September 3, 2009

Dr. Barry M. Klein, Vice Chancellor for Research
and Interim Reactor Director
Office of the Chancellor
University of California, Davis
One Shields Avenue
Davis, CA 95616-8558

SUBJECT: UNIVERSITY OF CALIFORNIA-DAVIS, NRC ROUTINE INSPECTION REPORT NO. 50-607/2009-202

Dear Dr. Klein:

On August 10-13, 2009, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at your University of California-Davis/McClellan Nuclear Radiation Center (Inspection Report No. 50-607/2009-202). The enclosed report documents the inspection results which were discussed on August 13, 2009, with two members of your staff, Walter Steingass, Reactor Supervisor, and David Reap, Radiation Safety Officer.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, and requests for withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Craig Bassett at (404) 358-6515 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/
Johnny H. Eads, Chief
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-607
License No. R-130

Enclosure: As stated

cc: See next page

cc:

Mr. David Reap, Radiation Safety Officer
5335 Price Avenue, Bldg. 258
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Mr. Walter Steingass, Reactor Supervisor
5335 Price Avenue, Bldg. 258
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Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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ACCESSION NO.: ML092390007 *** via e-mail** **TEMPLATE #: NRC-002**

OFFICE	PRTB:RI	PRT:LA	PRTB:BC
NAME	CBassett (*)	GLappert	JEads
DATE	8/20/2009	8/31/2009	9/3/2009

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No:	50-607
Report No:	50-607/2009-202
Licensee:	University of California-Davis
Facility:	McClellan Nuclear Radiation Center
Location:	McClellan Park Sacramento, California
Dates:	August 10-13, 2009
Inspector:	Craig Bassett
Approved by:	Johnny H. Eads, Chief Research and Test Reactors Branch B Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of California-Davis
McClellan Nuclear Radiation Center
Report No: 50-607/2009-202

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the University of California-Davis (the licensee's) Class I research and test reactor safety program including: 1) organizational structure and staffing, 2) review and audit and design change functions; 3) procedures; 4) radiation protection; 5) environmental monitoring; and, 6) transportation of radioactive materials since the last NRC inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with U.S. Nuclear Regulatory Commission requirements.

Organizational Structure and Functions

- The organizational structure and staffing were generally consistent with the requirements specified in Technical Specifications Section 6.

Review and Audit and Design Change Functions

- The Nuclear Safety Committee was meeting at the required frequency, reviewing the topics outlined in the Technical Specifications, and conducting audits of facility programs as required.

- The design change program, including review, evaluation, and documentation of changes to the facility, satisfied NRC requirements.

Procedures

- The procedure review, revision, control, and implementation program satisfied Technical Specifications requirements.

Radiation Protection Program

- Surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present.

- Postings met the regulatory requirements specified in Title 10 of the *Code of Federal Regulations,* Parts 19 and 20.

- Personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels and NRC's regulatory limits.

- Radiation survey and monitoring equipment was being maintained and calibrated as required.

- Acceptable radiation protection training was being provided to facility personnel.

Environmental Monitoring

- Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and Technical Specification limits.

Transportation of Radioactive Materials

- Radioactive material was generally being shipped in accordance with the applicable regulations.

REPORT DETAILS

Summary of Plant Status

The University of California-Davis (UCD, the licensee's) two megawatt (2 MW) TRIGA reactor, continued to be operated in support of neutron radiography, medical isotope production, neutron tomography, and experimental sample irradiation. During the inspection, the reactor was operated up go eight hours per day at a nominal power level of one (1) MW to support neutron radiography.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure [IP] 69006)

The inspector reviewed the following regarding the University of California-Davis/McClellan Nuclear Radiation Center (UCD/MNRC) organization, staffing, and responsibilities to ensure that the requirements of Technical Specification (TS) Section 6.1, Revision (Rev.) 13, dated March 28, 2003, were being met:

