Deployable Energy

Regulatory Engagement Plan

DE-P2509-PLN-0001

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Revision History

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1	02/05/26	Initial issue	Signed by: Philip Moor 79A12720DEDD4AC...	Signed by: Lance Maul 128960153BDD464...	Signed by: D8D83BAD1C9B417...

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1.0 Introduction and Purpose

1.1 Purpose

The Regulatory Engagement Plan (REP) outlines Deployable Energy's (DE) planned licensing approach and describes the framework for pre-application interactions with the U.S. Nuclear Regulatory Commission (NRC). The REP is intended to guide early and regular engagement between DE and NRC staff in support of future licensing interactions and to establish a clear path for regulatory dialogue throughout the development of the Unity Nuclear Battery (UNB™) micro-reactor. This REP also provides an overview of the UNB™ technology that is solely owned by DE.

1.2 Scope

This REP focuses on pre-application engagement activities with the NRC related to the commercial licensing of the First of a Kind (FOAK) UNB™ under a 10 CFR 50.22 class 103 non-power production and utilization facilities (NPUF) pathway. The REP will be updated as needed to reflect significant project developments. Future revisions may incorporate post-application engagement plans as the project advances. Any updates to the REP will be shared with NRC staff through formal correspondence.

1.3 Contact Information

The information below is to be used to facilitate communication between Deployable Energy and NRC staff.

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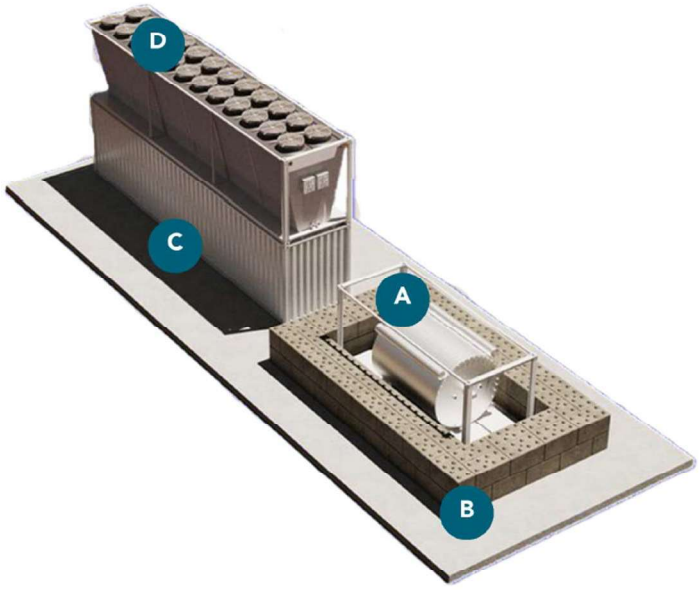
1.4 Company Structure

Deployable Energy Limited (DE) is a Delaware C Corporation headquartered in Houston, Texas. It is not a subsidiary of any other organization and operates independently. DE's team brings a diverse skill set in fast product development, and advanced nuclear knowledge & experience. DE's leadership is committed to establishing a respectful and productive relationship with NRC staff throughout all stages of engagement. DE's current licensing strategy is being developed entirely within the framework of NRC regulations and guidance.

2.0 Design Overview

2.1 Technology Summary

The (FOAK) UNB™ (Figure 2.1-1) is an advanced, 1 MWe gas cooled microreactor designed for scalable modular deployment in remote, distributed, or behind-the-meter energy applications in the United States. The UNB™ prioritizes inherent safety, operability and transportability in a small package.



A – Nuclear Island

B – Physical Protection (section view)

C – Balance of Plant

D – Air Cooler

Figure 2.1-1 – Unity Nuclear Battery Microreactor

The reactor core is housed inside the volume of a standard 20' ISO container, enabling rapid installation without extensive on-site infrastructure.

