

Certified By J. Hunt
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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)	Docket No. 50-142
(UCLA Research Reactor))	(Proposed Renewal of Facility License)

NRC STAFF RESPONSE TO
INTERVENOR OBJECTIONS TO BOARD ORDER

I. INTRODUCTION

On August 6, 1982, the Intervenor, Committee to Bridge the Gap (CBG) filed a document entitled "CBG Objections To Certain Portions of July 26, 1982 Prehearing Conference Order" (CBG Ojections). CBG stated it filed this document to preserve its objections for the record. CBG Objections at 1. By letter of August 13, 1982, the Board requested responses by Staff and Applicant to the CBG objections which the Board elected to treat as a motion for reconsideration. The NRC Staff opposes reconsideration for the reasons discussed below.

II. BACKGROUND

On July 30, 1981, CBG served 573 multi-part interrogatories on Staff and named Commission consultants at Battelle (PNL) and Los Alamos National Laboratory (LANL).^{1/} Staff declined to respond because of the

1/ Intervenor's Discovery Requests as to SER, EIA, NUREG/CR-207 and NUREG/CR-2198, July 30, 1981.

burdensome number and the fact that the information sought was irrelevant to the issues or available elsewhere.^{2/} Nevertheless, the Board directed Staff to meet with CBG to agree on a reduced number of interrogatories. (Order Relative to Discovery by CBG of the NRC Staff, October, 1981.)

A meeting was held on November 24, 1981 between CBG and Staff during which agreement was reached on more than 130 responses to interrogatories by Staff and its consultants at Battelle (PNL) and Los Alamos National Laboratory. These responses were filed on March 17, April 19, and May 10, 1982. The agreement about discovery was described in Staff and CBG letters of December 17, 1981 and February 8, March 17, April 19, and May 10, 1982. The agreement for discovery was completed May 10, 1982.

No motion to compel answers from Staff beyond the responses, submitted as agreed, has ever been filed by CBG, nor did CBG substantiate its general claim that all 573 interrogatories were necessary as stated in the CBG motion of September 14, 1981 asking that the Staff be required to answer the entire set of interrogatories.

On June 29 and 30, 1982, a prehearing conference was held in Los Angeles. During the conference, CBG stated that discovery disputes existed between Staff and Intervenor but Staff indicated otherwise,

^{2/} Letter to M. Pollock, Esq. from C. Woodhead, Staff Counsel, August 19, 1981.

believing the discovery agreement was fulfilled.^{3/} The Intervenor alleged the need for more information about the Commission's consultants. The Board's July 26, 1982 Prehearing Conference Order ("Order") set out CBG's prehearing conference transcript statement that more discovery was necessary concerning the "direct relations with the Argonaut licensee at the University of Washington" of the three authors of the "Battelle Study"^{4/} alleging that "Staff has objected to answering . . . questions about apparent conflicts of interest on the part of witnesses that they are putting forward." (Order, at 6) The Board ruled that:

These [CBG] allegations focus on the proposition that the professional activities of the authors might be curtailed by an unfavorable report. By implication, the position taken by CBG would require, if conflicts are to be avoided, that the report be prepared by individuals without any association with the type reactor in question.

We are unwilling to carry conflict of interest considerations this far. We will not assume that a scientist's or engineer's mere professional association with or use of a particular device so biases his or her professional judgment as to render that judgment suspect. We conclude that the interrogatories in question are not likely to lead to the discovery of admissible evidence. Consequently, we see no need for Staff to furnish any additional information to CBG with respect to this matter. (Order, 6-7).

On August 6, 1982, CBG filed CBG Objections setting forth its reasons why it disagreed with the Board's ruling that the Staff need not furnish any additional information with respect to certain CBG interrogatories.

^{3/} Tr. 625-629, 726

^{4/} Analysis of Credible Accidents for Argonaut Reactors, S. C. Hawley, R. L. Kathren; M. A. Robkin, NUREG/CR-2079, PNL-3691.

These reasons were that Staff has not provided information previously agreed - referring to UCLA Radiation Safety Committee minutes about which the Staff has repeatedly informed CBG it has no knowledge;^{5/} that further information about one of the Battelle study authors (Professor Robkin) is necessary to determine whether a serious personal consequence would occur if the Battelle study had determined Argonauts to be "fundamentally unsafe"; that interrogatory responses by two Battelle scientists were "evasive"; that the part time teaching position by one Battelle scientist and the part time study by another at a graduate study center at Richland, Washington sponsored by two universities, raises a question of bias in analysis of Argonaut characteristics; and that insufficient information has been provided by Staff to CBG to discover conflicts of interest by the Commission's consultants at Battelle (PNL) and the author of the LANL study.^{6/}

By letter of August 13, 1982, the Board notified Staff and Applicant that the CBG objections were being treated by the Board as a motion for reconsideration and requested that responses to the objections be received by the Board by August 23, 1982. There is no merit to Intervenor's objections to the Order denying further discovery as set out below.

^{5/} This was discussed at the prehearing conference. Tr. 740-743.

^{6/} Fuel Temperatures in an Argonaut Reactor Core Following a Hypothetical Design Basis Accident (DBA): G. E. Cort, LANL, NUREG/CR-2198.

