



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

June 22, 2023

Dr. Rusty Towell
Director of NEXT Lab
Abilene Christian University
ACU Box 27963
Abilene, TX 79699

SUBJECT: INTERIM REPORT ON REGULATORY AUDITS OF THE ABILENE CHRISTIAN UNIVERSITY PRELIMINARY SAFETY ANALYSIS REPORT (EPID L-2022-NFW-0002)

Dear Mr. Towell

The purpose of this letter is to provide an interim report on the regulatory audits for the U.S. Nuclear Regulatory Commission (NRC) staff's review of Abilene Christian University's (ACU's) application for a construction permit (CP) for a molten salt research reactor (MSRR). By letter dated August 12, 2022 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML22227A201), as supplemented by letter dated October 14, 2022 (ML22293B816), ACU submitted its CP application, including a preliminary safety analysis report (PSAR). By letter dated November 18, 2022 (ML22313A097), the NRC staff accepted ACU's MSRR CP application for docketing and provided an estimated date of May 2024 by which it expected to complete its safety evaluation (SE) for the application. In its November 18, 2022, letter, the NRC staff also identified several technical topics related to the MSRR application that would likely require increased focus to ensure timely completion of the review.

Following acceptance of the application, the NRC staff opened six audits to address items in various technical areas (see audit plans transmitted to ACU by emails dated January 13 and March 2, 2023¹). The NRC staff subsequently provided ACU with audit questions² to support discussion during the six audits. To date ACU has provided initial responses for approximately two-thirds of the NRC staff's questions to facilitate discussion of these questions. The NRC staff and ACU have conducted several virtual meetings to discuss many of the questions for which ACU has provided initial responses.

On May 17 and 18, 2023, the NRC staff engaged with ACU during in-person audit meetings at the ACU campus in Abilene, Texas. Areas of focus for these in-person audit meetings included:

- Seismic design, design codes and standards, and principal design criteria (PDCs) (primarily PSAR Chapters 2 and 3);

¹ See ML23013A089, ML23065A048, ML23065A051, ML23065A052, ML23065A055, and ML23065A056.

² See ML23038A009, ML23052A067, ML23073A302, ML23076A015, ML23080A191, ML23086A017, ML23086A014, ML23095A081, ML23116A171, ML23123A044, ML23123A046, and ML23129A780.

- Interactions between the fuel salt and materials (primarily PSAR Chapters 4 and 5);
- Instrumentation and controls (primarily PSAR Chapter 7);
- Fuel handling, storage, and the gas management system (primarily PSAR Chapter 9); and
- Accident sequences and analyses (primarily PSAR Chapter 13).

During the audit, ACU addressed many of the NRC staff's questions and indicated that it plans to draft revisions to the MSRR PSAR to provide additional or updated information on the docket to support the NRC staff's review of the application. Based on these discussions, the NRC staff understands that some of these PSAR revisions may be straightforward, because they involve simple corrections or clarifications to existing information, or because the scope of information that needs to be added is limited. However, some changes may be more complex and may involve additional design and engineering information that was not present in the initial PSAR submittal. Examples include material interactions (for example, the effect of corrosion by fuel salt on salt boundaries); inputs to the maximum hypothetical accident source term; safety classification of structures, systems, and components (SSCs); and determination of codes and standards applicable to the reactor design.

In addition to addressing the NRC staff's audit questions, ACU informed the NRC staff that several other design changes are planned or under consideration, which would also require PSAR revisions. Examples of these items include revisions to the reactor trip valves, reactor system configuration within the reactor thermal management system, reactor configuration within the ACU Science and Engineering Research Center systems pit, and PDCs.

Based on audit discussions to date, the NRC staff anticipates that the scope of planned changes to the MSRR PSAR will be significant. The NRC staff also notes that many of the revisions discussed will affect multiple areas or chapters of the PSAR and will require additional effort to ensure consistency within any revised PSAR, for example, changes related to PDCs and safety classification of SSCs.

The NRC staff encourages ACU to maintain up to date communication on its plans and progress for continuing to respond to audit questions and developing its PSAR revisions. As discussed in the NRC staff's November 18, 2022, letter accepting the MSRR PSAR application for docketing, the original schedule for completion of the NRC staff's review of the application was dependent on several factors, including the timeframe for resolution of technical issues, and design changes. The NRC staff will evaluate the need for any changes to the review schedule based on these factors and will consider any relevant information such as progress in resolving audit questions and ACU's plans for PSAR revisions. As discussed in a letter from the NRC staff dated December 16, 2022 (ML22341A615), any changes to the initial forecasted completion date, along with the reasons for the changes, will be communicated in writing to ACU.

The NRC staff acknowledges that a CP application reflects a preliminary design, and that some changes at this stage are an anticipated part of the design and application process. However, for the NRC staff to make applicable safety findings in an efficient and effective manner and on a predictable timeframe, there needs to be a reasonably fixed set of information in the PSAR. The NRC staff appreciates the positive and productive interactions with ACU during the in-person audit and other audit activities.

This interim audit report does not make any licensing conclusions or findings, but it is part of the administrative record of the staff's review of the application and may provide information supporting the NRC staff's SE. The NRC staff will issue additional reports on the audits associated with its review of the MSRR CP application following the completion of those audits, as discussed in the audit plans dated January 13 and March 2, 2023.

If you have any questions, please contact me at (301) 415-7190, or by via email at Richard.Rivera@nrc.gov.

Sincerely,



Signed by Rivera, Richard
on 06/22/23

Richard Rivera, Project Manager
Advanced Reactor Licensing Branch 1
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Docket No.: 50-610

cc: Abilene Christian University MSRR via GovDelivery

SUBJECT: INTERIM AUDIT REPORT ON REGULATORY AUDITS OF THE ABILENE CHRISTIAN UNIVERSITY PRELIMINARY SAFETY ANALYSIS REPORT (EPID L-2022-NFW-0002) DATED: JUNE 22, 2023

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NRR-106

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