- Management responsibilities
- Qualifications of facility personnel
- Current UCD/MNRC organizational structure and staffing
- Staffing requirements for safe operation of the research reactor facility
- Selected UCD/MNRC Startup Checklists for 2009 documenting shift staffing
- 2007 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 13, 2008
- 2008 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 17, 2009
- Facility Procedure UCD/MNRC-0004-DOC-13, "Technical Specifications for the McClellan Nuclear Radiation Center (MNRC) Reactor Facility," Rev. 13, approval date March 28, 2003
- Facility Procedure UCD/MNRC-0045-DOC-01, "Quality Assurance Program for McClellan Nuclear Radiation Center (MNRC)," Rev. 1, approval date November 22, 1999
- American Nuclear Society Standard 15.4-1988, "Selection and Training of Personnel for Research Reactors," standard approval dated June 9, 1988

b. Observations and Findings

Through interviews with licensee personnel and document review, the inspector determined that Dr. Robert G. Flocchini, the UCD/MNRC Reactor Director, had retired in June 2009. Until another person can be found to fill the position, the Vice Chancellor for Research has been appointed as Interim Reactor Director. The Vice Chancellor subsequently appointed an on-site team consisting of the Reactor Supervisor, the Assistant Director of Finance/ Administration, and the Associate Director for Research to ensure seamless functioning in the day-to-day operations of the facility.

As noted in NRC Inspection Report No. 50-607/2008-203, the licensee's organizational chart for the UCD/MNRC indicated that the chain of command included an Operations Manager who was to be in charge of reactor operations. The chart also indicated a staff position of Health Physics (HP) Supervisor. These two positions were no longer part of the facility organizational structure and the licensee was preparing a TS change to be submitted to reflect the current structure. As of the date of this inspection, this TS change was still pending.

Except as noted above, the organization and staffing at the facility, required for reactor operation, were as specified in the TS. Qualifications of the staff members met program requirements. Review of records demonstrated that management responsibilities were discharged as required by applicable procedures.

c. Conclusions

The licensee's organization and staffing, in general, remained in compliance with the requirements specified in the TS Section 6.

2. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69007)

To verify that the required reviews and audits were being completed and that facility changes were reviewed and approved as required by TS Section 6.2, the inspector reviewed selected aspects of:

- 2007 Annual Audit completed December 14, 2007
- 2008 Annual Audit completed August 1, 2008
- UCD/MNRC Monthly Reports for January through July 2009
- UCD/MNRC Monthly Reports for July through December 2008
- Nuclear Safety Committee meeting minutes for July 2007 through the present
- UCD/MNRC "Facility Modification Notebook" containing the "Facility Modification Log" forms
- Selected "Facility Modification Installation Authorization Forms" and associated "Facility Modification Checklist" forms processed during 2008 and 2009
- 2007 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 13, 2008
- 2008 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 17, 2009
- Facility Procedure UCD/MNRC-0043-DOC-04, "Facility Modification Procedure," Rev. 4, approval dated January 8, 2008

- Facility Procedure UCD/MNRC-0045-DOC-01, "Quality Assurance Program for McClellan Nuclear Radiation Center (MNRC)," Rev. 1, approval dated November 22, 1999

b. Observations and Findings

(1) Review and Audit Functions

Composition of the Nuclear Safety Committee (NSC) and qualifications of NSC members were as specified in TS Section 6.2.1. Minutes of the NSC meetings indicated that the committee met semiannually as required by TS Section 6.2.2 and provided the reviews and oversight specified in TS Section 6.2.3. Through records review the inspector determined that safety reviews were conducted by the NSC or a designated representative. Topics of those reviews were as required by the TS and provided sufficient guidance, direction, and oversight to ensure acceptable use of the reactor.

The inspector reviewed the most recent annual audit conducted at the facility. The audit was comprehensive and reviewed the activities specified in TS Section 6.2.4, including various aspects of the reactor facility operations and programs for calendar year 2008. No discrepancies were found and no recommendations were made as a result of the audit.

(2) Design Change Functions

The regulatory requirements stipulated in Section 50.59 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Changes, tests, and experiments," were implemented at the facility through Facility Procedure UCD/MNRC-0043-DOC-04, "Facility Modification Procedure." The procedure was developed to address activities that affected changes to the facility as described in the Safety Analysis Report (SAR), changes to MNRC procedures, and changes to or development of new tests or experiments not described in the SAR. The procedure adequately incorporated criteria provided by the regulations with additional requirements mandated by local conditions.

