



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

February 27, 2025

Mr. Chanson Yang  
Radiant Industries, Inc.  
1921 Maple St.  
El Segundo, CA 90245

SUBJECT: RADIANT INDUSTRIES, INC. - U.S. NUCLEAR REGULATORY COMMISSION'S FEEDBACK REGARDING TITLE 10 OF THE *CODE OF FEDERAL REGULATIONS* PART 51, "ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS," GAP ANALYSIS WHITE PAPER (EPID NO. L-2024-LRO-0058/CAC 000431)

Dear Mr. Yang:

By submission dated October 23, 2024 (Agencywide Documents Access and Management System Accession No. ML24298A242), Radiant Industries, Inc. (Radiant), submitted for the U.S. Nuclear Regulatory Commission (NRC) staff's review, white paper DOC-0BDD, "10 CFR 51 Gap Analysis." This white paper describes a gap analysis of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," against the specific requirements necessary to license a manufacturing facility capable of constructing and testing Radiant's Kaleidos reactor design and deploy the Kaleidos reactor units. The NRC staff was asked to perform a review of this white paper and provide feedback regarding the gap analysis. Given the availability of design information at this time, the NRC staff completed its review of the submittal and is generally aligned with its overall approach. However, the NRC staff noted that Radiant may want to reconsider its approach to a few sections noted in the enclosure. The enclosure to this letter provides the NRC staff's detailed observations for Radiant to consider.

If you have questions regarding this matter, please contact Kevin Roche at (301) 415-1554 or via email at [Kevin.Roche@nrc.gov](mailto:Kevin.Roche@nrc.gov)

Sincerely,

A handwritten signature in dark ink, appearing to read "John Segala".

Signed by Segala, John  
on 02/27/25

John. P. Segala, Chief  
Advanced Reactor Licensing Branch 2  
Division of Advanced Reactors and Non-Power  
Production and Utilization Facilities  
Office of Nuclear Reactor Regulation

Project No.: 99902106

Enclosure:  
As stated

SUBJECT: RADIANT INDUSTRIES, INC. - U.S. NUCLEAR REGULATORY COMMISSION'S FEEDBACK REGARDING TITLE 10 OF THE *CODE OF FEDERAL REGULATIONS* PART 51, "ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS," GAP ANALYSIS WHITE PAPER (EPID NO. L-2024-LRO-0058/CAC 000431) DATED: FEBRUARY 27, 2025

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**RADIANT INDUSTRIES, INC. - U.S. NUCLEAR REGULATORY COMMISSION'S FEEDBACK  
REGARDING RADIANT WHITE PAPER: "10 CFR 51 GAP ANALYSIS WHITE PAPER,"  
(L-2024-LRO-0045/CAC 000431) SPONSOR INFORMATION**

**Sponsor:** Mr. Chanson Yang

**Sponsor Address:** Radiant Industries, Inc.  
1921 Maple St.  
El Segundo, CA 90245

**Docket/Project No(s):** 99902106/L-2024-LRO-0058/CAC 000431

**DOCUMENT INFORMATION**

**Submittal Date:** October 23, 2024

**Submittal Agencywide Documents Access and Management System (ADAMS) Accession No.:** ML24298A242

**Purpose of the White Paper:** Radiant Industries, Inc., (Radiant) stated that the purpose of this white paper is to document its gap analysis of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," against the specific requirements necessary to license both a manufacturing facility capable of online reactor testing and deployed microreactor units for the Kaleidos reactor design.

**Action Requested:** Radiant requested the U.S. Nuclear Regulatory Commission (NRC) staff's feedback and observations regarding the information discussed in "10 CFR 51 Gap Analysis."

**FEEDBACK AND OBSERVATIONS**

The feedback and observations regarding this white paper are preliminary given the amount of available information and is subject to change. The feedback and observations are not regulatory findings regarding any specific licensing matter and are not official agency positions.

**NRC Staff Observations**

Since Radiant evaluated 10 CFR Part 51 independent of the licensing pathway (10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants"), these results are preliminary and additional discussions conducted during the pre-application phase will clarify any questions regarding the requirements of a particular licensing pathway. The NRC staff has reviewed the above referenced document and notes the following general observations.

