



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

May 18, 2020

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 – U.S. NUCLEAR REGULATORY
COMMISSION ROUTINE INSPECTION REPORT NO. 05000607/2020201

Dear Dr. Frey:

During January 6-8, 2020, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at your University of California-Davis/McClellan Nuclear Research Center. The enclosed report documents the inspection results discussed on January 8, 2020, with you; Mr. Walter Steingass, Operations Manager; and Mr. 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 inspectors reviewed selected procedures and records, observed various activities, and interviewed various 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).

W. Frey

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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,

/RA/

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:

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Mr. Walter Steingass, 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
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Test, Research and Training
Reactor Newsletter
Attention: Ms. Amber Johnson
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Dr. Prasant Mohapatra
Vice Chancellor for Research
Department of Computer Science
University of California
Davis, CA 95616

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

Docket No: 50-607

License No: R-130

Report No: 05000607/2020201

Licensee: University of California-Davis

Facility: McClellan Nuclear Research Center

Location: McClellan Park
Sacramento, California

Dates: January 6-8, 2020

Inspector: Craig Bassett

Accompanied by: Phil O'Bryan, RTR Inspector in Training

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. 05000607/2020201

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

Effluent and Environmental Monitoring

- Effluent and environmental monitoring satisfied license and regulatory requirements.
- Releases were within the limits specified in the regulations.

Organization and Operations and Maintenance Activities

- The organizational structure and staffing were consistent with technical specifications (TSs) requirements.
- Reactor operations were conducted in accordance with procedures and the appropriate logs were being 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 Nuclear Safety Committee (NSC) was meeting at the required frequency, reviewed the topics outlined in TS Section 6.2, and conducted audits of facility programs as required.
- The design change and control program, including review, evaluation, and documentation of changes to the facility, satisfied NRC requirements.

Procedures

- The procedure review, revision, control, and implementation program satisfied TS requirements.
- Procedural compliance was acceptable.

Radiation Protection

- Surveys were 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* (10 CFR) Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," and 10 CFR Part 20, "Standards for Protection against Radiation."
- Personnel dosimetry was worn as required and radiation doses were within the licensee's procedural action levels and NRC's regulatory limits.
- Radiation survey and monitoring equipment was maintained and calibrated as required.
- Acceptable radiation protection training was provided to facility personnel.

Transportation of Radioactive Materials

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

REPORT DETAILS

Summary of Facility Status

The University of California-Davis (UCD) 2-megawatt Training, Research, Isotope, General Atomics (TRIGA) research reactor continued to operate in support of neutron radiography, neutron tomography, experimental sample irradiation, and for tours of students and other members of the public. During the inspection, the reactor operated several hours per day at various power levels up to 1 megawatt to support neutron radiography, sample irradiation, and a tour.

1. Effluent and Environmental Monitoring

a. Inspection Scope (Inspection Procedure (IP) 69004)

The inspectors reviewed the following procedures and reports to verify compliance with the requirements of 10 CFR Part 20 and Section 6.4.2(d) of the UCD/McClellan Nuclear Research Center (UCD/MNRC) TSs, Revision 13, dated March 28, 2003:

- Facility Procedure UCD/MNRC-0029-DOC-20, "UCD/MNRC Radiation Protection Procedures," including:
 - Section 3, "Environmental Radiation Monitoring Procedures,"
 - Section 4, "Radioactive Effluent Monitoring Procedures," and
 - Section 17, "Radioactive Waste Procedures"
- Quarterly environmental thermoluminescent dosimeters (TLDs) reports for the last 2 years
- Radiochemical analysis data/results of water samples taken from a ground water well near the facility for 2019, and
- UCD/MNRC Annual Reports for 2017 and 2018.

b. Observations and Findings

The inspectors determined that gaseous releases continued to be monitored, totals were acceptably calculated, and the results documented in the annual operating report as required. To ensure that airborne concentrations of gaseous releases were within the concentrations stipulated in 10 CFR Part 20, Appendix B, Table 2, the licensee monitored the effluents emitted from the stack and calculated the average concentration of material released. The inspectors determined the average concentration of material released was well within the regulatory effluent concentration limits. To demonstrate that the radiation dose to the public from gaseous effluents as the result of reactor operations was below the dose constraint of 10 millirem per year as specified in 10 CFR 20.1101, "Radiation protection programs," paragraph (d), the licensee completed a separate calculation. This calculation, which was based on the total amount of effluent released, was performed using the Environmental Protection Agency's computer code, CAP88-PC, Version 4.0. The inspectors review of the results indicated an annual radiation dose to the public well below the regulatory limit.

