

September 30, 2016

Dr. Wesley D. Frey, Reactor Director  
McClellan Nuclear Research Center  
University of California, Davis  
5335 Price Avenue, Building 258  
McClellan, CA 95652-2504

SUBJECT: UNIVERSITY OF CALIFORNIA, DAVIS/MCCLELLAN NUCLEAR RESEARCH  
CENTER – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE  
INSPECTION REPORT NO. 50-607/2016-202

Dear Dr. Frey:

From August 29 – September 1, and September 8 – 9, 2016, the U.S. Nuclear Regulatory Commission (NRC or the Commission) completed an inspection at the University of California, Davis/McClellan Nuclear Research Center. The enclosed report documents the inspection results which were discussed on September 1, 2016, with you and the Reactor Supervisor.

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 non-compliance 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, 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).

W. Frey

- 2 -

If you have any questions concerning this inspection, please contact Craig Bassett at (301) 466-4495, or by electronic mail at [Craig.Bassett@nrc.gov](mailto:Craig.Bassett@nrc.gov).

Sincerely,

*/RA/*

Anthony J. Mendiola, 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:  
As stated

cc: See next page

University of California-Davis/McClellan

Docket No. 50-607

cc:

David Reap, Radiation Safety Officer  
5335 Price Avenue, Building 258  
McClellan, CA 95652-2504

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

California Energy Commission  
1516 Ninth Street, MS-34  
Sacramento, CA 95814

Radiological Health Branch  
California Department of Public Health  
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

W. Frey

- 2 -

If you have any questions concerning this inspection, please contact Craig Bassett at (301) 466-4495, or by electronic mail at [Craig.Bassett@nrc.gov](mailto:Craig.Bassett@nrc.gov).

Sincerely,

*/RA/*

Anthony J. Mendiola, 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:  
As stated

cc: See next page

**DISTRIBUTION:**

PUBLIC	RidsNrrDprPrta	RidsNrrDprPrtb	PROB R/F
MNorris, NRR	MCompton, NRR	CBassett, NRR	NParker, NRR
AMendiola, NRR	AAdams, NRR	LTran, NRR	MDeSouza, NRR

**ADAMS Accession No.: ML16256A082; \*concurrence via e-mail** **NRC-002**

<b>OFFICE</b>	NRR/DPR/PROB/PM*	NRR/DPR/PROB/LA*	NRR/DPR/PROB/BC
<b>NAME</b>	CBassett	NParker	AMendiola
<b>DATE</b>	09/13/2016	09/28/2016	09/30/2016

**OFFICIAL RECORD COPY**

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

Docket No: 50-607

License No: R-130

Report No: 50-607/2016-202

Licensee: University of California, Davis

Facility: McClellan Nuclear Research Center

Location: McClellan Park  
Sacramento, California

Dates: August 29 – September 1, 2016 and  
September 8 – 9, 2016

Inspector: Craig Bassett

Accompanied by: Michele DeSouza, License Examiner and Inspector Trainee

Approved by: Anthony J. Mendiola, Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Enclosure

## EXECUTIVE SUMMARY

University of California, Davis  
McClellan Nuclear Research Center  
Report No. 50-607/2016-202

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the University of California, Davis (the licensee's) two Megawatt Class I research reactor safety program, including: (1) organization and staffing, (2) review and audit and change control functions, (3) reactor operations, (4) operator requalification, (5) maintenance and surveillance, (6) fuel handling, (7) experiments, (8) procedures, and (9) emergency preparedness 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. No violations or deviations were identified.

### Organization and Staffing

- The organizational structure and staffing were generally consistent with Technical Specifications (TSs) requirements.

### Review, Audit, and Change Control Functions

- The Nuclear Safety Committee was meeting semiannually, reviewing the topics outlined in the TS, and conducting annual audits of facility operations as required.
- The review, evaluation, and documentation of changes to the facility satisfied NRC requirements.

### Reactor Operations

- Reactor operations were conducted in accordance with procedures and the appropriate logs were being maintained.

