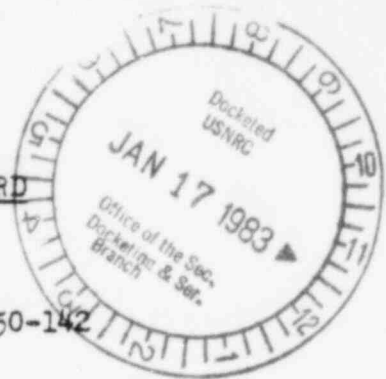


UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD



In the Matter of
THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA
(UCLA Research Reactor)

Docket No. 50-142

(Proposed Renewal of
Facility License)

DECLARATION OF DR. SHELDON C. PLOTKIN AS TO CONTENTION VII

I, Sheldon C. Plotkin, do declare as follows:

1. I am President of S.C. Plotkin and Associates, a consulting engineering firm specializing in safety and systems engineering. A statement of professional qualifications is attached to my declaration for Contention I.
2. I serve on the Executive Committee of the Southern California Federation of Scientists and have participated in and coordinated the activities of the SCFS review group assessing reactor safety matters related to the UCLA reactor, particularly with respect to providing technical assistance to the Committee to Bridge the Gap in responding to Staff and Applicant motions for summary disposition.
3. This review has included review of the SCRAM reports, reportable occurrence reports, and annual reports.
4. The purpose of this declaration is to respond to the Staff and Applicant motions for summary disposition as to Contention VII.
5. It is concluded based upon the above review that the UCLA reactor facility has evidenced throughout its operating history a high degree of operational unreliability, as well as incidents such as radiation leaks, public exposures, and equipment malfunctions which have posed substantial risks to the public. In particular, the history of operational unreliability, and continual failure of the facility to be able to rectify repeated instrumentation and operator error failures, indicate substantial risks to the public from continued operation, given the lack of inherent safety of the reactor. Review of the records indicate that NRC inspections have examined a very small fraction of these incidents, primarily the reported incidents, with virtually no attention paid to incidents such as the repeated unintended scrams from undetermined causes.

6. Over the period 1965-1980, there are a total of 125 recorded unintended shutdowns at the facility, for an average of over 8 unintentional scrams per year. As the facility operates only a few hours per week, this is a very high rate of instrumentation or operator errors requiring what amounts to emergency shutdown.*

7. A review of those scram records indicates that the causes were often repeated many times, without effective corrective action taken to remedy the situation. This is particularly true in terms of certain instrumentation failures where the facility staff obviously were aware of unreliability on the part of certain equipment but continued to operate the facility for months or years without effectively resolving the problem.


8. Perhaps more troubling are the numerous instances in which an emergency shutdown occurred, no cause could be determined in a cursory check, and the facility was brought back to critical without knowing what was wrong. From a safety standpoint, this is most serious. Blind faith in the fail-safe nature of equipment as evidenced here can be most dangerous. My review of the control equipment indicates several non failsafe modes, and from fundamental principles that is always the case. Rigid controls to determine causes of failures and correct them in a timely fashion are necessary.

9. The record also reveals numerous radiation leaks and spills, failures of irradiation sample containments, failed rabbits, primary coolant leaks, and other such incidents. Numerous of these accidents have involved radiation exposures to people that have the potential for causing significant injury. It would be most incorrect to assert that no event has occurred at the facility posing a threat to public health and safety--many such incidents appear to have caused actual radiation exposures to people of health and safety concern, and a great many more have produced conditions that had a significant potential of causing or contributing to an incident of safety significance--i.e., created substantial risks to public safety.

10. The unreliability of the reactor, both in terms of continued operator error and violations of regulations as well as continued failure of safety instrumentation, is very important in assessing whether continued operation of this facility poses undue risks to public safety. The significant unreliability of human and mechanical controls at the facility, in my opinion, creates substantial risks to the public.

* The most recent year recorded, 1981, indicates 8 unintended shutdowns, the same as the average for the 15 year period. Thus the operational reliability problems continue.

