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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
GEORGIA INSTITUTE)
OF TECHNOLOGY)
)
(Georgia Tech Research Reactor))
)
(Renewal of License No. R-97))

Docket No. 50-160-Ren

NRC STAFF (PANEL B) TESTIMONY OF
CRAIG H. BASSETT, EDWARD J. McALPINE
AND MARVIN M. MENDONCA, CONCERNING
GANE CONTENTION 9 (MANAGEMENT)

Q1. Please state your names, occupations and by whom you are employed.

A1(a). (CHB) My name is Craig H. Bassett. I am employed by the U.S. Nuclear Regulatory Commission as a Senior Radiation Specialist in the Fuel Facilities Branch, Division of Nuclear Materials Safety, NRC Region II. A statement of my professional qualifications is attached hereto.

A1(b). (EJM) My name is Edward J. McAlpine. I am employed by the U.S. Nuclear Regulatory Commission as Chief of the Fuel Facilities Branch, Nuclear Materials Safety Division, NRC Region II. A statement of my professional qualifications is attached hereto.

A1(c). (MMM) My name is Marvin M. Mendonca. I am employed as a Senior Project Manager in the Non-Power Reactors and Decommissioning Project

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Directorate, Division of Reactor Program Management, Office of Nuclear Reactor Regulation (NRR), U.S. Nuclear Regulatory Commission. A statement of my professional qualifications is attached hereto.

Q2. Please describe your current responsibilities.

A2(a). (CHB) I currently serve as an NRC radiation protection inspector and project inspector for research reactors and fuel facilities in NRC Region II.

A2(b). (EJM) As Chief of the Fuel Facilities Branch, I am responsible for supervising the implementation of the inspection program for research reactors, fuel facilities, and independent spent fuel storage installations in NRC Region II.

A2(c). (MMM) I currently serve as the NRC Staff's project manager for approximately 18 research reactors, including the Georgia Tech Research Reactor (GTRR) operated by the Georgia Institute of Technology ("Georgia Tech" or the Licensee"). As part of my duties, I am responsible for conducting and coordinating the Office of Nuclear Reactor Regulation's review of reactor licensing, inspection and enforcement issues in connection with the NRC licenses held by these 18 research reactor facilities, located in various NRC Regions. Additionally, I am responsible for coordinating the NRC Staff's actions concerning two deferred nuclear power plants.

Q3. Please explain what your duties have been in connection with the NRC Staff's inspection and oversight of the management and operation of the Georgia Tech Research Reactor (GTRR).

A3(a). (CHB) I was assigned to be the Project Inspector for the GTRR in 1989, and have served in this position until the present. In this position, I have served as the NRC Staff's principal inspector of the GTRR facility, and have been responsible for coordinating NRC Region II's inspection and enforcement efforts concerning the GTRR facility. As part of my duties, I am currently responsible for inspecting the GTRR's radiation protection program and tracking the NRC Staff's inspection and enforcement efforts to determine if the Licensee is in compliance with NRC regulations and license requirements.

A3(b). (EJM) I became familiar with inspection and enforcement issues related to GTRR initially through my responsibilities as Chief of the Radiation Safety Projects Section, in which capacity I served from August 8, 1989, until October 15, 1995, when I assumed the position of Chief, Fuel Facilities Branch. In both of these positions, I have been responsible for management of the inspection program for research reactors and fuel facilities. As part of my duties, I have been responsible for assuring that licensed facilities maintain safety programs which are adequate to protect the public and workers' health and safety, recommending enforcement action when violations are identified, and assuring that prompt and effective corrective action is taken by licensees to assure the continued protection of the public health and safety.

A3(c). (MMM) I have been an NRC project manager for research reactors since June 1990. From June 1990 to December 1991, I was the backup project manager for GTRR and during about three months of this period I was acting project manager for GTRR. I have been the project manager for the GTRR since December 1991. In this

position, I have become familiar with, and have been responsible for conducting and coordinating the NRC Staff's review of matters related to the application submitted by the Georgia Institute of Technology ("Georgia Tech" or "the Licensee") to renew its license to operate the GTRR. Additionally, my duties as project manager include the review of all GTRR applications for NRC license and Technical Specification (TS) amendments, and all inspection reports and enforcement actions concerning the GTRR. I have also participated in certain inspection activities, including management meetings, related to the GTRR; and I have administered an examination of GTRR's candidates for NRC reactor operator licenses. As part of my duties, I also reviewed and participated in the NRR review of two relatively recent license amendments (Amendments 10 and 11) regarding the GTRR's management and organization.

Q4. What is the purpose of this testimony?

A4. (All) The purpose of this testimony is to describe the Licensee's NRC inspection and enforcement history following the NRC Staff's authorization for restart of the GTRR facility in November 1988, and to provide the NRC Staff's views concerning the adequacy of Georgia Tech's management of the facility since that time, based upon this inspection and enforcement history.

Q5. Have you reviewed the assertions made by Georgians Against Nuclear Energy (GANE) in Contention 9?

A5. (All) Yes. As we understand the contention, GANE asserts that the Licensee's management is inadequate to provide reasonable assurance of the continued protection of the public health and safety, for the following reasons, set forth in GANE Contention 9:

Safety concerns at the Georgia Tech reactor are the sole responsibility of Dr. R. A. Karam. Dr. Karam is the director who withheld information about a serious accident from the NRC (1987 cadmium-115 accident). The NRC was advised of the 1987 cadmium-115 accident by the safety officer at that time, who was later demoted, and left the GTRR operation claiming harassment. Since the incident, management has been restructured giving the director (Dr. Karam) increased authority, including increased authority over the Manager of the Office of Radiation Safety. Although the safety officer has line to higher-ups than the director, since he/she works for the director on a day-to-day basis, the threat of reprisal would be a huge disincentive to defying the director. The Nuclear Safeguards Committee which has theoretical oversight of the GTRR operations has a distinct flaw in having no concern with health issues. The Office of Radiation Safety Manager is sought for its knowledge of law more than its knowledge of health physics.

In partial support of these assertions, GANE refers to a number of NRC Staff inspection reports and the Licensee's NRC enforcement history, among other materials.

Q6. Do you agree with GANE's view that the Licensee's management of the GTRR facility is inadequate to provide reasonable assurance of the continued protection of the public health and safety?

A6. (All) No.

Q7. Please explain the bases for your conclusion in this regard.

A7. (All) This conclusion is based upon our knowledge of (a) the NRC Staff's inspection and enforcement efforts in the period following the NRC's November 1988 authorization for the Licensee to restart operation of the GTRR, (b) our knowledge of the actions taken by the Licensee to comply with the requirements imposed by the NRC in connection with the January and March 1988 enforcement Orders to stop experiments and cease operations and the NRC's November 1988 authorization to restart, and (c) our knowledge of pertinent regulatory actions and other matters (including licensing actions in part described in the NRC Staff's Panel C testimony in this proceeding) related to the Licensee's management of its facility in the period following restart.