The inspectors review of reports and water sample results verified that there were no liquid effluent releases from the facility during 2018 and 2019. It was also noted that, although many barrels of radioactive waste were stored in various locations at the facility, no solid radioactive waste shipments were made from the facility in 2018 or 2019.

Environmental water samples were collected, prepared, and sent to a vendor for analysis consistent with procedural requirements. The inspectors review determined the results of these analyses were all within regulatory limits. On-site and off-site gamma radiation monitoring was completed using various environmental optically-stimulated luminescence (OSL) dosimeters in accordance with the licensee's procedures as well. A review of these data indicated that any measurable doses were below regulatory limits.

c. Conclusion

The licensee's effluent and environmental monitoring satisfied license and regulatory requirements and releases were within the specified regulatory limits. Airborne and liquid releases were monitored, collected, and analyzed in accordance with procedures and required programs. Radiation doses were appropriately monitored, and results were maintained.

2. **Organization and Operations and Maintenance Activities**

a. Inspection Scope (IP 69006)

The inspectors 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:

- Management responsibilities
- Qualifications of facility personnel
- Current UCD/MNRC organizational structure
- Selected Facility Anomaly Reports
- Staffing requirements for safe operation of the research reactor facility
- American National Standard Institute/American Nuclear Society (ANSI/ANS)-15.4-1988, "Selection and Training of Personnel for Research Reactors," approved June 9, 1988
- Various UCD/MNRC Startup Checklist Forms for 2019 and to date in 2020
- Selected UCD/MNRC Shutdown Checklist Forms for 2019 and to date in 2020
- Various UCD/MNRC Facility Rounds Log Forms for 2019 and to date in 2020
- Selected entries listed on UCD/MNRC Operations Log Pages contained in Log Books Nos. 174 through 179
- Facility Procedure UCD/MNRC-0004-DOC-13, "Technical Specifications for the University of California, Davis/McClellan Nuclear Radiation Center (UCD/MNRC)"
- Facility Procedure UCD/MNRC-0007-DOC-05, "Maintenance Procedures"

- Facility Procedure UCD/MNRC-0016-DOC-12, “UCD/MNRC Operating Instructions”
- Preventive Maintenance System database maintained on the control room computer which included entries denoting equipment history
- MNRC Preventive Maintenance System - Twelve Month Schedule for the period from November 2019 through October 2020
- Selected MNRC work order forms (MWOs) documenting various completed and pending maintenance tasks for 2019 and to date in 2020, and
- UCD/MNRC Annual Reports for 2017 and 2018.

b. Observations and Findings

(1) Organization and Staffing

The inspectors reviewed the operations organization at the facility. The current organization consisted of eight individuals: (1) the UCD/MNRC Director, (2) the Associate Director for Reactor Operations/Reactor Supervisor, (3) a Radiography/Facility Manager, (4) a Radiation Safety Officer (RSO)/Security Manager, (5) an Electronics Engineer, (6) a Radiographer, (7) a person hired to help with the license renewal and to become a radiographer/reactor operator, and (8) a newly hired individual to assist with radiography. It was noted that the Electronics Engineer worked at the reactor facility half-time and at another facility on the main campus for the remainder of the time.

The subject of facility staffing was reviewed by the inspectors. It was noted that five of the individuals mentioned above were licensed senior reactor operators (SROs). Even though the SROs all had collateral duties that required a portion of their attention, the inspectors concluded that staffing for reactor operation was adequate given the current level of operation at the facility. The inspectors review of staffing requirements for safe operation of the research reactor facility as required by the TSs determined that staffing requirements were being met. The staff notes that the licensee indicated that, because of an increased workload, they were able to hire a person to assist with the license renewal effort and the radiography work. It is anticipated that this person would also be trained to become a qualified reactor operator in the future. And, as noted above, another person was hired as well to assist with the radiography work.