The inspector reviewed selected "Facility Modification Installation Authorization Forms" and the associated "Facility Modification Checklist" forms processed during 2008 and to date in 2009. The completed forms showed that the proposed modifications were acceptably reviewed in accordance with the procedure. It was noted that none of the changes or modifications were determined to constitute a safety question or concern and none required a license or TS amendment.

c. Conclusions

The NSC was meeting as required and reviewing the topics outlined in the TS. Audits of various reactor operations and programs were being conducted as required. The design change program satisfied NRC requirements.

3. Procedures

a. Inspection Scope (IP 69008)

To verify compliance with TS Section 6.4, the inspector reviewed selected portions of the following:

- "Document Review" forms completed by staff members
- "MNRC Document List" listing all the licensee's current procedures
- "UCD/MNRC Controlled Document Review and Approval Reference List"
- Various memoranda from the Reactor Supervisor to the staff indicating document review assignments and responsibilities
- Various of the Addenda located in Facility Procedure UCD/MNRC-0042-DOC-14, "MNRC Health Physics Instrumentation Calibration and Test Procedures"
- Facility Procedure UCD/MNRC-0005-DOC-09, "Document Control Plan," Rev. 9, approval dated February 16, 2007
- Facility Procedure UCD/MNRC-0029-DOC-18, "UCD/MNRC Radiation Protection Procedures," Rev. 18, approval dated January 29, 2008

b. Observations and Findings

Technical Specification Section 6.4 required that procedures be prepared and approved for the activities listed in that section. The procedures were required to be approved by the UCD/MNRC Director. Facility Procedure UCD/MNRC-0005-DOC stipulated that the UCD/MNRC staff perform a biennial review of each active document to assure that it was current. The inspector noted that Operations and Health Physics procedures were typically being reviewed annually by the licensee while maintenance and other procedures were reviewed biennially. Changes to the procedures required the approval of the UCD/MNRC Director and all changes were required to be documented. The inspector determined that the UCD/MNRC procedures were being reviewed as required, that procedures were approved by the Director, and that changes were approved as required as well. It was also noted that training was being conducted for facility personnel regarding changes to procedures.

c. Conclusions

The current procedure review, revision, control, and implementation program satisfied TS requirements.

4. Radiation Protection

a. Inspection Scope (IP 69012)

The inspector reviewed the following regarding the licensee's radiation protection program to ensure that the requirements of 10 CFR Part 20 and TS Sections 4.7 and 6.4.2 were being met:

- Calibration of selected radiation monitoring instruments
- UCD/MNRC Monthly Reports for January through July 2009
- UCD/MNRC Monthly Reports for July through December 2008
- The "Self Inspection Checklist" completed by the RSO for 2008
- Personal monthly dosimetry results for 2007, 2008, and through June 2009
- "2008 MNRC Radiation Safety Program Review Report," completed by members of the NSC and dated December 4, 2008
- Lesson plans, training objectives, and qualification cards for training of personnel by the RSO
- Selected daily, weekly, and quarterly contamination and radiation survey results for the past two years
- 2007 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 13, 2008
- 2008 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 17, 2009
- Facility Procedure UCD/MNRC-0029-DOC-18, "UCD/MNRC Radiation Protection Procedures," Rev. 18, approval dated January 29, 2008
- Facility Procedure UCD/MNRC-0042-DOC-14, "MNRC Health Physics Instrumentation Calibration and Test Procedures," which included:
  - Addendum No. 01, "Beta Dose Rate Calibration Procedure," Rev. 6, dated August 22, 2007
  - Addendum No. 29, "Ludlum Model 177 Calibration Procedure," Rev. 3, dated February 22, 1999
  - Addendum No. 30, "Ludlum Model 177-54 Calibration Procedure," Rev. 3, dated February 22, 1999
  - Addendum No. 31, "Ludlum Model 3 Calibration Procedure," Rev. 4, dated September 18, 2007
  - Addendum No. 34, "RAM Calibration Procedure," Rev. 4, dated June 8, 2009
  - Addendum No. 48, "Stack CAM Calibration Procedure," Rev. 2, dated May 10, 2007
  - Addendum No. 49, "Reactor CAM Calibration Procedure," Rev. 1, dated May 16, 2007
  - Addendum No. 50, "Bay CAM Calibration Procedure," Rev. 1, dated May 21, 2007