Q8. Are you familiar with the events which led to the NRC's issuance of two Orders, in 1988, requiring a cessation of experiments and a shutdown of the GTRR, and the events and facts which led to the NRC's November 1988 authorization for restart?

A8. (All) Yes.

Q9. Please provide a summary of your views concerning the adequacy of the Licensee's management of the GTRR, based upon your knowledge of the NRC Staff's inspection and licensing efforts during this period.

A9. (All) In the period following the November 1988 authorization of restart, we have found that the cooperation between and functioning of the radiation

safety and operations groups has improved considerably from their descriptions by other NRC personnel who were involved with GTRR in 1988. The functioning of the radiation safety and operations organizations in this regard has been acceptable. Further, based upon our inspection and review of the Licensee's management and organizational structure, we have concluded that the Licensee's management of the GTRR since November 1988 has complied with NRC regulatory requirements (*i.e.*, regulations, license requirements and technical specifications), and accepted standards for research reactor licensees (described in the NRC Staff's Panel C testimony in this proceeding). Based on our inspections of the facility and our reviews of these matters, we have concluded that the corrective actions taken and other improvements made by the Licensee acceptably resolved the Licensee's previous management and organizational problems. Accordingly, we have concluded that the present organization and management of the GTRR provides reasonable assurance that the public health and safety, as well as the health and safety of GTRR employees, will be protected in the event that license renewal is authorized.

Q10. Please explain the NRC Staff's inspection program for non-power reactors, including the GTRR, pursuant to which NRC inspections of the GTRR were conducted.

A10. (All) The NRC inspection program for non-power reactors is conducted in accordance with the guidance of NRC Inspection Manual Chapter 2/45, Research and Test Reactor Inspection Program - Operations Phase, and the inspection procedures

safety and operations groups has improved considerably from their descriptions by other NRC personnel who were involved with GTRR in 1988. The functioning of the radiation safety and operations organizations in this regard has been acceptable. Further, based upon our inspection and review of the Licensee's management and organizational structure, we have concluded that the Licensee's management of the GTRR since November 1988 has complied with NRC regulatory requirements (*i.e.*, regulations, license requirements and technical specifications), and accepted standards for research reactor licensees (described in the NRC Staff's Panel C testimony in this proceeding). Based on our inspections of the facility and our reviews of these matters, we have concluded that the corrective actions taken and other improvements made by the Licensee acceptably resolved the Licensee's previous management and organizational problems. Accordingly, we have concluded that the present organization and management of the GTRR provides reasonable assurance that the public health and safety, as well as the health and safety of GTRR employees, will be protected in the event that license renewal is authorized.

Q10. Please explain the NRC Staff's inspection program for non-power reactors, including the GTRR, pursuant to which NRC inspections of the GTRR were conducted.

A10. (All) The NRC inspection program for non-power reactors is conducted in accordance with the guidance of NRC Inspection Manual Chapter 2545, Research and Test Reactor Inspection Program - Operations Phase, and the inspection procedures

outlined therein. The inspection frequency is based upon the non-power reactor's authorized power level and its operational status. Class I reactors are those licensed to operate at a power level of 2 megawatts (MW) or greater; Class II reactors are those licensed to operate at a power level less than 2 MW. The GTRR is authorized to operate at a power level up to 5 MW, and is therefore a Class I facility.

In NRC Region II, typically four routine inspections are performed each year at Class I non-power reactor facilities; in contrast, only two inspections are typically performed each year at a Class II facility. The number of inspections at a particular facility might vary (*i.e.*, there be more inspections than the typical number per year) because of unplanned events occurring at the facility. If the NRC determines that an event or a series of events demands immediate or increased attention, additional inspections (*e.g.*, a reactive inspection) would be performed.

The routine inspections conducted at Class I facilities, including the inspections conducted at the GTRR, are usually performed by four different inspectors, based upon their expertise in particular areas. Some of the subjects or areas of emphasis reviewed during a routine inspection at a facility, using the inspection procedures (Ips) mentioned in Manual Chapter 2545, include:

1. Reactor Operations

- IP 39745 - Class I Non-Power Reactors Organization and Operations and Maintenance Activities
- IP 40745 - Class I Non-Power Reactors Review and Audit and Design Change Functions

- IP 41745 - Class I Non-Power Reactor Operator Licenses, Requalification, and Medical Activities
- IP 42745 - Class I Non-Power Reactor Procedures
- IP 60745 - Class I Non-Power Reactor Fuel Movement
- IP 61745 - Class I Non-Power Reactor Surveillance
- IP 69745 - Class I Non-Power Reactor Experiments

2. Safeguards and Security

- IP 81401 - Plans, Procedures, and Reviews
- IP 81402 - Reports of Safeguards Events
- IP 81403 - Receipt of New Fuel at Reactor Facilities
- IP 81421 - Fixed Site Physical Protection of Special Nuclear Material of Moderate Strategic Significance
- IP 85102 - Material Control and Accounting

3. Emergency Preparedness

- IP 82745 - Class I Non-Power Reactor Emergency Plan

4. Health Physics

- IP 80745 - Class I Non-Power Reactor Effluent and Environmental Monitoring
- IP 83743 - Class I Non-Power Reactors Radiation Protection
- IP 86740 - Transportation Activities

Q11. Please provide a summary of the NRC Staff's inspection efforts in the period following the November 1988 authorization for restart, and your conclusions concerning the adequacy of the Licensee's management and organization based on the NRC Staff's inspection and enforcement efforts in this period.

A11. (All) In the period following the November 1988 authorization of restart, NRC inspections at the GTRR reviewed numerous aspects of the Licensee's operation and management of the facility, in accordance with established NRC inspection procedures as described above. The areas inspected have included the organization and the review and audit functions of the Licensee (including the Nuclear Safeguards Committee), as well as other functional areas established under the NRC's inspection program such as operational and maintenance activities, design change functions, operator licenses, requalification and medical activities, procedures, fuel movement, surveillance, experiments, effluent and environmental monitoring, emergency preparedness, radiation protection, and safeguards and security. The specific inspection findings for the GTRR are documented in the NRC inspection reports issued and associated enforcement actions taken in the period following the NRC's decision to allow a restart of the GTRR.

From January 1989 through April 1996, the NRC Staff performed a total of 31 inspections at the GTRR facility. Since January 1, 1989, 18 inspections found no violations; in 13 inspections, however, a total of 17 cited violations (Severity Levels IV and V) and seven non-cited violations (NCVs) were found and documented. The Inspection Reports which documented violations are discussed below. The significance of these violations and NCVs, considered individually, is discussed below in response to

Question 13; the collective significance of these violations and NCVs is discussed below in response to Question 15.

Q12. Please explain what is meant by the terms "Severity Level" and "non-cited violation" ("NCV").

