U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-224/84-01

Docket No. 50-224

License No. R-101

Licensee: University of California
Berkeley, California 94720

Facility Name: TRIGA, Mark III

Inspection at: Etcheverry Hall, Berkeley, California

Inspection conducted: December 17-20, 1984 and telephone discussions of December 21, 1984 and January 4, 1985

Inspector: M. Cillis — 1/18/85
M. Cillis, Radiation Specialist — Date Signed

Approved by: G P Yuhas — 1/25/85
G. P. Yuhas, Chief — Date Signed
Facilities Radiological Protection Section

Summary:

Inspection on December 17-20, 1984 and telephone discussions of December 21, 1984 and January 4, 1985 (Report No. 50-224/84-01)

Areas Inspected: Routine unannounced inspection of the radiation protection and reactor operation programs; including organizational structure, personnel monitoring, surveys, effluent releases, instrument calibrations, environmental monitoring, radioactive material transportation activities, emergency preparedness program, requalification training, procedures, surveillances, experiments, review and audit, reactor maintenance and a tour of the facility. The inspection involved 34 hours of onsite time by one regionally based inspector.

Results: Of the 14 areas inspected, no violations or deviations were identified.

Details

1). Persons Contacted

**Professor T. H. Pigford, Reactor Administrator
*Dr. T. Lim, Reactor Supervisor
M. Denton, Chief Reactor Operator
J. Harrell, Reactor Operator
*P. G. Vernig, Reactor Health Physicist
*A. Peterson, Radiation Safety Officer
V. Tillman, Assistant Administrator, Cowell Memorial Hospital
S. Lustig, Assistant Director, Cowell Memorial Hospital
Sgt. W. Cooper, Communications Officer, UC Berkeley Police Department
Professor R. M. Buxbaum, Chairman, Reactor Hazards Committee (RHC)
Dr. C. Cann, Radiology, RHC Member

*Denotes those individuals debriefed on December 20, 1984.

**Professor Pigford was debriefed during a telephone conversation on December 21, 1984.

2). Organization, Logs, and Records

The organizational structure for administration, operation and radiation protection program for the UC Berkeley research reactor remains unchanged from that previously reported in Region V Inspection Report 50-224/83-01. Professor T. H. Pigford has replaced Professor S. Kaplan as Reactor Administrator. A new reactor health physicist was hired to replace the previous health physicist who has left the UC Berkeley organization.

The new reactor health physicist has a college degree in chemistry and has had no prior health physics experience involving reactor operations. The individual did have prior health physics experience while in the US Army and in private industry prior to being selected at UC Berkeley. The individual appeared to have a good knowledge of health physics and the regulatory requirements prescribed in 10 CFR Part 20. The inspector reminded the reactor health physicist of the importance for becoming familiar with reactor operations, the Technical Specifications and previous NRC Inspection Reports.

The reactor health physicist informed the inspector that approximately 50% of his time is spent at the reactor facility as the reactor health physicist. The remaining portion of his time is devoted to activities covered under the State of California license.

Facility operating records, reports, and logs for the period of June 1983 to December 1984 were examined. Specific records examined are as follows: as follows:

a). Operations Log
b). Survey records (radiation, contamination, and airborne)
c). Startup and shutdown check lists
d). Instrument calibration records
e). Personnel training and exposure records
f). Waste shipping records
g). Weekly, monthly and annual reactor operations logs
h). Reactor operation surveillance records
i). Power "Pulse" Log
j). Maintenance Log

No violations or deviations were identified.

3) Radiation Monitoring Systems

a). Area Radiation Monitoring

Area radiation monitors (ARMs) are located on the reactor bridge and at various locations in the facility. Readout and alarm functions are provided at the reactor control panel, campus police (e.g. dispatcher's console), and in the reactor supervisor's office (e.g. reception room).

Technical Specification (T.S.), Sections 3.5 and 5.4 require the operability of at least two ARMs during reactor operations. Section 4.2.3 of the T.S. requires a weekly verification of operability and annual calibration of the ARMs. Additionally, T.S., Section 6.5 specifies that procedures be available for performing the calibration, tests, and alarm response checks of the monitors required pursuant to Table 1 of Section 3.5 and Section 5.4 of the T.S. A review of records and discussions held with the reactor and security staff verified that the operability, calibrations, alarm response check, and procedures were consistent with the T.S.