- Safety Analysis Report, Revision 4, dated December 1999, Chapter 11, "Radiation Protection and Waste Management Program," Revision 2, dated April 3, 1998
- American National Standard ANSI/ANS-15.11-1993, "Radiation Protection at Research Reactor Facilities," standard approval dated July 23, 1993

The inspector also toured the facility, conducted a radiation survey of selected areas, and observed the use of dosimetry and radiation monitoring equipment. In addition, licensee personnel were interviewed and radiological signs and postings were observed.

b. Observations and Findings

(1) Surveys

Daily, weekly, quarterly, and other special contamination and radiation surveys, outlined in the licensee's "UCD/MNRC Radiation Protection Procedures," were being completed by the RSO or other qualified staff members as required. Any contamination detected in concentrations above established action levels was noted and the affected area was decontaminated. Results of the surveys were typically documented on survey maps and posted at the entrances of the various areas surveyed so that facility workers could check and be knowledgeable of the radiological conditions that existed in those areas.

During the inspection the inspector accompanied a licensee representative to review the results of a Weekly Radiation and Contamination Survey. The inspector conducted an independent radiation survey as well. Areas surveyed at the facility included the Equipment Room, the Reactor Room, and associated support areas. The radiation levels noted by the inspector were comparable to those found by the licensee and no anomalies were noted.

(2) Postings and Notices

Copies of current notices to workers were posted in appropriate areas in the facility. Radiological signs and survey maps were typically posted at the entrances to controlled areas. Other postings also showed the industrial hygiene hazards that were present in the areas as well. The copy of NRC Form-3 noted at the facility was the latest issue, as required by 10 CFR Part 19, and was posted on a bulletin board near the main entrance to the facility where visitors are required to sign the Visitors Log.

(3) Dosimetry

Personnel were observed to be properly wearing extremity and whole body dosimetry in the controlled areas. The dosimeters being used were 4-chip thermoluminescent dosimeters (TLDs) processed monthly by a NVLAP certified vendor (Global Dosimetry Solutions). The TLDs were

used for whole body monitoring and TLD finger rings were used for extremity monitoring. An examination of the TLD results indicating radiological exposures at the facility for the past two years showed that the highest occupational doses, as well as doses to the public, were within 10 CFR Part 20 limits. The highest annual whole body exposure received by a single licensee employee for 2007 was 242 millirem deep dose equivalent (DDE). The highest annual extremity exposure for 2007 was 772 millirem shallow dose equivalent (SDE). The highest annual whole body exposure received by a single person for 2008 was 140 millirem DDE and the highest annual extremity exposure for 2008 was 323 millirem SDE. Through June 2009, the highest individual whole body exposure that had been received has been 14 millirem DDE and the highest extremity exposure has been zero (0) millirem SDE.

When the inspector asked to review the NRC Form-5 reports for personnel receiving greater than 100 millirem for 2008, the licensee indicated that they had not yet been received from the vendor and provided to the appropriate employees. The licensee then contacted the vendor and requested the forms. As of the date of the end of the inspection, no NRC Form-5s had been received.

(4) Radiation Monitoring Equipment

Selected calibration records of portable survey meters, friskers, fixed radiation detectors, and air monitoring instruments in use at the facility were reviewed. The records showed that the monitors were either calibrated by reactor staff or the instruments were sent off site to be calibrated by a contractor. The calibrations were documented, tracked, and controlled as required. The inspector confirmed that the frequencies of the calibrations satisfied the requirements established in the TS Section 4.7 and 10 CFR 20.1501(b). All instruments checked by the inspector had a current calibration sticker attached.

During the inspection the inspector observed the calibration of an air sampler by the RSO. The calibration was completed using the appropriate procedure and designated techniques. The various steps of the procedure were completed in order and signed off as required.

(5) Radiation Protection Program

The radiation protection program was described and controlled by procedures and policies that were well documented as required by TS Section 6.4.2 and 10 CFR 20.1101(a). Annual audits of the radiation protection program had been completed by the RSO on June 12, 2008, and June 30, 2009. A separate audit was conducted by members of the NSC on November 23, 2008. These audits satisfied the periodic program review required by 10 CFR 20.1101(c). One problem was noted by the NSC audit team and various recommendations for improvements were

made. (See Section 6 below for a discussion of the problem noted by the NSC members.)