A12. (All) Until June 30, 1995, NRC Enforcement Policy categorized violations in Severity Levels I through V. After June 30, 1995, NRC Enforcement Policy categorized violations in Severity Levels I through IV (*i.e.*, Severity Level V violations are not longer routinely issued by the NRC). The January 1995 revision of 10 C.F.R. Part 2, Appendix C, "General Statement of Policy and Procedure for NRC Enforcement Actions," Section IV describes "Severity of Violations" as follows:

Severity Level I and II violations are of very significant regulatory concern. In general, violations that are included in these severity categories involve actual or high potential impact on the public. Severity Level III violations are cause for significant regulatory concern. Severity Level IV violations are less serious but are of more than minor concern; *i.e.*, if left uncorrected, they could lead to a more serious concern. Severity Level V violations are of minor safety or environmental concern.

With respect to non-cited violations (NCVs), the NRC's current Enforcement Policy affords discretion for the NRC to treat as an NCV a violation that has not been formalized in a Notice of Violation. An explanation of the most common type of NCV (a self-identified violation) under the current Enforcement Policy is provided as follows:

1. Licensee-Identified Severity Level IV Violations.

The NRC, with the approval of the Regional Administrator or his designee, may refrain from issuing a Notice of Violation for a Severity Level IV violation that is documented in an inspection report . . . and described therein as a Non-Cited Violation (NCV) provided that the inspection report includes a brief description of the corrective action and that the violation meets all of the following criteria:

(a) It was identified by the licensee, including identification through an event;

(b) It was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation or a previous licensee finding that occurred within the past 2 years of the inspection at issue, or the period within the last two inspections, whichever is longer;

(c) It was or will be corrected within a reasonable time, by specific corrective action committed to by the licensee by the end of the inspection, including immediate corrective action and comprehensive corrective action to prevent recurrence;

(d) It was not a willful violation[,] or if it was a willful violation;

(i) The information concerning the violation, if not required to be reported, was promptly provided to appropriate NRC personnel, such as a resident inspector or regional section or branch chief;

(ii) The violation involved the acts of a low-level individual (and not a licensee official as defined in Section IV.C);

(iii) The violation appears to be the isolated action of the employee without management involvement and the violation was not caused by lack of management oversight as evidenced by either a

history of isolated willful violations or a lack of adequate audits or supervision of employees; and

(iv) Significant remedial action commensurate with the circumstances was taken by the licensee such that it demonstrated the seriousness of the violation to other employees and contractors, thereby creating a deterrent effect within the licensee's organization. Although removal of the employee from licensed activities is not necessarily required, substantial disciplinary action is expected.

NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions," 60 Fed. Reg. 34380, 34393 (June 30, 1995). It should be noted that prior to June 30, 1995, NCVs could also include Severity Level V Violations. The Enforcement Policy in effect at that time stated:

The NRC may refrain from issuing a Notice of Violation for a Severity Level V violation that is documented in an inspection report (or official field notes for some material cases) provided that the inspection report includes a brief description of the corrective action and that the violation meets all of the following criteria:

(a) It was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation or a previous licensee finding that occurred within the past two years of the inspection at issue, or the period within the last two inspections, whichever is longer;

(b) It was or will be corrected within a reasonable time, by specific corrective action committed to by the licensee by the end of the inspection, including immediate corrective action and comprehensive corrective action to prevent recurrence;

(c) It was not a willful violation.

Q13. Please provide a summary of the violations and NCVs identified in the NRC Staff's inspection reports during the period from 1989 to the present.

A13. (All) Violations and NCVs issued for the GTRR from 1989 to the present are listed below, along with a description of the actions taken by the Licensee to correct the problem and the NRC Staff's inspections that reviewed the Licensee's actions and closed out the issues:

1. Inspection Report 89-02

An operations inspection was conducted during July 31-August 3 and August 9, 1989, and was documented in Inspection Report (IR) 89-02. Two violations (both Severity Level IV) were identified:

- a. failure to perform leak-rate testing in accordance with commitments, and
- b. inadequate procedure to assure that any shim blade not fully inserted was withdrawn sufficiently to cause a negative trip when released into the core (a previous Unresolved Issue was upgraded to a violation).

The Licensee corrected the first issue by revising Procedure 4000, Containment Building Pressure Test, and developing Procedure 4002, Reference Vessel Pressure Test. The tests completed in April 1990 were reviewed by an NRC inspector during the week of June 26, 1990, and were found to be acceptable as documented in IR 90-03. The Licensee addressed the second issue by developing and implementing Procedure 7247, Determination of Minimum Shim-Safety Blade Angle to Generate a Negative Rate Trip. An NRC inspector reviewed this procedure and found that the measurements required by the procedure were made satisfactorily. However, the Licensee had failed to develop a

procedure to enforce the Technical Specification requirement of sufficient shim blade withdrawal prior to criticality. The Licensee subsequently corrected this matter by a revision to GTRR Procedure 2002, Reactor Operation, to include a requirement that each shim-safety blade be positioned at or above the minimum angle to generate a negative period trip should it fall freely into the core. This was documented in IR 92-01.

2. Inspection Report 89-05

A security inspection was conducted during September 14-15, 18-19 and 27, 1989, as documented in IR 89-05. The following six violations (all Severity Level IV) were identified:

- a. failure to maintain assessment equipment in operable condition and failure to properly position assessment equipment (two examples),
- b. failure to secure a controlled access barrier,
- c. failure to maintain the alarm system in operable condition,
- d. failure to change keys as committed,
- e. failure to control keys as committed, and
- f. failure to establish and maintain a safeguards event log.

The Licensee provided NRC Region II with a letter dated September 28, 1989, which identified actions the Licensee was voluntarily taking to enhance its security program and to correct noted violations. The Licensee committed to take the following actions:

- a. replace the assessment equipment or parts thereof that were not functioning properly,

- b. lock out the means of possible entrance to the containment building from the outside,
- c. perform an in-depth audit of the security plan,
- d. audit all keys and cards issued to Neely Nuclear Research Center (NNRC) personnel,
- e. develop a procedure for key control,
- f. develop a procedure for routine testing of the security system and emergency power source,
- g. revise the security plan by March 1, 1990,
- h. establish a safeguards event log, and
- i. assign responsibility for the security system to the Manager of Reactor Operations.

In addition, on November 16, 1989, the Licensee responded to the Notice of Violation (NOV) and outlined actions that had been or would be taken to correct the problems identified. The Licensee installed new equipment to address the first violation cited. The controlled access barrier was locked in place to address the second violation. In response to the violations concerning key changes and control, a new procedure was written to provide guidance and the requirements for changing and controlling the keys. The Licensee began keeping a safeguards events log on September 28, 1989. However, the Licensee denied the violations concerning failure to maintain the alarm system in operable condition and failure to control keys as committed. In a letter issued January 8, 1990, the NRC Staff concluded that the violations occurred as stated.

On January 22, 1990, the facility Project Inspector (Craig Bassett), the Section Chief for the Radiation Safety Projects Section (Edward McAlpine), and the Safeguards

Inspector who performed the September 1989, safeguards inspection met with GTRR management. The issues noted in the inspection report were again discussed and clarified and NRC personnel then toured the facility and observed the changes that the Licensee had made to the security system. The Licensee's corrective actions were found acceptable as documented in IR 91-01.

