



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

September 23, 2022

Dr. Caleb S. Brooks
Associate Professor
University of Illinois at Urbana-Champaign
Department of Nuclear, Plasma, and Radiological Engineering
Talbot Laboratory, Room 111C, MC234
104 South Wright St.
Urbana, IL 61801

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION STAFF OBSERVATIONS
REGARDING UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN WHITE
PAPER – UTILIZING A CLASS 104(C) LICENSING PATHWAY FOR THE
PROPOSED UIUC RESEARCH & TEST REACTOR (EPID NO.: L-2022-NFO-
0005)

Dear Dr. Brooks:

By letter dated June 13, 2022 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML22165A304), the University of Illinois at Urbana-Champaign (UIUC), submitted the white paper titled "Utilizing a Class 104(c) Licensing Pathway for the Proposed UIUC Research & Test Reactor," to the U.S. Nuclear Regulatory Commission (NRC) for review. UIUC stated that the objective of the white paper is to document the justification for the selected licensing pathway of the UIUC's proposed reactor.

The NRC staff's observations are provided in the enclosure to this letter. If you have any questions regarding this matter, please contact Adrian Muñiz at Adrian.Muniz@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "Greg Oberson".

Signed by Oberson, Greg
on 09/23/22

Greg Oberson, Acting Chief
Advanced Reactor Licensing
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Project No.: 99902094

Enclosure:

As stated

cc: csbrooks@illinois.edu
cht235@illinois.edu

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION STAFF OBSERVATIONS REGARDING UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN WHITE PAPER – UTILIZING A CLASS 104(C) LICENSING PATHWAY FOR THE PROPOSED UIUC RESEARCH & TEST REACTOR (EPID NO.: L-2022-NFO-0005) DATED: SEPTEMBER 23, 2022

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NRR-106

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The U.S. Nuclear Regulatory Commission Staff's Observations on UIUC White Paper Submission, "Utilizing a Class 104(c) Licensing Pathway for the Proposed UIUC Research & Test Reactor"

By letter dated June 13, 2022, (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML22165A304), the University of Illinois Urbana-Champaign (UIUC) submitted a white paper titled, "Utilizing a Class 104(c) Licensing Pathway for the Proposed UIUC Research & Test Reactor," which provides an overview and justification for the licensing approach for its advanced test reactor. Specifically, UIUC described its rationale for pursuing a Class 104(c) license.

In its letter, UIUC requested that the U.S. Nuclear Regulatory Commission (NRC) staff review the document to facilitate mutual understanding of the applicability of the 104(c) license for its planned advanced test reactor.

The NRC staff has reviewed the UIUC white paper. The NRC staff's observations are provided below. These observations do not constitute final agency positions. NRC staff observations in this response are not intended as comprehensive feedback. Lack of comment or observations regarding a certain aspect of the white paper should not be interpreted as NRC agreement with UIUC's position.

Background

- This white paper is part of UIUC's planned engagement (ADAMS Accession No. ML22216A058) regarding its plans to construct a non-power reactor facility specifically addressing the potential NRC staff's licensing pathway.
- The white paper describes UIUC's intent to pursue a Class 104(c) license as enabled by the Atomic Energy Act (AEA) of 1954, as amended, the Nuclear Energy Innovation and Modernization Act (NEIMA), and the related *Code of Federal Regulations* (CFR), 10 CFR 50.21(c).

Observations

1. UIUC states its goal to be licensed as a 104(c) facility and that it intends to meet the cost recovery requirements associated with such facilities. Upon docketing of an application for a construction permit, the NRC will evaluate the design and operation of the facility in accordance with applicable laws and regulations; and consistent with the standard review plan, NUREG-1537, Part 2, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors: Standard Review Plan and Acceptance Criteria" (ADAMS Accession No. ML042430048).
2. The NRC observes that the proposed reactor differs from the TRIGA reactor previously located on the UIUC campus discussed in the UIUC white paper.
3. UIUC states that "...microreactors have the potential to be commercially viable power sources." If UIUC intends to use the proposed reactor for electrical generation, the construction permit application should provide details about such expected use. Additionally, in the event UIUC intends to use the proposed reactor for electrical generation, the NRC staff suggests additional pre-application interaction related to this topic.

Enclosure

4. The NRC staff notes that when specific guidance documents for structures, systems, and components for non-power reactors do not exist, the equivalent power reactor guidance documents are utilized, informed by the relative risk of the facility. Secondary systems used for power generation or energy recovery will likely be evaluated against the existing power plant regulations as appropriate.
5. The NRC observes that the proposed facility would operate at 15 megawatts. The NRC staff notes that a nuclear reactor which is of a type described in 10 CFR 50.21(c) and is licensed to operate at a thermal power level in excess of 10 megawatts would be considered a testing facility per 10 CFR 50.2.
6. The NRC staff observes that the white paper describing the licensing process for the proposed facility did not address the full scope of applicable regulations. For example, because UIUC states it is considering a facility that would operate at 15 megawatts thermal, such a facility must address 10 CFR Part 100, "Reactor Site Criteria." The regulations in 10 CFR 100, Subpart A, "Evaluation Factors for Stationary Power Reactor Site Applications Before January 10, 1997 and for Testing Reactors," includes factors that the Commission will take into consideration in determining the acceptability of a site for a testing reactor.