III. DISCUSSION

The record in this proceeding fully supports the Board's finding that the interrogatories in questions are not likely to lead to the discovery of admissible evidence. The CBG Objections in question here are actually a complaint that interrogatories C(16)-(26) have not been answered and that certain other interrogatories were answered other than in the manner CBG now wishes. The Board's July 26, 1982 Prehearing Conference Order ending discovery except for two issues should not be challenged under the guise of an allegation that an apparent conflict of interest exists concerning NRC consultants and that insufficient information has been provided by Staff during discovery to determine this matter.

On April 19, 1982 Staff served responses by the authors of the Battelle study to Intervenor's interrogatories. These responses included the professional qualifications of the three authors as well as answers to questions concerning their association with Argonaut licensees. These documents and the CBG Interrogatories are attached to this response. The professional qualifications (resume's) of each person sets out clearly the employment and/or association with the University of Washington which operates an Argonaut research reactor licensed by the Commission. Additionally, each author answered specific questions concerning associations with Argonaut operating staff and payment by Argonaut licensees. Therefore, it is clear that: Professor Robkin is a professor of nuclear engineering and environmental health at the University of Washington (U.W.), and a member of the Radiological Sciences Group and Radiation Safety Committee; is paid by U.W.; is acquainted with the U.W. reactor staff and teaches

classes utilizing the reactor; and that Professor Robkin wrote the section of the Battelle study dealing with possible graphite fire in Argonauts. This analysis appears at pp. 30-41 in the Battelle study which is comprised of a total of 55 pages. The additional questions Intervenor alleges necessary for answer are attached. [Part C of CBG Interrogatories C(16)-C(26)]. These questions have either been answered by Professor Robkin in his statement of professional qualifications and specific responses to interrogatories, or the answer is apparent by description of activities. For this reason, Staff did not agree to answer the extra questions CBG created for Professor Robkin beyond those for the two Battelle scientists. Further, the allegation by CBG that Messrs. Kathren and Hawley at Battelle PNL supplied "evasive" answers to interrogatories is not supportable upon reading these responses. The answers clearly state that some questions were not clear enough to be understood or that an exhaustive listing of every person at Argonaut licensees known by Mr. Kathren and Mr. Hawley was not attempted since many of the U.W. and other Argonaut reactor staff are acquaintances. [See: Hawley response A(4) and Kathren response B(4)].

The professional associations of the authors of the Battelle study raise no question of real conflict of interest or circumstances undermining an objective scientific investigation of Argonaut reactors. A conflict of interest must be a real one in that a significant benefit or adverse consequence must be at stake. Even if, as Intervenor alleges, all Argonauts were shut down by the Commission because of adverse safety findings, none of the three authors of this study would be so seriously affected that a question of bias could legitimately be raised. Although Professor Robkin uses the U.W. Argonaut for some of his classes, is Chairman of

the Radiation Safety Committee at U.W., and is a member of the Radiological Sciences Group, none of these positions indicate that his career is so dependent on the U.W. Argonaut that he would be tempted to risk his professional integrity as a respected scientist to produce a biased scientific study, especially since his work was reviewed by and performed in conjunction with Battelle employees and also reviewed by NRC Staff who supervised the work in progress and made the ultimate decision as to the technical acceptability of the entire accident analysis.

As to the allegation of apparent conflict of interest of Messrs. Hawley and Kathren, this charge is frivolous since the parttime teaching and study at the joint graduate study center at Richland, Washington (near the Battelle PNL) which obviously does not utilize the U.W. Argonaut reactor at Seattle and which would not be affected by the status of the U.W. Argonaut does not demonstrate any reason whatsoever to believe that two Battelle scientists would be less than objective in their research. The same is true of the Intervenor allegation that because the University of California operates the Los Alamos National Laboratory, a scientist employed there would be biased in analyzing heat transfer characteristics of Argonauts as was done by Mr. Cort. This, like the part-time association with the U.W. graduate center, is a remote and speculative reason to charge possible bias or conflict of interest. It is quite apparent that Mr. Cort (author of the LANL study) would be unaffected by the status of the UCLA Argonaut reactor and has no reason to risk his integrity for such a tenuous connection as working under direction of University of California (which has other (TRIGA) research reactors). As is known to the Board, the National Laboratories are owned by the U.S. Department of Energy (DOE) and operated under contract with scientific institutions.

The problem of organizational conflicts of interest has been a vital concern to the Government for many years.^{7/} The NRC is among several agencies required by law to promulgate formal rules establishing policies and procedures to insure that organizational conflicts of interest are avoided.^{8/}

The NRC receives contract assistance through two different mechanisms:

- 1) by commercial contracts issued through the Division of Contracts, and
- 2) by interagency task orders to the Department of Energy (DOE) issued by the program offices.^{9/} Task orders are actually performed by the contractors operating the National Laboratories and by their subcontractors.

The procedures utilized to avoid conflicts of interest in a commercial context are administered by the Division of Contracts with assistance by the Office of the Executive Legal Director (ELD) and the program offices as necessary. The procedures governing DOE work orders are part of

^{7/} Early studies of the subject include H.R. Rep. No. 1121, 86th Cong., 1st Sess. (1959) and S. Doc. No. 94, 87th Cong., 2d Sess. (1962) (The "Bell Report").

^{8/} NRC's present rule is found at 41 C.F.R. Part 20. This rule was promulgated under Section 170A of the Atomic Energy Act of 1954, as amended.