No violations or deviations were identified.

b). Air Monitoring Systems

A review of records and documents maintained by the licensee disclosed that the continuous air particulate monitor (CAM) sampling the reactor room and the exhaust gas radiation monitor sampling the exhaust stack that are required for reactor operations were routinely checked for operability, functionally tested and calibrated as required by Section 4.2.3 of the T.S.

The inspector found the CAM to be malfunctioning during a tour of the facility. The inspector noted that the CAM was not drawing a representative sample at the sample head because of a poor seal at the sampling head chamber. This observation was brought to the licensee's attention. The problem was immediately corrected by the Chief Reactor Operator.

No violations or deviations were identified.

c) Particulates

Particulate air samples are taken weekly in the facility's ventilation exhaust system, the reactor bridge and at other locations within the facility. Results of particulate air samples, for the period of May 1983 through October 1984, ranged from 10^{-13} to 10^{-15} microCi/ml of beta-gamma activity. All sample results were well within 10 CFR Part 20 limits.

No violations or deviations were identified.

4). Radiation Protection Program

a). Posting and Labeling

The inspector verified that the licensee's posting and labeling practices were consistent with 10 CFR Part 19.11, "Posting of Notices to Workers" and 10 CFR Part 20.203, "Caution Signs, Labels Signals and Controls".

No violations or deviations were identified.

b). Personnel Monitoring

The inspector verified that the licensee's personnel monitoring program was consistent with 10 CFR Part 20.101, "Radiation Dose Standards for Individuals in Restricted Areas," 10 CFR Part 20.103, "Exposures of Individuals...in Air in Restricted Areas," 10 CFR 20.104, "Exposures of Minors," and 10 CFR Part 20.1(c), "Purpose" (e.g. ALARA).

An examination of personnel monitoring records for 1984 was performed. One individual received 50 mrem while the remaining individuals received less than 50 mrem for 1984.

It was noted that the licensee does not test or calibrate pocket dosimeters used by visitors. This same observation was identified in paragraph 5(a) of Region V Inspection Report 50-224/83-01. This observation was discussed with the new reactor health physicist who indicated that a calibration program would be considered.

No violations or deviations were identified.

c). Surveys

The licensee's monitoring program associated with reactor operations was examined during the inspection.

Surveys performed by the licensee consist of: (1) direct radiation measurements, (2) contamination surveys, (3) special surveys for experiments, classes, and alterations of the facility. A hand and foot monitor is used to provide for personnel monitoring at the reactor room exit point. Surveys for airborne radioactivity include an array of continuous fixed samplers located at the sample handling

area, counting room, rabbit sample hood, sample transfer (shipping) area, and at several environmental sampling stations located on top of Etcheverry Hall at a parking lot, and to the east of Etcheverry Hall.

Survey records related to the above monitoring program were reviewed for the period of 1983 and 1984 to date. The inspector observed the following:

- Direct radiation measurements are not normally performed when the reactor is shut down. The inspector informed the reactor health physicist that representative surveys include surveys taken to identify the hazards present during normal reactor operation and during periods when the reactor may be shut down.

- Contamination surveys of irradiated samples (rock specimens) shipped to Lawrence Berkeley Laboratory are not normally performed (see paragraph 13).

- A program for verifying the calibration of the fixed air samplers flow measurement devices as recommended by Regulatory Guide 8.25, "Calibration and error...for Total Volume of Air Sampled" was not established. The new reactor health physicist was not aware of when the last calibration checks of all the air samplers were performed. The reactor health physicist stated he thought the samplers had been modified to measure a constant air flow; however, there are no means to verify that the air flow is constant because the flow measuring devices are broken.

- Not all contamination surveys are recorded in "units" that are consistent with 10 CFR 20.401(b). Twenty five percent of the records reviewed indicated contamination results were recorded in "cpm" in lieu of the units specified in 10 CFR 20.5, "Units of Radioactivity". This same concern was brought to the licensee's attention during a previous NRC inspection, as identified in paragraph 5(b) of Inspection Report 50-224/82-03. The new reactor health physicist assured the inspector that the concern would be corrected.

The above observations were brought to the licensee's attention at the exit interview.

