

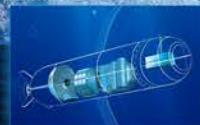
General Atomics Electromagnetic Systems

General Atomics-EMS Reactor Development Overview

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Presented To: Nuclear Regulatory Commission

Presented By: **Dr. Christina A. Back**
Vice-President
Nuclear Technologies and Materials
General Atomics
Electromagnetic Systems Group



Fast Modular Reactor (FMR) Concept



Thermal power	100 MW
Electric output	44 MW
Coolant	Helium
System pressure	7 MPa
System temperature	509 - 800 °C

Reactor Type

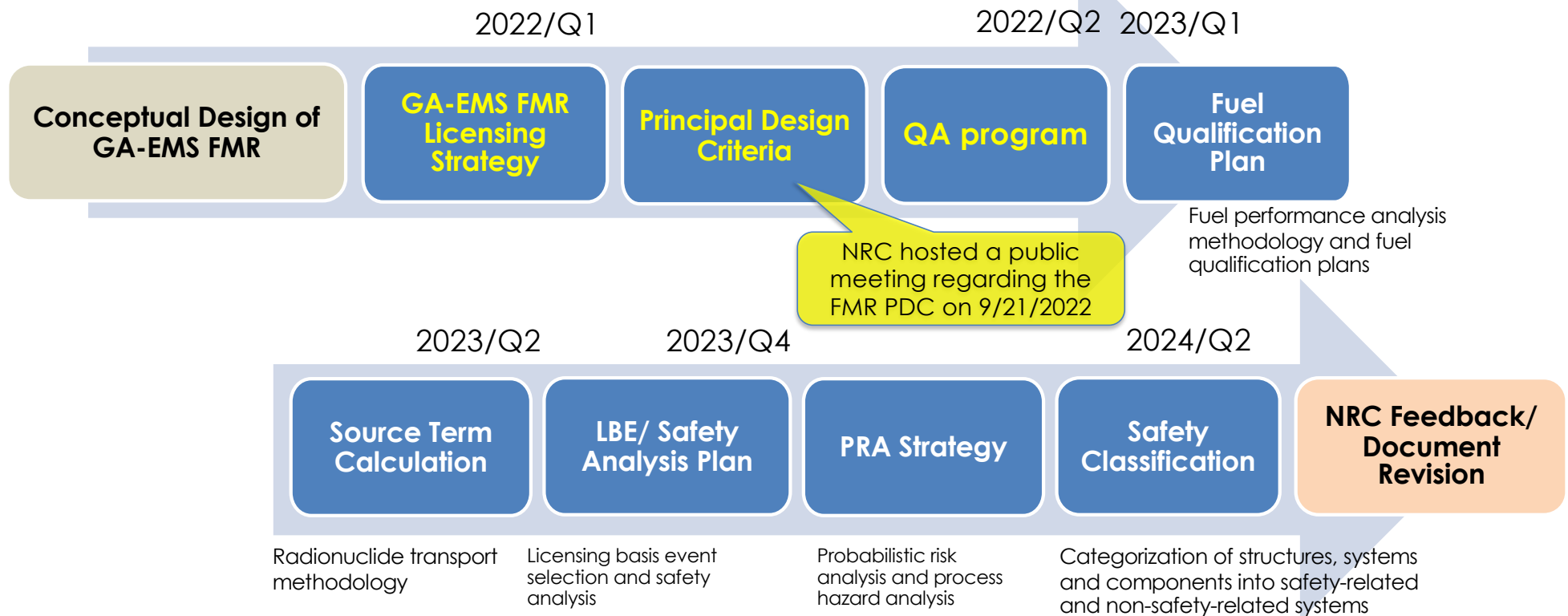
- **Gas-cooled Fast Reactor (GFR)**
- **High-Temperature Reactor (HTR)**
- **Small Modular Reactor (SMR)**



The community-friendly, safe, and distributed resource for the 2035 US Market

FMR Pre-application Regulatory Engagement Plan

A Regulatory Engagement Plan (REP) is encouraged by the NRC as an early step in the overall program to develop and deploy a new reactor technology.