^{9/} A very small portion of outside assistance is acquired by agreements with agencies other than DOE. Although these actions are not formally covered by the regulations discussed here, they are subjected to the same type of analysis for conflicts of interest as are all other transactions. When NRC issues a work order to DOE, the DOE field office issues a task to its contractor under the master contract for operation of the national laboratory which is to perform the work.

Manual Chapter 1102 (Attachment 2, ¶ 1102-031(1), Exhibit 1, p. 5 and Exhibit 4, p. 4) and are administered by the program offices with assistance by ELD as needed. The policy considerations underlying both 41 C.F.R. Part 20 and Manual Chapter 1102 are identical; they differ only in the mechanics of implementation. The Contracting Officer solicits and evaluates the relevant information in the course of awarding and administering commercial contracts.^{10/}

The policy embodied in these rules is that contractors ought not to be placed in conflicting roles which might bias their judgment in relation to their work for NRC.^{11/} If the contractor is placed in a situation where it is forced to reconcile competing interests, an actual conflict of interest exists, regardless of how those interests may, in fact, be ultimately reconciled. When the business activities of a prospective contractor indicate the potential for a conflict of interest,^{12/} the NRC examines the relevant circumstances to see if they provide a realistic motivation for bias in performance of the contract work. If so, one of several paths may be followed: the prospective contractor may be

^{10/} The NRC program offices are sensitive to this issue and often indicate relevant lines of inquiry to the DOE operations office at the time a work order is issued or during the course of its execution.

^{11/} The rule also addresses avoidance of unfair competitive advantage. This issue concerns fairness to the business community rather than the reliability of contract work products.

^{12/} The term "potential conflict of interest" is used to signify those situations which merit investigation prior to contract award in order to ascertain whether award would give rise to an actual conflict or which must be reported to the contracting officer for investigation if they arise during contract performance.

excluded from competing for the contract; a waiver may be processed;^{13/} or other appropriate steps may be taken (such as modification of the proposed scope of work). The key to making the necessary judgment concerning the existence of a conflict of interest lies in a detailed analysis of all relevant facts to see if a realistic motivation for bias can be found. Motivations for bias which are remote or speculative are not a proper basis for action in this area.^{14/}

Once a contract is awarded, contract clauses require the contractor to advise the NRC of any other work the contractor is considering which might present a conflict of interest. The contractor is prohibited from undertaking such work until the NRC has examined the circumstances and decided either that no conflict exists or that a waiver is appropriate. The NRC may also bar the contractor from entering into other contracts if they would present a conflict of interest.

The mere fact that a company may work both for the NRC and a licensee is not, in itself, a conflict of interest. If a contractor provides advice in the same technical area or on the same matter to the NRC and to an organization regulated by the NRC, the potential for conflict of interest

^{13/} The conflict of interest rule recognizes that the existence of a conflict does not necessarily foreclose a contract. Provisions are made in the rule for "waiving" the conflict when such action "is in the best interest of the United States". 41 C.F.R. 20-1.5411. These provisions are statutorily authorized by Section 170A of the Atomic Energy Act of 1954, as amended. A document analogous to a waiver is processed for DOE work orders when circumstances indicate such action is appropriate.

^{14/} Columbia Research Corp., B-185843, July 1, 1976, 76-2 CPD ¶ 2.

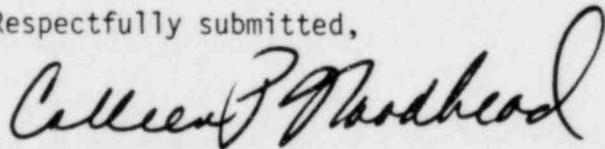
becomes greater and the circumstances must be examined more closely. If the work being done for the regulated party does not bear any necessary technical relationship to the work requested by the NRC, a conflict of interest does not result. In such cases it is acceptable for a contractor to support a licensee or applicant in one proceeding before the NRC and to support the NRC in a different proceeding because there is no risk that the information supplied to the NRC might be biased. These general principles are applied in all cases where the NRC receives contract assistance.

In sum, the Intervenor has stated no credible reason that the Board should reconsider its ruling in the Prehearing Conference Order nor has Intervenor pointed out any facts indicating an apparent conflict of interest nor any reason to question by further discovery a conflict of interest or bias by any of the authors of the Battelle study, or the LANL study.

IV. CONCLUSION

For the reasons stated above the Board should not reconsider the matters set out as CBG objections to the Board's Prehearing Conference Order of July 26, 1982.

Respectfully submitted,



Colleen P. Woodhead
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 23rd day of August, 1982.

Section II

The following interrogatories are to be answered by S.C. Hawley alone:

A(1). Please provide a current c.v. or resume and indicate in addition any other technical qualifications upon which you base your expertise as to the matters addressed in the report in question.

A(2). Are you now, or have you been within the last five years, an employee of any of the five current licensees of Argonaut reactors? If so, please indicate which licensee, which period of employment, and what your role was at that licensee. By licensee we mean not merely on staff of a particular reactor facility, but being a faculty member, researcher, consultant or other employee of the University or University system (e.g. Regents of the University of California) which held the license for the facility.

A(3) Do you now, or have you within the last five years, received a paycheck from any of the five current Argonaut reactor licensees? If so, please explain.

A(4) Do you have personal acquaintance with any of the current or past staff of the reactor facilities at any of the five Argonaut facilities? If so, please identify each such individual and describe the nature of the acquaintance.

