26,7.14	7.20	6.16	1.04	I ~~4~~	0
7	11.1,12.2	11.7	6.16	5.54	N ~~20~~	16
8	6.42,6.52	6.47	6.16	0.31	A ~~1~~	0
9	8.40,7.34	7.87	6.16	1.71	G ~~6~~	2
10	9.72,8.15	8.94	6.16	2.78	M ~~10~~	6
11	8.21,9.09	8.65	6.16	2.49	K ~~9~~	5
12	8.48,8.20	8.34	6.16	2.18	L ~~8~~	4
13	5.96,7.36	6.66	6.16	0.50	J ~~2~~	0
14	10.6,11.4	11.0	6.16	4.84	F ~~17~~	14
15	12.4,13.6	13.0	6.16	6.84	O ~~24~~	21
16	11.4,11.2	11.3	6.16	5.14	P ~~18~~	15

TLD Type	RDC Bkg.	Calibration Factor
$CaSO_4$: Dy 5/14/81	7.17	3.53

Precision: ± 2 mR of 10%

Calibrated to Co-60

* Use RDC background

James M. Mecozzi
Health Physicist

JMM/kjg
9/8

SUMMARY OF TLD OBSERVATIONS / AUGUST 26, 1980 -				
LOCATION	DIST/DIR	mR (EACH QUARTER)		AVERAGE 1976 - 1978
		No Pb	w/Pb	
F NEL STACK	0	12/12/10/14		11.6
A MSA 9318A	47/000	06/--/--	--/00/00/00	6.0
B MSA 9318A	50/020	05/--/--	--/00/00/00	
C MSA VENT. INTAKE	74/029	04/04/04/03		4.5
D MSA 9318C	111/051	05/--/--	--/00/00/00	
E MSA 9318C	102/058	06/--/--	--/NR/00/00	
H MSA 9318D	98/070	03/04/04/01		
G BH WINDSCREEN	38/180	03/04/03/02		4.4
M BH 8500	84/148	06/06/04/06		4.6
L LIB. COOLING TOWER	165/110	04/04/03/04		
K PLANETARIUM	166/092	05/05/04/MO		
I MS MET. STATION	183/068	02/05/05/00		3.8
J MS EAST END	353/086	00/03/02/00		
N KNUDSEN HALL	760/056	--/--/--/MO	00/NR/MO/--	8.9
O PARKING STRUCT. 3	3040/022	20/16/15/--		
" " 8		--/--/--/21		
P PARKING STRUCT. 5	1690/006	21/18/16/--		
" " 6		--/--/--/15		

DIST/DIR = DISTANCE FROM STACK IN FEET AND AZIMUTH MEASURED CLOCKWISE FROM NORTH (IN DEGREES).

NR = NOT RECOVERED OR NOT READ

MO = MOVED, HISTORY UNKNOWN

EXHIBIT H

REYES TO OSTRANDER MEMO OF SEPTEMBER 22, 1981

MEMORANDUM

22 Sept 1981

TO: Neill Ostrander, Manager
Nuclear Energy Lab

FROM: R. Reyes, Health Physicist
Nuclear Energy Lab

RE: Requested Area Re-Survey (100 KW)

The Reactor Area re-survey was done on 14 August 1981 and again on 2 September 1981. Pending recalibration of PNR-4 neutron, portable, detector, the second neutron survey (8/14/81) was done utilizing Texas Nuclear Nemosphere, Model 9146. Results of which indicated that neutron levels exterior to the reactor room and the machine room are undistinguishable from background. This was also the case with gamma re-survey which was done on 2 September 1981.

