

August 23, 2011

Dr. Barry M. Klein, Reactor Director
5335 Price Avenue, Bldg. 258
McClellan AFB, CA 95652-2504

SUBJECT: UNIVERSITY OF CALIFORNIA-DAVIS – NRC ROUTINE INSPECTION
REPORT NO. 50-607/2011-202

Dear Dr. Klein:

On July 18-21, 2011, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at your University of California-Davis/McClellan Nuclear Research Center (Inspection Report No. 50-607/2011-202). The enclosed report documents the inspection results which were discussed on July 21, 2011, with members of your staff including, Walter Steingass, Associate Director for Reactor Operations, 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 (301) 466-4495 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/

Johnny H. Eads, Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No. 50-607/2011-202
cc: See next page

University of California – Davis/McClellan MNRC

Docket No. 50-607

cc:

Mr. David Reap, Radiation Safety Officer
5335 Price Avenue, Bldg. 258
McClellan AFB, CA 95652-2504

Mr. Walter Steingass, Reactor Supervisor
5335 Price Avenue, Bldg. 258
McClellan AFB, CA 95652-2504

California Energy Commission
1516 Ninth Street, MS-34
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Radiological Health Branch
P.O. Box 997414, MS 7610
Sacramento, CA 95899-7414

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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

Docket No: 50-607

Report No: 50-607/2011-202

Licensee: University of California-Davis

Facility: McClellan Nuclear Research Center

Location: McClellan Park
Sacramento, California

Dates: July 18-21, 2011

Inspector: Craig Bassett

Approved by: Johnny H. Eads, Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of California-Davis
McClellan Nuclear Research Center
Report No: 50-607/2011-202

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 U. S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with NRC requirements.

Organizational Structure and Functions

- The organizational structure and staffing were 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 Technical Specification and regulatory limits.

Transportation of Radioactive Materials

- Radioactive material was 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 (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 to eight hours per day at a nominal power level of one MW to support neutron radiography and sample irradiation.

1. Organization and Staffing

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

The inspector reviewed the following regarding the University of California-Davis/McClellan Nuclear Research 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 Operations Logs and UCD/MNRC Startup Checklists for 2011 documenting shift staffing
- 2009 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 17, 2010
- 2010 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 28, 2011
- Facility Procedure UCD/MNRC-0004-DOC-13, "Technical Specifications for the McClellan Nuclear Research Center (MNRC) Reactor Facility," Rev. 13, approval date March 28, 2003
- Facility Procedure UCD/MNRC-0045-DOC-01, "Quality Assurance Program for McClellan Nuclear Research 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

The organization at the UCD/MNRC was as required by TS Section 6. The Vice Chancellor was the one designated as the licensee for the university. The UCD/MNRC facility was under the direct control of the Reactor Director who reported to and was accountable to the Vice Chancellor for the safe operation and maintenance of the facility. Individuals at the facility in management positions such as the Reactor Supervisor and the Radiation Safety Officer reported to the Reactor Director and were responsible for implementing UCD/MNRC policies, for operation of the facility, for safeguarding facility

personnel and the public from undue radiation exposure, and for adhering to the operating license and technical specifications.

As noted in NRC Inspection Report No. 50-607/2008-203, the licensee's organizational chart for the UCD/MNRC as shown in the TS 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. During a previous inspection, the inspector noted that the licensee had initiated, reviewed, and approved a TS change to reflect the current structure. During this inspection the licensee indicated that the change had been submitted to the NRC on July 15, 2011 and was thus awaiting NRC review.

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. Conclusion

With the recent TS change submitted to the NRC, the licensee's current organization and staffing were 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:

- 2009 Annual Audit of the MNRC completed December 21, 2009
- 2010 Annual Audit of the MNRC completed November 4, 2010
- Nuclear Safety Committee meeting minutes for June 2010 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 2010 and to date in 2011
- 2009 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 17, 2010
- 2010 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 28, 2011
- 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 Research 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 continued to meet 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 reviews were conducted by the NSC or designated representatives. 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 two most recent annual audits conducted at the facility. The audits were comprehensive and reviewed the activities specified in TS Section 6.2.4, including various aspects of the reactor facility operations and associated programs. No discrepancies were found but several recommendations were made as a result of the audits.

(2) Design Change Functions

The regulatory requirements stipulated in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 "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 entries in the "Facility Modification Log" Notebook for the period from 2010 and to date in 2011. The Notebook entries showed that the only modification proposed recently dealt with replacing an air conditioning unit with a larger model. The modification did not constitute a safety question or concern and did not require a license or TS amendment.

c. Conclusion

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:

- Selected "Document Review" forms completed by staff members
- "UCD/MNRC Controlled Document Review and Approval Reference List"
- "MNRC Document List" listing all the licensee's current procedures and the date each was last reviewed
- Various memoranda from the Reactor Supervisor to the staff indicating document review assignments and responsibilities
- 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
- Various of the Addenda located in Facility Procedure UCD/MNRC-0042-DOC-9, "MNRC Health Physics Instrumentation Calibration and Test Procedures," latest revisions of the addenda were completed on January 13, 2011

b. Observations and Findings

According to TS Section 6.4 it was 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 documented as required as well. It was also noted that training was being conducted for facility personnel regarding changes to procedures.

c. Conclusion

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

4. Radiation Protection

a. Inspection Scope (IP 69012)