### Operator Requalification

- Operator requalification was conducted as required by the Operator Training and Requalification Program and the program was being maintained up-to-date.
- Medical examinations were being completed biennially for each operator as required.

### Maintenance and Surveillance

- The Preventive Maintenance Program was being used to effectively complete maintenance.
- Surveillance activities at the facility were completed in a timely manner.

### Fuel Movement

- Fuel movement and handling was conducted in accordance with procedural requirements and fuel inspections were completed annually as required by the TS.

### Experiments

- The licensee's program for reviewing and conducting experiments satisfied procedural and TS requirements.

### Procedures

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

### Emergency Preparedness

- The emergency preparedness program was conducted in accordance with the Emergency Plan (E-Plan).
- Emergency response equipment was being maintained and alarms were being tested as required.
- The Memoranda of Understanding between the licensee and its various support agencies were being maintained.
- Emergency drills were being conducted annually as required by the E-Plan.
- Emergency preparedness training for operations personnel was being completed.

## REPORT DETAILS

### Summary of Facility Status

The University of California, Davis' (the licensee's) two Megawatt Class I TRIGA Mark-II research reactor continued to be operated in support of neutron radiography, medical isotope production, neutron tomography, and sample/product irradiation. During the inspection the reactor was operated up to eight hours per day at varying power levels up to one megawatt 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 staff responsibilities to ensure that the requirements of Technical Specification (TS) Section 6.1, were being met:

- Management responsibilities
- Qualifications of facility personnel
- Current UCD/MNRC organizational structure
- Staffing requirements for safe operation of the research reactor facility
- Facility Procedure UCD/MNRC-0004-DOC-13, "Technical Specifications for the University of California, Davis/McClellan Nuclear Radiation Center (UCD/MNRC)," Revision (Rev.) 13
- UCD/MNRC 2014 Annual Report, submitted to the U.S. Nuclear Regulatory Commission (NRC) on June 29, 2015
- UCD/MNRC 2015 Annual Report, submitted to the NRC on June 29, 2016
- American Nuclear Society Standards Institute/American Nuclear Society 15.4-1988, "Selection and Training of Personnel for Research Reactor," approved June 9, 1988

##### b. Observations and Findings

The inspector reviewed the organization at the facility. The organization consisted of five individuals: (1) the UCD/MNRC Director, (2) the Associate Director for Reactor Operations/Reactor Supervisor, (3) Radiography/Facility Manager, (4) Radiation Safety Officer (RSO) Security Manager, and (5) Electronics Engineer. It was noted that two radiographers, who had worked at the facility earlier this year, had been laid off due to budget constraints.

The subject of facility staffing was reviewed by the inspector. It was noted that the reactor operations staff consisted of five licensed senior reactor operators (SROs). Even though the SROs all had collateral duties to be performed, the inspector concluded that staffing appeared to be adequate given the current level of operation at the facility.

Staffing requirements for safe operation of the research reactor facility as required by the TS were being met. However, an increase in facility workload would definitely necessitate an increase in staffing.

The inspector met with the Vice Chancellor for Research. Various issues were discussed including monetary support and staffing for the facility and safety. The Vice Chancellor indicated that the university's administration is committed to the success of the UCD/MNRC facility. The Vice Chancellor also stated that safety is first and foremost then comes staffing and increasing usage of the reactor. The inspector also spoke with the Chair of the Nuclear Safety Committee (NSC). He indicated that safety is always the first consideration of the committee when reviewing changes and new experiments. He indicated that the committee had no safety concerns with current operation of the reactor. The NSC Chair and the UCD/MNRC facility director indicated that prospects for greater usage of the reactor looked very favorable. The UCD Department of Physics was going to begin teaching a three semester class dealing with nuclear theory, radiation protection, and an introduction to reactor physics to increase student and faculty involvement with the reactor.

c. Conclusion

The licensee's organization and staffing were generally in compliance with the requirements specified in TS Section 6.0