3. Inspection Report 90-02

A health physics (HP) inspection was performed during June 12-14, 1990, and was documented in IR 90-02. One violation (Severity Level IV) and one non-cited violation were identified:

- a. failure to maintain a high radiation area locked as required in 10 C.F.R. 20.203(c)(2), and
- b. failure to perform a personal survey at the exit to a controlled area. (This was the non-cited violation.)

The Licensee corrected the first issue identified above by revising Procedure 9310, Posting of Radiological Control Areas and Materials, to clarify the requirement for positive control over a high radiation area (HRA). The incident was verbally reviewed by the Manager of the Office of Radiation Safety (MORS) with GTRR staff members. During a subsequent inspection, the inspector discussed HRA control with selected members of the Licensee's staff, who demonstrated sufficient knowledge of the definition of a HRA and the measures required to control access to the area. This was documented in IR 91-02.

In order to correct the personal survey issue, the Licensee counselled the individual involved (a custodial worker) and gave him training on what he should do

when exiting a controlled area. The individual was also instructed to have items surveyed by health physics technicians if the items need to be removed from the controlled area. The area where the individual had been working was also surveyed and no contamination was found.

The NRC inspectors reviewed the surveys of the area during the prior six months and noted no contamination or spread of contamination which would indicate that personnel had failed to perform personal surveys. The inspectors also reviewed the training that this individual had in the past and determined that he had received training in 1976. The inspectors noted that no formal retraining program had been implemented by the Licensee at that time. The Licensee has since initiated a program to provide retraining for personnel who work with radioactive material at the research reactor facility and elsewhere on campus. In approximately January 1996, the Licensee began issuing newsletters which contain information relevant to work involving radioactive material being done around campus and other matters affecting campus personnel, including industrial safety and security.

4. Inspection Report 91-04

An emergency planning (EP) inspection was conducted during September 17-19, 1991, and was documented in IR 91-04. Two non-cited violations were noted during this inspection:

- a. Inadequate procedure for implementing the Emergency Plan notification requirements, and
- b. Failure to perform a biennial review of the Emergency Plan as required.

In response to the inadequate procedure issue, it was noted that the Licensee had revised the applicable procedure, Procedure 6100, Emergency Notification, in the past. However, because of the inadequacy noted during this inspection, the procedure was to be revised again and an Inspector Follow-up Item (IFI) was established by the NRC Staff to track the corrective action to be taken by the Licensee. The revised procedure was reviewed by the NRC Staff in IR 92-04 (see Item No. 5 below) and the adequacy of the corrective action was ultimately documented in IR 93-03. The corrective action taken was to standardize all notification times to one hour for all notifications.

Confusion concerning the second item, the biennial review, was resolved by the NRC Staff's clarification of the requirement, *i.e.*, the review cycle did not start on the date a Plan revision approval was received from the NRC but, rather, the review was required two years after the previous review had been completed. No further problems have been noted in this area during subsequent inspections.

5. Inspection Report 92-04

An EP inspection was conducted during November 9-10, 1992, and was documented in IR 92-04. One violation (Severity Level V) was noted during this inspection:

failure to have an adequate procedure for implementing certain EP notification requirements (a repeat of the non-cited violation noted in IR 91-04).

In order to correct the issue that had again been noted, the Licensee revised GTRR Procedure 6100. The revision standardized the notification times for the various

local, state, and federal agencies to one hour. This corrective action was verified to be complete as documented in IR 93-03.

6. Inspection Report 93-02

A combined operations and HP inspection was performed during September 23-24 and 27-30, 1993, and was documented in IR 93-02. Three violations (all Severity Level IV) were cited as a result of this inspection.

- a. failure of the Nuclear Safeguards Committee (NSC) to conduct the biennial audit of the licensed operator requalification program as required by Technical Specifications (the Manager of the Office of Radiation Safety (MORS) performed the audit; he was not a member of the NSC),
- b. failure to follow procedures for conducting neutron surveys, for completing certain twice weekly contamination control surveys, and for completing survey forms required for shipping radioactive material, and
- c. failure to comply with 49 C.F.R. Part 172 requirements concerning the description of radioactive material being shipped and indicating a 24-hour emergency response telephone number on shipping documents.

In response to the biennial audit issue, the Licensee denied the violation, indicating that the NSC was empowered to seek technical help from anyone regardless of membership in the committee. However, the Licensee also indicated that the NSC would perform the audit in the future. The NRC Staff rejected the Licensee's denial of the violation but accepted the Licensee's corrective action to have the NSC perform the audits henceforth. This resolution was verified by the NRC Staff and closed out as acceptable in IR 94-03.

With respect to the issue of surveys and survey forms, the Licensee added the neutron survey to its internal "work order" system which is used to schedule the required surveys and other routine surveillance items. Although the Licensee denied the twice weekly survey portion of the violation, it committed to perform the twice weekly contamination surveys until revised guidance, if needed, could be provided in GTRR Procedure 9250, Facility Contamination Surveys. (The Licensee's denial was not accepted by the NRC Staff.) Procedure 9250 was also revised to provide guidance for performing surveys of vehicles used to ship radioactive materials.

To address the issue of the description of radioactive materials and the 24-hour emergency response telephone number on shipping papers, the Licensee committed to list the chemical form and include the telephone number of the Georgia Tech Police on the shipping papers. Although these two issues have not yet been closed, the shipping papers for the most recent shipment of irradiated fuel were reviewed and determined to be acceptable.

7. Inspection Report 93-03

An EP inspection was conducted during November 2-5, 1993, and was documented in IR 93-03. One non-cited violation was noted:

failure to perform periodic testing of the criticality alarm system in accordance with procedure. (The required monthly tests of the system were not performed during May, June, and July, 1993.)

As a corrective action to prevent recurrence of missed surveillances, the Licensee modified its "work order" system to include a review of the status of work orders by the

Manager of the Office of Radiation Safety (previously, administrative personnel had been assigned to review the status work orders). In response to a separate matter, the performance of periodic testing of the criticality alarm system was reviewed during IR 96-01. No problems were noted and the periodic testing was being performed as required.

8. Inspection Report 94-01

A reactive inspection (*i.e.*, an unplanned inspection conducted in response to events or issues) was conducted during March 9-10, 1994, to follow up on an incident involving the failure of a Senior Reactor Operator (SRO) to follow procedures that resulted in two disabled reactor scram functions. This inspection was documented in IR 94-01. One NCV with two examples was identified:

- a. failure to complete the actions required by the checklist for startup of the reactor on February 15, 1994 (a fuse was not replaced after it had been removed during a training session), and
- b. failure to complete the actions required by the checklist during shutdown of the reactor on February 11, 1994 (three electrical jumpers had not been removed).

These incidents were classified as NCVs because the disabled scram functions were not required under the Technical Specifications for safe operation of the reactor, since credit is not taken for them in accident mitigation in the Safety Analysis Report, and they generally provide equipment protective functions.

