IV

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

DECLARATION OF IRA H. MONOSSON, M.D.

I, Ira H. Monosson, do declare as follows:

1. Until mid-1982, I was the Chief Public Health Medical Officer for CAL-OSHA (the Division of Occupational Safety and Health of the California State Department of Industrial Relations). I am now in private practice, specializing in occupational and environmental health. I am also a member of the Southern California Federation of Scientists. A statement of professional qualifications is attached hereto.

2. The purpose of this declaration is to address the following questions, and certain matters related thereto: (1) Would it be correct to say that none of the violations that have occurred at the UCLA reactor has had safety significance? (2) Would it be correct to assert that no one has ever been harmed by any of the incidents at the reactor? (3) Would it be correct to allege that no incident that has occurred at the reactor has posed a risk to public health and safety?

3. My conclusion, based upon a review of certain aspects of the UCLA reactor facility's record of compliance with regulations and license conditions, primarily through inspection report review, is that the answer to each of the above questions is in the negative.

4. During substantial periods, the reactor facility management has exhibited, as one of the inspection reports puts it, a "chronic history of noncompliance

with their reactor license." Many of these violations have been significant from a safety standpoint. Furthermore, the history of non-compliance is not a matter solely of the past, as some of the findings of recent inspections are among the most worrisome of the entire license period from a compliance and public health and safety standpoint.

5. The problems with regulatory non-compliance began near the inception of operation at this facility, according to the inspection reports. For example, during a January, 1962, inspection, UCLA was cited for several violations that had occurred the previous year, particularly conducting unauthorized experiments and exceeding (by 250%) the licensed power limit. The latter was reported to have been done without the knowledge or consent of the Reactor Supervising Engineer. The report noted, furthermore, that the violation would have been prevented had the safety circuits been properly calibrated and adjusted to the trip points promised in the UCLA Hazards Analysis. In my opinion, exceeding of safety limits mandated by the license, failure to set trip points as promised, and conducting unauthorized experiments are serious violations with safety significance.

6. The next inspection report, dated May 2, 1963, is extraordinary. I have read many such reports over the years, but this one and the recent June 9, 1982, report are something of classics. The cover AEC memo summarizes it well:

> At the conclusion of our visit, the licensee found it difficult to believe that they could have committed such a large number of license infractions. We believe that this is another University that has to learn how to operate and conduct an active experimental program within the limits established by the facility license and the rules and regulations of the Commission.

These violations included repeat performances from the previous inspection: unauthorized experiments, and exceeding licensed safety limits with regards to power. Once again, the trip levels remained far above the promised levels. But the litany of additional violations is quite something. A few examples:

(1) core level safety interlock bypassed, (2) reactor flow interlock bypassed, (3) reactor water temperature exceeding the authorized experimental limit, (4) power variations and power both exceeding the limits, (5) failure to have experiments reviewed by the Reactor Hazards Committee, (6) failure to use double sealed irradiation containers as required, (7) operation of the reactor with secondary cooling water shut off, (8) discharge of radioactive liquid wastes to the storm drain instead of a sanitary sewerage system as required, and (9) failure to label plutonium and cobalt sources and a dry radioactive waste container as required. The rest of the inspection report contains many more such items, such as a ten-month long calibration error for the temperature and flow instrumentation, giving an incorrect thermal power reading during the whole period, and undetected leakage of the Cobalt-60 source. (The last item is of particular interest, because it is my understanding that that source, and other leaking Cobalt-60 sources, were stored in the spent fuel storage holes. If true, that would be potentially quite significant, in light of the spent fuel shipment, taken from the storage holes, which was found to be contaminated with Cobalt-60 and is alleged to have been permitted by UCLA to leave its control without catching the contamination.)
The violations identified in this inspection report (key safety limits violated, safety interlocks bypassed, numerous unauthorized experiments, failure of the Reactor Hazards Committe to do its duty in reviewing experiments prior to their being conducted, etc.) have clear potential for causing or contributing to an incident which could affect public health and safety. They also raise serious questions, which are repeated at other points in the license period, about the adequacy of managerial and administrative controls at the facility.