The reactor utilizes standard low enriched uranium (LEU), uranium dioxide (UO_2) fuel and an actively cooled helium primary loop during operation. Following shutdown, decay heat is removed entirely through passive means – via conduction, radiation, and natural convection to the environment without reliance on operator actions or external power. This inherent safety design alleviates the need for large, pressure-retaining containment structures.

The reactor core and major components are built using commercially available materials that have been qualified for nuclear service under ASME and international standards. The design avoids exotic materials or advanced manufacturing techniques in favor of components that can be sourced from existing supply chains. Reactivity control is achieved through conventional means, including control elements and a strong negative temperature coefficient, with no reliance on active cooling systems for safety.

2.2 Novel Design Features

The UNB™ has various features that make it attractive for its safety, simplicity, and superior economics. In particular, the UNB™ design:

1. Uses inherent and passive safety features that reduce the complexity of safety systems.
2. Utilizes ≤5% enriched LEU which has wide market availability and low supply chain risk.
3. Utilizes currently deployed reactor materials that are ASME-qualified from the US and international supply chain.

2.3 FOAK and NOAK Deployment Model

The FOAK deployment site has not yet been finalized. The FOAK deployment will provide the proof of operation. Following the FOAK, the goal is to refine the design of the UNB™ and a generic or N^{th} of a Kind (NOAK) design for wide scale deployment.

Future NOAK deployment is anticipated under the yet to be developed regulations for Rapid High-Volume Deployable Reactors in Remote Applications (RHDRA). It is envisioned NOAK UNB™ units will be manufactured at a central facility operating under a 10 CFR 52, Subpart F, with fuel loading conducted under a 10 CFR 70 license with packaging and transport under a 10 CFR 71 license and used fuel storage under a 10 CFR 72 license pending operation of a federal High Level Waste repository. The company's long-term deployment strategy prioritizes scalable, remote deployments for such needs

as dispersed resource extractions, or scalable enterprises such as data centers that may or may not be collocated in populated centers that require the small emergency planning zones (EPZ) that only Small Modular Reactors (SMRs) and micro-modular reactors (MMRs) can provide.

2.4 Design Development and Testing

Deployable Energy is planning a series of testing activities to support safety case development and validate key performance assumptions for the UNB™ prior to license application submittals. These tests described below are intended to inform thermal-hydraulic behavior, structural performance, and neutronics modelling, and together with the Quality Assurance Program Manual (QAPM) will form the technical foundation for pre-application white papers and technical reports or topical reports.

- Integrated Fuel Assembly (IFA) Testing – This effort will validate passive and active heat removal performance through steady-state and transient thermal-hydraulic testing of the core's basic configuration of fuel, coolant and moderator, under prototypical conditions.
- Engineering Test Unit (ETU) – A full assembly of IFAs will undergo system-level thermal performance testing to demonstrate integrated flow behavior, validate modelling tools, and inform safety analysis. This will provide high-fidelity data for safety validation under design basis accident (DBA) conditions, operability, and design optimization. The results will be used in support of the preliminary safety analysis report (PSAR) as part of the construction permit (CP) application.
- Criticality Testing – A non-commercial integrated nuclear test is planned at a DOE national laboratory. This test will serve to validate core neutronic behavior, support qualification of key analytical tools and inform the development of the PSAR.

Additional separate effects of testing may be performed at the component or subcomponent level to support material qualification and refine design margins.

Empirical confirmation from these test campaigns will be used to inform design reconciliation activities prior to the submission of the Operating License (OL) application. Should any design changes be necessary after license issuance, but before operation, DE will evaluate them in accordance with applicable NRC change control processes.

3.0 Regulatory Strategy

3.1 Regulatory Strategy Overview

Several licensing pathways are available to support deployment of advanced nuclear technologies, and Deployable Energy continues to evaluate the most effective regulatory route for the UNB™. The final licensing path will be shaped by ongoing engagement with NRC staff, emerging regulatory frameworks, and alignment with technical and commercial project milestones.

