



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

September 14, 2021

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

SUBJECT: REGENTS OF THE UNIVERSITY OF CALIFORNIA – REPORT ON THE
REGULATORY AUDIT RE: LICENSE RENEWAL APPLICATION FOR THE
UNIVERSITY OF CALIFORNIA – DAVIS/MCCLELLAN NUCLEAR RESEARCH
CENTER TRIGA NUCLEAR REACTOR (EPID NO. L-2020-NFR-0002)

Dear Dr. Mohapatra:

By letter dated June 11, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18179A501), the Regents of the University of California (licensee) submitted a license renewal application (LRA) for a 20-year renewal of the Class 104c Facility Operating License No. R-130, Docket No. 50-607, for the University of California – Davis (UCD) McClellan Nuclear Research Center Training, Research, Isotope, General Atomics nuclear reactor. By letter dated July 6, 2020 (ADAMS Accession No. ML20188A368), the licensee updated its LRA to reflect its decision to reduce the licensed thermal operating power level from 2.3 megawatt thermal (MWt) to 1.0 MWt, and to eliminate pulsing capability and irradiation of explosive materials in the reactor tank.

Enclosed is a report on the regulatory audit conducted by staff of the U.S. Nuclear Regulatory Commission (NRC) from December 14, 2020, to August 31, 2021, in connection with its review of the LRA. The audit report does not make any licensing conclusions or findings, but it is part of the administrative record of the NRC staff's review of the application and may provide information supporting the NRC staff's safety evaluation. The audit followed the plan provided by letter dated December 10, 2020 (ADAMS Accession No. ML20338A257), unless otherwise noted in the enclosed report.

Included in the enclosure is the list of documents reviewed by the NRC staff. Some of the information listed was identified as being needed by the NRC staff to formalize its review findings. This supplemental information was discussed with Mr. Wesley Frey, of your staff during the audit exit meeting conference call, conducted on August 31, 2021, who agreed to provide the information as a supplement to the LRA.

These documents must be submitted in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.4, "Written communications," and pursuant to 10 CFR 50.30(b), "Oath or affirmation," be executed in a signed original document under oath or affirmation.

Information included in the response that you consider sensitive or proprietary, and seek to have withheld from public disclosure, must be marked in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding." Any information related to safeguards should be submitted in accordance with 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

If you have any questions, please contact me at (301) 415-0893, or by electronic mail at Geoffrey.Wertz@nrc.gov.

Sincerely,



Signed by Wertz, Geoffrey
on 09/14/21

Geoffrey A. Wertz, Project Manager
Non-Power Production and Utilization Facility
Licensing 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

Mr. Walter Steingass, Reactor Supervisor
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

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

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

SUBJECT: REGENTS OF THE UNIVERSITY OF CALIFORNIA – REPORT ON THE REGULATORY AUDIT RE: LICENSE RENEWAL APPLICATION FOR THE UNIVERSITY OF CALIFORNIA – DAVIS/MCCLELLAN NUCLEAR RESEARCH CENTER TRAINING, RESEARCH, ISOTOPE, GENERAL ATOMICS NUCLEAR REACTOR (EPID NO. L-2020-NFR-0002) DATED: SEPTEMBER 14, 2021

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ADAMS Accession No. ML21250A366**NRR-106**

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NAME	GWertz	NParker	JBorromeo	GWertz
DATE	09/08/2021	09/08/2021	09/14/2021	09/14/2021

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OFFICE OF NUCLEAR REACTOR REGULATION
REGULATORY AUDIT REPORT
REGARDING RENEWAL OF FACILITY OPERATING LICENSE FOR
FACILITY OPERATING LICENSE NO. R-130
UNIVERSITY OF CALIFORNIA-DAVIS/MCCLELLAN
UNIVERSITY OF CALIFORNIA-DAVIS MCCLELLAN NUCLEAR RESEARCH CENTER
DOCKET NO. 50-607

Location: U.S. Nuclear Regulatory Commission (NRC) Headquarters, Rockville, MD
(virtual)

Dates: December 14, 2020, - August 31, 2021

NRC Audit Team Members: Linh Tran, Audit Team Leader
Geoffrey Wertz, Audit Team Leader (backup), Technical Reviewer
Robert Beaton, Technical Reviewer - Nuclear Engineer
Adam Rau, Technical Reviewer - General Engineer
David Heeszel, Technical Reviewer - Geophysicist
Rao Tammara, Technical Reviewer - Physical Scientist
Zachary Gran, Technical Reviewer - Health Physicist
Richard Clement, Technical Reviewer - Senior Health Physicist
Jorge Cintron-Rivera, Technical Reviewer - Electrical Engineer
Michael Balazik, Technical Reviewer - Project Manager
Joshua Wilson, Technical Reviewer - Reactor Systems Engineer
Tarico Sweat, Technical Reviewer - Reactor Systems Engineer
Briana Arlene, Technical Reviewer - Biologist
Jeffrey Rikhoff, Technical Reviewer - Sr. Environmental Scientist
Kevin Folk, Technical Reviewer - Environmental Scientist
Phyllis Clark, Technical Reviewer - Nuclear Engineer
Paulette Torres, Technical Reviewer - Project Manager
Nicole Newton, Technical Reviewer - Financial Analyst

Licensee Representative: Dr. Wesley D. Frey, Director McClellan Nuclear Research Center

Background

By letter dated June 11, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18179A501), the Regents of the University of California (licensee) submitted a license renewal application (LRA) for a 20-year renewal of the Class 104c Facility Operating License No. R-130, Docket No. 50-607, for the University of California – Davis (UCD) McClellan Nuclear Research Center Training, Research, Isotope, General Atomics nuclear reactor. By letter dated July 6, 2020 (ADAMS Accession No. ML20188A368), the licensee updated its LRA to reflect its decision to reduce the licensed thermal operating power level

Enclosure

from 2.3 megawatt thermal (MWt) to 1.0 MWt, and to eliminate pulsing capability and irradiation of explosive materials in the reactor tank.

