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

June 3, 2022

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

SUBJECT: REGENTS OF THE UNIVERSITY OF CALIFORNIA – REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE RENEWAL APPLICATION FOR THE UNIVERSITY OF CALIFORNIA – DAVIS/MCCLELLAN NUCLEAR RESEARCH CENTER (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 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 McClellan Nuclear Research Center Training, Research, Isotope, General Atomics nuclear reactor. By letter dated July 6, 2020 (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.

The U.S. Nuclear Regulatory Commission (NRC) staff identified additional information needed to continue its review of the LRA, as described in the enclosed request for additional information (RAI). As discussed with Dr. Wesley Frey of your staff, by telephone on May 16, 2022, provide a response to the RAI or a written request for additional time to respond, including the proposed response date and a brief explanation of the reason, 30 days from the date of this letter. Following receipt of the complete response to the RAI, the NRC staff will continue its review of the LRA.

The response to the RAI 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 regarding the NRC staff's review or if you intend to request additional time to respond, please contact me at (301) 415-0893, or by electronic mail at Geoffrey.Wertz@nrc.gov.

Sincerely,


Signed by Wertz, Geoffrey
on 06/03/22

Geoffrey 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

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

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ADAMS Accession No. ML22146A194 **NRR-088**

OFFICE	NRR/DANU/UNPL/PM	NRR/DANU/UNPL/LA	NRR/DANU/UNPL/BC	NRR/DANU/UNPL/PM
NAME	GWertz	NParker	JBorromeo	GWertz
DATE	6/2/2022	6/2/2022	6/3/2022	6/3/2022

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OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR ADDITIONAL INFORMATION

REGARDING RENEWAL OF FACILITY OPERATING LICENSE NO. R-130

UNIVERSITY OF CALIFORNIA-DAVIS/MCCLELLAN NUCLEAR RESEARCH CENTER

DOCKET NO. 50-607

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the license renewal application for compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) using the following guidance and standard(s):

- The regulation, 10 CFR 20.1301, "Dose limits for individual members of the public," which states "(a) Each licensee shall conduct operations so that – (1) The total effective dose equivalent to individual members of the public from licensed operations does not exceed 0.1 rem (1 mSv) in a year…," and, "(d) A licensee or license applicant may apply for prior NRC authorization to operate up to an annual dose limit for an individual member of the public of 0.5 rem (5 mSv). The licensee or license applicant shall include the following information in this application: (1) Demonstration of the need for and the expected duration of operations in excess of the limit in paragraph (a) of this section; (2) The licensee's program to assess and control dose within the 0.5 rem (5 mSv) annual limit; and (3) The procedures to be followed to maintain the dose as low as is reasonably achievable."

- NUREG-1537 Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content," issued February 1996 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML042430055)

- NUREG-1537 Part 2, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Standard Review Plan and Acceptance Criteria," issued February 1996 (ML042430048)

- "Interim Staff Guidance for the Streamlined Research Reactor License Renewal Process," A. Adams to K. Brock, October 15, 2009 (ML092240256 and ML092240244)

The NRC staff review of the University of California Davis (UCD), McClellan Nuclear Research Center (MNRC) loss-of-coolant accident (LOCA) used the guidance in NUREG-1537, Part 2, Chapter 13, "Accident Analyses," "Loss of Coolant," which states that licensees should analyze potential LOCAs, and states, in part, that a LOCA could cause the uncovered reactor core to constitute an unshielded gamma ray source.

The NRC staff review finds that the radiation dose rates, as stated in Section 13.2.3.2.2.3, "Radiation Levels from the Uncovered Core" for the LOCA scenario, Table 13-11, "Scattered Radiation Dose Rates at the MNRC Fence Line After a Loss of Pool Water Accident Following

1 MW Operations," of the UCD/MNRC SAR (redacted version ML20238B984) appear to represent the highest radiation dose that a member of the public could receive following a LOCA. The NRC staff also finds the dose rates provided in Table 13-11 would result in a radiation dose to a member of the public, located outside the controlled area boundary of the UCD/MNRC fence, in excess of the annual radiation limit specified in 10 CFR 20.1301(a)(1) of 100 millirem (mrem), within a few hours of exposure following the LOCA.

Further, the NRC staff review of the licensee's SAR did not identify any systems or equipment credited to potentially mitigate or reduce the dose rates following a LOCA. Also, the NRC staff review of the licensee's Emergency Plan, Revision 9, dated June 2018 (redacted version ML20238B990), did not find any protective actions to remove or evacuate members of the public from the areas outside the controlled area boundary of the UCD/MNRC fence, in order to mitigation the potential radiation dose.

In order to continue with its review, the NRC staff requires the following additional information:

1. As necessary to demonstrate compliance with 10 CFR Part 20 dose limits and consistent with the guidance in NUREG-1537, provide a comprehensive updated description of the UCD/MNRC LOCA scenario, including a timeline of the major activities or assumptions, the postulated cause of the leak, the drain-down rate, the assumed time for the core to become uncovered, and any changes to the calculated dose rates, if identified.

2. As necessary to demonstrate compliance with 10 CFR Part 20 dose limits and consistent with the guidance in NUREG-1537, provide the proposed plans to reduce or mitigate the potential radiation exposure to a member of the public such that the postulated LOCA scenario would not result in any member of the public receiving an annual dose in excess of 100 mrem, as required by 10 CFR 20.1301, such as:

    2.1. operator actions and/or facility equipment planned to be used to mitigate the consequences of the LOCA, and whether the equipment should be included in the technical specifications.

    2.2. procedures or processes to mitigate the consequences of the LOCA, including any changes to the UCD/MNRC Emergency Plan.

    2.3. support needed from any off-site local support agencies, officials, or emergency response organizations, including the use of any signed agreements.

    2.4. any other planned actions credited to mitigate the consequences of the LOCA.

3. The regulation, 10 CFR 20.1301(d) states that "[a] licensee or license applicant may apply for prior NRC authorization to operate up to an annual dose limit for an individual member of the public of 0.5 rem (5 mSv). The licensee or license applicant shall include the following information in this application:

    (1) Demonstration of the need for and the expected duration of operations in excess of the limit in paragraph (a) of this section;

    (2) The licensee's program to assess and control dose within the 0.5 rem (5 mSv) annual limit; and

(3) The procedures to be followed to maintain the dose as low as is reasonably achievable."

If an increase of the annual dose limit for an individual member of the public is being requested, provide the information stated in 10 CFR 20.1301(d)(1)-(3), listed above.