The application pathway for FOAK deployment of the UNB™ will be in accordance with 10 CFR 50 CP and OL for class 103 NPUF. The UNB™ design will comply with the safety principles of U.S. NRC regulations as defined in 10 CFR 50, using the principal design criteria guidance in RG 1.232. The technical information for the license application will follow the format and content of NUREG-1537.

DE will monitor regulations under development – such as in the Risk-Informed Performance-Based (RIPB) approach of 10 CFR 53 and the intent of 10 CFR 57 RHDRA for consideration during the UNB™ design and license application development. These frameworks may offer greater flexibility for future deployments - particularly in areas such as staffing, security, or EPZ requirements. The RHDRA proposal aims for faster site approval times of 6 months or less under a reactor type-approval approach. These options remain under consideration and may be integrated into the long-term licensing strategy depending on rulemaking progress and deployment needs.

It is anticipated that future NOAK UNB™ units will be manufactured at a central facility under a 10 CFR 52, Subpart F Manufacturing License (ML) with licenses for Parts 70, 71, 72. This strategy supports DE's modular deployment model and allows site-specific safety cases to be tailored as needed.

This approach draws from recent microreactor licensing precedents and aligns with NRC's evolving guidance for modular and transportable reactor technologies.

3.2 Deterministic Approach to Safety Analysis

Deployable Energy plans to use a deterministic approach to safety analysis with a RIPB approach as an option to develop the licensing and safety case for UNB™. This approach is in line with the Licensing Modernization Project (LMP) framework outlined in NEI 18-04 and endorsed by the NRC in Regulatory Guide 1.233, which supports a technology-inclusive methodology for identifying licensing basis events, classifying SSCs, and defining safety functions.

In addition, DE is evaluating the applicability of the NRC's RHDRA framework. RHDRA guidance – outlined in recent NEI and NRC correspondence offers regulatory efficiencies for transportable, modular designs like Unity.

3.3 NRC Review Strategy

Deployable Energy seeks early and frequent alignment with NRC staff on the review framework to be applied to UNB™ licensing. DE anticipates the employment of aspects of the Advanced Reactor Content of Application Project (ARCAP) to guide application structure, where appropriate, with a focus on clarity and risk-significance.

Preliminary design calculations indicated UNB™ will have large safety design margins based on deterministic methods limiting the need for RIPB methods. Deterministic methods are anticipated to simplify reviews, but in those cases where deterministic reviews do not demonstrate adequate safety margin DE will apply a RIPB methodology. Early engagement on SSC classification will support an efficient and focused regulatory review.

4.0 Pre-application Engagement

4.1 Application Engagement Strategy

Deployable Energy will engage NRC staff through submittal of the QAPM and a series of presentations, white papers, technical reports and topical reports prioritized by safety and licensing topics. These documents will be supported by data from ETU and fuel assembly testing conducted under DE's Quality Assurance Program (QAP).

Pre-application meetings are expected to occur regularly, with the goal of resolving key issues and aligning on expectations ahead of formal license submissions.

4.2 Interaction Plan

Deployable Energy anticipates that the frequency and format of interactions with NRC staff will evolve with the project's development and staff availability. DE plans to maintain regular communication through a combination of project management calls, and focused technical discussions.

- Project management interactions will occur routinely, typically monthly, to maintain alignment on engagement topics, schedules, and issue tracking. These may take the form of brief calls or email exchanges with NRC project staff.

- Technical discussions and pre-submittal meetings will provide structured engagement with NRC reviewers and management on key safety and licensing topics, and will focus on the white papers and reports described in Section 4.3.

Oral communications will be sought for non-technical discussions where either DE or the NRC would benefit from clarification of general information such as schedule or status updates and planning for future communications. Drop-in meetings will be supported by presentations developed by DE.

Public meetings may be held at DE or NRC selected locations to provide opportunities to discuss the project details or technical aspects of the technology and planned deployment. The protocol for participation of the public will be in accordance with NRC guidance with some information (i.e., commercially sensitive, or security related matters) withheld per 10 CFR 2.390. To the maximum extent practical, DE will make materials and discussions available for public access.