Following the incident, the Licensee took corrective action which included reviewing the incident, interviewing those involved, suspending the responsible SRO's

reactor operating duties while the incident was reviewed, and establishing a panel to further investigate the incident and the SRO's operating history to recommend what actions should be taken, if any. (The SRO was the same individual who was involved in the 1987 cadmium-115 contamination event.) The Licensee's panel evaluated the technical performance of the SRO with respect to the incident of February 15, 1994, and also examined the SRO's historical performance. The Licensee's panel further determined that, because of the SRO's lack of diligence to safety and poor past performance, the suspension of the SRO should remain in effect until there was an obvious change in attitude and a commitment to follow procedures. The SRO subsequently terminated employment at the facility in June 1994.

9. Inspection Report 94-02

An HP inspection was conducted during August 17-19, 22 and 25, 1994, and was documented in IR 94-02. One violation (Severity Level IV) was cited:

failure of the licensee to make a proper evaluation of the extent of the radiation present following the annual neutron radiation survey performed August 11, 1994, which was required by procedure.

The Licensee corrected the error after it was detected by the inspector and discussed with GTRR staff. A training session was held by Licensee management with GTRR staff on document review. The GTRR form used to document surveys was changed to include the formula for converting from counts per minute to millirem per hour so that no further confusion would occur. The NRC Staff has verified that these

corrective actions have been taken; the documentation of this fact has not yet been completed by the Staff.

10. Inspection Report 94-04

An EP inspection was performed during October 19-21, 1994, and was documented in IR 94-04. One non-cited violation was noted:

failure to submit emergency procedure changes to the NRC in accordance with Section 10.4 of the Emergency Plan.

In response to this issue, the Licensee added a notice to the master file copy of all GTRR series 6000 procedures (emergency procedures) directing administrative personnel to distribute copies of the procedures to the NRC, Georgia Department of Natural Resources (GDNR), Georgia Emergency Management Agency (GEMA), Atlanta/Fulton County Emergency Management Agency (A/FEMA), and the facility emergency organization including the Georgia Tech Police, in accordance with the distribution list, when revisions are made. The Licensee also confirmed that future NRC distributions would be made in accordance with 10 C.F.R. 50.4 and provided current copies of the GTRR series 6000 procedures to the inspector for use by NRC Region II. The Licensee also reviewed and revised the distribution list to ensure that it included current copy holders and the distributions that were required to be sent to each.

11. Inspection Report 94-05

An operations inspection was conducted during December 12-14, 1994, and was documented in IR 94-05. One non-cited violation was noted during this inspection:

failure to replace the charcoal cartridges every two weeks as required by Technical Specification 6.4.b(6).

The Licensee indicated that this issue resulted from a problem with the computer software and "work order" tracking system used to generate work orders to indicate when required surveys, analyses, and surveillances are due. The tracking system was based on a 30 day cycle. The Licensee stated that the software would be changed to allow work orders for this cartridge change out and analysis to be generated on a bi-weekly basis.

12. Inspection Report 95-01

An HP inspection was performed during February 22-24, 27, March 20-24 and 27, 1995. In addition, teleconferences between NRC and Licensee management and staff were held on April 25 and 26, 1995. The inspection results were documented in IR 95-01. Two violations (one Severity Level IV and one Severity Level V) were noted:

- a. reporting failures, by: (1) omission of some of the required data and providing inaccurate data in annual reports concerning liquid and gaseous radioactive effluents to the NRC for the years 1983, 1986, and 1988 through 1993, and (2) providing inaccurate information to the NRC in the 1994 Safety Analysis Report concerning continuous, automatic measurement and recording of meteorological data, and
- b. failure to have a Nuclear Safeguards Committee (NSC) approved procedure to calibrate and operate the alpha/beta proportional counter.

In response to the issue of omitted and inaccurate data, the Licensee created a computer data base for liquid waste discharge that included all the historical data from 1983 forward. The omitted and inaccurate data were corrected in the Licensee's response

to the Notice of Violation. The data base included software that calculates parameters required to be reported in the annual reports. A computer data base for gaseous releases was also established. With regard to the inaccurate information in the Safety Analysis Report (SAR) concerning recording of meteorological data, the Licensee sent a correction to the SAR by letter dated August 16, 1995, which deleted any reference to recording meteorological data. (This information was not required to be submitted in the SAR, since the GTRR meteorological tower and instrumentation are not required by NRC regulations or by the GTRR Technical Specifications.)

With respect to the failure to have an NSC approved procedure, the Licensee held a meeting with the GTRR staff to review the requirement and emphasize the need to have all procedures approved by the NSC. A new procedure was subsequently prepared by the Licensee and approved by the NSC.

The verification of these corrective actions has not yet been completed and documented by the NRC Staff.

13. Inspection Report 95-02

A security inspection was conducted during May 3, 8, and 12, 1995, and was documented in IR 95-02. One violation (Severity Level V) was identified:

failure to submit material status reports within 30 days of March 31 and September 30 of each year as required by 10 C.F.R. 74.13(a)(1).

As a corrective measure, the Licensee revised its work order system for tracking Special Nuclear Material Inventory reports to require that a report to all federal officials be issued within 30 days after the end of the period covered by the report. The NRC

Staff has verified that these corrective actions have been taken; the documentation of this fact has not yet been completed by the Staff.

Q14. Were any other matters noted in the NRC Staff's inspections of the GTRR, which presented some concern but did not constitute a violation or NCV?

A14. (All) Yes. In addition to the violations and NCVs discussed above, during some emergency preparedness inspections, although no violations were cited, specific areas of weakness in the Licensee's performance were identified and brought to the attention of the Licensee, as discussed in Inspection Reports 89-04, 91-04, and 94-04 (respectively closed out in IRs 90-04, 92-04, and 95-03). These performance weaknesses did not result in the issuance of violations nor did they indicate deficiencies in the Licensee's Emergency Plan. In addition, during the NRC Staff's inspections at GTRR, certain matters were identified as "Unresolved Items" (URIs) which required further inspection or evaluation before a determination could be reached as to whether they demonstrated a violation of regulatory requirements. Two of the URIs have been closed but those in one inspection report (IR 95-01) have not yet been closed and therefore could still be found to indicate a violation, with respect to (1) the completion of the calibration of the Geiger-Mueller gas monitor and the Kanne ionization chamber within the specified surveillance interval allowed time frame, and (2) the Kanne ionization chamber setpoint determinations for tritium measurement.

Q15. Please provide your views with respect to the adequacy of the Licensee's management, based upon a collective analysis of the violations and NCVs described in response to Question 13 above.

