



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 23, 2021

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

SUBJECT: UNIVERSITY OF CALIFORNIA-DAVIS – U.S. NUCLEAR REGULATORY
COMMISSION ROUTINE INSPECTION REPORT NO. 05000607/2021202

Dear Dr. Frey:

From October 11 – 14, 2021, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the University of California-Davis/McClellan Nuclear Research Center. The enclosed report documents the inspection results discussed on October 14, 2021, with you, Burton Mehciz, Interim 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 various 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, 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).

If you have any questions concerning this inspection, please contact Craig Bassett at (240) 535-1842, or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "Michael Takacs".

Takacs, Michael signing on behalf
of Tate, Travis
on 12/23/21

Travis L. Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
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, Bldg. 258
McClellan, CA 95652-2504

Burton Mehciz, Interim Reactor Supervisor
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California Energy Commission
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Radiological Health Branch
California Department of Public Health
P.O. Box 997414, MS 7610
Sacramento, CA 95899-7414

Test, Research and Training
Reactor Newsletter
Attention: Ms. Amber Johnson
Dept of Materials Science and Engineering
University of Maryland
4418 Stadium Drive
College Park, MD 20742-2115

Dr. Prasant Mohapatra
Vice Chancellor for Research
Department of Computer Science
University of California, Davis
Davis, CA 95616

SUBJECT: UNIVERSITY OF CALIFORNIA-DAVIS – U.S. NUCLEAR REGULATORY
COMMISSION ROUTINE INSPECTION REPORT NO. 05000607/2021202
DATED: DECEMBER 23, 2021

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

Docket No.: 50-607

License No.: R-130

Report No.: 05000607/2021202

Licensee: University of California-Davis

Facility: McClellan Nuclear Research Center

Location: McClellan Park
Sacramento, California

Dates: October 11 – 14, 2021

Inspector: Craig Bassett

Approved by: Travis L Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

University of California-Davis
McClellan Nuclear Research Center
Inspection Report No. 05000607/2021202

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the University of California-Davis (UCD, the licensee's) 2 megawatt Class I research reactor safety program, including: (1) operator licenses, requalification, and medical examinations; (2) experiments; (3) organization and operations and maintenance activities; (4) review and audit and design change functions; (5) procedures; (6) fuel movement; (7) surveillance; and, (8) emergency preparedness. The Nuclear Regulatory Commission (NRC) staff determined the licensee's program was acceptably directed toward the protection of public health and safety and in compliance with regulatory requirements.

Operator Licenses, Requalification, and Medical Examinations

- Operator training, requalification, and medical examinations was conducted as required by the regulations and the training and requalification program and the program was maintained up-to-date.

Experiments

- The licensee's program for reviewing, approving, and conducting experiments satisfied procedural and technical specification (TS) requirements.

Organization and Operations and Maintenance Activities

- The organizational structure and staffing were consistent with TS requirements.
- Reactor operations were conducted in accordance with procedures, TSs, and the appropriate logs were maintained.
- The preventive maintenance system was used effectively to ensure that maintenance activities were completed in a timely manner.

Review and Audit and Design Change Functions

- The facility Nuclear Safety Committee (NSC) met semiannually, reviewed the topics outlined in the TSs, and conducted annual audits of facility operations as required by the TSs.
- The review, evaluation, and documentation of changes to the facility satisfied facility procedure and the regulations.

Procedures

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

Fuel Movement

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

Surveillance

- Surveillance activities at the facility were completed within the TS-prescribed time frames.

Emergency Preparedness

- The emergency preparedness program was conducted in accordance with the Emergency Plan (E-Plan).

REPORT DETAILS

Summary of Facility Status

The UCD 2 megawatt Class I Training, Research, Isotope, General Atomics Mark-II research reactor continued to be operated in support of neutron radiography, neutron tomography, and sample/product irradiation. During the inspection the reactor operated up to eight hours per day at varying power levels up to 1 megawatt to support neutron radiography and sample irradiation.

1. Operator Licenses, Requalification, and Medical Examinations

a. Inspection Scope (Inspection Procedure (IP) 69003)

The inspector reviewed selected aspects of the following to verify compliance with the UCD/McClellan Nuclear Research Center (MNRC) Operator Training and Requalification Program outlined in Procedure UCD/MNRC-0009-DOC-05, "Selection and Training Plan for Reactor Personnel," and Section 6.1.4 of the UCD/MNRC TSs, Revision 13, dated March 28, 2003:

- status of qualified operators' licenses
- selected operator physical examination records, training and lecture attendance records, reactivity manipulations and active duty performance records, and annual operating tests and requalification written examinations for the current training cycle
- current memorandum for the training coordinator from Dr. Wesley Frey, UCD/MNRC Director, dated August 24, 2021
- various entries documented on UCD/MNRC operations log pages from Log Book Nos. 182 through 188
 - UCD/MNRC 2019 annual report, submitted to the NRC on July 6, 2020
 - UCD/MNRC 2020 annual report, submitted to the NRC on June 22, 2021

b. Observations and Findings

The inspector noted that there were six qualified senior reactor operators (SROs) on staff at the facility. The inspector verified that all operators' licenses were current. The inspector verified that operators maintained active duty status in accordance with the qualification program. The inspector also reviewed medical records for the operators and verified that they received the biennial medical examinations required by the regulations.

c. Conclusion

The inspector determined each operator's training, requalification, and medical examination was completed and maintained up-to-date as required by the licensee's requalification program and regulatory requirements.

2. Experiments

a. Inspection Scope (IP 69005)

The inspector reviewed selected aspects of the following to verify compliance with the licensee's program for conducting experiments as outlined in Procedure UCD/MNRC-0033-DOC-05, "University of California, Davis/McClellan Nuclear Research Center Research Reactor Facility Experiment Review and Authorization Process," and TS Sections 3.8, 4.8, and 6.5:

- Log Books No. 182 through 188
- selected facility use authorization forms, irradiation summary forms, and listing of approved experiments and authorized experimenters
- various UCD/MNRC irradiation request forms and tracking sheets for 2020 through the present
- Procedure UCD/MNRC-0081-DOC-00, "UCD/MNRC Experiment Coordination Checklist"
- the two most recent annual reports for UCD/MNRC submitted to the NRC

b. Observations and Findings

The inspector noted that no new experiments were proposed or approved since the last inspection. The inspector verified that the experiments conducted at the facility were reviewed and approved by the NSC as required by procedure UCD/MNRC-0033-DOC-05. The inspector confirmed that the experiments conducted at the facility were completed under the cognizance of the Reactor Supervisor and the SRO on duty, and in accordance with TS requirements.

c. Conclusion

The inspector determined that the licensee's program for reviewing, approving, and conducting experiments satisfied TSs and procedural requirements.

3. Organization and Operations and Maintenance Activities

a. Inspection Scope (IP 69006)

The inspector reviewed the following regarding the UCD/MNRC organization, staffing, staff responsibilities, reactor operations, and preventive maintenance program to ensure that the requirements of TS Sections 3.0, 6.1, and 6.8 were met:

- qualifications of facility personnel
- Log Books No. 182 through 188
- current UCD/MNRC organizational structure and management responsibilities
- various UCD/MNRC startup checklist forms, shutdown checklist forms, and facility rounds log forms for 2020 through the present
- UCD/MNRC-0004-DOC-13, "Technical Specifications for the University of California, Davis/McClellan Nuclear Radiation Center (UCD/MNRC)"
- Procedures UCD/MNRC-0007-DOC-05, "Maintenance Procedures," and UCD/MNRC-0016-DOC-12, "UCD/MNRC Operating Instructions"
- preventive maintenance system database including equipment history

- selected MNRC work order forms documenting completed maintenance tasks
- the two most recent annual reports for UCD/MNRC submitted to the NRC

b. Observations and Findings

The inspector noted that the Vice Chancellor for Research was designated as the licensee for the UCD/MNRC. The inspector verified that the facility was under the direct control of the MNRC Director who was accountable to the Vice Chancellor for the safe operation and maintenance of the facility. The inspector also noted that the organization was as stipulated in TS Section 6.1. Facility staffing was also reviewed by the inspector. The inspector found staffing requirements for safe operation of the research reactor facility were met.

The inspector found that recorded results listed operational conditions and parameters which were consistent with license and TS requirements and indicated that operational limits were not exceeded. The inspector observed various facility activities and found operations were conducted in accordance with the applicable procedures and documented in the required logs.

The inspector found the preventative maintenance system was designed to generate MNRC Work Order forms (MWOs) and the data from each completed MWO was entered into the computerized tracking system for tracking maintenance completion. The inspector verified that the licensee conducted maintenance activities at the frequencies required by their maintenance program.

c. Conclusion

The inspector determined the licensee's organization and staffing were in compliance with the requirements specified in TS Section 6.1. The inspector also determined reactor operations were conducted in accordance with procedures, TSs, and the appropriate logs were maintained. Further, the inspector verified that the facility preventive maintenance system was implemented effectively by the licensee to ensure completion of maintenance activities in a timely manner.

4. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69007)

To verify that the required reviews and audits were completed by the licensee and to ensure that facility changes were reviewed and approved as required by the licensee's change process outlined in procedure UCD/MNRC-0043-DOC-05, "Facility Modification Procedure," and TS Section 6.2, the inspector reviewed selected aspects of:

- annual audits conducted for 2019 and 2020
- NSC meeting minutes for March 2020 through the present
- UCD/MNRC facility modification notebook containing facility modification log forms
- selected facility modification installation authorization forms and the associated checklist forms processed during 2019 through the present

b. Observations and Findings

The inspector verified that the composition of the NSC and qualifications of NSC members were as specified in TS Section 6.2.1. The inspector noted that minutes of NSC meetings confirmed 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. The inspector found that safety reviews were conducted by the NSC or a designated representative. The inspector also noted that various audits were conducted by members of the NSC or other groups from campus. The inspector confirmed the audits were adequate and covered the activities specified in TS Section 6.2.4.

The inspector confirmed that the licensee implemented procedure UCD/MNRC-0043-DOC-05, "Facility Modification Procedure," which incorporated criteria provided by the regulations. The inspector verified that one change request and two screenings were processed since the previous NRC inspection and none of the proposed changes required a license amendment or approval by the NRC.

c. Conclusion

The inspector determined that the NSC met semiannually, reviewed the topics outlined in the TSs, and conducted annual audits of facility programs as required by TSs. The inspector also determined that the facility design change program satisfied NRC requirements.

5. Procedures

a. Inspection Scope (IP 69008)

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

- MNRC document list including the date of the last procedure reviews
- Procedures UCD/MNRC-0005-DOC-09, "Document Control Plan" and UCD/MNRC-0043-DOC-05, "Facility Modification Procedure"

b. Observations and Findings

The inspector noted that TS Section 6.4 required that procedures be prepared and approved for the activities listed in that section and that the procedures and changes thereto be approved by the UCD/MNRC Director. The inspector verified that this process was followed by the licensee. The inspector also noted periodic reviews of the procedures were required by the TSs to assure that they were current. The inspector confirmed that biennial reviews of the maintenance procedures and annual reviews of the other procedures were completed as required by TSs.

c. Conclusion

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

6. Fuel Movement

a. Inspection Scope (IP 69009)

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

- Log Books No. 182 through 188
- selected UCD/MNRC fuel movement and transfer forms, fuel handling checklists, and fuel inspection and tracking sheets for 2020 and 2021
- selected UCD/MNRC element location forms and the core status boards located in the control room and in the reactor room indicated current fuel element locations
- Procedures UCD/MNRC-0019-OMM-04, 5220, "Fuel Handling Tools" and UCD/MNRC-0011-OMM-04, 5240, "Fuel"

b. Observations and Findings

The inspector verified that fuel was moved according to an established procedure and in conjunction with specific fuel movement sheets. The inspector also noted that the inspections were completed annually in compliance with TS Sections 3.2.4 and 4.2.4. The inspector verified that fuel handling tools were maintained and were controlled and secured when not in use. The inspector found fuel was used and stored in authorized locations and the licensee's current core was designated as core 30B.

c. Conclusion

The inspector determined that fuel movements and inspections were conducted in accordance with the TS and procedural requirements.

7. Surveillance

a. Inspection Scope (IP 69010)

To verify that the licensee complied with TS Section 4.0, the inspector reviewed selected aspects of:

- Log Books No. 182 through 188
- selected MWOs documenting various completed and pending surveillance items for 2020 and to date in 2021
- Procedure UCD/MNRC-0007-DOC-05, "Maintenance Procedures"
- the two most recent annual reports for UCD/MNRC submitted to the NRC

b. Observations and Findings

The inspector found that routine maintenance work and surveillance activities were completed as required by the TSs. The inspector verified that many major maintenance and surveillance items were completed during the licensee's annual maintenance shutdown. The inspector reviewed selected data recorded in the system database and found the results of surveillances were within the TS and procedurally prescribed parameters.

c. Conclusion

The inspector determined that the MNRC preventive maintenance system was used to track and complete surveillance activities at the facility in a timely manner in accordance with the TSs.

8. Emergency Preparedness

a. Inspection Scope (IP 69011)

The inspector reviewed selected aspects of the following documents and records to verify compliance with the UCD/MNRC-0001-DOC-08, "Emergency Plan for the University of California, Davis - McClellan Nuclear Research Center (UCD/MNRC)," approved by the NSC Chairman dated June 12, 2006:

- documentation of the 2020 and 2021 emergency drills and critiques
- memorandum of understanding (MOU) with the UCD Medical Center, dated May 1, 2006
- MOU between the County of Sacramento and the Sacramento Metropolitan Fire District (SMFD) and McClellan Airport and Park, dated November 23, 2004, concerning fire protection services
- MOU with the Sacramento County Sheriffs' Department, dated December 18, 2000
- training schedule for maintenance of qualifications for reactor operators for the last two requalification cycles which included emergency preparedness training
- Procedure UCD/MNRC-0018-DOC-07, "University of California, Davis/McClellan Nuclear Research Center Emergency Procedures"
- various UCD/MNRC emergency procedures for emergency response personnel

b. Observations and Findings

The inspector verified that the E-Plan was reviewed and updated biennially as required. The inspector also reviewed the UCD/MNRC emergency procedures associated with the E-Plan and found the procedures were also reviewed and revised as needed. The inspector verified that an MOU existed between the UCD/MNRC and each of the support agencies listed in the E-Plan. The inspector also verified that the memorandum stipulated that the agency or group would be available during an emergency and would provide support for the facility.