7. The July, 1964, inspection report finds additional violations and comments further upon the problem with managerial controls:

It is our opinion that although the licensee has demonstrated some

> improvement in his adherence to procedures and the limits established by the license, there is still too much of a tendency to permit the facility to be operated as a one-man operation. It is also our opinion that the licensee's conclusion that the broken fuel bundles and the binding control rod problem did not constitute reportable indications or occurrences of possible unsafe conditions was stretching the intent of the license condition a bit far.

8. The pattern of non-compliance and the lack of administrative controls were so severe that AEC inspectors made a special visit to UCLA in late August of 1964 to discuss with top management at UCLA the problems. As the report puts it:

> The purpose of the meeting was to discuss with the Chairman and the Dean of the Department of Engineering the University's chronic history of noncompliance with their reactor license and to reemphasize the need for a greater awareness, by responsible management, of the day-by-day operations of the reactor.

9. The rest of the report contains a lengthy summary of the pattern of regulatory non-compliance that had existed over the years at the facility. The report also indicates that the AEC had chosen to not cite UCLA for a number of other occurrences which could be interpreted as violations. As Mr. Engelken is quoted as saying, p.5:

> In the past, Region V has not made an issue of many borderline infractions because they, of themselves, did not appear to have a great deal of significance to the safety of operations. When viewed as a whole, however, the picture is one which suggests a rather disturbing attitude. That the UCLA staff is well qualified and that they are putting the reactor to good use, is readily recognized. However, their license was issued to them on the basis that they would perform their operations in the manner and within the limitations described in their application, and that all operations outside of these limits are unauthorized.
>
> (emphasis added)

The AEC inspector indicated that "closer scrutiny of day-by-day operations" should be made"by responsible management"; the Dean "readily admitted" that he had not been keeping in touch with the reactor facility activities as he should (p. 6).

10. The next inspection (65-01) contains a number of significant items, most particularly an exposure of an employee to a 50 Rad/hour radiation

beam, continued fuel tie-bolt failures of unknown cause, control rod binding problems, poorly documented personnel monitoring records, and management problems between the Office of Environmental Health and Safety and the reactor staff. No formal violations were issued, although the following comment is instructive (cover memo, p. 1):

> Our conversations with MacLain [the reactor supervisor who had been the subject of the "one-man operation" criticism of previous reports] during this visit indicated that he is gradually showing a greater recognition and awareness of his management responsibilities as they relate to license requirements and federal regulations, as well as the safety of the operation. The employee exposure incident, in particular appeared to have a humbling effect on him to the extent that his attitude toward the use of procedures and the necessity for proper supervision of the work around the reactor is acquiring a more positive tone. Whether this represents a short term or long term improvement remains, of course, to be seen.
>
> (emphasis added)

11. The employee exposure incident is described on page 8 of the report as follows:

> The incident occurred on March 5, 1965 while the reactor was shut down and an experiment was being loaded into a beam port. Five employees were engaged in the operation. The staff member who was functioning as shift health physicist apparently allowed himself to become personally engaged in the work for a few minutes and in doing so placed the group in the position of carrying out the operation without supervision by a person not directly engaged in it. During this period, the affected employee intercepted a 50 r/hr beam with his waist while working just to the right of the emergent beam. When this was noticed, the man was asked to read his dosimeters. These were found to be off-scale above 200mr.

This is just one example of how failure to adhere to safety rules and to maintain adequate supervision can and often does result in injury.