(6) Personnel Training

Personnel training required by 10 CFR 19.12, "Instruction to Workers," was provided by the RSO. In a graded approach, there were five "levels" or plans for training, designated as "A" through "E". The type of training provided to an individual was dictated by the type of work to be performed and/or what controlled area(s) the person would be required to enter. Plan A was training provided for visitors. Plan B was training provided for Radiation Workers. Plan C was given biennially typically to reactor operators. Plan D was given annually to all facility faculty and staff. Plan E was for ancillary personnel such as custodial service workers. The training was being completed as required and appeared to be adequate.

(7) Radiation Work Permit Program

The inspector reviewed the Radiation Work Permits (RWPs) that had been written, used, and closed out during 2008 and those issued to date in 2009. It was noted that no Special RWPs had been issued recently. Of those RWPs that had been written for 2009, the inspector determined that the controls, precautions, and instructions specified in the RWPs appeared to be appropriate and were being followed. Review by the RSO had been completed as required.

(8) Facility Tours

The inspector toured the main Staging or Set-Up area, Bays 1 and 2, the Equipment Room, and the Reactor Room with licensee representatives on various occasions and observed on-going activities. The inspector noted that facility radioactive material storage areas were properly posted. No unmarked radioactive material was noted. Radiation and High Radiation Areas were posted as required and properly controlled.

c. Conclusions

The inspector determined that the Radiation Protection and ALARA Programs, as implemented by the licensee, satisfied regulatory requirements because: 1) surveys were completed and documented acceptably to permit evaluation of the radiation hazards present; 2) postings at the facility met regulatory requirements; 3) personnel dosimetry was being worn as required and recorded doses were well within the NRC's regulatory limits; 4) radiation survey and monitoring equipment was being maintained and calibrated as required; 5) the Radiation Protection Program was acceptable and was being reviewed annually as required; and, 6) acceptable radiation protection training program was being provided to facility personnel.

5. Effluent and Environmental Monitoring

a. Inspection Scope (IP 69004)

The inspector reviewed the following to verify compliance with the requirements of 10 CFR Part 20 and TS Section 6.4.2(d):

- Solid Radwaste Logbook
- UCD/MNRC Monthly Reports for January through July 2009
- UCD/MNRC Monthly Reports for July through December 2008
- Quarterly Environmental TLD Reports for 2007, 2008, and to date in 2009
- "Radioactive Material Discharged Into Sanitary Sewer" form maintained and updated for 2007, 2008, and to date in 2009
- 2007 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 13, 2008
- 2008 Annual Report for University of California-Davis/McClellan Nuclear Radiation Center, Docket No. 50-607, License No. R-130, report dated June 17, 2009
- Facility Procedure UCD/MNRC-0029-DOC-18, "UCD/MNRC Radiation Protection Procedures," Rev. 18, approval dated January 29, 2008
- Facility Procedure UCD/MNRC-0042-DOC-14, "MNRC Health Physics Instrumentation Calibration and Test Procedures," which included:
  - Addendum No. 08, "Stack CAM Alarm Setpoint Procedure," Rev. 7, dated May 16, 2007
  - Addendum No. 12, "Weekly Stack CAM Source Check Procedure," Rev. 4, dated October 27, 2005
  - Addendum No. 16, "Canberra 2404 Calibration Procedure," Rev. 7, dated May 14, 2008
  - Addendum No. 48, "Stack CAM Calibration Procedure," Rev. 2, dated May 10, 2007

b. Observations and Findings

The inspector determined that gaseous releases continued to be monitored as required, were acceptably analyzed, and were documented in the annual operating reports. Airborne concentrations of gaseous releases were well within the concentrations stipulated in 10 CFR Part 20, Appendix B, Table 2, and TS limits. The dose rate to the public, as a result of the gaseous releases, was below the dose constraint specified in 10 CFR 20.1101(d) of 10 millirem per year. As required, the licensee also calculated the dose to a member of the public as the result of reactor operations using the EPA computer code, CAP88-PC, Version 3. The results indicated an annual dose to the public of 0.02 millirem for 2007 and 0.019 millirem for 2008.

There were no liquid releases from the facility during 2007, 2008, and to date in 2009. It was also noted that no solid radioactive waste had been shipped from the facility during 2007, 2008, and to date in 2009.