**2. Review and Audit and Change Control Functions**

a. Inspection Scope (IP 69007)

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

- Annual Audits conducted for 2014 and 2015
- NSC meeting minutes for February 2015 through the present
- UCD/MNRC Facility Modification Notebook containing Facility Modification Log Forms
- Selected Facility Modification Installation Authorization Forms and the associated Facility Modification Checklist Forms processed during 2014 through the present
- Facility Procedure UCD/MNRC-0043-DOC, "Facility Modification Procedure"
- Facility Procedure UCD/MNRC-0045-DOC, "Quality Assurance Program for McClellan Nuclear Research Center (MNRC)"
- Annual Reports for UCD/MNRC, submitted to the NRC in June 2015 and June 2016

- “Charter of the Nuclear Safety Committee (NSC) for the University of California, Davis/McClellan Nuclear Research Center (UCD/MNRC),” Rev. 3

b. Observations and Findings

(1) Review and Audit Functions

Composition of the NSC and qualifications of NSC members were as specified in TS 6.2.1. Minutes of NSC meetings demonstrated that the committee met semiannually as required by TS 6.2.2, and provided the reviews and oversight specified in TS 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 noted that the annual operations audit for 2014 was conducted on September 2, 2014, by the Chair of the NSC. The audit appeared to be adequate and covered the activities specified in TS 6.2.4, including various aspects of the reactor facility operations and other functions. The most recent facility operations audit had also been conducted by the Chair of the NSC and was completed on February 27, 2015. The audit also appeared to be adequate. A second audit was conducted on October 27, 2015, to follow-up the earlier audit for that year. No problems were noted and no recommendations were made in these audits. It was noted that all the audits for 2016 were still pending but the licensee was aware of the situation and had made plans to have them all completed within the next three months.

(2) Change Control Functions

To satisfy the regulatory requirements stipulated in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.59, “Changes, tests, and experiments,” the licensee had implemented Facility Procedure UCD/MNRC-0043-DOC, “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, tests or experiments not described in the SAR. The procedure adequately incorporated criteria provided by the regulations. The inspector verified that, as required by procedure, all proposed facility modifications were presented to a Modification Review Committee for screening and classification. In addition to that committee’s screening, the packages were required to be reviewed by the Reactor Supervisor and a health physics representative, and then approved by the Facility Director. Safety significant changes and modifications (designated by the facility as

Class I and II changes) were required to be reviewed and approved by the NSC.

The evaluation of experiments or modifications under the provisions of 10 CFR 50.59 forms reviewed by the inspector were completed and closed out properly. The completed forms showed that a proposed experiment modification and a proposed new experiment were acceptably reviewed in accordance with the procedure. None of the changes or modifications reviewed was determined to constitute a safety question or concern and none required a license or TS amendment.

c. Conclusion

The NSC was meeting semiannually, reviewing the topics outlined in the TS, and conducting annual audits of facility programs as required. The facility design change program satisfied NRC requirements.

**3. Reactor Operations**

a. Inspection Scope (IP 69006)

To verify that the licensee was operating the reactor and conducting operations in accordance with TS Section 3, and procedural requirements, the inspector reviewed selected portions of the following:

- Selected Facility Anomaly Reports
- Various UCD/MNRC Startup Checklist Forms for 2015 and to date in 2016
- Selected UCD/MNRC Shutdown Checklist Forms for 2015 and to date in 2016
- Various UCD/MNRC Facility Rounds Log Forms for 2015 and to date in 2016
- Selected UCD/MNRC Operations Log Pages contained in Log Book No. 157 through Log Book No. 162
- Facility Procedure UCD/MNRC-0016-DOC, "UCD/MNRC Operating Instructions"
- Facility Procedure UCD/MNRC-0073-DOC, "UCD/MNRC Reactor Control Room Computer Operating Instructions"
- Two latest Annual Reports for UCD/MNRC, submitted to the NRC in June 2015 and June 2016

b. Observations and Findings

The inspector reviewed selected UCD/MNRC Startup and Shutdown forms, Rounds Log sheets, and Operations Log entries dating from 2015 through the date of this inspection. The operating logs and checklists were complete and provided an acceptable indication of operational activities. The logs and checklists showed that operational conditions and parameters were consistent

with license and TS requirements and indicated that operational limits had not been exceeded.