This report summarizes the regulatory audit conducted by the NRC audit team from December 14, 2020, to August 31, 2021, in connection with its review of the LRA. The audit report does not make any licensing conclusions or findings, but it is part of the administrative record of the NRC staff's review of the LRA and may provide information supporting the NRC staff's safety evaluation. The NRC audit team followed the plan dated December 10, 2020 (ADAMS Accession No. ML20338A257), unless otherwise noted in this report.

Audit Activities

The NRC audit team conducted the entire audit through virtual video-teleconferences. The NRC audit team opened the audit with an entrance meeting conducted on December 14, 2020, and performed a focused audit review of selected information through the week. The NRC audit team conducted a preliminary exit meeting for the focused review week on December 18, 2020, but the audit remained open until concluding on August 31, 2021, with an exit meeting. The NRC audit team and licensee participated in bi-weekly video teleconferences throughout the audit period to discuss and share information.

The licensee provided requested information using an internet portal (BOX) which allowed NRC audit team members to access the information (documents and computer files), or otherwise share outside the audit team. Below is a list of documents reviewed during the regulatory audit:

- MNRC Soil Permeability Information.docx
- MNRC 1 MW MHA source term.xlsx
- Analysis of Fuel Temperature after LOCA 20210624.docx
- Analysis of Fuel Temperature after LOCA 20210604.docx
- Instantaneous Loss of Coolant Accident.docx
- UC_Davis_Report_R1.docx
- TH RAI questions.docx
- Apndxb_converted 1 MW version final 2021 correct 24 decay term.docx
- reactor room survey.pdf
- rxrmloca.txt
- UCD MNRC-0029-DOC-18.pdf
- 4.49 Marcum Woods Reese Comparison of Fuel Temperature and Bulk Coolant.pdf
- Fuel Elements for Pulsed TRIGA Research Reactors.pdf
- 4.25 Baldwin Foushee Greenwood Fission Products Release from TRIGA LEU Reactor Fuel.pdf
- Steady State Thermal Hydraulic Analysis of the Oregon State University TRIGA Reactor Using RELAP5 3D.pdf
- A Comparison of Pulsing Characteristics of the Oregon State University TRIGA Reactor with FLIP and LEU Fuel.pdf
- MNRC Water Quality Monitoring Well Description.docx
- Analysis for FOD blocking Fuel Channel v2.docx
- MNRC Analysis of Fuel Temperature after LOCA.docx
- UCD MNRC-0009-DOC_Rev 05 draft.doc
- Criticality safety analysis for MNRC spent fuel pits.docx [Version 1]
- Criticality safety analysis for MNRC spent fuel pits.docx V2 [Version 2]

- Uncontrolled Withdrawal of a Control Rod nonlinear worth.docx [Version 1]
- Uncontrolled Withdrawal of a Control Rod nonlinear worth.docx V2 [Version 2]
- MNRC TRIGA reactor water worth.docx
- environmental_report_formated_reviewed 1 MW version final.docx
- New prompt criticality accident analysis.docx
- New 1 MW MHA source term.mix.txt
- HotSpot Table Output MHA stability class E.txt
- HotSpot Table Output MHA stability class F.txt
- Apndxb_converted 1MW version final 2021.docx
- HotSpot Table Output MHA stability class C.txt
- HotSpot Table Output MHA stability class A.txt
- HotSpot Table Output MHA stability class B.txt
- HotSpot Table Output MHA stability class D.txt
- August NRC focused audit follow up.docx
- MNRC_OCC_BOL_14.81.i
- MNRC_LCC_BOL_17.69.i
- MNRC_LCC_EOL_17.59.i

Request for Supplemental Information

The NRC audit team identified several documents that would need to be submitted on the docket as part of the LRA to satisfy or demonstrate compliance with the regulatory requirements. The NRC staff request that these documents be submitted as supplemental information to the LRA in response to this letter. This request was discussed and agreed upon with Dr. Frey. These documents are listed below:

- MNRC Soil Permeability Information.docx
- MNRC 1 MW MHA source term.xlsx
- Analysis of Fuel Temperature after LOCA 20210624.docx
- TH RAI questions.docx
- Apndxb_converted 1 MW version final 2021correct 24 decay term.docx
- Analysis for FOD blocking Fuel Channel v2.docx
- Criticality safety analysis for MNRC spent fuel pits.docx V2 [Version 2]
- Uncontrolled Withdrawal of a Control Rod nonlinear worth.docx V2 [Version 2]
- MNRC TRIGA reactor water worth.docx
- environmental_report_formated_reviewed 1 MW version final.docx
- New prompt criticality accident analysis.docx
- August NRC focused audit follow up.docx

Request for Additional Information

During the audit, the NRC audit team identified additional information that would need to be submitted on the docket to support the NRC staff's review of the LRA. The NRC audit team discussed these items with the licensee covering the following topics:

- Update financial assurance information
- Use of 30/20 fuel followers
- Maximum reactivity coefficient value
- Facility changes associated with pulsing and square wave modes

- Confirmation that ECCS/ESF is not credited in any accident scenarios
- Shared facilities and facility modifications

The NRC audit team expects to issue the request for additional information within 90 days from the date of this letter.

Exit Briefing

On August 31, 2021, the NRC audit team held an exit briefing with the licensee representative, Dr. Frey, Director McClellan Nuclear Research Center. No disagreements were noted.

Deviations from the Audit Plan

No deviations from the audit plan were identified.