



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

August 10, 2022

Mr. George Wilson  
Vice President Regulatory Affairs  
TerraPower, LLC  
15800 Northup Way  
Bellevue, WA 98008

SUBJECT: TERRAPOWDER, LLC – U.S. NUCLEAR REGULATORY COMMISSION (NRC)  
STAFF'S RESPONSE TO TERRAPOWDER'S REQUEST FOR A REGULATORY  
INTERPRETATION REGARDING THE CONSTRUCTION OF THE SODIUM  
TEST AND FILL FACILITY

Dear Mr. Wilson:

By letter dated June 3, 2022, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22154A564), TerraPower, LLC., requested the U.S. Nuclear Regulatory Commission (NRC) staff to provide a regulatory interpretation of the applicability of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.10, "License required; limited work authorization," to the construction of TerraPower's Sodium Test and Fill Facility (TFF). The letter included TerraPower's assessment of the applicability of 10 CFR 50.10 as it relates to the TFF and conceptual illustrations of the planned site layout. As indicated in TerraPower's letter, the TFF is intended to be used to test certain non-nuclear components of the Sodium reactor and is planned to be located adjacent to the proposed Sodium advanced reactor plant located in Kemmerer, Wyoming.

Based on the information provided, the NRC staff determined that the construction of the TFF does not constitute "construction" as defined in 10 CFR 50.10(a)(1) and that a construction permit or limited work authorization is not required to build the TFF. Because the information provided in TerraPower's letter dated June 3, 2022, is preliminary in nature and does not constitute a license application, the NRC staff's response, provided in the enclosure, does not constitute either a review or approval of the design of the planned Sodium facility or the TFF. The staff's response in the enclosure also does not constitute a verification that the Sodium plant or TFF will be constructed or perform as described by TerraPower. In addition, if the actual TFF and/or Sodium facility differ from the descriptions and information provided in TerraPower's letter dated June 3, 2022, the NRC staff's determination could change.


The NRC staff's response to TerraPower's request is provided in the enclosure to this letter.

G Wilson

- 2 -

If you have any questions on this matter, please contact Mallecia Sutton (Project Manager), at 301-415-0673 or via email at [Mallecia.Sutton@nrc.gov](mailto:Mallecia.Sutton@nrc.gov).

Sincerely,



Signed by Kennedy, William  
on 08/10/22

William B. Kennedy, Acting Chief  
Advanced Reactor Licensing Branch 1  
Division of Advanced Reactors and Non-Power  
Production and Utilization Facilities  
Office of Nuclear Reactor Regulation

Project No.: 99902100

Enclosure:  
As stated

cc: [igifford@terrapower.com](mailto:igifford@terrapower.com)  
[tneider@terrapower.com](mailto:tneider@terrapower.com)  
[rsprengel@terrapower.com](mailto:rsprengel@terrapower.com)

SUBJECT: TERRAPOWER, LLC – U.S. NUCLEAR REGULATORY COMMISSION (NRC)  
STAFF'S RESPONSE TO TERRAPOWER'S REQUEST FOR A REGULATORY  
INTERPRETATION REGARDING THE CONSTRUCTION OF THE SODIUM  
TEST AND FILL FACILITY DATED: AUGUST 10, 2022

**DISTRIBUTION:**

Public  
RidsNrrDanu Resource  
RidsNrrDanuUarl Resource  
DGreene, NRR  
CSmith, NRR  
WKennedy, NRR  
MSutton, NRR  
SPhilpott, NRR  
RAnzalone, NRR

**ADAMS Accession No.: ML22174A425****NRR-106**

OFFICE	NRR/DANU/UAL1/PM	NRR/DANU/UAL1/LA	NRR/DANU/UTB2
NAME	MSutton	CSmith	RAnzalone
DATE	6/27/2022	7/6/2022	7/6/2022
OFFICE	NRR/DANU/UTB2	OGC	NRR/DANU/UAL1/BC
NAME	SPhilpott	MASpencer	WKennedy
DATE	7/12/2022	8/4/2022	8/10/2022

**OFFICIAL RECORD COPY**

## OFFICE OF NUCLEAR REACTOR REGULATION RESPONSE TO TERRAPOWER, LLC

### REQUEST FOR INTERPRETATION OF 10 CFR 50.10

#### INTRODUCTION

By letter dated June 3, 2022, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22154A564), TerraPower, LLC., requested the U.S. Nuclear Regulatory Commission (NRC) staff to provide a regulatory interpretation of the applicability of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.10, "License required; limited work authorization," to the construction of TerraPower's Sodium Test and Fill Facility (TFF). The letter included TerraPower's assessment of the applicability of 10 CFR 50.10 as it relates to the TFF and conceptual illustrations of the planned site layout. As indicated in TerraPower's letter, the TFF is intended to be used to test certain non-nuclear components of the Natrium reactor and is planned to be located adjacent to the proposed Natrium advanced reactor plant located in Kemmerer, Wyoming.