(2) Operations

The inspectors reviewed selected UCD/MNRC startup and shutdown forms, rounds log sheets, and operations log entries dating from 2018 through the date of this inspection. The inspectors determined 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 inspectors observed facility activities during the week including a routine reactor start-up, operations on various occasions, and a shutdown. The inspectors determined that operations were conducted in accordance with the applicable procedures and the actions were documented in the required logs.

(3) Maintenance Activities

The inspectors reviewed the licensee's preventive maintenance system developed to schedule and track maintenance activities and surveillance items. A computer program was designed to produce periodic work schedules and was set up to generate MWOs. The MWOs were used to complete and document the required maintenance and/or surveillance activities. The data from each completed MWO was typically entered into the computerized tracking system by the Radiography Supervisor/Building Manager. The inspector's review verified that the licensee conducted the various maintenance activities at the frequencies required by their program.

c. Conclusion

The licensee's organization and staffing were in compliance with the requirements specified in TS Section 6.0. Reactor operations were conducted in accordance with procedure and the appropriate logs were maintained. The facility preventive maintenance system was used effectively by the licensee to ensure completion of maintenance activities in a timely manner.

3. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69007)

To verify that the required reviews and audits were completed and facility changes were controlled and evaluated as required in 10 CFR 50.59, "Changes, tests and experiments," and were reviewed and approved by the NSC as required by TS Section 6.2, the inspectors reviewed selected aspects of:

- NSC meeting minutes for 2018 through the present
- "MNRC UC Davis Audit," – the 2017 annual audit conducted by the Chair of the NSC on February 25, 2018
- "MNRC UC Davis Audit," – the 2018 annual audit conducted by the Chair of the NSC on February 20, 2019

- “2018 MNRC Radiation Safety Program Review Report,” – the annual radiation protection program review conducted on November 6, 2018, by the UCD Environmental Health and Safety (EH&S) Research Safety Manager and the campus associate RSO
- “2019 MNRC Radiation Safety Program Review Report,” – the annual radiation protection program review conducted on November 15, 2019, by UCD EH&S personnel
- UCD/MNRC “Facility Modification Notebook” containing the “Facility Modification Log” forms
- Selected “Facility Modification Installation Authorization Forms” and associated “Facility Modification Checklist” forms processed in the past Selected Facility Procedures including:
 - UCD/MNRC-0043-DOC-04, “Facility Modification Procedure,” and,
 - UCD/MNRC-0045-DOC-04, “Quality Assurance Program for McClellan Nuclear Research Center (MNRC),” and
- UCD/MNRC Annual Reports for 2017 and 2018.

b. Observations and Findings

(1) Review and Audit Functions

The inspectors determined the composition of the NSC and qualifications of committee 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 to provide review and oversight of the UCD/MNRC as specified in TS Section 6.2.3. Through records review, the inspectors determined that reviews were conducted by the NSC or designated representatives. Topics of those reviews were as required by the TSs and the reviews provided sufficient guidance, direction, and oversight to ensure safe and acceptable use of the reactor.

The inspectors reviewed the results of the two most recent annual audits conducted at the facility. The inspectors noted that these audits were appropriate and covered the activities specified in TS Section 6.2.4, including various aspects of the reactor facility operations and health physics programs. To help ensure timely completion of these audits, the activities were added to the list of items in the licensee’s system used to track TSs required surveillances and other periodic items.

(2) Design Change Functions

The regulatory requirements stipulated in 10 CFR 50.59, 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 site-specific conditions.

The inspectors reviewed the "Facility Modification Log" notebook to determine whether any entries had been made for 2018 and 2019. The notebook entries showed that no changes or modifications had been proposed or completed in the last 2 years.

It was noted that the licensee's modification procedure did not mention a process allowed by the regulations called "screening" which provided a method to consider a change which might be rather minor in nature and, therefore, did not require any further review or evaluation. Such a change could then be "screened out" but the process would provide documentation that the licensee had considered issues involved and had concluded that nothing further was required. The licensee was informed that the issue of revising the modification procedure to include a "screening" process would be considered an inspection follow-up item (IFI) and would be reviewed during a future inspection (IFI 05000607/2020201-01).

c. Conclusion

The inspectors determined the NSC met as required and reviewed the topics outlined in the TSs. Audits of various reactor operations and programs were also conducted as required. The design change control program satisfied NRC requirements.