A(5) What personal knowledge do you have regarding Argonaut reactors? Please be specific.

A(6) Have you ever been employed at an Argonaut reactor? If so, please give details.

A(7) Have you ever operated an Argonaut reactor? If so, please give date and details and identify the specific reactor(s).

A(8) Do you endorse the full content of the report you co-authored? If not, please identify each specific portion, aspect or sentence which you do not fully endorse, and explain why.

A(9) Do you have reservations about any aspect of the report? If so, please identify each specific portion, aspect, or sentence about which you have reservations, and explain the reservations.

A(10) Do you take the abstract and summary of the report at its beginning to accurately reflect the content of the report?

A(11) Do you have any reservation about the abstract and summary completely accurately reflecting the content of the report? If yes, please identify each aspect of the abstract or summary with which you take some issue and indicate what you feel would be a more accurate way of summarizing or abstracting the report.

A(12) We note that language throughout the report could readily be interpreted as saying that certain accident scenarios (other than the fuel handling incident) are potentially credible. Is it your view that accident scenarios other than the fuel handling accident are credible? If yes, please specify which. If no, please explain why.

A(13) If A(12) above was affirmatively answered, please indicate whether any of the accidents potentially credible could result in doses in excess of those postulated for the fuel handling accident.

A(14) We note also that throughout the report there are indications of destruct events which were consciously not considered or which more study was recommended or which your team stated firm analysis was outside of the scope of the present study. Do you believe that your team analyzed all credible destruct modes for Argonaut facilities?

A(15) Are there some destruct or accident modes that you think demand greater attention than you have been able to give them to accurately assess their credibility and/or consequences?

Part B

These interrogatories are to be answered by R.L. Kathren:

Please answer questions A(1) through (15) above, numbering your answers B(1) through B (15).

Part C

These interrogatories are to be answered by E.A. Robkin:

Please answer questions A(1) through (15) above, numbering your answers (C)(1) through C(15).

Please in addition answer the following questions:

C(16) We note that the report indicates you are an employee of the University of Washington, a licensee of an Argonaut reactor. We also note that you are employed by the Department of Nuclear Engineering at the University of Washington. Is the U of W Argonaut part of the Department of Nuclear Engineering?

C(17) Do you teach any courses which utilize the U of W Argonaut? If so, please specify which classes, what use the reactor is put to, and how many hours per year roughly of reactor time you so use.

C(18) Have you in the past taught any classes that use the reactor? Please give details.

C(19) Do you now, or have you in the past, used the U of W reactor for any research, neutron activation, or other non-teaching activity? If so, please detail with specificity the uses to which you have put the reactor, the research you have conducted with it, and roughly the hours of reactor use so involved.

C(20) Do you personally know any of the staff of the U of W Argonaut? If so, please detail all such acquaintances.

C(21) Do you have colleagues at the University of Washington who use the reactor for teaching or research or other activities? If possible, please identify colleagues who are principal users and the use put.

C(22) Do you now, or have you in the past, sat on any supervisory committee for the U of W reactor (reactor hazards committee, etc.)? If so, please detail said involvement.

C(23) Are you personally acquainted with any members of said supervisory committees; if so, in what capacity?

C(24) Were the University of Washington reactor shut down, would any of your research or teaching activities have to be modified or curtailed? If so, please specify what activities would have to be altered and how. If not, please specify precisely why no alteration would be needed.

C(25) Is the University of Washington reactor currently up for relicensing or will it be in the next three years?

C(26) Is the NRC at this time reviewing any application from the University of Washington regarding its reactor facility? If so, please specify.

RESPONSES TO CBG INTERROGATORIES

ID0-16285, Phillips Petroleum Co., NRTS, ARCO, Idaho) was not reported with error bars or assigned an uncertainty.

- ✓ A(1). A current resume and a statement of professional qualifications for S. C. Hawley are attached to this affidavit.
- A(2). I am not now, nor have I been within the last five years, an employee of any of the five current licensees of Argonaut reactors.
- A(3). I have not received, either now or within the last five years, a paycheck from any of the five current Argonaut reactor licensees.
- ✓ A(4). I have personal acquaintance with one current and one past staff of the University of Washington Argonaut reactor (Mr. P. Miller, professional acquaintance and Mr. W. E. Wilson, a former employer). However, I am unaware of both the specific background experience of all my acquaintances and the current and past staff of all five current Argonaut licensees. Therefore, if specific individuals are identified, I will try to describe the nature of my acquaintance with each.
- A(5). I have gained personal knowledge of the general configuration of Argonaut reactors through a visit to the University of Washington Argonaut reactor facility.
- A(6). I have never been employed at an Argonaut reactor.
- A(7). I have never operated an Argonaut reactor.
- A(8). While I did not personally perform all of the calculations or research used in this report, I have nonetheless reviewed the document and find nothing illogical or unreasonable. Thus, I endorse the report as written, with the errata dated July 21, 1981, and the correction of

the typographical errors on page 39, line 10, fifth word ("present," rather than "prevent") and on page 43, line 3, which should read "...Since the open..." rather than "... Since opening..." and on page 19, lines 13 and 16, which should read "...54°C..." rather than "...74°C...".

