



June 3, 2022

TP-LIC-LET-0021 Project Number 99902100 10 CFR 50.10

U.S. Nuclear Regulatory Commission Washington, DC 20555-0001 ATTN: Document Control Desk

Subject:Regulatory interpretation of the applicability of 10 CFR 50.10 to the
construction of the Sodium Test and Fill Facility

This letter provides the TerraPower, LLC (TerraPower) assessment on the applicability of Section 50.10 of Title 10 of the *Code of Federal Regulations* (10 CFR) to the construction of the Sodium Test and Fill Facility. TerraPower is requesting the U.S. Nuclear Regulatory Commission (NRC) provide a regulatory interpretation and assessment on the applicability of 10 CFR 50.10 to the construction of the Sodium Test and Fill Facility, which is planned to be located adjacent to the proposed Natrium[™] advanced reactor plant.

This letter and enclosures make no new or revised regulatory commitments.

If you have any questions regarding this submittal, please contact Ryan Sprengel at rsprengel@terrapower.com or (425) 324-2888.

Sincerely,

Kyn Spegl

Ryan Sprengel License Application Development Manager TerraPower, LLC



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- Enclosure: 1. TerraPower, LLC Assessment of 10 CFR 50.10 Applicability to the Construction of the Sodium Test and Fill Facility
- cc: William (Duke) Kennedy, NRC Mallecia Sutton, NRC

ENCLOSURE 1

TerraPower, LLC Assessment of 10 CFR 50.10 Applicability to the Construction of the Sodium Test and Fill Facility

TerraPower, LLC (TerraPower) is requesting the U.S. Nuclear Regulatory Commission (NRC) provide a regulatory interpretation of the assessment on the applicability of Section 50.10 of Title 10 of the *Code of Federal Regulations* (10 CFR) to the construction of the Sodium Test and Fill Facility (TFF), which is located adjacent to the proposed Natrium[™] advanced reactor plant.

TerraPower plans to build the TFF near Kemmerer, Wyoming, adjacent to the proposed Natrium advanced reactor plant. The purpose of the TFF is to test components to qualify them for use in the Natrium plant, such as the in-vessel transfer machine, control rod drive mechanisms, and primary sodium pumps. The TFF will also be used to transfer sodium to the Natrium plant for the initial fill from the TFF sodium tank. The TFF sodium tank will be temporarily connected to the Natrium plant through a sodium transfer system with piping connected between the TFF sodium tank and the Natrium plant. This is a temporary system interconnection and will not be connected until the end of construction of the Nuclear Island (NI) and removed prior to commencement of operations. The NI will be constructed only after the NRC approves a construction permit. Based on this, no analyses will be performed on the temporary interconnection between the TFF and the Natrium plant for the construction of the TFF and regulatory analyses will be performed prior to making the temporary interconnection.

The following TFF dimensions are conceptual and subject to change. The TFF building is approximately 140 feet wide x 270 feet long x 120 feet tall. The deepest part of the test pit is approximately 106 feet below grade. The TFF building is located approximately 214 feet from the NI outer fence and the closest NI building is approximately 351 feet away.

Appendix A contains representative images of the TFF and the proximity to the Natrium plant site.

Based on the following evaluation, TerraPower does not believe that a limited work authorization (LWA) is needed to build the TFF.

Regulation:

§ 50.10 License required; limited work authorization.

(a) *Definitions*. As used in this section, *construction* means the activities in paragraph (a)(1) of this section, and does not mean the activities in paragraph (a)(2) of this section.

(1) Activities constituting construction are the driving of piles, subsurface preparation, placement of backfill, concrete, or permanent retaining walls within an excavation, installation of foundations, or in-place assembly, erection, fabrication, or testing, which are for:

(i) Safety-related structures, systems, or components (SSCs) of a facility, as defined in 10 CFR 50.2;

(ii) SSCs relied upon to mitigate accidents or transients or used in plant emergency operating procedures;

(iii) SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function;

(iv) SSCs whose failure could cause a reactor scram or actuation of a safety-related system;

(v) SSCs necessary to comply with 10 CFR 73;

(vi) SSCs necessary to comply with 10 CFR 50.48 and criterion 3 of 10 CFR part 50, appendix A; and

(vii) Onsite emergency facilities, that is, technical support and operations support centers, necessary to comply with 10 CFR 50.47 and 10 CFR part 50, appendix E.

Regulatory Analysis:

The purpose of 10 CFR 50.10 is to ensure that activities constituting construction of a production or utilization facility on a site on which the facility is to be operated do not begin until a license or authorization is issued by the NRC. This ensures there is a safety analysis report that demonstrates the activities conducted under the LWA will be conducted in compliance with the technically-relevant NRC requirements in 10 CFR Chapter 1 that are applicable to the design of those portions of the facility within the scope of the LWA and that the NRC staff issues a final environmental impact statement for the LWA in accordance with subpart A of part 51 of Chapter 1. These requirements ensure that an NRC authorization is obtained before undertaking activities that have a reasonable nexus to radiological health and safety and/or common defense and security.