The inspector confirmed that emergency preparedness training for SROs and other staff was conducted. The inspector verified that training for support organization personnel was provided. The inspector noted that emergency call lists were revised and updated, as needed, and were available in the control room and in the various emergency cache kits as required by the E-Plan. The inspector verified that emergency equipment, including personal protective equipment and decontamination materials, was available and inventoried semiannually as required by the E-Plan.

The documentation of the drills conducted during the past 2 years was reviewed by the inspector. The inspector noted that emergency drills were conducted annually and included the participation of off-site support groups every other year as required by the E-Plan. The inspector found that the drills and the critiques held thereafter were well documented.

c. Conclusion

The inspector determined that the licensee's emergency preparedness program was conducted in accordance with the facility E-Plan.

9. Follow-up on Previously Identified Item

a. Inspection Scope (IP 92701)

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

b. Observation and Findings

- (1) 05000607/2020202-01 – IFI – Follow-up on the issue of the licensee clarifying the emergency training given to facility personnel and documenting the training.

During an inspection in June 2020, the inspector noted that emergency training for all facility personnel was conducted but it was not apparent what the training consisted of nor that it was recorded properly. The training did not appear to be extensive and did not include a lot of detail. The issue was identified as an inspector follow-up item IFI.

During this inspection, the inspector reviewed the emergency preparedness training materials provided to staff members, including presentation slides and handouts. The inspector found that the material provided sufficient emergency response training for the staff. This issue is considered closed.

- (2) 05000607/2020202-02 – URI – Follow-up on the issue of the licensee holding a drill within the allowed time frame for the year 2020.

During the inspection in June 2020, the inspector also noted that no drill was conducted for 2020. Because the licensee planned to hold a drill with the SMFD later in the summer when Coronavirus Disease 2019 Public Health Emergency restrictions were relaxed, no violation was issued. However, the licensee was informed that the issue of holding a drill within the allowed time frame for the current year would be identified as a URI.

During this inspection, the inspector confirmed that the licensee responded to a fire alarm at the facility on November 11, 2020. The SMFD also responded and both the licensee and SMFD personnel checked the facility to ensure that no actual problem existed. The groups then discussed proper response protocol. The fire alarm was treated as a drill because of the extensive interaction that occurred between the SMFD and licensee personnel. Following the drill, a critique was held with all licensee personnel and the correct response to such an alarm was reviewed with all staff. This issue is considered closed.

c. Conclusion

The inspector determined that an IFI and a URI were addressed by the licensee and the issues are considered closed.

10. Exit Interview

The inspection scope and results were summarized on October 14, 2021, with the Facility Director, the Interim Reactor Supervisor, and the Radiation Safety Officer. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

C. Dresser	Radiography Supervisor and SRO
T. Essert	Electrical Engineer and SRO
W. Frey	Facility Director and SRO
E. Gabbler	Radiographer trainee, RO trainee
B. Mehciz	Operations Manager, and SRO
D. Reap	Radiation Safety Officer, Security Officer, and SRO
S. Warren	Radiographer, Level III and SRO
M. Wilkinson	Radiographer, Level II

Other Personnel

None

INSPECTION PROCEDURE USED

IP 69003	Class I Research and Test Reactor Operator Licenses, Requalification, and Medical Examinations
IP 69005	Class I Research and Test Reactor Experiments
IP 69006	Class I Research and Test Reactor Organization and 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

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

05000607/2020202-01	IFI	Follow-up on the issue of the licensee clarifying the emergency training given to facility personnel and clearly documenting the training.
05000607/2020202-02	URI	Follow-up on the issue of the licensee holding a drill within the allowed time frame for the year 2020.

PARTIAL LIST OF ACRONYMS USED

E-Plan	Emergency Plan
IFI	Inspector Follow-up Item
IP	Inspection Procedure
MNRC	McClellan Nuclear Research Center
MOU	Memorandum of Understanding
MWO	McClellan Nuclear Research Center Work Order
NRC	U.S. Nuclear Regulatory Commission
NSC	Nuclear Safety Committee
SMFD	Sacramento Metropolitan Fire Department
SRO	Senior Reactor Operator
TSs	Technical Specifications
UCD	University of California-Davis
URI	Unresolved Item