The logs were also used to record problems with equipment and abnormal events or anomalies. Unplanned shutdowns and inadvertent scrams were also noted in the logs, in addition to being documented in the licensee's Monthly Reports and reported in Annual Reports submitted to the NRC.

The inspector observed facility activities on various occasions during the week including routine reactor operations. The operations were conducted in accordance with the applicable procedures and the actions were documented in the required logs. The inspector was also able to observe a reactor startup and shutdown during the inspection. These activities were also completed according to procedure and the appropriate checklists and logs were filled out as required.

c. Conclusion

UCD/MNRC reactor operations were conducted in accordance with procedure and the appropriate logs were being maintained.

**4. Operator Requalification**

a. Inspection Scope (IP 69003)

To verify that the licensee was complying with TS 6.1.4, and the facility Operator Training and Requalification Program, the inspector reviewed selected aspects of:

- Status of active operator licenses
- Selected operator physical examination records for the past 3 years
- Training Schedule for Maintenance of Qualifications for SROs for the 2012-2014 and 2014-2016 requalification cycles
- Operator active duty status documented on MNRC Personnel Reactivity Manipulations and Active Duty Performance Record forms for 2014, 2015, and to date in 2016
- Operator training and lecture attendance records for 2014 through 2016 documented on MNRC Training Attendance Record forms
- Selected records for 2014 through 2016 documented on UCD/MNRC Reactor Facility Annual Operating Test for SROs and Reactor Operators Forms and MNRC SRO Requalification Written Examination Forms
- Current Memorandum for the Training Coordinator from B. Klein, UCD/MNRC Director, dated February 22, 2016, specifying those individuals who had completed the Requalification Program and were certified to continue operating the reactor and those who were in training
- Facility Procedure UCD/MNRC-0009-DOC, "Selection and Training Plan for Reactor Personnel"

- Latest two Annual Reports for UCD/MNRC, submitted to the NRC in June 2015 and June 2016
- American Nuclear Society Standards Institute/American Nuclear Society 15.4-1988, "Selection and Training of Personnel for Research Reactors," approved June 9, 1988

b. Observations and Findings

As noted above, there were five qualified SROs on staff at the facility. The inspector verified that all operators' licenses were current. It was also noted that the Requalification Program was being implemented and maintained as required. MNRC Personnel Reactivity Manipulations and Active Duty Performance Records and logs showed that operators were maintaining active duty status as required. A review of the logs and records also showed that training was being conducted in accordance with the approved requalification and training program. Procedure reviews and examinations had been documented as required.

Records of quarterly reactor operations, reactivity manipulations, other operations activities, and Reactor Supervisor activities were being maintained. Records indicating the completion of annual operating tests and supervisory observations were also being maintained as required. Biennial written examinations were being completed by the operators as required as well.

The inspector reviewed medical records for various operators and verified that the operators were receiving the biennial medical examinations required by the program in accordance with "American Nuclear Society Standards Institute/American Nuclear Society 15.4-1988."

c. Conclusion

Operator requalification was being completed and being maintained up-to-date as required by the Requalification Program. Medical examinations were being completed biennially for each operator as required.