A15. (All) We have reviewed the number and nature of the violations and NCVs which were observed at the GTRR in the course of the NRC Staff's inspections. From 1989 to April 1996, the inspection and enforcement history shows: 1989 (8 violations), 1990 (1 violation, 1 NCV), 1991 (no violations, 2 NCVs), 1992 (1 violation), 1993 (3 violations, 1 NCV), 1994 (1 violation, 3 NCVs), and 1995 (3 violations). While the number of violations and non-cited violations appears large, they have generally not involved significant health and safety issues, nor does our review indicate that the violations demonstrate a breakdown of management controls and programs. Accordingly, the violations and NCVs discussed above do not support a conclusion that the Licensee's management of the facility is inadequate.

In addition, we have found an overall reduction in the frequency and severity of violations since restart of the GTRR was authorized in November 1988. The previous enforcement history shows that, during the period from 1987 - 1988, the NRC Staff identified approximately 20 violations of NRC regulations and TS requirements; the NRC Staff held three management and enforcement conferences with GTRR management; and the NRC issued two orders restricting reactor operation and a \$5000 civil penalty to Georgia Tech. However, since January 1989, in a period of over seven years, the NRC Staff identified 17 violations, or about the same number of violations as were previously found from 1987 through 1988; further, the violations found in the period since restart

have had a lower degree of severity as defined in the NRC Enforcement Policy. In addition, our review leads us to conclude that the violations observed during the period of 1989 to date do not indicate a consistent failure of Licensee management to identify and correct problems (as had occurred previously). On the contrary, the NRC Staff's inspection and enforcement efforts show an improvement as compared to the period before 1989. Based on the above, we conclude that the Licensee continues to operate and manage its facility in a manner that acceptably ensures that the public health and safety is protected.

The NRC Staff has instituted periodic reviews of all research reactor licensees in NRC Region II, including Georgia Tech. This has involved a staff assessment of the Licensee's performance followed by a meeting between the Licensee and senior regional management to discuss that performance; the Licensee has also been afforded the opportunity to discuss its view of its performance. During the period of January 1989 to the present, assessments of the Licensee's performance, followed by meetings with Georgia Tech management, were conducted on January 10, 1991, June 25, 1992, and February 16, 1994. During all three assessments, NRC staff and senior regional management determined that the Licensee's performance was acceptable and the problems from the 1987 to 1988 time period had been corrected. Since early 1989, the personnel at GTRR have significantly improved the facility's procedures, and the Licensee's compliance with NRC regulations and procedures has generally improved. In sum, it is our conclusion that the Licensee's present organization performs its various functions in a manner which assures proper attention to the protection of the public health and safety.

Q16. To what extent do your conclusions as to the adequacy of the Licensee's management of the GTRR take into consideration discussions with, or observations of, License personnel in connection with the NRC Staff's inspections?

A16. (All). In general, NRC inspections at the Licensee's facility have verified that the Licensee complies with the Technical Specification requirements associated with organization and management. The Project Inspector (Craig Bassett) has personally attended various meetings of the Nuclear Safeguards Committee (NSC). This attendance at NSC meetings and the NRC Staff's review of the minutes of the majority of the other meetings showed the Committee performed its duties (including, among other matters, the review of procedures) as stated in the Technical Specifications.

Also, during our assigned duties related to the facility, we have had the opportunity to interact with various members of the Licensee's staff including health physics personnel, licensed operators, and office personnel. During the period since 1989, the number of personnel on staff at the NNRC has varied from about 15 to 30. Over the past seven years since restart, we have interviewed the majority of the NNRC personnel, including management, HP technicians, reactor operators, and office personnel, concerning working conditions, surveys, procedures, and their opinions of interoffice relationships and cooperation at GTRR. None of those interviewed indicated that there was a continuation of the past problems between the HP and operations personnel. Those individuals who had been at the facility during the previous personnel problems stated there was a significant improvement in the working relationships. None indicated that they had been or are currently harassed or intimidated by management or

fellow workers, or that they had been restricted in any way from performing their job functions. None of the HP technicians or operations personnel raised any concerns about unsafe conditions at the facility or management problems during our interviews.

Q17. In your interviews with NNRC and GTRR personnel, did you detect any reluctance to discuss safety issues or potential regulatory violations with the Director of the NNRC, the Nuclear Safeguards Committee (NSC), University officials or NRC personnel?

A17. (CHB) No. During my interviews with HP technicians, reactor operators, and office personnel, conducted outside the presence of Licensee management, no reluctance was noted or expressed by anyone to discuss safety issues with the Director of the NNRC, the NSC, other Georgia Tech officials or NRC personnel.

Q18. Have you reached a conclusion as to whether the Licensee's management encourages a safety-conscious attitude among its employees, and provides an environment in which employees feel they can freely voice safety concerns?

A18. (All) Yes. Based upon the information available to us to date, we are not aware of any reason to believe that the Licensee's management has failed to encourage a safety-conscious attitude among its employees, or to provide an environment in which employees feel they can freely voice safety concerns. The NRC Staff does not specifically inspect a Licensee's "work environment," as a matter of course, as part of any formal inspection procedure or module. Rather, the Staff inspects a Licensee's

training program and its display of appropriate notices to workers, concerning their ability to bring safety concerns to the attention of management or the NRC. The Staff also reviews Licensee documents, such as control room logs and committee meeting minutes, in which safety issues are customarily recorded. In addition, the NRC Staff would consider seriously allegations concerning harassment and intimidation by Licensee management, or management directions to conceal, or to refrain from reporting, safety problems or regulatory violations to Licensee management or oversight committees or to the NRC.

The Staff's inspections of the GTRR to date have indicated that proper training has been received by Licensee personnel concerning employees' right to bring safety and regulatory concerns to the attention of Licensee management or the NRC, and that appropriate notices are in place at the facility in this regard. In addition, our review of the Nuclear Safeguards Committee (NSC) minutes indicates that potential problems have been reported to the NSC, and the NSC's minutes provide a record of these communications. In the period following the restart decision through March 1996, the NRC did not receive any allegations of potential harassment and intimidation; any allegations or additional information received following that period would be evaluated by the Staff and dispositioned appropriately. Accordingly, we are not aware of any reason to believe that the Licensee's management has failed to encourage a safety-conscious attitude among its employees, or to provide an environment in which employees feel they can freely voice safety concerns.

Q19. Did the Licensee satisfactorily complete the actions it was required to take prior to restart?

A19. (CHB, EJM) Yes. All issues that were required to be complete prior to restart were resolved before issuance of the November 15, 1988, letter providing "Authorization to Resume Reactor Operations and Experiments." In late 1990, during a general review of records associated with closure of various enforcement Orders, NRC Region II determined that an official closure of orders to Georgia Tech had not been documented. As a result, a review was conducted and a letter was sent to Georgia Tech dated September 18, 1990, notifying the Licensee that the NRC Staff was satisfied that the Licensee had complied with all of the terms of the Orders. The September 18, 1990, letter identified the pertinent correspondence between the NRC and the Licensee to that date and all of the inspections that had been performed with respect to the Licensee's closeout of these matters.

Q20. GANE has asserted that the director of the facility has been given "increased authority over the Manager of the Office of Radiation Safety. Although the safety officer has line to higher-ups than the director, since he/she works for the director on a day-to-day basis, the threat of reprisal would be a huge disincentive to defying the director." Do you agree with these assertions?