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



Sheldon C. Plotkin

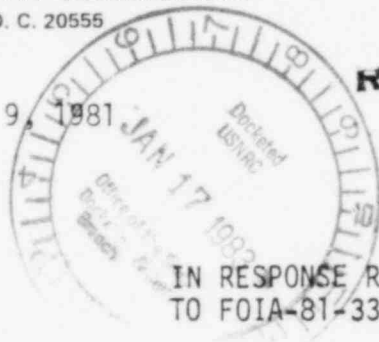
Executed at Los Angeles, California, this 12th day of January, 1983.



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

VII

September 9, 1981



RECEIVED

SEP 11 1981

LAW OFFICE OF
JACK R. WILLIS

Mark Pollock, Esquire
Counsel for Committee to Bridge the Gap
1724 North La Brea Avenue
Los Angeles, CA 90046

IN RESPONSE REFER
TO FOIA-81-339

Dear Mr. Pollock:

This is in partial response to your undated letter received in this office on August 21, 1981, in which you requested, pursuant to the Freedom of Information Act, copies of documents relating to 15 categories of information you identified in your letter.

In response to your request, Appendix A is a listing of documents which were found to be responsive to your request. These documents are enclosed.

As explained in a telephone conversation on September 4, 1981, between Mr. Dan Hirsch of your office, and Ms. Nina Toms, of my staff, the Nuclear Regulatory Commission has not performed probabilistic risk assessments of research reactors. Ms. Toms also explained to Mr. Hirsch that, due to the variance in design of nonpower reactors, the NRC does not have comparative statistical data, at present, which would evaluate the performance of different research reactors as to unintentional scrams, abnormal occurrences and violations.

The Reportable Occurrence and Licensee Event Reports for the Universities of Florida and Washington have already been made available for public inspection and copying at the NRC Public Document Room (PDR), 1717 H Street, N.W., Washington, DC 20555. These documents can be located under Dockets 50-83 and 50-139. The charge for reproducing records located in the PDR is five cents (\$0.05) per page, as specified in 10 CFR 9.14(a). Copies of these documents can be purchased by writing directly to the PDR. Upon your agreement to pay the reproduction charges, the PDR will arrange for the records to be reproduced by Literature Research Company, a private reproduction contractor servicing the PDR. You will be billed by Literature Research Company for the reproduction charges, plus tax and postage.

The review of additional documents subject to your request has not yet been completed. As soon as this review is completed, we will advise you of our disclosure determination.

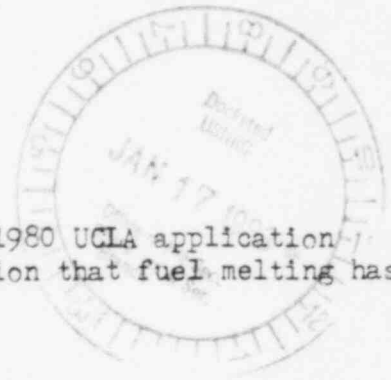
Sincerely,

J.M. Felton, Director
Division of Rules and Records
Office of Administration

Enclosures: As stated

CONTENTION VIII

RESPONSE TO STAFF'S ASSERTED MATERIAL FACTS



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

DISPUTED

- a. The SAR submitted with the 1980 application rests merely on the assumption that 3 curies of I-131 have been released. (Application, p. III/B-4 and B-6; Aftergood declaration as to Contention VIII, P 18-19)
- b. The 3 curie release assumed in the 1980 application is smaller than the release assumed by Hawley for a fuel-handling accident and by the Staff for seismic damage. (Aftergood declaration for VIII, P 19-21; Hawley report, p. 48; SER p. 14-7)
- c. The releases assumed by Hawley and the Staff would thus produce higher doses at 15 meters than the 1800 rem assumed in the 1980 application. (Aftergood declaration for VIII, Table 2)

2. "Fuel melting cannot occur in an Argonaut-UTR reactor limited to \$3.00 excess reactivity and 100 kw power level."

DISPUTED

(Kaku declaration for XIX, P 17; Norton declaration for V, P 75, 81; Dupont declaration for XIX, P 22, 27-29)

3. "An inadvertent stepwise insertion of \$3.90 excess reactivity would produce a fuel temperature of 500°C with possible hot spot of 590°C."