4. Procedures

a. Inspection Scope (IP 69008)

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

- "MNRC Document List (Requiring 1 Year Review)"
- Selected "Document Review," forms completed by staff members
- "MNRC Document List," showing all the licensee's current documents and procedures including the date each was last reviewed
- Selected Facility Procedures including:
 - UCD/MNRC-0005-DOC-09, "MNRC Facility Document Control Plan,"
 - UCD/MNRC-0029-DOC-20, "UCD/MNRC Radiation Safety Procedures," and,
 - UCD/MNRC-0082-DOC-01, "Environmental Compliance and Health and Safety Plan."

b. Observations and Findings

According to TS Section 6.4, approved procedures are required for the activities listed in that section. The procedures are required to be approved by the UCD/MNRC Director. Facility Procedure UCD/MNRC-0005-DOC-09 stipulated that the UCD/MNRC staff perform a biennial review of each active document to assure that it was current. The inspectors determined that operations and health physics procedures were typically reviewed annually by licensee staff members,

while maintenance and other procedures were reviewed biennially. It was noted that changes to procedures required the approval of the UCD/MNRC Director and all changes were required to be documented. The inspectors also determined that no radiation protection procedural reviews were overdue for review at the time of the inspection.

The activities and operations observed by the inspectors during this inspection were completed in accordance with the applicable procedures. These activities included reactor operations, handling radioactive material, and conducting surveys.

c. Conclusion

The inspectors determined the current procedure review, revision, control, and implementation program satisfied TS requirements. Procedural compliance was acceptable.

5. Radiation Protection

a. Inspection Scope (IP 69012)

The inspectors reviewed selected portions of the following records and reports regarding the licensee's radiation protection program to ensure that the requirements of 10 CFR Part 19, 10 CFR Part 20, and TS Sections 4.7 and 6.4.2 were being met:

- Calibration records of selected radiation detection and monitoring instruments
- List documenting all MNRC personnel who were authorized to handle radioactive material, dated August 14, 2019,
- Monthly Occupational Radiation Exposure Reports for UCD/MNRC personnel for 2017, 2018, and in 2019 through November
- Individual NRC Forms 5, "Occupational Dose Record for A Monitoring Period," for UCD/MNRC personnel for 2017 and 2018 (forms for 2019 were not yet available)
- "2018 MNRC Radiation Safety Program Review Report," completed by members of the campus EH&S Department and dated November 6, 2018
- "2019 MNRC Radiation Safety Program Review Report," completed by members of the campus EH&S Department and dated November 15, 2019
- Lesson plans, training objectives, and qualification cards for training of personnel by the RSO
- Selected daily, monthly, and quarterly contamination and radiation survey results for the past 2 years documented on forms entitled: "RSO Daily Log," "Radiological Survey (monthly)," and "Radiological Survey (Quarterly)"
- Facility Procedure UCD/MNRC-0029-DOC-20, "UCD/MNRC Radiation Protection Procedures," (containing various Sections and Appendices which outlined the MNRC Radiation Protection Program) including:
 - Section 5, "Personnel Monitoring Procedures,"
 - Section 7, "Radiation Survey Procedures,"
 - Section 9, "Radiation Safety Training for UCD/MNRC Personnel,"
 - Section 12, "Spill Procedure,"

- Section 13, "Procedures for Working with Radioactive Material,"
- Section 16, "Personnel Decontamination Procedures,"
- Section 18, "Radiation Work Permit Procedure," and,
- Section 20, "ALARA Program Procedure"
- Facility Procedure UCD/MNRC-0042-DOC-19, "MNRC Health Physics Instrumentation and Test Procedures," containing various addenda which specified equipment calibrations and tests
- UCD/MNRC Annual Reports for 2017 and 2018, and
- ANSI/ANS-15.11-1993, "Radiation Protection at Research Reactor Facilities," standard approval dated July 23, 1993.