**5. Maintenance and Surveillance**

a. Inspection Scope (IP 69006 and 69010)

To verify that the licensee was meeting the requirements of their Preventive Maintenance Program and complying with TS Section 4, the inspector reviewed selected aspects of:

- Selected UCD/MNRC Operations Log pages from Log Book No. 157 through Log Book No. 162
- Preventive Maintenance Program database maintained on the Control Room computer which included entries denoting equipment history

- McClellan Nuclear Research Center Preventive Maintenance System - Twelve Month Schedule for the period from January 2016 through December 2016
- Selected MNRC Work Order (MWO) forms documenting various completed and pending maintenance tasks to date in 2016
- Facility Procedure UCD/MNRC-0007-DOC, "Maintenance Procedures"
- Facility Procedure UCD/MNRC-0030-DOC, "MNRC Tag-Out Procedure"
- Latest two Annual Reports for UCD/MNRC, submitted to the NRC in June 2015 and June 2016

b. Observations and Findings

The inspector reviewed the Preventive Maintenance Program that the licensee had developed to schedule and track maintenance activities. The program was maintained on an excel database system and was designed to ensure that all maintenance activities were completed as required. It was also used to ensure that post maintenance testing was conducted and that the entire process was documented appropriately. In addition, the database was also set up to enable the licensee to maintain equipment histories for the various systems, components, and instruments in the program.

The program was designed to generate a work schedule for facility personnel. Weekly, monthly, and annual schedules were available as needed. The work schedules listed all the maintenance and surveillance activities that needed to be completed during the specified time interval.

The Preventive Maintenance Program not only produced periodic work schedules, but was designed to generate MWOs. The MWOs were used to complete and document the maintenance and/or surveillance activities. It was noted that the MWOs were assigned to a lead SRO who was responsible to ensure that the work was performed and the results were recorded on the MWO. The data from each MWO was typically entered into the computerized tracking system by the Radiography Supervisor/Building Manager.

Routine maintenance work and surveillance activities were typically completed on Mondays during the weekly routine scheduled reactor shutdown. Major maintenance and surveillance items were completed during the licensee's annual maintenance shutdown which typically lasted for a full week.

The inspector reviewed selected data recorded in the database and on the MWOs for various TS required surveillances. The records indicated that the required tests, checks, verifications, and calibrations had been completed on schedule and in accordance with licensee procedures. The results reviewed by the inspector were found to be within the TS and procedurally prescribed parameters.

c. Conclusion

The MNRC Preventive Maintenance Program was being used to effectively complete maintenance and surveillance activities at the facility in a timely manner.

**6. Fuel Handling**

a. Inspection Scope (IP 69009)

To ensure that the licensee was following the requirements of TS Sections 3.2.4, 4.2.4, and 5.3, the inspector reviewed selected aspects of the following:

- Selected Fuel Inspection Sheets for 2015
- Various UCD/MNRC Fuel Transfer Forms
- Selected UCD/MNRC Present Element Location Forms
- Fuel Handling Checklists for fuel handling in 2015 and to date in 2016
- Selected entries in the UCD/MNRC Fuel Measurement Notebook
- Various Fuel Movement Sheets developed prior to, and used for, fuel movements
- Selected UCD/MNRC Fuel Element Tracking Information Log Sheets
- Various entries in the UCD/MNRC Fuel Measurement Data Notebook detailing fuel element measurements
- Selected UCD/MNRC Operations Log pages from Log Book No. 157 through Log Book No. 162
- Core Fuel Status and Storage Boards located in the Control Room and in the Reactor Room indicating current fuel element locations
- Facility Procedure UCD/MNRC-0019-OMM 5220, "Fuel Handling Tools"
- Facility Procedure UCD/MNRC-0011-OMM 5240, "Fuel"

b. Observations and Findings

The inspector reviewed the fuel movement process used by the licensee and verified that fuel was moved according to established procedure and in conjunction with the specific fuel movement sheets developed by an SRO for each evolution. The sheets were used not only for fuel movement, which included transferring fuel from the core to storage and from storage to the core, but for fuel inspection as well. The inspector compared the current location of fuel elements in the reactor core with the information maintained on the Fuel Status Boards in the Control Room and the Reactor Room, and on the fuel movement sheets. No problems were noted. The licensee's current core was designated as the 30B core.