The TFF is not part of the structures, systems, or components (SSCs) of the Natrium plant. Rather, it is an independent facility that will be used to test components and initially fill the Natrium plant with sodium through a tank and temporary piping system.

This will not occur until the end of construction of the NI and will occur after the issuance of a construction permit from the NRC.

Since the TFF is an independent facility, it is not part of the Natrium plant design and does not have any SSCs defined as safety-related for Natrium plant operations. The Natrium design does not rely on any part of the TFF to provide mitigation for any accident or transient; the TFF is not utilized in any emergency operating procedures; failure of the TFF would not prevent any safety-related SSCs from fulfilling their safety-related function; and the TFF cannot cause a reactor scram or actuation of a safety-related SSC. Based on this assessment, criteria i, ii, iii, and iv of 10 CFR 50.10(a)(1) do not apply to the TFF.

Construction activities for SSCs necessary to comply with 10 CFR 73 include the preparation and building of physical barriers and structures and associated hardware and detection systems for the physical security program. None of the Natrium plant physical security program SSCs will be located at the TFF. There will not be any digital components and control systems identified as critical digital assets to meet the requirements of the Cyber Security Program, included in 10 CFR 73.55, at the TFF. Based on this assessment, criterion v of 10 CFR 50.10(a)(1) does not apply.

Construction activities for SSCs necessary to comply with 10 CFR 50.48 and Advanced Reactor Design Criterion 3 in Regulatory Guide 1.232, Rev. 0, "Guidance for Developing Principal Design Criteria for Non-Light-Water Reactors," include fire protection equipment and components to achieve and maintain safe shutdown. This includes all fire protection equipment for protection of the equipment necessary to achieve and maintain safe shutdown, including the fire barriers in walls for penetrations to minimize spread and maintain separation. Potential fires at the TFF would not prevent the ability to achieve and maintain safe shutdown of the reactor. The Natrium design does not rely on any part of the TFF to provide mitigation for any accident or transient. Based on this assessment, criterion vi of 10 CFR 50.10(a)(1) does not apply.

Onsite emergency facilities (i.e., technical support and operations support centers) necessary to comply with 10 CFR 50.47 and 10 CFR 50, appendix E will not be located at the TFF. The facility for providing onsite emergency first aid and decontamination will not be located at the TFF. Based on this assessment, criterion vii of 10 CFR 50.10(a)(1) does not apply.

As evaluated above, none of the criteria associated with the definition of construction in accordance with 10 CFR 50.10 apply to the TFF and, therefore, TerraPower believes that an LWA is not required to construct the TFF adjacent to the Natrium plant. Construction

of the TFF more closely aligns with 10 CFR 50.10(a)(2)(vi) which covers the erection of support buildings (e.g., construction equipment storage sheds, warehouse and shop facilities, utilities, concrete mixing plants, docking and unloading facilities, and office buildings) for use in connection with the construction of a facility. The NRC further clarified this concept in Regulatory Guide 1.206, Rev. 1, "Applications for Nuclear Power Plants", which states the following:

"The definition is intended to prevent persons from having to obtain a COL, LWA, or ESP authorizing LWA activities to fabricate, assemble, and test components and modules in a shop building, warehouse, or laydown area, even if located onsite."

Conclusion:

Based on the above analysis, TerraPower does not believe that an LWA will be needed to construct the TFF, since it does not meet any of the construction activities defined in 10 CFR 50.10(a)(1). The TFF more closely aligns with the description in 10 CFR 50.10(a)(2)(vi) and the clarification on page 113 of Regulatory Guide 1.206, Rev. 1, "Applications for Nuclear Power Plants", which describes construction activities that do not require an LWA.

Appendix A

Representative images of the TFF and the proximity to the Natrium plant site.

NOTE: All the representative images below are subject to the DOE Cooperative Agreement No. DE-NE0009054.



Figure 1: Sodium Test and Fill Facility (TTF) location relative to the Nuclear Island (NI) and Energy Island (EI).

TFF Building Elevation

The Sodium Test & Fill Facility (TFF) conceptual design includes a tension membrane structure over a foundation containing a sodium tank pit.

Building measures approx. 140' wide x 270' long x 120' tall

Deepest part of the pit is 106' below grade



All dimensions are conceptual and subject to change

Figure 2: Sodium Test and Fill Facility (TTF) building elevation.



Figure 3: Sodium Test and Fill Facility (TTF) location relative to the Nuclear Island (NI).

TFF Location

The TFF area will be fenced and is physically separate from the NI. Current distance from the TFF fence to the outer NI fence is ~35'. Current distance from the TFF building to the NI outer fence is ~ 214'.



All dimensions are conceptual and subject to change

Figure 4: Sodium Test and Fill Facility (TTF) location relative to the Nuclear Island (NI) fence.

TerraPower, LLC Assessment of 10 CFR 50.10 Applicability to the Construction of the Sodium Test and Fill Facility



All dimensions are conceptual and subject to change

Figure 5: Sodium Test and Fill Facility (TTF) pit location relative to the Natrium plant Nuclear Island (NI) reactor pit.