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

January 26, 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 100, "REACTOR SITE CRITERIA," GAP ANALYSIS WHITE PAPER (EPID NO. L-2024-LRO-0059/CAC 000431)

Dear Mr. Yang:

By submission dated September 30, 2024 (Agencywide Documents Access and Management System Accession No. ML24275A261), Radiant Industries, Inc. (Radiant), submitted for the U.S. Nuclear Regulatory Commission (NRC) staff's review, white paper DOC-0BDB, "10 CFR 100 Gap Analysis." This white paper describes a gap analysis of Title 10 of the *Code of Federal Regulation* (10 CFR) Part 100, "Reactor Site Criteria," 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 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

Sincerely,

John Segala Signed by Segala, John on 01/26/25

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

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RADIANT INDUSTRIES, INC. - U.S. NUCLEAR REGULATORY COMMISSION'S FEEDBACK REGARDING RADIANT WHITE PAPER: "10 CFR 100 GAP ANALYSIS WHITE PAPER," (L-2024-LRO-0059/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-0059/CAC 000431

DOCUMENT INFORMATION

Submittal Date: September 30, 2024

Submittal Agencywide Documents Access and Management System (ADAMS) Accession No.: ML24275A261

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 100, "Reactor Site Criteria," 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 100 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

The NRC staff focused its feedback on the information provided in the compliance rationale column with respect to reactor siting. The feedback is divided into general NRC staff observations and feedback and observations regarding specific regulations.

General NRC Staff Observations:

- The applicability of existing site and hazard characterization information to support license or permit applications to the NRC has been a topic of discussion between the NRC staff and various stakeholders. The NRC staff are currently considering developing guidance on how to use existing information, either directly or indirectly, in support of site characterization for licensing actions. Some considerations regarding the applicability of information under discussion are the age of the information, methods of data retrieval and analysis, quality assurance of the available data, and other considerations.

- The NRC staff notes that the use of engineering solutions related to site characteristics should be fully discussed and supported by appropriate site investigations and hazard specific information.

- The NRC staff encourages the applicant to leverage pre-application engagement to discuss site and hazard specific considerations for a selected design and site. This would include the available information and how it can be used in the development of an application.

- The NRC staff is considering the how to apply margin within the characterization of the site, as was discussed in the Preliminary White Paper on Nth-of-a-Kind Microreactor Licensing and Deployment Considerations (ML24268A317). The NRC staff notes that crediting margin inherent to the reactor design may be limited as there is only so much margin available before safety could be compromised. The applicant should consider this in the design and deployment of microreactors and in any justification for why margin can be credited for safety.

Observations on Specific Regulations:

Section 4.3 *Subpart B – Evaluation Factors for Stationary Power Reactor Site Applications on or After January 10, 1997*

- Regulations 10 CFR Sections 100.20(c)(3), 100.21(b), 100.23(c), 100.23(d)(4) – General observation – Apart from the safe shutdown earthquake, it appears this gap analysis paper is focused on exemptions to regulatory requirements for certain aspects of siting. For the sections for which a potential exemption is being considered, the applicant should consider how to demonstrate that the applicable principal design criteria (PDC) or general design criteria, if used in lieu of PDCs, related to protection against natural phenomenon can be met and there is reasonable assurance of adequate protection.
- Regulation 10 CFR Part 100.23, “Geologic and seismic siting criteria” – The regulation requires site investigations for determining the soil and rock subsurface properties in order to characterize the seismic hazard, foundation stability, slope stability, and the potential for soil liquefaction at the site. In addition, the analysis to determine the safe shutdown earthquake ground motion response spectra requires that uncertainty be adequately captured through an appropriate analysis such as a probabilistic seismic hazard analysis.

Principal Contributor(s): Jenise Thompson, Cliff Munson, NRR