It was noted that, during the annual shutdown for facility maintenance completed in August 2016, the licensee also completed inspection of those fuel elements specified in the TS. The inspector reviewed selected fuel inspection sheets and noted that the inspections were being completed annually in compliance with

TS Section 3.2.4. The inspector verified that fuel handling tools were being properly maintained and were adequately controlled/secured when not in use.

c. Conclusion

Fuel movements and inspections were conducted in accordance with TS and procedural requirements.

**7. Experiments**

a. Inspection Scope (IP 69005)

The inspector reviewed selected aspects of the following to verify compliance with TS Sections 3.8, 4.8, and 6.5:

- Listing of current experiments and authorized users
- Most recent UCD/MNRC Irradiation Summary Forms
- Selected UCD/MNRC Experimenter Certification Forms
- Various UCD/MNRC Experimenter Approval Request Forms
- Most recent reviews conducted by the Experiment Review Board (ERB)
- Various UCD/MNRC Irradiation Request Forms for 2015 and to date in 2016
- Selected UCD/MNRC Irradiation Tracking Sheets for 2015 and to date in 2016
- Various UCD/MNRC Operations Log pages from Log Book No. 157 through Log Book No. 162
- Selected Facility Use Authorization Forms which had been completed
- Facility Procedure UCD/MNRC-0033-DOC, "University of California, Davis/McClellan Nuclear Research Center Research Reactor Facility Experiment Review and Authorization Process"
- Facility Procedure UCD/MNRC-0081-DOC, "UCD/MNRC Experiment Coordination Checklist"
- Latest two Annual Reports for UCD/MNRC, submitted to the NRC in June 2015 and June 2016

b. Observations and Findings

The inspector reviewed the experiment review and approval process at the facility. It required that, if an approved experimenter decided to propose a new experiment, that person was required to complete an Experiment Request Form for review. The experimenter was also required to ensure that the proposed experiment would meet the conditions established for one of five approved Facility Use Authorizations. The request was then reviewed by the Experiment Coordinator and the ERB and approved by the MNRC Facility Director. The Experiment Coordinator also completed an Irradiation Summary Form to further document approval by the Facility Director, the Reactor Supervisor, and the RSO. If a new or revised Facility Use Authorization was needed, it was also required to be reviewed and approved by the NSC. It was noted that no new Facility Use Authorizations had been approved since the previous inspection.

The experiments conducted at the facility had been reviewed and approved by the NSC as required.

The inspector also noted that the ERB had met on October 2, 2015, to discuss proposed changes to an established experiment. The change involved neutron radiography of a new Class I explosive device. The ERB considered the proposed change and the 10 CFR 50.59 form that had been completed and subsequently approved the change because no new safety issues were raised. An ERB was convened again on December 1, 2015, to review a new experiment involving the neutron irradiation of special nuclear material. The new experiment was considered, as was the 10 CFR 50.59 form that had been completed pertaining to the experiment. The experiment was subsequently approved and no change to the TS or license was required.

The inspector noted that the experiments conducted at the facility were initiated using an approved Facility Use Authorization Number and an Experiment Approval Number. The experiments were then completed under the cognizance of the Reactor Supervisor and the SRO, and in accordance with TS requirements (e.g., reactivity limitations). The results of the experiments were documented on the appropriate Irradiation Request Forms which listed the conditions of the irradiation and the radiological survey results of the material when removed from the reactor. The forms reviewed by the inspector had been completed as required with the appropriate information included.

c. Conclusions

The program for reviewing and conducting experiments satisfied TS and procedural requirements.

**8. Procedures**

a. Inspection Scope (IP 69008)

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

- “UCD/MNRC Controlled Document Review and Approval Reference List”
- MNRC Document List, including the procedure number, title, individual responsible for reviewing the procedure, and date of the last review
- Facility Procedure UCD/MNRC-0005-DOC, “Document Control Plan”

b. Observations and Findings

TS 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. Changes to the procedures also required the approval of the UCD/MNRC Director and all changes were required to be documented. The inspector noted that facility procedures had been developed for the activities

as required by the TS and had been approved by the Director. The inspector verified that recent changes had also been approved by the Director.