No violations or deviations were identified.

d. Solid Waste

One transfer of solid waste to the Environmental Health and Safety group was made during 1984 consisting of 0.08 millicuries (mCi) of mixed activation products.

No violations or deviations were identified.

e) Liquid Waste Releases

Liquid waste is normally collected in glass containers and transferred to the UC Berkeley Environmental Health and Safety (EH&S) office (State of California License) for disposal. A review of the Berkeley Research Reactor Radiation Safety Statistic monthly reports indicated that there were no liquid waste collected from reactor facility for the period of May 1983 through October 1984. No liquid waste is discharged to the environment from the reactor facility.

No violations or deviations were identified.

f). Radiological Safety Training Program for Workers

The licensee's Radiological Safety training program for meeting 10 CFR Part 19.12, "Instruction to Workers" was examined. The reactor training program is described in Inspection Reports 50-224/80-03, 50-224/82-03 and 50-224/83-01. Concerns with the informal training program were brought to the licensee's attention in each of the previous three inspection reports. The contents of this training continues to be vague and poorly documented.

The reactor health physicist uses the following outline for providing the instruction to workers pursuant to 10 CFR 19.12:

"Safety Orientation Outline"...

"I Safety is to both protect individuals and their work and to prove that they were protected.
II Emergency signals and actions
III Access lists and access
IV Dosimeters - capabilities and uses
V Radiation and contamination - Levels involved from past experience, implications.
VI For females, NRC Reg. Guide (e.g. R.G.'s 8.13 and 8.29) the secretary has sign-up sheet
VII NRC and SHD report regulations and how to ask."

The content of the instructions provided to workers was discussed with the reactor health physicist. The new reactor health physicist stated he was unaware of the previous concerns that were identified and stated that he would develop and implement a formal training program that will assure compliance with 10 CFR Part 19.12. The reactor health physicist also stated that information needed to demonstrate compliance with 10 CFR Part 19.12 would be documented.

The content of the training appears to meet the minimum requirements of 10 CFR Part 19.12; but is not clearly documented.

The inspector brought the above concerns to the licensee's attention at the exit interview. The inspector reemphasized the previous concerns for establishing a formal training program for the purpose

of demonstrating compliance with 10 CFR Part 19.12. This item will be examined during a subsequent inspection (84-01-01).

No violations or deviations were identified.

g) Gaseous Effluent Releases

An examination of the gaseous effluent records for 1984 was conducted. Release records indicated approximately 1.6 curies of Argon-41 had been released in 1984. Also examined were Argon-41 releases for 1983 reported by the licensee's annual report received by the Region V NRC office on March 31, 1983.

The examinations revealed that the Argon 41 releases for 1983 and 1984 were within the Technical Specification and 10 CFR Part 20 limits.

No violations or deviations were identified.

5) Reactor Operator Requalification Training

A review of facility records and personnel training files by the inspector verified that the licensee had implemented a requalification program for reactor operators that is consistent with 10 CFR Part 55. The files contained records of examinations, reactivity manipulation, evaluations and other activities as described in the requalification program. The inspector noted that one licensed operator has not participated in the licensee's requalification program. The reactor supervisor informed the inspector that the individual is not expected to recertify his license.

No violations or deviations were identified.

6) Reactor Operational Procedures

The inspection included an examination of the licensee's reactor operating procedures for compliance with the Technical Specifications (T.S.), Sections 6.5, "Operating Procedures". Procedures reviewed were those associated with reactor startup, reactor shutdown, emergency plan (see paragraph 9), fuel element loading and unloading, steady state operations, and experiments. The licensee's review and approval cycle for procedures was also examined.

It should be noted that the T.S., Section 6.5 requires that substantive changes will require the approval of the reactor supervisor and reactor administrator or the Reactor Hazards Committee as described in Section 6.2.d(2) of the T.S. Section 6.5 further states that all temporary changes to procedures shall be subsequently reviewed by the reactor administrator. It should also be noted that the T.S. requires a minimum of eight different types of procedures to be in effect.