A20. (All) No. With regard to the director's increased authority over the Manager of the Office of Radiation Safety (MORS), the director of the facility was given increased authority over the MORS upon the issuance of Amendment No. 7 in 1988

(described in the NRC Staff's Panel C testimony in this proceeding). However, based on our testimony as stated above, it is our belief that the current organizational structure has improved the organizational relationships and resulted in acceptable performance. The MORS' performance of his safety responsibilities is regularly considered in NRC inspection activities to ensure that the ability to raise issues to higher levels of management or the NSC on safety matters is clearly understood and implemented. That is, we conclude that there is no effective disincentive to raising safety issues and assuring that they are properly addressed.

Q21. GANE has also asserted that "safety concerns at the Georgia Tech reactor are the sole responsibility of Dr. R.A. Karam." Do you agree with this assertion?

A21. (All) No. Although the Director of the facility has overall responsibility for safety at the GTRR, responsibility for safety at the facility rests not only with the Director of the facility, but also with the MORS, the NSC, other Georgia Tech officials (including the President of Georgia Tech and the Dean for Engineering), as well as all employees involved with GTRR. This is further discussed in the testimony of NRC Staff Panel C.

Q22. GANE has also asserted that the Nuclear Safeguards Committee "has theoretical oversight of the GTRR operations" but has "no concern with health issues." Further, GANE asserted that the Manager of the Office of Radiation Safety (MORS) "is

sought for its knowledge of law more than its knowledge of health physics." Do you agree with these assertions?

A22. (All) No. This conclusion is based on the facts and views set forth in response to Question 16 above with regard to NSC function and safety responsibilities (which is also described in testimony of NRC Staff Panel C). In addition, the qualifications and experience of the present MORS were outlined in a letter from the Licensee to the NRC dated December 4, 1992; these qualifications demonstrate the MORS has in-depth knowledge and practical experience in the area of health physics and radiation safety.

Further, the NRC inspector (Craig Bassett) has met with the current MORS on many occasions at the facility, has inspected the implementation of his program and his overall performance, and is satisfied that the current MORS is capable of performing his functions effectively and that he has done so.

Q23. GANE has also asserted that the MORS lacks sufficient authority or independence to perform his functions effectively. Do you agree that the MORS lacks sufficient authority, independence and support from the Director of the facility to effectively perform his duties?

A23. (All) No. Based on our knowledge of the current organizational structure and functioning of the GTRR, we are satisfied that the MORS has the backing and support of the Director to perform his duties in both the health physics and safety areas. This conclusion is also based on discussions we have had with the NNRC

Director, the MORS, and other GTRR personnel, and on our observations and review of safety-related activities and programs in connection with our assigned duties concerning the GTRR.

Q24. Please describe the present status of the Licensee's HP procedures, equipment and personnel competency to deal with a contamination event at the GTRR.

A24. (CHB) At present, the HP procedures and equipment are acceptable, and the HP and operations personnel are competent, to implement the radiation protection program at the GTRR. Since 1989, I have noted improvements in the Licensee's HP procedures, including standardized format, references to the regulations or requirements and to other related procedures, and more information, specific guidance, and direction for the HP staff. Procedure changes have been reviewed and approved by the NSC.

Q25. GANE has also asserted that the Licensee's management is inadequate based on certain circumstances involving a bismuth block leak and a fuel element failure. Please provide your understanding of the facts concerning these matters.

A25. (CHB) I understand the facts concerning these matters to be as follows.

1. The Bismuth Block

The bismuth block is part of a shield located adjacent to the biomedical facility. It is designed to attenuate gamma radiation from the core while allowing neutrons to pass through to the biomedical facility. The bismuth block cooling system is primarily

designed to remove heat to cool the bismuth shield block for equipment protection purposes and is not a SAR accident mitigation system.

In NRC Inspection Report 83-01, dated September 29, 1983, a description is provided concerning the discovery of a leak in the bismuth block. This report indicates that on August 4, 1983, GTRR staff noted that a one gallon per hour leak had developed in the coolant system of the innermost bismuth shield block of the bio-medical beam port. At the time, the bismuth block coolant system contained heavy water (D_2O) in a closed system which was (and is) entirely separate from the reactor's D_2O coolant system. Some of the D_2O leak flowed by gravity to the next lower level which is the basement and entirely contained within the Reactor Containment Building. The reactor was shutdown when the leak was discovered and much of the D_2O was collected and stored. An area of about 12 feet by 12 feet in the basement was posted and restricted as a potentially contaminated area. No personnel contamination occurred and no significant increases in air or liquid effluents to unrestricted areas resulted. After examining the source of the leak, plans were made to correct the problem. A commercial radiator "stop-leak" product was used to seal the leak and, after flushing the system, regular water was used as the coolant in place of the heavy water.

In 1989, the bismuth block began to leak once again. As documented in NRC Inspection Report 90-01, dated February 5, 1990, this time the application of epoxy over the leak area and addition of "stop leak" to the coolant did not stop the leak. The GTRR staff then received approval from the NSC to install a collection system in the area under the leak to catch the leaking water, channel it to a condensate pump, circulate the water

through a 5 micron filter and return the water to the coolant storage tank. Inspections in the area of the basement where the collection system is located have indicated that the area is roped off and controlled as a potentially contaminated area. Review of the contamination surveys of the area have indicated no contamination spread outside the controlled area. Only small amounts of water have ever been observed in the area and the collection system appears to be functioning. The area is sometimes damp but no running water has been observed.

2. Fuel Element Failure

A fuel element weld failure was noted in the NSC minutes dated October 29, 1992. The Licensee informed the NRC of the problem by a phone call on September 22, and in a letter dated September 23, 1992. The letter explained that a problem was noted during an annual exchange of the fuel elements in storage outside the GTRR core with some of the elements in the core. During an attempt to install fuel element B015, the Licensee observed that it did not seat correctly in the plenum. An inspection of the bottom end of the fuel element indicated that two of the four welds of the guide plate were broken and the other two were bent. Because the locating end fitting of the fuel element was flared slightly, the element did not seat properly. It was also noted that there were no missing pieces of the fuel element that could have fallen into the reactor vessel. The Licensee stated that element B015 would not be used in the reactor in the future. The fuel element weld failure was also mentioned in Paragraph 1.b of the Licensee's Annual Report dated February 22, 1993. During an inspection of the facility

in January 1996, I noted that fuel element B015 was removed from the floor storage area in the reactor building and was transferred to the storage pool for further processing.

GTRR management notified the NRC of both the bismuth block leak and the fuel element failure. Neither the bismuth block leak nor the fuel element weld failure problem resulted in a violation of NRC regulations or the GTRR license.

Q26. Please summarize your testimony regarding the adequacy of the management at the GTRR facility.