The inspector reviewed selected portions of 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
- List documenting all MNRC personnel who were authorized to handle radioactive material dated June 21, 2011
- The "Self Inspection Checklist" completed by the Radiation Safety Officer (RSO) for 2009 and 2010
- Personal monthly dosimetry results for 2009, 2010, and through March 2011
- "2009 MNRC Radiation Safety Program Review Report," completed by members of the NSC and dated September 10, 2009
- "2010 MNRC Radiation Safety Program Review Report," completed by members of the NSC and dated December 6, 2010
- 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
- 2009 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 17, 2010
- 2010 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 28, 2011
- 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-9, "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
- 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 observe the completion of a Weekly Radiation and Contamination Survey. The inspector conducted an independent radiation survey using an NRC issued survey meter. 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 (Mirion Technologies (formerly 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 2009 was 69 millirem deep dose equivalent (DDE). The highest annual extremity exposure for 2009 was 168 millirem shallow dose equivalent (SDE) and the highest skin or other shallow dose was 63 mr SDE. The highest annual whole body exposure received by a single person for 2010 was 169 millirem

DDE. The highest annual extremity exposure for 2010 was 562 millirem SDE and the highest skin or other shallow dose was 171 mr SDE. Through May 2011, the highest individual whole body exposure that had been received has been 11 millirem DDE; the highest extremity exposure has been 46 millirem SDE; and, the highest skin or other shallow dose was 12 mr SDE.

(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 meters and detectors were either calibrated by reactor staff or the instruments were sent off site to be calibrated by a contractor. The calibrations were tracked and documented 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.

(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 18, 2010, and July 6, 2011. These were documented in the form of a "Self Identification Checklist." Separate audits of the program were conducted by members of the NSC on September 10, 2009, and December 6, 2010. These audits satisfied the periodic program review required by 10 CFR 20.1101(c). No problems were noted by the NSC audit team but various recommendations for improvements were made.

(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 initial training for reactor operators hired at the facility. Subsequent training on this material was provided to operators during their requalification training. Plan D was given annually to all facility faculty and staff. Plan E was for ancillary personnel such as custodial service workers.

The inspector reviewed the training given to facility personnel. Newly hired individuals had received Plan B training as well as job specific training. The inspector noted that training was being completed as required and it appeared to be adequate.

On July 21, 2011, a tour group consisting of high school students and their teachers visited the facility. The inspector observed the briefing given to the group as well as the sign-in and dosimetry issuing process. The briefing appeared to be adequate for the activities the students were to be involved in and the processing was according to procedure.

(7) Radiation Work Permit Program

The inspector reviewed the Radiation Work Permits (RWPs) that had been written, used, and closed out during 2010 and those issued to date in 2011. It was noted that no Special RWPs had been issued recently. Of those RWPs that had been written for 2010 and 2011, the inspector determined that the controls, precautions, and instructions specified in the RWPs appeared to be appropriate and were being followed. It was also noted that the RWPs had been reviewed by the RSO as required.

(8) Facility Tours

The inspector toured the main Staging or Set-Up area, the Equipment Room, the Reactor Room, and various support areas with licensee representatives on various occasions and observed on-going activities. It was 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. Conclusion

The inspector determined that the Radiation Protection and As Low As Reasonably Achievable (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
- Quarterly Environmental TLD Reports for 2009, 2010, and to date in 2011
- "Radioactive Material Discharged Into Sanitary Sewer" form maintained and updated for 2009, 2010, and to date in 2011

- 2009 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 17, 2010
- 2010 Annual Report for University of California-Davis/McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130, report dated June 28, 2011
- 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-9, "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
 - 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

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 average dose rate to the public for 2009, as a result of the gaseous releases, was calculated to be 0.86 mr, well below the dose constraint specified in 10 CFR 20.1101(d) of 10 millirem per year. The average dose rate to the public for 2010, as a result of the gaseous releases, was calculated to be 0.48 mr. The licensee also completed a calculation of the dose to a member of the public as the result of reactor operations using the Environmental Protection Agency (EPA) computer code, CAP88-PC, Version 3. The results indicated an annual dose to the public of 2.2E-2 millirem for 2009 and 1.33E-2 millirem for 2010.

There were no liquid releases from the facility during 2009, 2010, and to date in 2011. It was also noted that no solid radioactive waste had been shipped from the facility during 2009, 2010, and to date in 2011.

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 23 millirem for 2009 and 23 millirem for 2010.

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 including completed radiological survey forms
- 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
- 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

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 measured as required. All radioactive material shipment records reviewed by the inspector had been completed in accordance with DOT and NRC regulations.

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 licensee personnel designated as "shippers" had received the appropriate training covering the DOT, Information Assessment Team Advisory (IATA), and International Civil Aviation Organization (ICAO) requirements within the past three years.

c. Conclusion

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

7. Exit Interview

The inspection scope and results were summarized on July 21, 2011, 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 Manager and Senior Reactor Operator (SRO)
H. Egbert	Radiography Supervisor and SRO
B. Klein	Reactor Director
M. Lerche	Associate Director for Research/Education Coordination
B. Liu	Research Support Engineer
R. Miller	Level II Radiographer and SRO
D. Reap	Radiation Safety Officer and SRO
M. Lagunas-Solar	Associate Director for Radioisotopes Sciences and Development and Member of the Nuclear Safety Committee
W. Steingass	Associate Director for Reactor Operations and Reactor Supervisor
R. Walker	Radiographer/Mechanic

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

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

PARTIAL LIST OF ACRONYMS USED

ALARA	As low as reasonably achievable
10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
DDE	Deep dose equivalent
DOT	Department of Transportation
EPA	Environmental Protection Agency
HP	Health Physics
IP	Inspection procedure

MNRC	McClellan Nuclear Research 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