The inspection disclosed that the reactor supervisor was unaware of the regulatory requirement of T.S., Section 6.5 which prescribes the review and approval process of T.S. required procedures. Technical

Specification procedures required by Section 6.5 have not been organized into a Reactor Operations Manual. The procedures are informal in nature and are classified as Nuclear Engineering Reactor Laboratory reports. There is no easy method for verifying whether or not the reactor administrator and Reactor Hazards Committee (RHC) reviews and approvals have been accomplished as required by the T.S. The RHCs written charter required by Section 6.2.b does not include a description of their responsibility for review of procedures as required by Section 6.2.d.(2) of the T.S. This latter observation was discussed with the reactor administrator and Chairman of the RHC. The inspector was informed that a statement provided in the RHC minutes of March 16, 1981 defined which procedures are reviewed and approved by the RHC. The minutes state in part: "The committee agreed, after discussion, that its practices and procedures under its bylaws are appropriate to discharge its responsibilities between reactor staff and itself for the review and audits required of it by 6.2.d of the Tech Specs particularly those of Tech Specs 6.2.d.2." The reactor supervisor was not quite certain what the statement meant and the chairman informed the inspector that it meant that the committee is responsible for the review and approval of procedures that affect the health and safety of the public such as procedures that affect reactivity. The inspector was informed that the statement in the RHC minutes of March 16, 1981 was issued for the purpose of clarifying the RHC Bylaws which currently can be interpreted to require the RHC to review and approve all procedures.

The inspector emphasized the need for the RHC to include a simple description in the charter of the RHC's responsibilities for review and approval of procedures.

The examination also revealed that the reactor operating procedures had not been revised as agreed to by the licensee (see paragraph 6 of Inspection Report 50-224/82-01 of January 29, 1982).

It was the inspector's conclusion that procedures existed as required by the Technical Specifications, although the organization, review and approval of the procedures lacked formality. This matter was discussed during the exit interview. This item will be examined during a subsequent inspection (84-01-02).

No violations or deviations were identified.

7) Surveillances

The inspector verified that the surveillances required by T.S., Section 4.2, "Limiting Conditions for Operations," Section 4.2.2, "Control and Safety System," Section 4.2.3, "Radiation Monitoring System," and Section 4.2.4 "Ventilation System" were accomplished. The results of the surveillances appeared to be well documented and accomplished at the frequencies specified in the T.S.

No violations or deviations were identified.

8) Experiments

Experiments performed since the previous inspection were reviewed. Experiments reviewed were:

Experiment No.	Subject
368A	Activation analysis of impurities in glass
369A	Irradiation of geologic samples
370	Irradiation of ^{23}Na
E371A	Rare earths

The inspection disclosed that the review and approval of experiments were accomplished in accordance with T.S., Sections 6.1 and 6.2. As a minimum, all experiments are reviewed and approved by the reactor supervisor and reactor health physicist. The inspector verified that the review and approvals were consistent with T.S., Sections 3.2, "Reactivity Limitations," Section 3.8, "Limitations on Experiments," Section 3.9, "Irradiations," and Section 4.2.5, "Experiment and Irradiation Limits". The inspector concluded that the experiments did not involve an unreviewed safety question.

No violations or deviations were identified.

9) Review and Audit

The licensee's review and audit activities assigned to the Reactor Hazards Committee pursuant to Sections 6.2 and 6.5 of the T.S. were examined during the inspection. The examination included discussions with licensee management and a review of the following:

a). Reactor Hazards Committee (RHC) minutes
b). Annual Report for 1983
c). Reactor Hazards Committee audit reports
d). RHC Bylaws
e). Technical Specifications
f). RHC staffing appointed by the Chanellor

Changes to the facility design and to the Emergency Plan were found to have been completed consistent with the criteria of 10 CFR 50.

The following additional observations were noted:

a) The RHC Bylaws have not been amended to include the surveillance program as an audit function as agreed to by the licensee (see paragraph 3 of Inspection Report 50-224/82-01 of January 29, 1982). The current Bylaws were last adopted and approved on March 16, 1981.

b). The current Bylaws do not have provisions for assuring compliance with Section 6.2.d.(2) and Section 6.5 of the T.S. (See paragraph 6).

c). The RHC meeting minutes of March 9, 1984 identified that the first quarter audit would consist of an audit of the RHC review of quarterly audit procedures and practices. The minutes stated that the committee agreed to review and submit written comments on the present audit procedures and practices before the next meeting. The inspector noted that the audit agreed upon at the March meeting was incomplete at the time of this inspection. The inspection also disclosed that the audit for the second quarter of 1984 was a continuation of the first quarter audit. The results of the audit assigned at the March meeting were never documented even though the subject was discussed in the subsequent 1984 RHC meeting minutes.