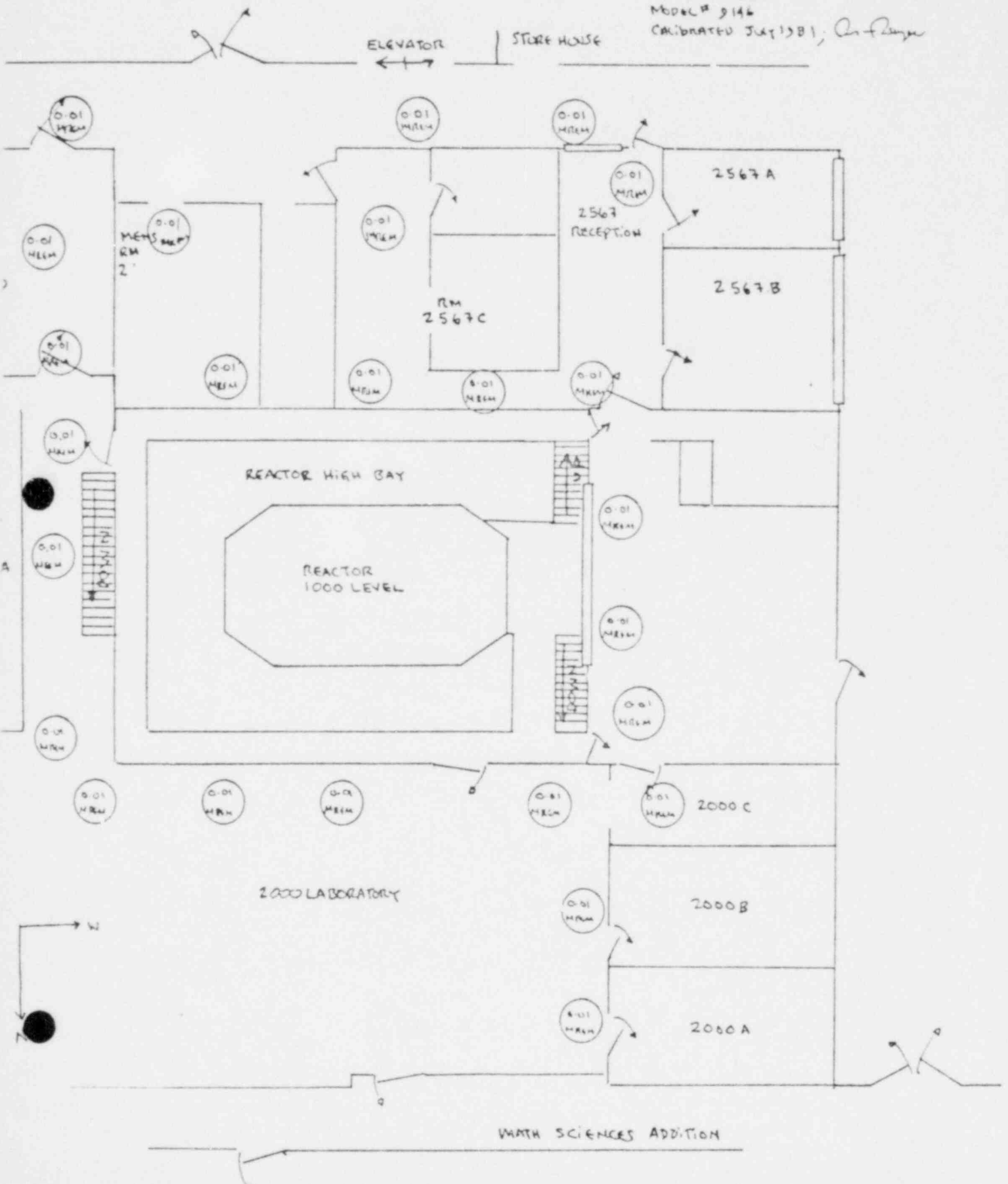
RR

cc. W. Wegst

Attachments: Neutron Survey 8/14/81
Beta-Gamma Survey 9/2/81

14 AUGUST 1981 REACTOR RUN 100 KW

MONITORED WITH:
TEXAS NUCLEAR ATMOSPHERE
NEUTRON DOSIMETER
UC# 67400 5441
UC# 68400 5572
MODEL# 9146
CALIBRATED JULY 1981;