12. Inspection Report 66-01, for May of 1966, gives further insight into the origins of the above-described injury:

> Too much of the health physics burden has been falling on the shoulders of the Supervisor of Reactor Operations, Jack Hornor. The only reason a health physicist has not been procured for the reactor facility in the past is because of the political battle which went on between MacLain and the Environmental Health & Safety Office. Everyone at the exit interview appeared to be quite delighted that the question was brought up. Actually,

> UCLA's license states that the facility will have a health physicist. MacLain got around this by designating one of his operating people, Hornor, a health physicist.
>
> (emphasis added)

"Getting around" requirements and license conditions, such as that requiring a health physicist at the facility, by such means is very serious and can result in substantial risk to the health and safety of both employees and the public. It shows little understanding of basic health and safety principles.

13. I will end my discussion of these inspection reports at the point where MacLain has resigned and problems begin with the new reactor management. I understand other colleagues at the Southern California Federation of Scientists will address other parts of the record. Let me summarize certain readily apparent conclusions, however. (1) The inspection reports make clear a "chronic history of noncompliance" with license conditions. (2) Many of these violations were quite serious from a safety standpoint. (3) The record indicates very serious inadequacies in managerial controls, which had the potential for seriously impacting upon health and safety. Performing experiments forbidden by the license, bypassing safety interlocks, exceeding safety limits such as restrictions on power, and failure of the responsible supervisorial individuals and groups to exercise their required duties in such matters as safety review of proposed experiments and protection of individuals against over-exposure to radiation during dangerous procedures-- such incidents all have considerable safety significance, particularly in a facility where numerous students are present and a dense population is immediately adjacent to the reactor structure. The history reviewed is by no means admirable from a safety standpoint, just the opposite.

14. I understand that it has been asserted that none of the events that has occurred in the 22 years of reactor operation has posed any risk to

public health or safety. Such a statement would be based upon a serious misunderstanding of basic concepts of protection of health and safety.

15. For example, a violation of a safety rule which, by good luck, did not result in an actual injury, makes that violation no less significant from a health and safety standpoint. If agencies charged with regulation of potentially dangerous enterprises only took action when a violation actually resulted in injury or death, then they would be shirking their duty to protect health and safety. The purpose of safety regulations is to prevent conditions from arising which have the potential for causing events which can injure or kill. Numerous events which have occurred at UCLA have had such potential, because one is dealing with a device containing large quantities of potentially very toxic materials. To argue, for example, that none of the numerous operator errors, miscalibration of safety devices, exceeding of safety limits, or faulty maintenance or management has yet resulted in, for instance, an explosion at the reactor, in no way justifies those practices. The purpose of compliance with safety rules is to prevent or minimize the potential for accident. Luck is no substitute for rigid compliance with safety regulations.

16. Furthermore, a number of the events at the UCLA reactor has apparently resulted in increased exposures of people to ionizing radiation. Were one to assert that no injury had been done because no one suffered from acute radiation syndrome (i.e., exposure to doses in the range of a few hundred rad) is to misunderstand completely the effects of ionizing radiation on the human body.

17. Radiation in doses less than those necessary to produce immediately visible somatic effects (vomiting, beta skin burns, etc.)is nonetheless injurious to human tissue. Ionizing radiation, when it comes in contact

with or penetrates human organs, creates ion pairs, altering the molecular structure of the material affected. That damage may not be fatal--the particular cells affected, for example, may die, but the individual continue to live--or a cancer or genetic effect may be induced, which may result in severe damage or death some years later.

18. It generally is accepted in the medical community that there is no threshhold for radiation damage, that all radiation causes some damage, with the magnitude of the damage increasing with the amount of radiation exposure on an additive or cumulative basis. Further, the cancer inducing dose for repetitive low level exposures is not known but is believed to be far less than large, single exposure doses. For that reason, rigid compliance with the principle of ALARA (keeping radiation exposures As Low As Reasonable Achievable) is vitally important. Compliance with the basic radiation standard (keeping public exposures below 500 millirem per year) is very important, but ALARA mandates that exposures be kept far, far below that, unless there are very strong overriding reasons and no real alternatives. That is because 500 millirems is the equivalent of roughly 17 medical chest X-rays per year. We in the medical profession are very cognizant now of the increased risks associated with unnecessary chest and other diagnostic X-rays. It would be completely unsupportable from a public health standpoint, in my opinion, to expose people to the equivalent of even one chest X-ray per year because they happened to be students or employees at UCLA and UCLA had a reactor whose emissions were not well controlled. ALARA considerations should, in my opinion, limit public exposures to a small fraction of the dose they get from a diagnostic chest X-ray (which, unlike exposure to radiation from a reactor, has a medical benefit which is carefully considered in weighing the possible injuries that might result).