Discussions with the chairman of the RHC revealed that delays in resolving the first quarter audit were unavoidable and he is convinced the audit should be completed by the first quarter of 1985.

d) The inspector also noted that the current RHC audit schedule expired in March 1984.

The inspector was informed that the UC Berkeley research reactor operating procedures were scheduled to be audited during the first quarter of 1985. The inspector discussed the findings of paragraph 6 with the individual assigned the responsibility for accomplishing the audit.

The inspector verified that the audits performed prior to March 1984 were completed in accordance with the schedule assigned by the RHC. The depth of these audits appeared to be shallow.

The need for improving the audits was expressed by the inspector at the exit interview. The inspector informed the licensee that the RHC reviews and audits could be useful in verifying that concerns identified in previous NRC inspection reports are resolved. This item will be examined during a subsequent inspection (84-01-03).

No violations or deviations were identified.

10) Emergency Preparedness

The licensee's capabilities for responding to emergencies as described in their Emergency Plan of August 13, 1984 and for demonstrating compliance with 10 CFR 50.54(q) and Appendix E of 10 CFR Part 50 were examined during the inspection. A letter, dated November 9, 1984, from the Reactor Administrator to C. O. Thomas of the NRC identified that the revised upgraded UC Berkeley Emergency Plan had been implemented.

The examination included: (1) a review of the letter of agreement with Cowell Memorial Hospital, (2) discussions with the Communications Officer of the UC Berkeley Campus Police Department, (3) verification of the training provided to the campus police, City of Berkeley Police and Fire Departments, (4) review of applicable emergency procedures, (5) review of emergency drills (6) a physical inspection of emergency equipment identified in the emergency plan and (7) the training provided to the

Reactor Staff and Laboratory Users as described in Section 10 of the Emergency Plan.

The examination disclosed that the Memorandums of Understanding (MOU) with Cowell Memorial Hospital had not been verified since October 25, 1982. Discussions held with the Cowell Memorial Hospital Assistant Director indicated he was not aware of MOU; however, the Assistant Director informed the inspector that he would still honor the previous MOU.

The inspection revealed that the training of Campus Police Department and affected off site agencies such as the Berkeley Fire Department consisted of familiarization tours of the reactor facility. A recent tour of these activities was conducted in June and July of 1984.

The inspector observed that the emergency equipment specified in the Emergency Plan was available and checked at the frequencies specified in the Emergency Plan.

The examination disclosed that an emergency drill had not been conducted since the new plan was implemented. The reactor supervisor stated he was planning to conduct a drill involving the reactor staff, Cowell Memorial Hospital, UC Berkeley Police Department and Fire Department. The reactor supervisor stated that the drill would probably be conducted some time in the spring or early summer of 1985. The inspector noted that an evacuation drill was conducted in accordance with the licensee's old emergency plan in June of 1984.

The inspection disclosed that the licensee does not have a formal training program for the reactor staff or laboratory users. The licensee's training program for the reactor staff and laboratory users consists of self study of the Emergency Plan and the drills. The licensee has not developed formal means for documenting the training that is provided to the reactor staff.

It should be noted that 10 CFR Part 50, Appendix E requires that a licensee's emergency plan shall contain, but not necessarily be limited to, information needed to demonstrate compliance with elements set forth below, i.e. organization for radiation emergencies, assessment action, activation of emergency organization, emergency facilities and equipment, training, maintaining emergency preparedness and recovery. Paragraph 10.1.1 states in part: "It is the responsibility of the Reactor Supervisor to maintain a training program for the Reactor Staff and Laboratory Users so that procedures outlined here will be known and understood by all concerned."

The inspector concluded from discussions held with a reactor staff member having a Seniors Operating License that the individual did not have a good understanding or knowledge of the new Emergency Plan. The individual was unaware of the location of the Emergency Support Center discussed in Paragraph 8.1 of the plan or of the classifications of emergency conditions (e.g. Unusual Event, Alert, Site Area Emergencies, and General Emergency) as identified in Paragraph 4 of the plan. The individual was not certain whether he had or had not read the plan. The

individual informed the inspector that he was aware that a new plan had been issued and where copies of the plan were maintained in the event he had to use it during emergency conditions. Remaining individuals questioned appeared to be familiar with the plan; however, it should be noted that these individuals were responsible for its preparation.

