# NEI's Preliminary Perspective's on the NRC's White Paper on "Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations"

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# Introduction

- NEI appreciates the considerable amount of work the NRC has done to adapt the regulatory framework to address new technologies and applications.
- Preliminary perspectives are focused on large-scale microreactor deployment, but many could be applied to larger advanced (light-water and non-light water) reactors.
- The next generation of nuclear reactors under development today bring with them very different manufacturing, construction, and operational models.
- NRC Paper concepts mostly align with proposals in NEI's RHDRA paper; with some differences in details that can have significantly different outcomes

# Legislative and Regulatory Considerations

(Preliminary White Paper - Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations)

- The NRC paper states that it proposes alternative approaches that do not require legislative changes.
- However, the paper does not discuss whether legislative changes were considered that would enable other more effective and efficient alternatives for NOAK licensing.
- The NRC should discuss the potential legislative changes that were considered, and if none were considered.
- Such a discussion of potential legislative changes are within NRC's authority and would enable Congress to better understand the potential improvements they could enable.

# Licensing Strategy for NOAK Micro-Reactors

(Preliminary White Paper - Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations)

- The NRC licensing timelines for NOAK licensing may not achieve the business conditions for deployment of 180 days or less as identified by potential customers.
- The NRC's licensing timelines range from 206 to 566 days for Part 50, and 211 to 511 days for Part 52, as measured from submission of the application to issuance of the license/authorization to load fuel.
- NEI's RHDRA proposal identified that the NRC would need to accomplish this scope of work within 150 days to meet certain business models.
- NEI identified alternative approaches that are similar to the NRC's proposal that could achieve those timelines, such as taking advantage of parallel processes (e.g., review of a CP and OL at the same time).

# Inservice Inspection, Inservice Testing, and Preservice Inspection and Testing and Motor-Operated Valve Programs

(Enclosure 1 - Standardization of Operational Programs for Nth-of-a-Kind Micro-Reactors)

- The NOAK Strategy is not clear regarding the distinction between regulatory requirements and regulatory expectations.
    - If flexibility in requirements is intended, it will be helpful to state the circumstances and limitations.
- Due to the design of the next generation of reactor's, many of the requirements either would not apply or would not be practical for the design.
- It is not clear if NRC staff has fully considered their approach to address advanced reactor characteristics and avoid large LWR-specific requirement and standards.

# Quality Assurance, Maintenance Rule and Reliability Assurance Programs

(Enclosure 1 - Standardization of Operational Programs for Nth-of-a-Kind Micro-Reactors)

- It does not appear that the NRC staff considered the potential need for alternative approaches for micro-reactors using the LMP approach.
- The NOAK Strategy recognizes the regulatory requirement that a QA program description be submitted per application.
    - It does not however specifically call out implementation of NQA-1 as a requirement.
- It appears that the NRC is open to considering the validity and efficacy of other commercial quality programs, with additional controls and requirements as warranted, to meet the QAPD requirements.

# Radiation Protection Program (Including Minimization of Contamination)

(Enclosure 1 - Standardization of Operational Programs for Nth-of-a-Kind Micro-Reactors)

- In RG 1.206 Rev. 1 it is noted that the use of Design Acceptance Criteria (DAC) is appropriate for certain design areas.
- The use of these standards and their underlying methodologies may potentially require exemptions from existing NRC regulations (e.g., 10 CFR Part 20).

**Question for Staff Consideration** - For these designs that justify the use of updated standards, is the NRC anticipating the use of the exemption process or a future rule making to avoid the need for exemptions?

# Non-licensed Plant Staff Training, Reactor Operator Training and Requalification Programs

(Enclosure 1 - Standardization of Operational Programs for Nth-of-a-Kind Micro-Reactors)

- NRC's recommended Option 2 appears to most effective and efficient.
- NRC references NEI 06-13A as an acceptable option for addressing training programs. NEI has also submitted NEI 23-09, an advanced reactor version of the same guidance, for NRC review and endorsement.
- Rulemaking to prevent having to submit multiple exemptions for a fleet of microreactors at numerous sites should be taken into consideration, or a strategy for generically approving the first exemption for future NOAK reactors owned and operated by a single entity.

**Question for Staff Consideration**- Can a single training exemption request for the FOAK be subsequently applied without prior approval to future NOAK reactors?

# Technical Specification's

(Enclosure 1 - Standardization of Operational Programs for Nth-of-a-Kind Micro-Reactors)

- The NRC staff cite "DANU-ISG-2022-08, "Risk-Informed Technical Specifications" (ML23277A146) which references existing guidance in RG 1.174 and RG 1.177 that depend on the risk metrics of Core Damage Frequency (CDF) and large early release frequency (LERF).
- These risk metrics may be difficult to apply to micro-reactors as core damage might not be clearly defined for some reactor types.
- The performance objectives for CDF and LERF are based on consequences for large light-water reactors.