19. Thus, if it is true, as my colleagues at SCFS will indicate in their statements, that a calibration error, lost maintenance log, and other violations led to underestimation of actual emissions by two orders of magnitude, and that the emissions are many times the Maximum Permissible Concentration at the point of emission, and that dosimeters indicate doses in public areas far in excess of the ALARA considerations I indicated above, it would be my opinion that such occurrences posed, and pose, an unacceptable risk to public health and safety that was totally avoidable if proper practices had been maintained with reasonable care.

20. Furthermore, I have reviewed testimony by Daniel Hirsch before a hearing of the California Highway Patrol on radioactive waste transport in California. That testimony indicates that UCLA failed to detect high levels of Cobalt-60 contamination (up to 100,000 counts per minute) on a shipment of spent fuel from UCLA, and that UCLA thus released from its control a severely contaminated truck, tie-downs, truckbed, and so on. (I note for example, it is reported that the driver's cab was contaminated, as well as his gloves, raising the potential of exposure not only to the driver and his companion but to anyone who came in contact with them; this is in addition to exposures from the contamination on the truck itself.) If the contamination event indeed did occur, and if UCLA failed, in its radiation monitoring to detect the contamination before permitting the truck to go on its way, then in my view this was an event with considerable potential for having caused injury to members of the public. Furthermore, as noted earlier, the existence of leaking Cobalt-60 sources at the facility which were stored in spent fuel storage holes creates a possibility that UCLA was responsible for the contamination, in addition to failing to detect it. If this is true, the seriousness of the oversights would be even greater.

21. It has been asserted, I understand, that the calibration errors and violation of calibration procedures and failure to calibrate at required intervals have had no safety significance whatsoever. I find it difficult to understand how such a statement could be made. A three-hundredfold underestimation of actual Argon-41 emissions resulting in a finding of violation of the radiation protection standards, if true, can hardly be considered to have no safety significance. Failure to properly calibrate, or check calibration at the appropriate intervals, can have very serious effects, when it is calibration of radiation protection monitors or safety systems one is discussing. From what I know of the UCLA facility, relaxing calibration standards or intervals would be to move in the wrong direction from a safety standpoint, particularly in light of its past safety record outlined in this declaration.

22. An excellent example of the safety ramifications of improper calibration and lack of proper managerial supervision can be seen from the recent inspection report dated June 9, 1982. Frankly, the report is distressing. A health physicist with no prior experience aside from being an X-ray technician, no familiarity with the radiation protection regulations, failure to even read the Technical Specifications he was to carry out, no calibration procedures at all for some instruments, no acceptance criteria for others, actual readings 10 to 40% higher than those he was reporting, failure of calibration records to match calibration labels, calibration results accepted even though off by as much as 35% the expected values, failure of the reactor supervisor, director, or radiation use committee to provide any real oversight, and on and on-- the radiation protection program at the reactor, from a reading of this inspection report, appears to remain dangerously lacking in the necessary competence and carefulness. One example that typifies the safety significance of these failings,

and the seriousness of the facility staff's inability to comprehend the safety significance, is the discussion on page 8 of the report about three malfunctioning portable survey instruments that the health physicist had failed to tag out of service or otherwise indicate they were malfunctioning. Other staffpersons were quoted as saying they thought the instruments were fine and would not hesitate to use them:

> The reactor health physicist was unable to provide the inspector with a reasonable response as to why he did not take positive action to remove the malfunctioning instruments from service nor was it apparent to him the safety consideration that could result if an individual used a defective instrument.