The inspector concluded that the licensee's Emergency Plan existed as required by 10 CFR Part 50, although the implementation of the emergency plan's training program and procedures lacked cohesion and formality. This matter was discussed during the exit interview. The reactor supervisor agreed to evaluate the inspector's observations for the purpose of improving the emergency plan's training program. This item will be examined during a subsequent inspection (84-01-04).

No violations or deviations were identified.

11) Followup on Previous Inspection Findings

(Open) Followup Item (83-01-01) identified that the licensee did not perform calibration of radiation detection instrumentation in order to correct non-penetrating dose rate measurements. Paragraph 5.c of inspection report 50-224/83-01 stated that the licensee had agreed to calibrate instruments for non-penetrating radiation and to develop a program for evaluating non-penetrating radiation exposure, either by special surveys or by routinely performing the surveys.

A review and examination of the licensee's actions that were agreed to in inspection report 50-224/83-01 was accomplished during the inspection.

The examination disclosed that the licensee had failed to take any action with respect to this item. The new reactor health physicist informed the inspector that he was unaware of the concern because he had not read the inspection report.

The Radiation Safety Officer (RSO) informed the inspector, at the exit interview, that he and the previous reactor health physicist had evaluated the concern and determined that no actions were necessary. The RSO stated the results of their evaluation were not documented.

The inspector informed the licensee of the importance for performing surveys that are consistent with the intent of 10 CFR 20.201, "Surveys". The inspector added that the results of their evaluation should be documented. This item will be inspected during a subsequent inspection (83-01-01).

12) Follow-up on Information Notices

A discussion was held with the reactor supervisor for the purpose of determining the disposition of IN 82-49, "Correction for Sample Conditions for Air and Gas Monitoring" that was provided to the licensee during a previous inspection (see paragraph 11 of Inspection Report 50-224/83-01 of June 17, 1983). The disposition of subsequent IN's issued since the June 17, 1983 inspection were also addressed during the discussion. A total of sixteen IN's (e.g. #'s 83-59, 83-66, 83-66,

Supplement 1, 83-67, 83-68, 84-03, 84-08, 84-14, 84-21, 84-24, 84-34, 84-40, 84-56, 84-60, 84-72, and 84-75) were issued to test and research reactors since June 17, 1983.

The reactor supervisor informed the inspector that he did not recall receiving a copy of IN 82-49, nor does he keep track of those that he does receive. The reactor supervisor added that he does receive some; however, he has no way of determining whether or not he is receiving all IN's that are issued. The discussions indicated that the reactor supervisor did not recall receiving many of the IN's issued after June 17, 1983.

On January 4, 1985, the inspector verified that the licensee's Reactor Administrator and Reactor Supervisor are on the NRC's direct mailing list for the distribution of IN's.

The inspector informed the licensee's staff of the purpose for issuing IN's and the importance for determining whether or not the generic problem identified in the IN may apply to activities associated with the operation and administration of activities at the UC Berkeley research reactor. The inspector added that the NRC would expect licensee's to implement appropriate corrective actions to circumvent a similar problem from occurring at their facility. The inspector emphasized the importance for the establishing a system for tracking and documenting the review and evaluation of IN's.

The above observations were brought to the licensee's attention during the exit interviews. The reactor supervisor informed the inspector of his intent to establish a system for tracking and documentation of the evaluations of IN's.

The inspector provided the reactor supervisor with copies of most of the IN's identified herein. This item will be examined during a subsequent inspection (84-01-05).

No violations or deviations were identified.

13) Independent Inspection

The inspector conducted a tour of selected areas of the licensee's facilities. Independent radiation measurements were performed by the inspector during the tour in order to confirm compliance with 10 CFR 20.105 and 10 CFR 20.203.

The examination of radiation levels in unrestricted and restricted areas did not reveal any inconsistencies with the regulatory requirements.

The following observations were made during the tour:

- Plant housekeeping was adequate.

- Calibration labels affixed on two portable radiation survey instruments indicated the calibrations had expired.

- The emergency call out lists posted at the entrance to the reactor room, counting room, electronics room and chemistry laboratory were not consistent with the most recent emergency plan call out list. One individual listed was no longer employed by UC Berkeley.