- A(9). I do not have any reservations about the report with the errata corrections.
- A(10). I believe the abstract and summary of the report (with errata corrections) reflect the content of the report.
- A(11). I do not have any reservations about the abstract and summary (with errata corrections) reflecting the content of the report.
- A(12). There are almost an infinite number of accident scenarios which some one could consider credible. However, the majority of these would require site specific conditions or be of less magnitude than the generic-type accidents illustrated in NUREG/CR-2079.
- A(13). Not applicable.
- A(14). I believe we did not analyze all destruct modes for Argonaut reactors because sabotage was specifically excluded.
- A(15). Based on the work performed to produce NUREG/CR-2079, the answer to this interrogatory is no.

SEAN C. HAWLEY
Professional Qualifications

My name is Sean C. Hawley. I am a research scientist employed by the Radiological Sciences Department at Battelle, Pacific Northwest Laboratory, Richland, Washington. I provide support to senior staff in external contacts with sponsors and technical experts and occasionally direct the activities of small groups. I occasionally interact directly with sponsors and scientists external to my group and usually publish as a junior author.

I received a Bachelor of Arts Degree in Chemistry from Reed College, Portland, Oregon in 1978. In addition, I have completed 10 credit hours of graduate level studies in Radiological Sciences at Washington State University and the University of Washington (Joint Center for Graduate Studies, Richland, Washington).

I have about eight years of experience working in areas related to research reactors. I received my first Senior Operator's Permit in 1973 for the Reed College Reactor Facility. I was employed there as a Senior Reactor Operator, Assistant Health Physicist, Reactor Supervisor and Training Supervisor. I received my second Senior Operator's Permit in 1979 for the Washington State University Reactor. I was employed there as Reactor Supervisor.

I am a member of the American Chemical Society, and the Columbia Chapter of the Health Physics Society.

SEAN C. HAWLEY, Research Scientist, Health Physics Technology Section,
Radiological Sciences Department

Education

B. A., Chemistry, Reed College
Washington State University
Joint Center for Graduate Studies
(University of Washington)

1978
1979-1980
1980-Present

Experience

Mr. Hawley has eight years of experience working with research reactors and one year of experience evaluating emergency preparedness at nuclear power plants.

- Reactor Operation and Supervision. Mr. Hawley received his first Senior Operator's Permit in 1973 for the Reed College Reactor Facility. In his six years there, he was a senior reactor operator, assistant health physicist, reactor supervisor, and training supervisor. In 1979, he received his second Senior Operator's Permit for the Washington State University reactor. As reactor supervisor, he was responsible for the safe operation and maintenance of the reactor, and also advised and instructed researchers in the methodology of neutron activation analysis.
- Accident Analysis and Emergency Preparedness. Since joining Battelle, Mr. Hawley has been analyzing credible accidents for research reactors and participating in emergency preparedness appraisals and exercise observations at nuclear power plants. He is also reviewing emergency plans for other NRC-licensed facilities.

Mr. Hawley is a member of the American Chemical Society and the Health Physics Society.

Publications

- Hawley, S. C., R. L. Kathren and M. A. Robkin. 1981. Analysis of Credible Accidents for Argonaut Reactors. NUREG/CR-2079, PNL-3691, Pacific Northwest Laboratory, Richland, Washington.
- Hawley, S. C., and R. L. Kathren. 1982. Credible Accident Analyses for TRIGA and TRIGA-Fueled Reactors. NUREG/CR-2387, PNL-4028, Pacific Northwest Laboratory, Richland, Washington.

statement of the section entitled "Core-Crushing Accident" was included to enable the consequences of such scenarios to be readily determined, if desired. Also note that the whole body dose equivalent should be 0.066 rem, rather than 2 rem, as noted in the errata to the report.

91. The x/Q value of 10^{-2} was selected as being the maximum credible value; the downwind distance at which this value might occur is site and time specific. The report assumed that this value to occur at the location of a downwind observer irrespective of the distance of that observer from the point of release.

SECTION II

- B(1). A current resume and statement of professional qualifications for R. L. Kathren are attached to this affidavit.
- B(2). Affiliate Assistant Professor of Radiological Sciences, University of Washington, Joint Center for Graduate Study, Richland, 1978 to date; Coordinator in Radiological Sciences, Joint Center for Graduate Study, Richland, 1980 to date. Have also given occasional lectures/seminars at the University of Washington, Seattle, in Radiological Sciences and Environmental Health classes and have taught continuing education classes through Joint Center for Graduate Study, Richland.
- ✓ B(3). See 3(2) above.
- ✓ B(4). My professional acquaintances and associations are many, and I am unaware of the specific background experience of each nor am I cognizant of the current or past staff of the five Argonaut facilities. Needless to say, I am acquainted with some members of the staff at the University of Washington Argonaut reactor. If specific names of interest are provided, I will endeavor to accurately identify the nature of my association with each.

B(5). I am not certain as to precisely what information is being requested, and request clarification of this question.

B(6). No.

B(7). No.

B(8). While I did not personally perform all of the calculations or research used in this report, I have nonetheless reviewed the document and find nothing illogical or unreasonable. Thus, I endorse the report as written, with the errata dated July 21, 1981, and the correction of the typographical errors on page 39, line 10, fifth word ("present," rather than "prevent") and on page 43, line 3, which should read "...Since the open..." rather than "... Since opening..." and on page 19, lines 13 and 16, which should read "...54°C..." rather than "...74°C...".

B(9). No.

B(10). Yes, with errata dated July 21, 1981.