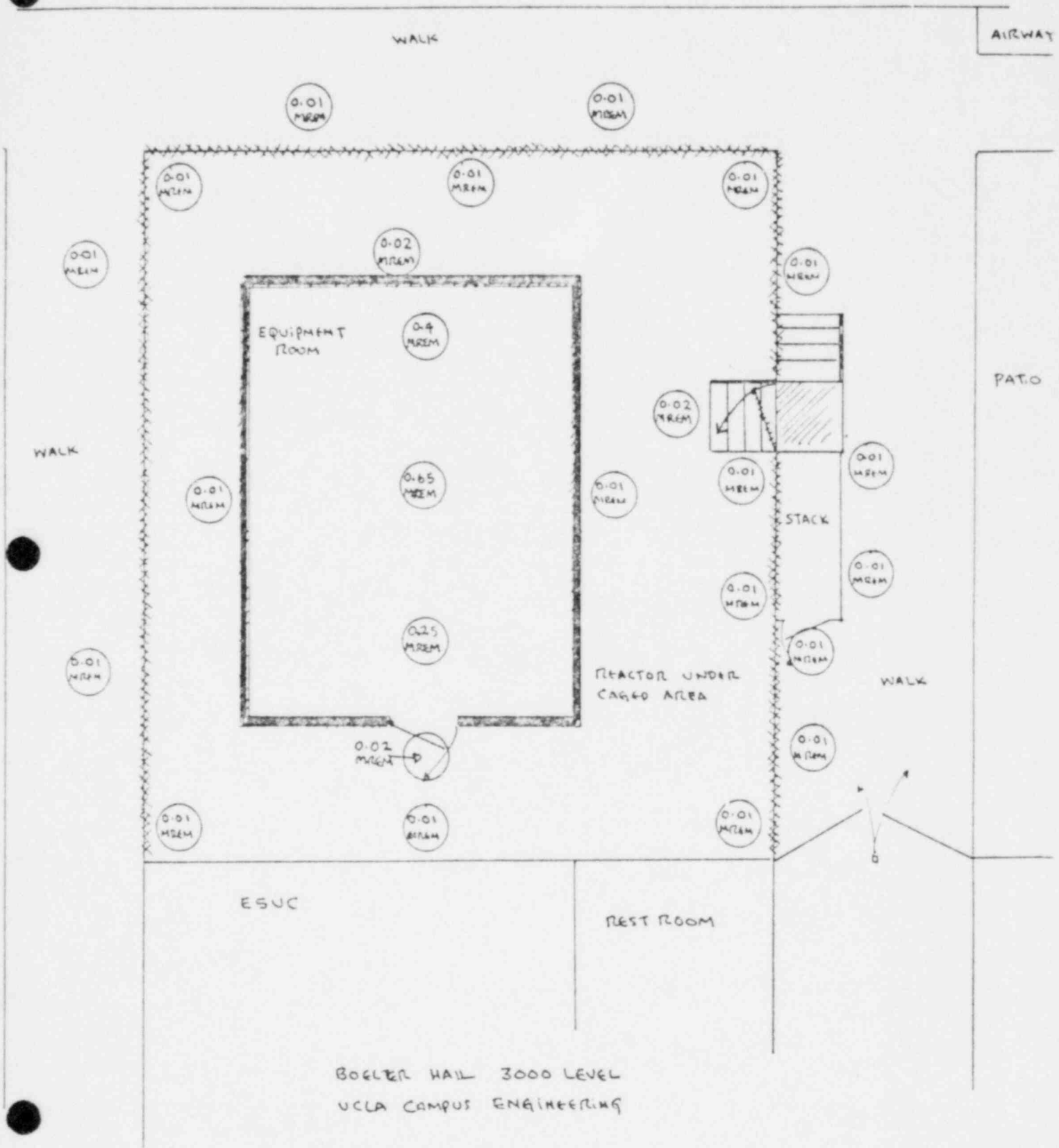


14 AUGUST 1981 REACTOR RUN 100 KW

N

E

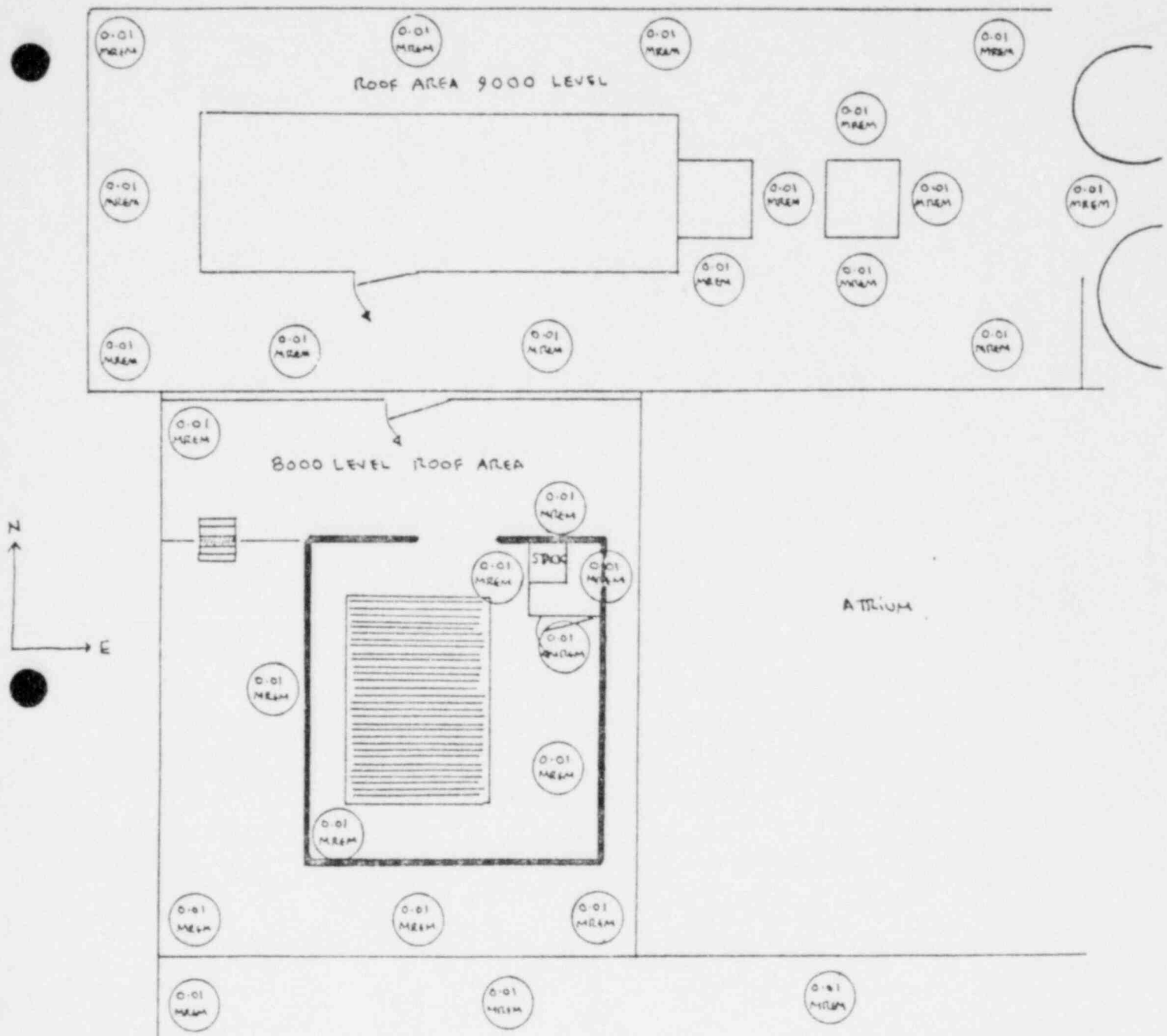
MATH SCIENCE BLDG



BOELTER HALL 3000 LEVEL
UCLA CAMPUS ENGINEERING

MONITORED WITH:
TEXAS NUCLEAR NEMO-SPHERE
NEUTRON DOSIMETER
UC# 67400544 1
UC# 68400557 2
UC# 67400 - MODEL 9196
CALIBRATED JULY 1981

14 AUGUST 1981 REACTOR RUN 100 KW



MONITORED WITH:
TEXAS NUCLEAR NEMO-SPHERE
NEUTRON DOSIMETER
UCR 67400 5441
UCR 68400 5572
MODEL# 9146
CALIBRATED JULY 1981;

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the attached: APPLICANT'S FOLLOW-UP RESPONSES TO INTERVENOR'S SET THREE AND SETFOUR (FINAL) FOLLOW-UP INTERROGATORIES in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, postage prepaid, addressed as indicated, on this date: November 9, 1981.

Elizabeth Bowers, Esq.
U.S. Nuclear Regulatory Commission
Atomic Safety & Licensing Board
Washington, DC 20555

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

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

Chief, Docketing and Service Section (3)
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Counsel for NRC Staff
Office of the Executive Legal Director
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Daniel Hirsch
Committee to Bridge the Gap
1637 Butler Avenue, #230
Los Angeles, CA 90025

Daniel Hirsch
c/o Quaker Center
Box 686
Ben Lomond, CA 94306

John Bay
2261 Columbia Street
Palo Alto, CA 94306

WHC/mm

William H. Cormier
UCLA Representative

WC/s1-4