- The CAM located on the reactor bridge was not functioning properly (see paragraph 3(b)).

The above observations were brought to the licensee's attention during the inspection and at the exit interview. Licensee representatives updated the emergency call out list and repaired the CAM. The reactor health physicist informed the inspector that the radiation instruments had been calibrated on time; however, he had forgot to update the labels.

No violations or deviations were identified.

14) Transportation Activities

An examination of the licensee's radioactive material shipment records for 1983 and 1984 was conducted. Radioactive materials produced in the reactor are transferred to the University's State of California license.

The examination included a review of intra-laboratory transfers and shipment records of material transferred/shipped to Lawrence Livermore Laboratory and to Lockheed.

The examination disclosed the same concerns and inconsistencies that were brought to the licensee's attention in Inspection Reports 50-224/80-03, 50-224/82-03 and 50-224/83-01.

The inspectors observations were discussed with the reactor health physicist and at the exit interview. The inspector informed the licensee that radioactive material shipments made from the reactor facility appeared to be inconsistent with the Department of Transportation (DOT) regulatory requirements that are prescribed in 49 CFR Parts 100-178. The inspection further disclosed that the licensee does not have a procedure for handling radioactive materials that are produced in the reactor. The RSO informed the inspector that a procedure does exist for handling State of California licensed material. The RSO added that the procedures are currently being revised to assure compliance with the recent changes that have been made to 10 CFR Parts 20, 30, 61 and 71 and to 49 CFR Parts 100-178.

The inspector informed the licensee that even though there were no violations of NRC regulations, the inconsistencies observed with DOT regulations would be referred to the appropriate State of California authorities. The specific inconsistencies observed involve, as a minimum, the following DOT regulatory requirements:

- 49 CFR Part 172.101, Subpart A
- 49 CFR Part 172.200-204, Subpart C, Shipping Papers
- 49 CFR Part 173.420-424, Limited Quantities of Radioactive Materials
- 49 CFR Part 173.443, Contamination Control
- 49 CFR Part 178, Packaging

No violations or deviations were identified.

15) Environmental Monitoring Program

The licensee's environmental monitoring program was examined and found to be consistent with the information provided in the licensee's 1983 annual report that was received by the NRC, Region V office on March 9, 1984. The licensee's environmental monitoring program consists of a direct radiation measurement study using CaSO4:Dy thermoluminescent dosimeters. The program also includes a study of the airborne activity within and adjacent to the research reactor facility.

The dosimeters located on the patio area (e.g. volley ball court), directly above the reactor, ranged from 58 to 171 mrem per quarter. The maximum accumulative measurement on the patio for the last year was 428 mrem. Remaining environmental dosimeters did not exceed 8 mrem per quarter. The environmental air samples received were in the range of normal background and gave no evidence of change due to reactor operations.

No violations or deviations were identified.

16). Exit Interview

The inspector met with the licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on December 21, 1984. The inspector summarized the scope and findings of the inspection. The licensee was informed that no apparent violations or deviations were identified.

The inspector debriefed the reactor administrator of the inspection scope and findings by telephone on December 21, 1984.

The licensee was informed that the inspection identified weaknesses and findings that were on the border line of being considered violations. The inspector stated that almost all of the concerns were identified during previous NRC inspections that were conducted over the past four years. The inspector added that it was apparent that the inspection reports were not being reviewed or were being ignored by the reactor operating staff and the Reactor Hazards Committee. The inspector further informed the licensee, based on the results of this inspection, that the periodic RHC audits required by Section 12.1.3.4 of the T.S. appeared to be ineffective.

The inspector emphasized that while the observations and findings do not represent a health and safety issue, the results of the inspection indicate that there is a need for management attention in resolving the findings and implications reflected by the inspection. The newly appointed reactor administrator agreed that the findings deserved management attention. The reactor administrator suggested the licensee's staff appeared to administer their responsibilities in a complacent manner. The reactor administrator also stated that the inspection findings would be brought to the attention of the appropriate UC Berkeley management level and suggested an early NRC reexamination (e.g. within 6

months) of the UC Berkeley research reactor facility be accomplished. The reactor administrator further suggested that the inspector meet with him and UC Berkeley management at some convenient date after the holiday seasons to further discuss the inspection findings.