B(11). No, but this seems redundant with regard to question 10.

B(12). The number of potentially credible accident scenarios is limitless; the report focuses on generic rather than specific accidents, and evaluates "worst case" credible accidents.

B(13). See B(12).

B(14). No.

B(15). No.

RONALD L. KATHREN
Professional Qualifications

My name is Ronald L. Kathren. I am Staff Scientist, Occupational and Environmental Protection Department of Battelle, Pacific Northwest Laboratory, Richland, Washington. In addition, I serve as Affiliate Assistant Professor of Radiological Sciences and Program Coordinator in Radiological Sciences at the Joint Center for Graduate Study in Richland Washington.

I was awarded the Bachelor of Science degree from the University of California, Los Angeles, in 1957, and the Master of Science from the University of Pittsburgh in 1962. In addition, I have taken extension coursework through the University of California, Berkeley, sporadically during the 1960's.

My professional experience includes two years as a health physicist at Mare Island Naval Shipyard (1959-1961) and five years at the Lawrence Radiation Laboratory at the University of California (1962-1967). In 1967, I joined Battelle-Northwest serving as section manager and senior research scientist largely working in the area of radiation dosimetry and instrumentation. For six years I served as corporate health physicist to Portland General Electric Company, rejoining Battelle in 1978.

I am a member of the Health Physics Society, having served on the Board of Directors of that organization, the American Association of Physicists in Medicine, American Association for Advancement of Science, American Academy of Environmental Engineers, and American Nuclear Society where I serve as a member of Executive Council of the Radiation Protection and Shielding Division. In 1966, I was certified by the American Board of Health Physics, and am now a member of that Board. I have been a licensed Senior Reactor Operator (TRIGA), and am a registered professional engineer in the State of California. I have also been a consultant to the USNRC with regard to the Three Mile Island Accident.

RONALD L. KATHREN, Staff Scientist, Occupational & Environmental Protection
Department

Education

B.S., University of California, Los Angeles	1957
M.S., University of Pittsburgh	1962
Additional Study, University of California, Berkeley, Extension	1960-1961 1962-1964

Experience

Mr. Kathren has more than 20 years of broad experience in health physics and related areas. He originally joined Battelle-Northwest in 1967, serving first as a section manager and then as senior research scientist with responsibilities in the areas of radiological calibration and standardization, instrumentation, and radiation dosimetry. Following six years as corporate health physicist to Portland General Electric Company, he rejoined Battelle-Northwest in 1978 as staff scientist with broad responsibilities in the areas of health physics, dosimetry, and reactor safety. His other special interests include education and training and the historical aspects of radiation protection.

His prior experience five years as a health physicist at Lawrence Livermore Laboratory of the University of California, where he was involved in a variety of applied health physics research activities, and two years as supervisory health physicist at Mare Island Naval Shipyard where he was responsible for the dosimetry program and environmental monitoring.

Mr. Kathren is a member of the faculty of the University of Washington at the Joint Center for Graduate Study, and also served on the adjunct faculty of Oregon State University. From 1973-1978, he served as health physicist to Reed College. In 1977 he received the Elda Anderson Award for outstanding contributions to the science and art of health physics and has been elected to the American Academy of Environmental Engineers. He is certified by the American Board of Health Physics, and as a registered professional engineer. Mr. Kathren is an active member of the Health Physics Society, American Nuclear Society, American Association for Advancement of Science, and American Association of Physicists in Medicine.

Publications

Mr. Kathren has authored or coauthored more than 50 scientific journal articles and book chapters, the book Health Physics: A Backward Glance, many technical reports, several miscellaneous popular articles, and three curriculum texts for technicians, Nuclear Safety, Reactor Physics, and Radiation Detection and Measurements. He has been an editor of the scientific

Journal, Health Physics and is currently a member of the advisory panel to the Handbook of Radiation Protection and Measurement.

Professional Associations

Health Physics Society - Board of Directors (1973-1976); President, Columbia Chapter (1971); Chairman, History Committee (1969-1974); Chairman, Subcommittee on Health Physics Technicians (1968-1970); Member, Ad Hoc Committee on X-Ray Protocol (1973-1975); Society Historian (1974-____)

American Association on Physicists in Medicine--1962

American Association for Advancement of Science--1962

American Nuclear Society--1972; Divisional Executive Committee--(1980-1983)

Oregon Academy of Science--1972-1978 (Executive Council 1976-1977).

Licenses and Certifications

Certified Health Physicist, American Board of Health Physics--1966

Licensed Professional Engineer, California--1975

Senior Reactor Operator, USNRC (TRIGA MK I)--1977-1981

Diplomate, American Academy of Environmental Engineers--1978

Awards and Honors

Elda E. Anderson Award--1977

U.S. Public Health Service Fellow (Radiological Health), University of Pittsburgh (1961-1962)

U.S. Delegate, Second, Third, and Fifth International Congress on Radiation Protection--1970, 1973, and 1980

Academic Appointments

Instructor in Radiation Technology, Chabot College (California)--1966-1967;
Columbia Basin College--1967-1968

Lecturer, Joint Center for Graduate Study, University of Washington--1971-1972

Adjunct Professor, Oregon State Division of Continuing Education--1973-1978

Health Physicist, Reed College--1973-1978

Affiliate Assistant Professor, University of Washington, Joint Center for Graduate Study--1978; Coordinator, Radiological Sciences, 1980-____

Professional Activities

American Board of Health Physics, 1982-____; Member of Panel of Examiners--1978-1981

Editor, Health Physics--1976-1980

Abstractor, Chemical Abstracts--1962-1978

Oregon Radiation Advisory Committee--1977-1978

Member, Joint Subcommittee N13/42--1968-1980; American National Standards Institute N41--1971-____

Portland Chamber of Commerce, Environmental Standards Committee--1972;
Chairman, Subcommittee of Noise--1975-1978; Energy Committee--1974-1979.