A26. (All) In summary, it is our conclusion that the GTRR management and organizational structure fulfills the NRC requirements for the performance of required duties with sufficient oversight to assure independent review. The organizational structure provides an integrated approach to operations, experiments, radiation safety and use of radioactive materials. The organizational structure also provides a satisfactory means to raise safety issues to University officials by both the NSC and MORS. The Licensee's inspection history following restart, and the Staff's conversations with Licensee personnel to date, support a conclusion that safety problems and regulatory violations would likely be reported to appropriate Licensee management or to the NRC.

Q27. Does this conclude your testimony?

A27. (All) Yes.

Craig H. Bassett

Senior Radiation Specialist
Fuel Facilities Branch
Division of Nuclear Materials Safety
Region II
Nuclear Regulatory Commission (NRC)

Education:

Brigham Young University (63-64 & 67-69)
Bachelor of Arts Degree in Political Science
University of Utah (74-77)
Completed approximately 77 hours of the Pre-Med
requirements for Medical School

Experience:

3/89 to Present - Current position is NRC Senior Radiation Specialist and Project Inspector. Principal duties include inspecting, assessing, and reporting on all aspects of the criticality safety programs at various fuel facilities including General Electric, Westinghouse, and Nuclear Fuel Services, and inspecting, assessing, and reporting on all aspects of the radiological protection programs at various non-power reactors in the region including Georgia Institute of Technology, North Carolina State University, University of Florida, and University of Virginia. Current duties also include serving as project inspector for two fuel facilities and the four non-power reactors in Region II to track progress toward completion of the overall inspection effort for each facility.

3/86-3/89 - Functioned in the positions of NRC Radiation Specialist and Senior Radiation Specialist. Principal duties during this period included inspecting, assessing, and reporting on all aspects of the radiological protection programs at various nuclear power plants.

11/84-3/86 - Manager, Radiological Auditing and Safety Engineering for Westinghouse Electric Corporation (WEC). Responsibilities included implementation and oversight of the radiological auditing and industrial hygiene/safety programs at the Naval Reactors Facility in Idaho.

6/82-11/84 - WEC Supervisor, Radiological Controls Crew Q. Responsibilities included supervising and coordinating the activities of health physics technicians in support of fuel disposal efforts and in support of maintenance work at the Expanded Core Facility at the Naval Reactors Facility in Idaho.

6/78-6/82 - WEC Radiological Control Technician (Health Physics Technician). Responsibilities included monitoring for external and internal exposures, air sampling, contamination control, decontamination of equipment and personnel, radiological waste and spent fuel shipping, and maintaining exposures ALARA at the Expanded Core Facility at the Naval Reactors Facility in Idaho.

9/73-6/78 - Various companies unrelated to the nuclear field. Also attending the University of Utah.

9/69-9/73 - U. S. Army - Various positions including 2nd and 1st Lieutenant in the Army Security Agency/Army Intelligence.

EDWARD J. McALPINE

Chief, Fuel Facilities Branch
Division of Nuclear Materials Safety
Region II (RII)
Nuclear Regulatory Commission (NRC)

Education: Pennsylvania State University B.S./Chem. Eng. 1965

Professional
Experience:

1995 to Present - Chief, Fuel Facilities Branch, Division of Nuclear Materials Safety, RII, NRC - Responsible for the management of inspection program for four research reactors, five fuel fabrication facilities, and four independent spent fuel storage installations.

1989 to 1995 - Chief, Radiation Safety Projects Section, Nuclear Materials Safety and Safeguards Branch (NMSS), Division of Radiation Safety and Safeguards (DRSS), RII, NRC - Responsible for the management of inspection program for four research reactors, five fuel fabrication facilities, and four independent spent fuel storage installations.

1980 to 1989 - Chief, Material Control & Accountability Section, NMSS, DRSS, RII, NRC - Responsible for the management of the MC&A inspection program for six fuel fabrication facilities.

1977 to 1980 - Material Control Analyst, Division of Safeguards (DS), Office of Nuclear Material Safety and Safeguards (ONMSS), NRC - Responsible for the review and approval of Fundamental Nuclear Material Control Plans for the accounting of Special Nuclear Material for assigned facilities.

1976 to 1977 - Acting Chief, Material Control and Accountability Licensing Branch (MC&A LB), DS, ONMSS, NRC - Responsible for the management of the national program for review and approval of Fundamental Nuclear Material Control Plans for the accounting of Special Nuclear Material.

1975 to 1976 - Material Control Reviewer, MC&A LB, DS, ONMSS, NRC - Responsible for the review and approval of Fundamental

Nuclear Material Control Plans for the accounting of Special Nuclear Material for assigned facilities.

1974 to 1975 - Manager, Program Audits, General Electric Company, San Jose, California - Responsible for the establishment and conduct of a program to audit safeguards programs at four sites.

1971 to 1974 - Manager, Nuclear Materials Management - California Components, General Electric Company, San Jose, CA - Responsible for the management of the program to account for all Special Nuclear Material at two sites.

1969 to 1971 - Accountability and Quality Control Engineer, General Electric Company, Pleasanton, CA - Responsible for the accountability and quality control programs for a plutonium fuel development laboratory.

1967 to 1969 - Supervisor, Plutonium Laboratory, General Electric Company, Pleasanton, CA - Responsible for the supervision of workers and the safe operation of a plutonium fuel development laboratory.

1965 to 1967 - Research Engineer, Corporate Research & Development Center, General Electric Company, Schenectady, NY - Responsible for assigned projects in the area of chemical system and process research and development.

MARVIN M. MENDONCA

Senior Project Manager
Non-Power Reactors and Decommissioning Project Directorate
Division of Project Support
Office of Nuclear Reactor Regulation (NRR)
Nuclear Regulatory Commission (NRC)

Education:	University of California, Berkeley	M.S./ME	1972
	University of California, Berkeley	B.S./ME	1971
	Modesto Junior College	A.A./Engr.	1969

Professional
Experience:

1990 to Present - NRC Senior Project Manager for Non-Power Reactors and Decommissioning Project Directorate, NRR - Responsible for implementation of NRC regulatory program for approximately 20 research reactors.

1986 to 1990 - NRC Project Section Chief, Division of Reactor Projects and Safety, Region V - Responsible for implementation of NRC inspection program for Diablo Canyon and Trojan Nuclear Power Plants.

1983 to 1986 - NRC Senior Resident Inspector - Responsible for implementation of NRC inspection program at the Diablo Canyon Nuclear Power Plant during post-construction, pre-operational, startup and full power operational phases.

1981 to 1983 - NRC Resident Inspector - Responsible for inspection activities at the Diablo Canyon and San Onofre Nuclear Power Plants during the pre-operational phase.

1976 to 1981 - NRC Reactor Engineer, Reactor Systems Branch, NRR - Responsible for safety evaluation of reactor systems analyses, events and conditions at Pressurized and Boiling Water Reactors.

1972 to 1976 - Senior Engineer, General Atomics - Responsible for several safety analyses of core heatup, fission product release, and core testing for High Temperature Gas-Cooled Reactor designs.

Certification: Professional Mechanical Engineer Certified by the State of California