**Question for Staff Consideration** - Has the NRC considered the use of the AERI approach for micro-reactors and/or is the NRC anticipating that micro-reactors would need to propose alternative risk metrics to CDF and LERF?

# Security (Cyber Security, Access Authorization, FFD)

(Enclosure 1 - Standardization of Operational Programs for Nth-of-a-Kind Micro-Reactors)

- An alternative, graded regulatory approach is needed that provides flexibility (i.e., levels of requirements) in protecting the integrity of digital computer and communication systems and networks.
- An alternative approach that is performance-based and graded is needed when addressing access authorization and fitness for duty for the new generation of nuclear reactors.
    - The alternative approach should establish the acceptance criteria that must be met and the corresponding requirements for features and functions that must be implemented.

# Emergency Planning (EPZ and Site Emergency Preparedness)

(Enclosure 1 - Standardization of Operational Programs for Nth-of-a-Kind Micro-Reactors & Enclosure 3)

- NRC staff acknowledges that “Many aspects of a micro-reactor EP program(s) could be reviewed in a Design Certification (DC) or Manufacturing License (ML) application.”
- Elements of the white paper that could have significant advantages:
  - Exploring RTR-like guidance.
  - Considering bounding EPZ sizing analyses.
- NRC states that many aspects of a micro-reactor EP program could be reviewed in a DC or ML application.

# Environmental Reviews

(Enclosure 2 - Environmental Reviews for Nth-of-a-Kind Micro-Reactors)

- NRC's proposed multi-option "timed-phased" approach to micro-reactor licensing that begins NRC's recommended Option 2a in parallel with Option 3, followed by option 4 appears to be effective and efficient.
- We commend the NRC for examining the environmental review streamlining practices of other federal and state environmental or engineering agencies, as documented in the 2024 PNNL report cited in Enclosure 2.
- In this regard, NEI believes the NRC staff's proposed use of an Environmental Review Portal, Generic Micro-Reactor EA Template, and checklists could substantially expedite the agency's NEPA review process for NOAK micro-reactors.

# Grading the Level of Site Characterization

(Enclosure 3 - Technical, Licensing, and Policy Considerations for Nth-of-a-Kind Micro-Reactors)

- NRC matrix for reduced characterization appears to require more characterization than is necessary when EAB dose margin or the site parameter margin is “high”
- NRC does not include the NEI RHDRA proposal to allow the use of publicly available, reliable data sources to inform site characterization, such as that from USGS, NOAA, etc. in lieu of site data collection.
- NRC does not appear to have address Section 401 of the Advance Act in grading the site characterization.

# Deployment Site Security

(Enclosure 3 - Technical, Licensing, and Policy Considerations for Nth-of-a-Kind Micro-Reactors)

- NRC did not consider NEI RHDRA proposal to consider the development of a graded approach to set threat and protection requirements, similar to what is done for Research and Test Reactor's.
- APSRAR and Part 53, while considerate of the technological advancements associated with advanced reactor designs, do not go far enough to address the unique characteristics of Micro-Reactor's.
- While the staff cite NEI 03-12 as a template that applicants could use for a standard security plan, NEI 03-12 was developed for large Light-Water Reactor's.

# Streamlined Licensing Process

(Enclosure 3 - Technical, Licensing, and Policy Considerations for Nth-of-a-Kind Micro-Reactors)

- NRC proposal for streamlining NOAK licensing appear to be effective and efficient.
- The NRC timelines in the paper focus solely on the NRC actions from application submittal to issuance of the operating license/authorization to load fuel.
- However, the NRC regulatory framework imposes schedule requirements on other parts of the deployment timeline, specifically in the area of site characterization that should be considered.

**Question for Staff Consideration**- What is NRC's plans to inform FOAK licensing processes with the NOAK review enhancements?

# Stakeholder Engagement

(Preliminary White Paper - Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations)

- While the NRC discusses that it's white paper addresses the considerations of the ADVANCE Act, it does not mention incorporating the recommendations from NEI's RHDRA paper or how industry proposed alternatives were incorporated.
- NRC's paper provides policy level and directional information on the topics but lacks many details on how to implement the approaches.
- Workshops are needed for NRC to engage in the details with all stakeholders to develop rule makings and guidance in these areas.

**Question for Staff Consideration** - What additional work does the NRC plan to do to implement the ADVANCE Act Section 208, including the plan for a rulemaking within 3 years? How will that future work impact the proposals in this paper?

# Thank You for Your Time!