The inspectors also toured the facility and observed the use of dosimetry and radiation monitoring equipment. In addition, the lead inspector conducted a radiation survey while accompanying the RSO as he completed a routine weekly survey. Licensee personnel were interviewed, and radiological signs and postings were observed as well.

b. Observations and Findings

(1) Surveys

The inspectors determined RSO daily log sheets and weekly, monthly, quarterly, and special radiation and contamination surveys were completed by the RSO or other qualified staff members, as required. A review of these records indicated that any contamination detected in concentrations above established action levels was noted on the appropriate form and the affected area or article was decontaminated. Results of the surveys were documented on survey maps and posted at the entrances of the various areas surveyed so that facility workers would be knowledgeable of the radiological conditions that existed in those areas prior to entry.

It was noted that all facility personnel had been trained to use radiation detection instruments. The inspectors verified that various individuals, including radiographers, were performing limited radiation surveys using the appropriate meters (i.e., when the shield doors to the radiography bays were opened). The use of survey meters was adequate.

During the inspection, the inspectors accompanied the facility RSO while he completed a monthly radiation and contamination survey. The lead inspector conducted a radiation survey alongside the RSO using an NRC-supplied meter. Areas surveyed at the facility included the equipment room, the reactor room, and associated support areas. The RSO completed the survey using appropriate survey techniques. The radiation readings found by the lead inspector were comparable to those found by the RSO. No anomalies were noted.

(2) Postings and Notices

The inspectors determined the required radiological signs were posted at the entrances to controlled areas. Other postings also showed the industrial hygiene hazards that were present in the areas as well.

A copy of NRC Form 3, "Notice to Employees," and a notice indicating where supplemental information could be found were conspicuously posted in Staging Area No. 1. These notices were on a bulletin board near the main entrance to the facility where visitors are required to sign in using the licensee's visitors log. The posted NRC Form 3 noted at the facility was the current edition (August 2017), as required by 10 CFR Part 19.

(3) Dosimetry

Personnel were observed wearing extremity and whole-body dosimetry in the controlled areas in the appropriate manner and location. The dosimetry being used consisted of OSL dosimeters and TLDs processed monthly by a National Voluntary Laboratory Accreditation Program certified vendor (Landauer). The OSL dosimeters were used for whole body monitoring and the TLDs were positioned in finger rings which were used for extremity monitoring. An examination of the OSL and TLD results, which documented the radiological exposures at the facility for the past 3 years, showed that the highest occupational doses, as well as doses to the public, were well within 10 CFR Part 20 limits.

Individual copies of NRC Form 5 issued to the various staff members in 2017 and 2018 were reviewed. (Forms for 2019 were not yet available.) The forms accurately reflected the data reported in the individual exposure records. No problems were noted.

(4) Calibration of 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 were sent off site to be calibrated by a contractor. The calibrations were tracked and documented as required. The inspectors confirmed that the frequency of these calibrations satisfied the requirements established in TS Section 4.7 and 10 CFR 20.1501, General," paragraph (b). All instruments checked by the inspectors that were staged for use or that were in use at the facility had a current calibration sticker attached.

(5) Radiation Protection Program

The radiation protection program was described and implemented 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 members of the campus

EH&S department and documented in reports dated November 6, 2018, and November 15, 2019. These audits satisfied the periodic program review required by 10 CFR 20.1101(c). No significant issues were identified by the auditors 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 visit conducted or the type of work to be performed and whether or not the person would be required to enter any controlled area and/or handle radioactive material. The inspectors determined that the appropriate training was provided to individuals visiting the facility and to those working at the facility. It was noted that Lesson Plan A (for visitors) had recently been updated and could now be completed on-line prior to the visitor arriving at the facility.

The inspectors reviewed the training given to various personnel, other than visitors, and noted that training was being completed as required. Specific supplemental training was also provided, as needed, to ensure that personnel understood the subjects. An annual radiation safety review emphasizing the as low as reasonably achievable (ALARA) principle was provided to all facility staff members as well. The training was determined to be adequate.