Written communication will be conducted in accordance with 10 CFR 50.4. During pre-application, communications are expected to be in the form of email, presentations, white papers, technical reports and topical reports that will be used to describe DE's design or regulatory approach in order to facilitate alignment with NRC staff.

4.3 Pre-application Submissions

Deployable Energy's pre-application engagement will focus on key licensing and safety topics that benefit from early discussion and resolution. A summary of initial pre-application meeting topics and timelines are provided in Table 4.3-1.

The scope of pre-application submissions may be adjusted over time, with additional topics added or consolidated as appropriate. Each report is envisioned to follow a consistent engagement sequence:

1. Pre-submittal meeting to align with NRC on report objectives and review expectations.
2. Formal submittal of the report to the NRC.
3. Post-submittal discussion to clarify feedback and confirm next steps.
4. Written feedback from NRC summarizing findings or recommendations.
5. Revisions, as necessary, to address feedback and support continued engagement.

These activities are intended to resolve technical issues early and support efficient progression toward license applications, while recognizing that the level of NRC feedback or endorsement may vary by topic and submittal type.

Table 4.3-1 – List of Topics for Pre-application Engagements

Meeting #	Meeting content	Meeting date
1	• Regulatory Engagement Plan • Quality Assurance Program Manual	Week of 2nd February, 2026
2	• Reactor Design Overview • Principal Design Criteria • Fuel Qualification and Testing • Gap Analysis / Exemptions	Week of 23rd March 2026
3	• LBE Classifications • Safety and Accident Analysis Methodologies • Associated Validations	Week of 4th May, 2026
4	• Site Attributes • Environmental Report • Seismic Methodology • Physical Security • Fire Protection • Emergency Planning & EPZ	Week of 8th June, 2026
5	• Engineering Test Unit Testing Report • Computer Code Qualification	Week of 15th July, 2026

4.4 Licensing Submittal Schedule

DE seeks the following schedule for a FOAK deployment:

- Submission of QAPM in February 2026.
- 10 CFR 50 class 103 NPUF CP application submission in Q4 2026
- Targeted 10 CFR 50 CP approval by Q3 2027
- 10 CFR 50 class 103 NPUF OL application submission in Q1 2028
- Targeted 10 CFR 50 OL approval by Q4 2028

Future licenses contemplated:

- Manufacturing license at central facility (under 10 CFR 52 Subpart F)
- Licensed handling of fuel for the assembly of the UNB™ (under 10 CFR 70)

- Packaging Transportation license of UNB™ to and from manufacturing facility and licensed sites (under 10 CFR 71)
- Storage of spent fuel at central facility (under 10 CFR 72)

Confirmations will be sought with the NRC during the license pre-application process to clarify potential exceptions to such topics as:

- Staff operating numbers pertaining to subparts of 10 CFR Parts 50
- The required level of physical security and plant protection as pertaining to 10 CFR 73

5.0 References

[1] Title 10, Code of Federal Regulations, Part 50, Domestic Licensing of Production and Utilization Facilities

[2] Regulatory Guide 1.232, Guidance for Developing Principal Design Criteria for Non-light-water Reactors, Rev. 0

[3] NUREG-1537, Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, February 1998

[4] Title 10, Code of Federal Regulations, Part 53, Risk Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors, Note: Draft – Not Yet Issued

[5] Title 10, Code of Federal Regulations, Part 57, RHDRA (Rapid High-Volume Deployable Reactors in Remote Applications) Note: Draft – Not Yet Issued

[6] Title 10, Code of Federal Regulations, Part 52, Licenses, Certifications, and Approvals for Nuclear Power Plants

[7] Title 10, Code of Federal Regulations, Part 71, Packaging and Transportation of Radioactive Material

[8] Title 10, Code of Federal Regulations, Part 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste

[9] Title 10, Code of Federal Regulations, Part 70, Domestic Licensing of Special Nuclear Material

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