Oregon Department of Environmental Quality, Commercial and Industrial Noise Advisory Committee--1974

U.S. Atomic Energy Commission, Traineeship Advisory Committee--1973-1974

Member, National Advisory Committee on Nuclear Technicians, Technical Education Research Center--1975-1980

Radiation Technology Advisory Committee, Columbia Basin College--1967-1968

Member, Special Panel on Three Mile Island Unit 2 Radiation Protection Program, U.S. Nuclear Regulatory Commission--1979

Consultant, Nuclear Regulatory Commission Special Inquiry Group (Rogovin Commission), Three Mile Island--1979

Consultant, Advisory Committee on Reactor Safeguards--1979-____

U.S. Expert, International Atomic Energy Agency, Regional Conference on Radiological and Environmental Protection in Nuclear Facilities, Caracas--1977

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 fo Facility License)

AFFIDAVIT OF MAURICE A. ROBKIN

I, Maurice A. Robkin, do depose and state:

- C1) I am a Professor of Nuclear Engineering and a Professor of Environmental Health on the faculty of the University of Washington (U.W.), Seattle, Washington. A statement of my professional qualifications is attached to this affidavit.
- C2) I am now an employee of the U.W. which holds a license to operate an Argonaut research reactor. I have been on the faculty since 1967 in the Department of Nuclear Engineering. The Argonaut reactor is operated by the Department of Nuclear Engineering. I have not been part of the operating staff of the reactor.
- C3) I am currently on the faculty of the U.W. and am payed by the University.
- C4) I have acquaintance with the staff of the U.W. reactor. I have known all of the staff since we are in the same Department and since I have taught classes which utilized the reactor. These staff members include Mr. W.P. Miller, Associate Director for Reactor Operations; Mr. DeLoss L. Fry, Assistant Director for Facilities Engineering; Mr. Astor G. Rask, Chief Electronics Engineer; and Professor W.S. Chalk, Director of the Nuclear Reactor Laboratory. In each case, the relationship has been a professional one.
- C5) My knowledge of the Argonaut reactor includes its configuration, fuel, operation, flux levels, kinds of experiments performed and its use as a research and teaching tool.
- C6) I have never been directly employed at an Argonaut reactor. My employment at an Argonaut licensee is as described in C1 through C4.
- C7) I have never operated an Argonaut reactor.
- C8) I served as a consultant to Battelle and submitted a report for the "Graphite Fire" section. My report was edited somewhat, but,

except for residual typographical errors, I endorse that section for the combination of the report and the typographical error errata sheet. There are residual typographical errors on page 39, line 9 (for "prevent" read "present") and page 43, line 3 (for "opening" read "the open"). While I did not personally perform or verify the calculations used for other sections of this report, I have reviewed the document and find nothing implausible or unreasonable.

C9) As discussed in C8, I did not find anything implausible or unreasonable in any part of the report.

C10) The abstract and summary are reasonable representation of the content of the report.

C11) In my opinion, the abstract and summary are reasonable representations of the content of the report.

C12) Those accidents described in the report which lead to a graphite fire are credible in the sense that they do not require any unusual physical phenomena to occur. They depend on equipment malfunction or human error, both of which are credible. Similarly, with respect to other accidents, they are physically possible but, barring overt sabotage, I consider them to be unlikely.

C13) I did not evaluate the dose which might accrue to any person or persons as the result of a graphite fire. My assignment specifically excluded dosimetry.

C14) I analyzed as many credible scenarios leading to a graphite fire as I could think of, given the limitations of time and effort. There is always the possibility that someone else could think of another credible scenario. I believe that I have discussed a complete set of credible scenarios for which any specific scenario omitted would be merely a particular alternate case which would not materially alter any conclusions reached. For accidents other than those leading to a graphite fire, I was not able to postulate a credible potentially destructive accident mode which was not considered by the other authors.

C15) A probabilistic analysis of the scenarios was outside the scope of the work. Thus, ranking the scenarios leading to a graphite fire as to their relative credibility was not done. In order to evaluate the relative credibility would require additional effort. Non of the scenarios which I analyzed, in my opinion, can plausibly lead to a graphite fire of such magnitude and duration as to result in fuel melting and dispersion of significant amounts of radioactivity. Thus, it does not appear to be necessary to give them any attention beyond that which has already been given.

MAURICE A. ROBKIN
Professional Qualifications

My name is Maurice A. Robkin. I am Professor of Environmental Health, Professor of Nuclear Engineering, Member of the Radiological Sciences Group and Chairman of the Radiation Safety Committee at the University of Washington, Seattle, Washington.

I received a Bachelor of Science degree in Physics in 1953 from Caltech, a certificate in Reactor Technology in 1954 from the Oak Ridge School of Reactor Technology and a Ph.D. in Nuclear Engineering in 1961 from M.I.T.