(7) Radiation Work Permit Program

The inspectors reviewed the radiation work permits (RWPs) used during 2019. The inspectors determined that the controls, precautions, and instructions specified in the RWPs are appropriate. It was also noted that the RWPs had been reviewed by the RSO as required. The 2019 RWPs, originally issued on January 29, 2019, were still in use pending the development of new ones for 2020. The RWPs typically covered routine maintenance work as well as experiment disassembly. The inspectors determined that no special RWPs were issued during 2019.

(8) Facility Tours

The inspectors 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 inspectors determined that the radiation protection and ALARA programs, as implemented by the licensee, satisfied regulatory requirements. Specifically, (1) periodic surveys were completed and documented acceptably to permit evaluation of the radiation hazards present, (2) postings and signs met regulatory requirements, (3) personnel dosimetry was worn as required and recorded doses were within the NRC's regulatory limits, (4) radiation survey and monitoring equipment was maintained and calibrated as required, and (5) the radiation protection training program was implemented as stipulated in the procedure.

6. Transportation Activities

a. Inspection Scope (IP 86740)

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

- Selected licenses of various UCD/MNRC consignees
- Records of the radioactive material shipments made during 2019 including completed radiological survey forms
- 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-20, "UCD/MNRC Radiation Protection Procedures," including:
 - Section 11, "Procedure for Receiving Radioactive Material,"
 - Section 21, "Procedures for Shipping Radioactive Material," and,
 - Section 21 Appendix 21-A, "Limited Quantity of Class 7 (Radioactive) Materials Checklist."

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspectors determined that the licensee made six shipments of radioactive material during 2019. Three shipments were designated as limited quantity shipments and three were Radioactive Material Yellow II shipments. The radioactive material was shipped to various consignees including the University of Queensland in Australia and the Lawrence Livermore National Laboratory (LLNL). The records indicated that the radioisotope types and quantities were calculated, and dose rates were measured as required. The radioactive material shipment records reviewed by the inspectors were completed in accordance with DOT and NRC regulations.

The inspectors verified that the licensee-maintained copies of shipment recipients' licenses to possess radioactive material or possessed authorization letters for the Department of Energy contractors (i.e., LLNL), as required. The licenses were determined to be current or in timely renewal prior to initiating a shipment. The inspectors also verified that the recipients were authorized to

receive and possess the type and quantity of radioactive material shipped to them.

The inspectors reviewed the training of MNRC staff members responsible for shipping radioactive material. The inspectors verified that licensee personnel designated as “shippers” had received the appropriate training covering the specified requirements within the past 3 years as required by the regulations.

c. Conclusion

The inspectors determined radioactive material was being shipped in accordance with the applicable NRC and DOT regulations.

7. Exit Interview

The inspection scope and results were summarized on January 8, 2020, with members of licensee management and the RSO. The lead 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 during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

H. Bollman	Radiography Supervisor and SRO
C. Dresser	Radiographer and Reactor Operator Trainee
W. Frey	Facility Director and SRO
T. Essert	Electrical Engineer and SRO
B. Mehciz	Radiographer Trainee and Technical Assistant
D. Reap	Radiation Safety Officer, Security Officer, and SRO
T. Slattery	Radiographer Helper Trainee
W. Steingass	Associate Director for Reactor Operations, Operations Manager, and SRO

INSPECTION PROCEDURES USED

IP 69004	Class I Research and Test Reactor Effluent and Environmental Monitoring
IP 69006	Class I Research and Test Reactors 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 69012	Class I Research and Test Reactor Radiation Protection
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-607/2020-201-01	IFI	Follow-up on the the issue of the licensee revising their modification procedure to include a "screening" process so that minor changes and modifications can be properly documented.
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Closed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ALARA	As Low as Reasonably Achievable
DOT	Department of Transportation
EH&S	Environmental Health and Safety
IFI	Inspection Follow-up Item
IP	Inspection Procedure
LLNL	Lawrence Livermore National Laboratory
MNRC	McClellan Nuclear Research Center
MWO	McClellan Work Order
NRC	U.S. Nuclear Regulatory Commission
NSC	Nuclear Safety Committee
OSL	Optically-Stimulated Luminescence
RSO	Radiation Safety Officer
RWP	Radiation Work Permit
SAR	Safety Analysis Report
SRO	Senior Reactor Operator
TLD	Thermoluminescent dosimeter
TSs	Technical Specifications
UCD	University of California