I am appalled that the administrative controls at the facility were such that such a situation could exist for over a year without internal controls discovering it and correcting it. I also am surprised and distressed that the previous NRC inspection, which I understand occurred after the individual in question assumed the duties of health physicist, did not detect the problem at that time. At any rate, the June 9, 1982, inspection report indicates that the radiation protection program is very seriously inadequate and poses a substantial risk to public health and safety. Proper radiation monitoring is absolutely essential to safe operation of a facility such as this.

23. The foregoing discussion is by no means meant to be exhaustive or all-inclusive. The points made above are but a few examples from a record containing many more. A few such examples, however, are more than sufficient to demonstrate that non-compliance has been significant at this facility, that noncompliance continues to this day, and that many of the violations have been significant from a health and safety standpoint.

I, Ira H. Monosson, M.D., declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated at Los Angeles, California,

this 7 day of January, 1983

Ira H. Monosson, M.D.

Statement of Professional Qualifications

IRA H. MONOSSON, M.D.

My name is Ira H. Monosson. Until mid-1982, I was the Chief Public Health Medical Officer of CAL-OSHA (the Division of Occupational Safety & Health, Department of Industrial Relations, State of California). I am now in private practice in occupational and environmental health. I am also a member of the Executive Board of the Southern California Federation of Scientists.

I attended U.S.C. from 1955-58, and Stanford University from 1958-59, receiving my B.A. from Stanford in 1959.

I attended Stanford Medical School from 1958-1962, receiving my M.D. in 1962.

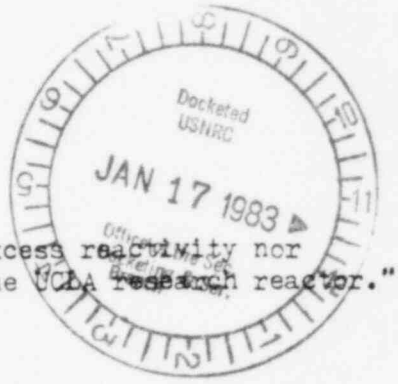
I held a Mixed Medical-Surgical Internship at Montefiore Hospital, Bronx, New York, 1962-63, and Residencies in Internal Medicine at Los Angeles County General Hospital 1963-64 and Cedars of Lebanon Hospital, Los Angeles 1964-65. From 1965-66 I held a Fellowship in Cardiopulmonary Diseases at Scripps Clinic and Research Foundation in La Jolla, California under an NIH Training Grant. In 1976-77 I held a Residency in Occupational Medicine, Dept. of Community & Environmental Medicine, University of California, Irvine College of Medicine. I have been licensed by the National Board of Medical Examiners since 7-1-63 and the California Board since 8-9-63.

I conducted a private practice of Internal Medicine from 1966-74, was Coordinator of a Cardiac Stress Testing Program for the City of Los Angeles in 1975, and Public Health Medical Officer, Division of Occupational Safety & Health, Department of Industrial Relations, State of California from 1976-1982. I was appointed Chief Public Health Medical Officer on 12-15-80.

I am a member of the Society for Occupational & Environmental Health, Member of San Diego County Medical Society 1966-68, Member of

California Society of Internal Medicine 1966-68, Member of the Los Angeles County Medical Association 1974 to 1976, Member of the American Occupational Medical Association, Member of American Conference of Governmental Industrial Hygienists, a Fellow of the Royal Society of Health since 1972, a Full Member of the American Industrial Hygiene Association since 1977, a Member of the American Academy of Occupational Medicine since 1979, the Board of Directors of the Western Occupational Medical Association, a Member of the Occupational Medicine Committee of the American Industrial Hygiene Association, Member of Industrial Branch Advisory Board of the local chapter of the American Cancer Society, Chairperson of the occupational health committee of the Los Angeles County chapter of the American Lung Association, Consultant in Toxicology to the Los Angeles City Attorney and the Los Angeles District Attorney, and a Member of the Hazardous Materials Task Force Advisory Committee of the City of Los Angeles; I also have clinical faculty teaching appointments at the UCLA and USC Schools of Medicine.