Enclosure

- Section 4.1, “General Provisions” of 10 CFR Part 51 - typographical error. This section references 10 CFR Part 50 not 10 CFR Part 51, as the NRC staff believes that Radiant intended.
- Section 4.3, “Preliminary Procedures”
  - Regulation 10 CFR 51.20 (b)(9) - General observation - The ‘compliance rationale’ states to ‘submit a 10 CFR Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste,” application’ for an Independent Spent Fuel Storage Installation (ISFSI). Although not specifically stated, this specific licensing decision is based upon the location of the ISFSI being at the manufacturing/testing facility since general license provisions under 10 CFR Part 50 or 10 CFR Part 52, assume a spent fuel storage cask.
  - Regulation 10 CFR 51.22, “Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review,” and 10 CFR 51.31, “Determinations based on environmental assessment” - The ‘compliance rationale’ is noted. NRC White Paper “Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations” (ML24268A310) issued September 2024, provides options for expanded use of categorical exclusions, environmental assessments, and generic environmental impact statements. SECY-24-008 dated January 24, 2024, “Microreactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory” (ML23207A252) has been written by the NRC staff to provide the Commission with options for regulating certain aspects of fuel loading and operational testing of commercial factory-fabricated micro-reactors. This paper also seeks the Commission’s direction on whether a factory-fabricated microreactor that includes “features to preclude criticality” would require a facility operating license or a combined license when loaded with fuel. The NRC staff is awaiting the Commission’s direction on these issues.
- Section 4.4, “Environmental Reports and Information - Requirements Applicable to Applicants and Petitioners for Rulemaking”
  - Regulation 10 CFR 51.50, “Environmental report – construction permit, early site permit, or combined license stage.” General Observations regarding the ‘Compliance Rationale’: The NRC staff awaits the Commission’s direction on these issues. SECY-24-008 has been written by the NRC staff to provide the Commission with options for regulating certain aspects of fuel loading and operational testing of commercial factory-fabricated microreactors. This SECY paper also seeks the Commission’s direction on whether a factory-fabricated microreactor that includes “features to preclude criticality” would require a facility operating license or a combined license when loaded with fuel.
  - Regulation 10 CFR 51.51, “Uranium fuel cycle environmental data - Table S-3,” and 10 CFR 51.52, “Environmental effects of transportation of fuel and waste - Table S-4.” ‘Compliance Type’ may be better captured as ‘Action Required’ and further consideration given to ‘Compliance Rationale’ as both regulations apply to Radiant as a ‘connected action’. Radiant would need to discuss the uranium fuel cycle environmental data as a ‘connected action’ to the manufacture of fuel. See

10 CFR 51.50 (b)(3) and 10 CFR 51.50 (c). The activities associated with fuel cycle activities are not restricted to light water reactors regardless of licensing pathway.

- Regulation 10 CFR 51.53, “Postconstruction environmental reports,” – The general observation is that it applies only to a Construction Permit under 10 CFR Part 50 if Radiant were to decide on that licensing pathway.
- Section 4.6, “NEPA Procedure and Administrative Action”; 10 CFR 51.104, “NRC proceeding using public hearings; consideration of environmental impact statement” thru 10 CFR 51.109, “Public hearings in proceedings for issuance of materials license with respect to a geologic repository”
  - Compliance Type’ may be better captured as ‘Further Evaluation’ and further consideration given to ‘Compliance Rationale’, accordingly to the type of licensing pathway in 10 CFR Part 50 or 10 CFR Part 52 selected. On April 12, 2024, the Commission issued Staff Requirements Memoranda (SRM) SECY-24-0032 – “Revisiting the Mandatory Hearing Process at the NRC.” The Commission approved the use of simplified hearing procedures, outlined as Option 1, the Commission would preside over mandatory hearings but provide for submission of evidence, and all Commissioner questions and party answers are to be in written form only.

Principal Contributors: Joe O’Hara, NMSS  
Don Palmrose, PhD, NMSS