



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

December 28, 2022

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. 05000607/2022202

Dear Dr. Frey:

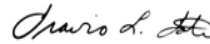
From July 25 – 28, 2022, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the University of California-Davis/McClellan Nuclear Research Center. The enclosed report documents the inspection results discussed on July 28, 2022, with you, Burton Mehciz, Reactor Supervisor, and 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 email at Craig.Bassett@nrc.gov.

Sincerely,



Signed by Tate, Travis
on 12/28/22

Travis 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

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

Radiologic 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. 05000607/2022202
DATED: DECEMBER 28, 2022

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OFFICE	NRR/DANU/PM	NRR/DANU/LA	NRR/DANU/BC
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DATE	8/29/2022	9/7/2022	12/28/2022

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

Docket No.: 50-607

License No.: R-130

Report No.: 05000607/2022202

Licensee: University of California-Davis

Facility: McClellan Nuclear Research Center

Location: McClellan Park
Sacramento, California

Dates: July 25 – 28, 2022

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. 05000607/2022202

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 were conducted as required by the NRC regulations and the training and requalification program was 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

- Reactor operations were conducted in accordance with procedures and the preventive maintenance system ensured that maintenance activities were completed.

Review and Audit and Design Change Functions

- The facility Nuclear Safety Committee (NSC) met semiannually and reviewed the topics and conducted annual audits as required by the TSs.
- The review, evaluation, and documentation of changes to the facility satisfied facility procedure and the NRC 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 (TRIGA) Mark-II research reactor continued to be operated in support of neutron radiography, neutron tomography, and sample/product irradiation. During the inspection, the reactor was not operated due to ongoing annual maintenance shutdown activities.

1. Operator Licenses, Qualification, 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 TSs:

- status of qualified operators' licenses
- selected operator physical examination, training and lecture attendance, 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 April 8, 2022
- various entries documented on UCD/MNRC operations log pages from Logbooks Nos. 188 through 191
 - UCD/MNRC 2020 annual report, submitted to the NRC on June 22, 2021
 - UCD/MNRC 2021 annual report, submitted to the NRC on June 3, 2022

b. Observations and Findings

The inspector noted that there were six qualified senior reactor operators (SROs) on staff at the facility. The inspector confirmed that all operators' licenses were current or in timely renewal. The inspector verified that the 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 NRC 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:

- Logbooks Nos. 188 through 191
- 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 2021 through the present
- the two most recent annual reports for UCD/MNRC submitted to the NRC

b. Observations and Findings

The inspector verified that the experiments conducted at the facility were reviewed and approved by the NSC as required by procedure. The inspector confirmed that the experiments conducted at the facility were completed using the appropriate facility use authorization forms, under the cognizance of the Reactor Supervisor and the SRO on duty, and in accordance with TS requirements. The inspector noted that no new experiments were proposed or approved since the last inspection.

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 UCD/MNRC reactor operations and the preventive maintenance program to ensure that the requirements of TS sections 3.0, 6.1, and 6.8 were met:

- Logbooks Nos. 188 through 191
- various UCD/MNRC startup checklist, shutdown checklist, and facility rounds log forms for 2021 through the present
- 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 observed various facility activities and found operations were conducted in accordance with the applicable procedures and documented in the logs. The inspector confirmed that the facility logbooks listed operational conditions and parameters which were consistent with license and TS requirements and indicated that operational limits were not exceeded.

The inspector found the preventative maintenance system was designed to generate MNRC work order forms (MWOs) and, once the work was completed, the data from each 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 reactor operations were conducted in accordance with procedures and TSs, and the appropriate logs were maintained. The inspector also determined that the facility preventive maintenance system ensured 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 2020 and 2021
- NSC meeting minutes for March 2021 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 2021 through the present

b. Observations and Findings

The inspector verified that the NSC 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 confirmed that various audits were conducted which covered the activities specified in TS section 6.2.4.

The inspector noted that the licensee implemented Procedure UCD/MNRC-0043-DOC-05, "Facility Modification Procedure," which incorporated criteria specified in the NRC regulations. During this inspection, the inspector verified that various change requests, screenings, and evaluations were processed since the previous

NRC inspection but 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 dates 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 procedures be prepared and approved for the activities listed in that section and procedures and changes there to 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 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:

- Logbooks Nos. 188 through 191
- selected UCD/MNRC fuel movement and transfer forms, fuel handling checklists, and fuel inspection and tracking sheets for 2021 and 2022
- 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 fuel inspections were completed annually in compliance with TS sections 3.2.4 and 4.2.4. The inspector observed as the licensee conducted fuel inspections during this inspection. The inspector verified that fuel handling tools were maintained and were controlled and secured when not in use. The inspector confirmed that fuel was used and stored in authorized locations.

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:

- Logbooks Nos. 188 through 191
- selected MWOs documenting various completed and pending surveillance items for 2021 and to date in 2022
- 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 confirmed 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. The inspector observed the licensee conduct annual control rod inspections and annual surveillance of the regulating rod and measurement of the control rod drop times during this inspection.

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):"

- documentation of the 2019, 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 and McClellan Airport and Park, dated November 23, 2004
- 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 and noted that the UCD/MNRC emergency procedures associated with the E-Plan were 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 each memorandum stipulated that the agency or group would be available in case of an emergency and would provide support for the facility.

The inspector confirmed that the emergency preparedness training for SROs and other staff was conducted. The inspector verified that training for support organization personnel was provided when requested. The inspector noted that the 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 the emergency equipment, including personal protective equipment and decontamination materials, was available and inventoried semiannually as required by the E-Plan.

The inspector verified 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 confirmed that the drills, and the critiques held following the drills, were documented as required by the E-Plan. During the inspection, the inspector and the Radiation Safety Officer visited a fire station near the facility and discussed the proper response to various emergencies. The inspector noted a good working relationship between Fire Department personnel and the reactor staff.

c. Conclusion

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

9. Exit Interview

The inspection scope and results were summarized on July 28, 2022, with facility management. 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
T. Slattery	Senior Photo Technician
P. Van Gent	Radiographer trainee
S. Warren	Radiographer, Level III, and SRO
M. Wilkinson	Radiographer, Level II

Other Personnel

K. Keeley	Chief, Battalion 7, C Shift, Sacramento Metropolitan Fire District, County of Sacramento
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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

ITEMS OPENED AND CLOSED

Opened

None

Closed

None