CONTENTION V



RESPONSE TO STAFF'S ASSERTED MATERIAL FACTS

1. "Neither step insertion of 2.6% Δk/k ($3.90) excess reactivity nor prompt criticality would produce fuel melting at the UCLA research reactor."

DISPUTED

(Norton declaration for V, entire; Kaku declaration for XIX, P19-54; Dupont declaration for XIX, P26-29)

2. "The available excess reactivity in Argonaut reactors is not sufficient to cause fuel melting."

DISPUTED

(same citations as in 1 above)

3. "The $3.00 amount of excess reactivity allowed by the UCLA technical specifications is well within the margin of safety and poses no threat of fuel melt."

DISPUTED

(same citations as in 1 above)

4. "The graphite temperature coefficient in the Argonaut affects reactivity more slowly than the negative water temperature coefficient."

DISPUTED

(Norton declaration for V, P61-68; Kaku declaration for XIX, P80-81)

5. "The negative worth of the control blades in an Argonaut reactor can compensate for an amount of positive graphite temperature coefficient equal to the negative water temperature."

DISPUTED

(same citations as in 4 above)
also--

a. The positive temperature coefficient is greater than the negative coefficient for the water. (Inspection Report 68-1, p. 6; Application, p. III/6-5)

6. "The increase in power level from 10 kw to 100 kw in 1963 at the UCLA research reactor required only a trivial increase in excess reactivity, and no greater likelihood of a power excursion leading to fuel melt."

NOT DISPUTED.

counterfact:

a. The increase in power level from 10 kw to 100 kw increased the fission product inventory substantially, and thus, substantially increased the consequences of a power excursion leading to fuel melt, or other accident involving fission product release. (Norton declaration, P10, fn. 3; Kaku, P45)

7. "Only a few elements or isotopes in significant quantities could affect reactivity if inserted into the reactor by the pneumatic sample 'rabbit' system."

DISPUTED (although note the "fact" is quite vague--how many are a "few?")

(Norton declaration, P72; Kaku, P82)

counterfact:

a. All samples inserted into the reactor, whether by the rabbit system or the irradiation ports, affect reactivity. (any entry in the reactor operating log indicating change in control blade position after insertion or removal of samples).

8. "All experiments at UCLA are subject to prior review and approval by the Reactor Use Committee or the Supervisor and Health Physicist and technical specification limits in Section 3.5 of the Technical Specifications."

DISPUTED.

(November 16, 1981, notice of violation from UCLA to NRC regarding violation of reactivity rules, caused in part by failure of the Radiation Use Committee to review to experimental procedures; Inspection Report 63-1 similar violations; Radiation Use Committee minutes, which show only three or four experiments reviewed in the last several years; Monosson declaration, P5-13, 22)

RESPONSE TO UCLA'S ASSERTED MATERIAL FACTS

UCLA facts 12 and 13 duplicate Staff's facts 1 and 2, and are DISPUTED with the citations used in response to 1 and 2 above.

UCLA fact 14 duplicates Staff's fact 3, and is DISPUTED with the citations used in response to 3 above.

15. "'Appendix B' of the 1960 Hazards Analysis Report does not state that melting of the fuel will occur at 2.3% k-eff."

DISPUTED

(Norton declaration P28-31)

16. "The maximum reactivity changes that can be induced by the "rabbit" system at the UCLA reactor are less than 50¢."

DISPUTED.

(Kaku declaration, P82; Norton declaration, P72; May 20, 1981, UCLA interrogatory answers to interrogatories V.13-15, 19, 30& November 9, 1981, UCLA follow-up answers V.2-5