The inspector noted that various members of the facility staff were required to perform periodic reviews of the procedures to assure that they were current. The completion of these reviews continued to be tracked by the Reactor Supervisor. The inspector determined that biennial reviews of the maintenance procedures and annual reviews of the other types of procedures were generally being completed as required.

c. Conclusion

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

**9. Emergency Preparedness**

a. Inspection Scope (IP 69011)

The inspector reviewed selected aspects of the following to verify compliance with the UCD/MNRC-0001-DOC, "Emergency Plan for the University of California, Davis - McClellan Nuclear Research Center (UCD/MNRC)," Rev. 8, approved by the NSC Chairman dated June 12, 2006:

- Documentation of the 2014 and 2015 emergency drills and critiques
- Memorandum of Understanding (MOU) with the UCD Medical Center, dated May 1, 2006
- MOU between the County of Sacramento and McClellan Park, dated November 23, 2004, concerning fire protection services
- MOU between the Sacramento County Sheriffs' Department and the licensee, dated December 18, 2000
- Training Schedule for Maintenance of Qualifications for SROs for the 2014-2016 requalification cycle
- Facility Procedure UCD/MNRC-0018-DOC, "University of California, Davis/McClellan Nuclear Research Center Emergency Procedures"
- Facility Procedure UCD/MNRC-0078-DOC, "UCD/MNRC Emergency Procedures for Emergency Response Personnel – Class 0 Emergency-Personnel and Operation Events"
- Facility Procedure UCD/MNRC-0079-DOC, "UCD/MNRC Emergency Procedures for Emergency Response Personnel - Class I Emergency-Notification of Unusual Events"
- Facility Procedure UCD/MNRC-0080-DOC, "UCD/MNRC Emergency Procedures for Emergency Response Personnel – Class II Emergency-Alert"

b. Observations and Findings

The inspector reviewed the Emergency Plan (E-Plan) in use at the reactor and verified that it was reviewed and updated biennially as required. Activities associated with the

E-Plan (e.g., training, drills, etc.) were reviewed annually by the NSC. The inspector reviewed the UCD/MNRC Emergency Procedures as well. It was noted that the procedures were also typically reviewed annually and revised as needed to ensure effective implementation of the E-Plan.

Through records review and interviews with SRO personnel and other emergency responders, the inspector determined that they were knowledgeable of the proper actions to take in case of an emergency. Training for facility personnel had been conducted and documented acceptably. Training for support organization personnel was provided whenever those organizations' schedules would permit.

The inspector verified that the MOU between the County of Sacramento and McClellan Park remained in effect. The MOU stipulated that the Sacramento Metropolitan Fire District would be available during an emergency and would provide support for the facility. The inspector also verified that the MOU between the UCD/MNRC facility and UCD Medical Center remained in effect. That MOU indicated that the UCD Medical Center would provide the MNRC with needed support in case of any event involving a medical emergency. The licensee also maintained an MOU with the Sacramento County Sheriff's Department. That MOU stipulated that Sheriff's Department officers would provide the MNRC with immediate support in case of any security event at the facility.

Communications capabilities with support groups were acceptable and the various equipment (e.g., telephones and the building public address system) were in use daily. Portable public address devices were also available for use as needed and were checked semiannually. Emergency call lists had been revised and updated as needed and were available in the control room and in the various emergency cache kits as required. The inspector also verified that emergency equipment, including decontamination material, was available and was being inventoried semiannually as required by the E-Plan.

The documentation of the training and drills conducted during the past 2 years was reviewed. Through drill scenario and record reviews, and personnel interviews, off-site emergency responders were determined to be knowledgeable of the proper actions to take in case of an emergency. Emergency drills had been conducted annually and had included the participation of off-site support groups every other year as required by the E-Plan. The scenarios and critiques written for the drills were well documented. It was noted that no drill had been conducted to date. The licensee was planning a drill for November 2016.