Environmental water samples were collected, prepared, and sent to a vendor for analysis consistent with procedural requirements. The results of these analyses were all within regulatory limits. On-site and off-site gamma radiation monitoring was completed using various environmental TLDs in accordance with the applicable procedures as well. The review of data indicated that there were no measurable doses above any regulatory limits. The highest unrestricted area dose measured by an environmental TLD was 20 millirem for 2007 and 25 millirem for 2008.

c. Conclusion

Effluent monitoring satisfied license and regulatory requirements and releases were within the specified TS requirements and regulatory limits.

6. Transportation

a. Inspection Scope (IP 86740)

To verify compliance with regulatory and procedural requirements for transferring or shipping licensed radioactive material, the inspector reviewed the following:

- Selected licenses of various consignees
- Selected records of various types of radioactive material shipments
- Selected training records for staff personnel authorized to ship hazardous material in accordance with the regulations specified by the Department of Transportation (DOT)
- Facility Procedure UCD/MNRC-0029-DOC-18, "UCD/MNRC Radiation Protection Procedures," Rev. 18, approval dated January 29, 2008
- Appendix A, "Limited Quantity of Class 7 (Radioactive) Materials Checklist," of Section 21 of Facility Procedure UCD/MNRC-0029-DOC-18, "UCD/MNRC Radiation Protection Procedures," Rev. 18, approval dated January 29, 2008
- NUREG-1660/RAMREG-002, "U.S.-Specific Schedules of Requirements for Transportation of Specified Types of Radioactive Material Consignments," published November 1998

b. Observations and Findings

(1) Routine Shipments

Through records review and discussions with licensee personnel, the inspector determined that the licensee had shipped various types of radioactive material since the previous inspection in this area. The records indicated that the radioisotope types and quantities were calculated and dose rates generally measured as required. All radioactive material shipment records reviewed by the inspector had been completed in accordance with DOT and NRC regulations except as noted below.

The inspector verified that the licensee maintained copies of shipment recipients' licenses to possess radioactive material as required and that the licenses were verified to be current prior to initiating a shipment. The training of the staff members responsible for shipping the material was also reviewed. The inspector verified that the shippers had received the appropriate training covering the DOT, IATA, and ICAO requirements within the past three years.

(2) Shipment Problem Noted by NSC Members

Regulation 10 CFR 71.5(a) requires that each licensee who transports licensed material outside the site of usage, as specified in the NRC license, or where transport is on public highways, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the Department of Transportation (DOT) regulations in 49 CFR parts 171 through 180, appropriate to the mode of transport.

Regulations 49 CFR 173.441(a) requires that each package of Class 7 (radioactive) material offered for transportation must be designed and prepared for shipment, so that under conditions normally incident to transportation, the radiation level does not exceed 2 milliSeiverts per hour (mSv/hr) (200 millirem per hour) at any point on the external surface of the package, and the transport index does not exceed 10.

During the inspection the inspector reviewed the "2008 MNRC Radiation Safety Program Review Report," completed by two members of the NSC. The inspector noted that one of the findings discussed by the NSC members involved radioactive material shipments. The report indicated that there had been 14 shipments of radioactive material from the UCD/MNRC in 2008. The shipments ranged from Limited Quantity Excepted Packages to Type A shipments using various carriers. After a review of the shipment checklists, radiological surveys, and shipping papers, the NSC members determined that all of the shipments were in accordance with DOT or IATA requirements except that radiation surveys were not performed on the external surfaces of the Type A packages for eight Argon-41 (Ar-41) shipments and three Sodium-24 (Na-24) shipments. The surveys should have been performed to verify that the contact dose rates on the packages involved were less than 200 millirem per hour as required by 49 CFR 173.441.

The inspector also reviewed the 2008 shipment checklists, radiological surveys, and shipping papers and verified that the required surveys had not been completed and/or documented. The individuals involved with the shipments were questioned about the surveys and admitted that, although the surveys may have been conducted, they had not been documented as required. The licensee had instructed the individuals to review the DOT requirements and ensure that all surveys were documented as required for future shipments. It was noted that no such shipments have been made to date in 2009.

The licensee was informed that failure to complete surveys on the external surfaces of the Type A packages for various Ar-41 and Na-24 shipments was a violation of the regulations specified in 49 CFR 173. The licensee was also informed that this violation is being treated as a minor violation. Although this issue should be corrected, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the Enforcement Policy.

c. Conclusions

Radioactive material was generally being shipped in accordance with the applicable regulations. One minor violation was noted for failure to comply with the requirements of 49 CFR Part 173.441.