From 1954 to 1956, I worked at the Bettis Atomic Power Laboratory in the area of reactor shielding. From 1961 to 1967, I worked at the Vallecitos Atomic Laboratory of the General Electric Company in the area of reactor physics. Since 1967, I have been on the faculty of the University of Washington in the Department of Nuclear Engineering. In 1981, I received a joint appointment to the Department of Environmental Health.

I am a member of the American Nuclear Society, the Health Physics Society, the Radiation Research Society, The American Association for the Advancement of Science, Sigma Xi, and the New York Academy of Sciences. I am a consultant to industry in the area of nuclear technology and I am a Licensed Professional Engineer (Nuclear) in the State of Washington.

Form NRC-489
(1-76)U. S. NUCLEAR REGULATORY COMMISSION
NRC MANUAL
TRANSMITTAL NOTICECHAPTER NRC-1102 PROCEDURE FOR PLACEMENT OF WORK
WITH THE DEPARTMENT OF ENERGY

SUPERSEDED:

	Number	Date
Chapter	_____	_____
Page	_____	_____
	_____	_____
	_____	_____
Appendix	_____	_____

NRC Bulletin 1102-6 2/24/78

TRANSMITTED:

	Number	Date
TN	1100-6	_____
Chapter	NRC-1102	10/2/79
Page	_____	_____
	_____	_____
	_____	_____
Appendix	_____	_____

REMARKS:

The present Bulletin 1102 is revised to clarify several administrative areas where questions have resulted since February 1978. This was based on both NRC and DOE suggestions. Additionally, the format was revised to standard manual chapter style.

Planning and mutual notification requirements are expanded to support both long range planning and specific project or task action. This includes early notification of future year plans as well as more detailed cost and schedule estimates, and adds requirement for notification when funding reaches the 90% level or is expected to result in any overrun or short funding situation. Cost detail reporting is expanded.

The internal coordination process within NRC is revised to insure that all program offices concur in each project prior to submittal to a DOE laboratory. This review will include the NRC Form 173, the statement of work, and the proposal forwarded to the sponsoring office.

A method is included for immediately starting work on urgent projects, such as TMI support, prior to formal documentation of all steps.

An added statement clarifies the applicability of the 1102 procedure to DOE GOGO's as well as GOCO laboratories.

Technical reporting requirements are expanded to include a requirement for preparation of an abstract and executive summary. Procedures for reports approval prior to publication, handling, printing, and distribution are expanded, clarified, and standardized. The use of the NRC Form 426A is added.

9. Forecasts:

- a. Milestone Chart for accomplishing the work.
- b. Planned monthly rate of costs for first fiscal year. This may be provided with the first report of an authorized program if not known at time of proposal submittal. At the beginning of each subsequent year, reports should include the planned monthly rate of costs for the ensuing year.

10. Conflict of Interest:

In order to assist the Commission in its evaluation, the DOE Contracting Officer shall describe any significant contractual and organizational relationships of the DOE, its contractor, their employees, or expected subcontractors or consultants on this proposal, with industries regulated by the NRC (e.g. utilities, etc.) and suppliers thereof (e.g. architect engineers and reactor manufacturers, etc.) that might give rise to an apparent or actual conflict of interest.

shall be submitted in writing to the DOE Contracting Officer (where the DOE performing organization is a DOE contractor) or the DOE Facility Manager (where the DOE performing organization is a DOE facility) for approval of the acceptance of the proprietary information, and for reaching agreement with the Commission on the limitations, conditions and terms under which the information may be used by the performing organization.

For DOE contractor employees used as NRC consultants, proprietary or other privileged information may be provided by NRC on an individual basis with the understanding that it will be protected from disclosure and will be returned to NRC upon completion of the task.

5. Work for Others

Notwithstanding any other provision of the work order, the DOE Contracting Officer and DOE contractor agree that placement of this work does not give rise to any actual or apparent conflict of interest from either agency's viewpoint. They further agree that during the period of performance, the contractor will forego entering into any new contractual arrangement which could give rise to a conflict of interest. The performing organization shall ensure that all employees designated as key personnel, if any, under the work order abide by the provisions of this clause. The DOE organizational conflict of interest provisions will be used as a guide in making such determinations. If in the DOE Contracting Officer's view, any proposed contractual arrangement creates a possibility for conflict of interest, he shall notify the issuing NRC office and obtain their written approval prior to the execution of the associated contract.

6. Subcontracting

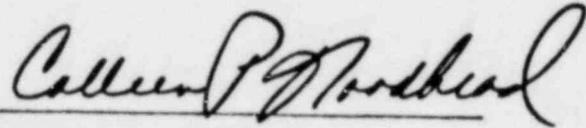
The DOE organization shall notify the issuing office reasonably in advance of entering into any major or significant technical service subcontract not contained in the original proposal. "Major or significant" must be used with judgement and related to the total value of the project and/or impact on the results. This advance notification will include:

- (a) A description of services to be called for by the subcontract,
- (b) Identification of the proposed subcontractor,
- (c) The proposed subcontract costs, and
- (d) A statement that the proposed subcontract will not result in a real or apparent conflict of interest situation. If the NRC program office requires additional specific subcontractor

Atomic Safety and Licensing Appeal
Panel (5)*
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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

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Sarah J. Shirley
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Colleen P. Woodhead
Counsel for NRC Staff