The inspector and the Facility Director visited the UCD Medical Center in Sacramento, observed the facilities and equipment at that location, and interviewed Environmental Health and Safety (EH&S) personnel. The inspector determined that there were adequate supplies and equipment available at the hospital to handle an emergency at the MNRC. It was also noted that the emergency area for handling serious problems at the UCD Medical Center was well equipped and properly staffed. Through talking with EH&S staff, the inspector noted that they were knowledgeable of their duties and responsibilities with respect to the MNRC.

c. Conclusion

The emergency preparedness program was being conducted in accordance with the E-Plan.

**10. Follow-up on Previously Identified Items**

a. Inspection Scope (IP 92701)

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

b. Observation and Findings

IFI 50-607/2006-201-01 (Open) - 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.

In August 2006, the inspector determined that the licensee's TS organizational chart for the UCD/MNRC stipulated that the chain of command included an "Operations Manager," who would be in charge of reactor operations and to whom the Reactor Supervisor would report. The chart also included a staff position designated as "HP [Health Physics] Supervisor." Since these two positions were no longer part of the facility's actual organization structure, the inspector questioned the licensee about this. The licensee indicated that a TS change was being prepared, but it was not complete and had not been submitted as of the date of the 2006 inspection.

During this inspection the inspector reviewed this issue with the licensee. It was noted that in 2010, the licensee had completed a TS amendment request which would bring the organizational structure specified in the TS into agreement with actual conditions at the facility. This change had been reviewed and approved by the Chairman of the NSC and the licensee had subsequently submitted it to the NRC. At the time of this inspection, the licensee had decided to withdraw the change and, instead, name persons at the facility to fill the positions indicated on the organization chart. The licensee submitted a request to rescind the TS amendment on September 9, 2016. This issue is considered closed.

c. Conclusion

One IFI identified during a previous inspection was reviewed during this inspection and was closed.

**11. Exit Interview**

The inspection scope and results were summarized on September 1, 2016, with the Associate Director for Reactor Operations. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee acknowledged the findings presented. Although proprietary material was provided to and reviewed by the inspector during the inspection, none of that information is included in this report. Additional phone conversations were held with the licensee on September 8 & 9, 2016, concerning the closure of the IFI mentioned above.

## **PARTIAL LIST OF PERSONS CONTACTED**

### Licensee Personnel

H. Bollman	Radiography Manager, Building Manager, and SRO
T. Essert	Electronics Engineer and SRO
W. Frey	Director, UCD/MNRC and SRO
H. Lewin	Vice Chancellor for Research, University of California, Davis
D. Reap	Health Physics Technician, Security Officer, and SRO
W. Steingass	Associate Director for Reactor Operations/Reactor Supervisor and SRO

### Other Personnel

L. Kroger	Radiation Safety Officer, Department of Environmental Health and Safety, University of California Davis Medical Center
P. Leinwander	EH&S Specialist II, Department of Environmental Health and Safety, University of California Davis Medical Center
G. Miller	Chair, UCD/MNRC Nuclear Safety Committee; Senior Lecturer Emeritus, Chemistry; and, Reactor Supervisor, University of California, Irvine

## **INSPECTION PROCEDURE USED**

IP 69003	Class I Research and Test Reactor Operator Licenses, Requalification, and Medical Activities
IP 69005	Class I Research and Test Reactor Experiments
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 69009	Class I Research and Test Reactor Fuel Movement
IP 69010	Class I Research and Test Reactor Surveillance
IP 69011	Class I Research and Test Reactor Emergency Preparedness
IP 92701	Follow-up on Previously Identified Items

## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### Opened

None

### Closed

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**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ERB	Experiment Review Board
IFI	Inspector Follow-up Item
IP	Inspection procedure
MNRC	McClellan Nuclear Research Center
MOU	Memorandum of Understanding
MWO	MNRC Work Order
NRC	U.S. Nuclear Regulatory Commission
NSC	Nuclear Safety Committee
SRO	Senior Reactor Operator
TS	Technical Specification
UCD	University of California, Davis
UCD/MNRC	University of California, Davis/McClellan Nuclear Research Center