7. Follow-up of Previous Open Items

a. Inspection Scope

The inspector reviewed the licensee's actions taken in response to a previously identified Inspector Follow-up Item (IFI).

b. Observation and Findings

(Closed) IFI - 50-607/2006-201-02– Follow-up on the licensee's actions to update facility drawings so that they reflect current plant conditions.

As noted in NRC Inspection Report No. 50-607/2006-201, various modification packages at the facility had not been closed out. At that time, the licensee indicated that this was because the majority of the open modification packages required a change to specific facility drawings and that those actions had not been completed.

The inspector reviewed this open item during this inspection and noted that all but two modification packages had been closed. The two remaining were FM-III-05-01, entitled, "Modification of Bay 3 Console and New CT Equipment" and FM-III-07-01, entitled, "AC Power Distribution Changes for X-Ray System in Bay 4."

In reviewing the status of these two open packages, the inspector noted that the actual work involved with FM-III-05-01 had been completed in early 2005. The electrical engineer who performed the work was unable to complete some of the drawing changes prior to being laid off from work at the UCD/MNRC facility. No personnel currently at the facility has the skill set to complete the needed drawing modifications. As a result the package has remained open but efforts were being made to arrange for other personnel on campus to update the drawings.

With respect to FM-III-07-01, the majority of the electrical work on this modification has been completed. However, the Level III Neutron Radiographer at the facility recommended that no further work on the project be completed until

the required personnel needed for operation of the X-ray equipment are available at the facility. Currently no such persons are employed at the UCD/MNRC and there is a California State requirement that such personnel be present for the operation of the X-ray equipment involved. It is not known when the project will continue or when "X-ray qualified" personnel will be available at the facility to proceed with this work.

Because of the current California State budget crisis, because of the staffing level at the facility, and because the licensee is well aware of what needs to be done to close out these two open modification packages, the inspector determined that the IFI should be closed. The licensee was informed that this IFI is considered closed.

c. Conclusions

One previously identified IFI was closed.

8. Exit Interview

The inspection scope and results were summarized on August 13, 2009, with members of licensee management and staff. The inspector described the areas inspected and discussed the inspection findings. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

H. Bollman	Facility Supervisor and SRO
M. Boussoufi	Experiment Coordinator
H. Egbert	Radiography Supervisor and SRO
R. Miller	Level II Radiographer and SRO
D. Reap	Radiation Safety Officer and SRO
W. Steingass	Reactor Supervisor and SRO

INSPECTION PROCEDURES USED

IP 69004:	Class I Research and Test Reactor Effluent and Environmental Monitoring
IP 69006:	Class I Research and Test Reactor Organization, Operations, and Maintenance Activities
IP 69007:	Class I Research and Test Reactor Review and Audit and Design Change Functions
IP 69008:	Class I Research and Test Reactor Procedures
IP 69012:	Class I Research and Test Reactor Radiation Protection
IP 86740:	Inspection of Transportation Activities
IP 92701	Inspector Follow-up

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

50-607/2006-201-02	IFI	Follow-up on the licensee's actions to update facility drawings so that they reflect current plant conditions.

Discussed

50-607/2006-201-01	IFI	Follow-up on the licensee's actions to update and correct the organizational chart specified in the TS by submitting the appropriate TS change request.

PARTIAL LIST OF ACRONYMS USED

ALARA	As low as reasonably achievable
10 CFR	Title 10 of the *Code of Federal Regulations*
DDE	Deep dose equivalent
DOT	Department of Transportation
HP	Health Physics
IFI	Inspector Follow-up Item
IP	Inspection procedure
MNRC	McClellan Nuclear Radiation Center
MW	megawatt
NRC	U. S. Nuclear Regulatory Commission
NSC	Nuclear Safety Committee
PDR	Public Document Room
Rev.	Revision
RSO	Radiation Safety Officer
SRO	Senior Reactor Operator
RWP	Radiation Work Permit
SDE	Shallow dose equivalent
TLD	Thermoluminescent dosimeter
TS	Technical Specifications
UCD	University of California-Davis