DISPUTED (Norton declaration for V; Kaku declaration for XIX, P 39-54, 78-82; Dupont declaration for XIX, P 22, 27-29)

4. "The aluminum fuel cladding of the UCLA fuel plates melts at 660°C and the fuel meat melts at 640°C."

NOT DISPUTED.

Counter-facts:

a. The uranium in the fuel plates may ignite around 350°C. (Dupont declaration for XIX, P 9, 28; Warf declaration for XIX, P 11)

b. Clad softening and volumetric expansion effects may occur below the melting temperature. (Dupont declaration for XIX, P 28; Hawley answers to CBG interrogatories 46-7)

c. The temperatures below melting at which clad failure could occur would require further research than that performed for the Hawley study. (Hawley answer to CBG interrogatory 46)

- d. Materials that may be in-core have ignition temperatures below the melting temperature of the fuel. (Dupont declaration for XIX, P 28; Hawley report, p. 34-6, 40)
 - e. Significant fission product release begins around 400°C, or 240°C below the melting temperature (Application, III/8-9)
 - f. The critical temperature for accident considerations for the UCLA reactor is not the melting temperature of the fuel (640°C) but the Wigner energy threshold (about 170°C). (Dupont declaration for XIX, P 27-29; Warf declaration for XIX, P23-27)
5. "The extremely conservative analysis in the UCLA SER of a worst case accident which crushed the reactor core so that 750 guillotine breaks in the fuel occurred, resulted in a calculated release of fission products inside the reactor room causing a dose of .047 rem, whole body, and 30 rem to the thyroid."

DISPUTED.

The analysis was not extremely conservative, nor did it assess a worst case accident, nor would even the assumed accident produce the asserted doses:

- a. The NRC Staff's consultants assumed greater doses would result from a fuel handling accident involving only one of the reactor's twenty-four fuel bundles. (Hawley report, p. 48).
 - b. A core crushing accident would produce some multiple of the release assumed for the fuel handling accident (Hawley report, p. 26; Kaku declaration for XIX, P65-70)
 - c. Accidents involving far greater releases than the .189% of the equilibrium iodine inventory assumed in the SER are credible for the UCLA reactor. (Kaku, full declaration for XIX, summarized at P 83-86; Norton, P 76; Dupont, P29; Fulido, P26)
 - d. Even if one were to assume the fission product release presumed in the SER, doses inside the reactor room would be in excess of 9000 rem to the thyroid. (Aftergood declaration for VIII, P4, 16, 21, Table 2 & Figure 2)
6. "The only chemical reaction which could produce an explosion in the UCLA reactor core is a metal-water reaction between the aluminum in the fuel plates and the coolant water, and resulting hydrogen gas formation."

DISPUTED

(Warf declaration for XIX, P 4-21, 31; Kaku declaration for XIX, P58-64, 71-76; Dupont declaration for XIX, P23)

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

DISPUTED

(Warf declaration for XIX, P 14-17, 31; Norton declaration for V, P3,4,13,14,73,81; Dupont declaration for XIX, P23; Kaku for XIX, P55-57,64)

8. "No credible mechanism could reduce the fuel plate cladding into filings at an Argonaut-UTR"

NOT DISPUTED

9. "A graphite fire in the UCLA reactor would occur only if an experiment failed and a general building fire occurred and the reactor's graphite blocks were exposed to a free flow of air."

DISPUTED

(Pulido declaration for XV, P 18-26; Dupont declaration for XIX, P4, 22-23,28-29; Kaku declaration for XIX, P 58-64; Warf declaration for XIX, P4-21,27,30,31)

10. "Severe damage to fuel plates due to a fuel handling accident at the UCLA reactor would not produce doses inside the reactor room above 2 rem whole body and 43 rem, thyroid."

DISPUTED

(Aftergood declaration for VIII, P3-21, Table 2 & Figure 2)

RESPONSE TO UCLA'S ASSERTED MATERIAL FACTS

UCLA's "FACTS" 9, 10, and 11 all duplicate the Staff's "FACT" # 1. CBC likewise disputes the UCLA facts, with the same counter-facts and citations as used above.