#### BACKGROUND

TerraPower first discussed the TFF with the NRC staff in a May 25, 2022, public meeting (slides available at ADAMS Accession No. ML22132A152), which provided an overview of TerraPower's planned testing program and methodology. The design and functions of the TFF were also described in the referenced letter from TerraPower. From the documents submitted, the NRC staff understands that the TFF is intended to be fully independent of the Natrium reactor during operation and the TFF systems, structures, and components (SSCs) are not part of the Natrium reactor design.

TerraPower's June 3, 2022, letter additionally states that while the TFF is intended to be independent of the Natrium reactor, a temporary interconnection will be used to transfer sodium from the TFF to the Natrium reactor. This interconnection would be connected only after the construction of the Natrium nuclear island is complete and would be removed prior to the commencement of operations for the Natrium reactor.

#### OVERVIEW OF 10 CFR 50.10

Pursuant to 10 CFR 50.10, "License required; limited work authorization," paragraph (c), "[n]o person may begin the construction of a production or utilization facility on a site on which the facility is to be operated until that person has been issued either a construction permit... or a limited work authorization[.]" The current Section 50.10(a) definition of "construction" is divided into two parts: 10 CFR 50.10(a)(1) specifies activities deemed to constitute "construction," and 10 CFR 50.10(a)(2) specifies activities which are excluded from the definition. Regulations 10 CFR 50.10(d) through (f) provide for the request and issuance of a limited work authorization by which applicants may be authorized by the NRC to conduct certain activities meeting the 10 CFR 50.10(a)(1) definition of construction on site prior to the issuance of a construction permit.

Enclosure

## EVALUATION AND CONCLUSION

The NRC staff evaluated TerraPower's regulatory applicability assessment in the letter dated June 3, 2022. Taking into consideration the details provided by TerraPower regarding the TFF and Natrium reactor designs discussed above, the NRC staff determined whether construction of the TFF meets the definition of "construction" provided in 10 CFR 50.10(a)(1). The NRC staff's evaluation is as follows:

- Regulations 10 CFR 50.10(a)(1)(i) through (iv) are not applicable because the TFF will be separate from and will not fulfill any safety function for the Natrium reactor facility.
- Regulation 10 CFR 50.10(a)(1)(v) is not applicable because, as discussed in TerraPower's assessment, the TFF is not part of the Natrium plant's physical or cyber security program and as such does not contain any SSCs necessary to comply with 10 CFR Part 73, "Physical Protection of Plants and Materials."
- Regulation 10 CFR 50.10(a)(1)(vi) is not applicable because, as discussed in the TerraPower assessment, the TFF does not contain SSCs needed as part of the plant's fire protection system to comply with 10 CFR 50.48, "Fire protection," or criterion 3 of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants." The NRC staff notes that, rather than general design criterion (GDC) 3, TerraPower's June 3, 2022, letter referenced advanced reactor design criterion 3 from Regulatory Guide (RG) 1.232, Revision 0, "Guidance for Developing Principal Design Criteria for Non-Light-Water Reactors" (ML17325A611). While TerraPower has not yet submitted principal design criteria (PDCs) for the NRC staff's review, if the PDC for fire protection for the Natrium facility is substantially similar to the advanced reactor design criterion 3 from RG 1.232, the NRC staff expects that the TFF would not be needed to comply with fire protection requirements since the TFF is not relied on for any accident or transient mitigation.
- Regulation 10 CFR 50.10(a)(1)(vii) is not applicable because, as discussed in the TerraPower assessment, the TFF does not contain onsite emergency facilities necessary to comply with the requirements of 10 CFR 50.47, "Emergency plans," and 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities."

As such, the NRC staff determined that the construction of the TFF does not meet the definition of "construction" provided in 10 CFR 50.10(a)(1) and therefore, a construction permit or a limited work authorization pursuant to 10 CFR 50.10 is not required to begin the construction of the TFF.

Because the information provided in TerraPower's June 3, 2022, letter is preliminary in nature and does not constitute a license application, the NRC staff's determination does not constitute either a review or approval of the design of the planned Natrium facility or the TFF or a

verification that the Natrium plant or TFF will be constructed or perform as described by TerraPower. In addition, if the actual TFF and/or Natrium facility differ from the descriptions and information provided in TerraPower's June 3, 2022, letter, the NRC staff's determination could change.

Additionally, in TerraPower's June 3, 2022, letter, TerraPower stated that "[p]otential fires at the TFF would not prevent the ability to achieve and maintain safe shutdown of the reactor," in evaluating the applicability of 10 CFR 50.10(a)(1)(vi). The NRC staff notes that, while this may be a design goal for the TFF and the Natrium reactor, the existence of the TFF adjacent to the Natrium reactor should be appropriately evaluated and addressed in TerraPower's construction permit and operating license applications. The sodium transfer interconnection between the TFF and the Natrium reactor should also be appropriately evaluated and addressed in TerraPower's construction permit and operating license applications.