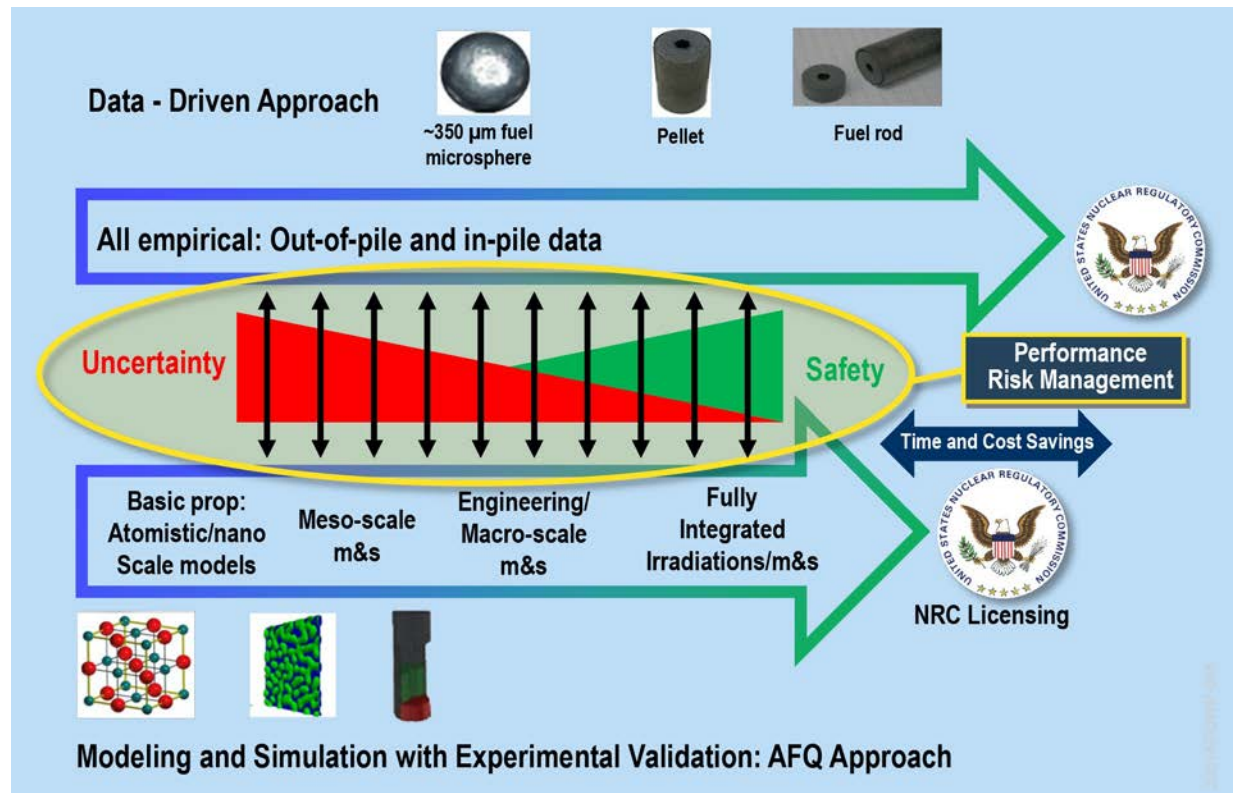


Accelerated Fuel Qualification (AFQ): Methodology to Reduce Time and Cost to Qualify New Fuels

- Brings together modeling and simulation with targeted experiments
- Emphasis on physics-based modeling and simulation versus use of empirical fits
- Use of integral as well as separate effects and accelerated experiments

K. A. Terrani, N. A. Capps, M. J. Kerr, C. A. Back, A. T. Nelson, B. D. Wirth, S. L. Hayes, C. R. Stanek,
JNM 539, 152267, 2020

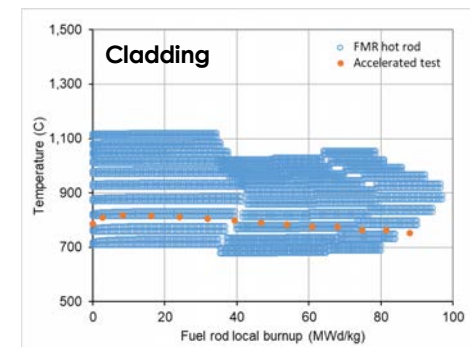
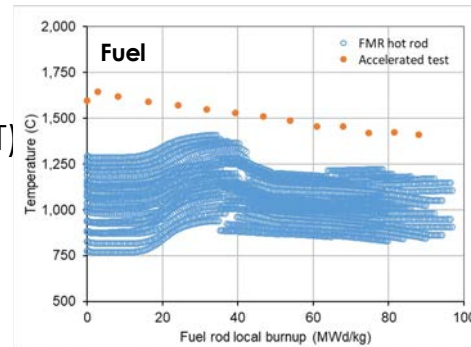
C. Drzewiecki, J. Schmidt, C. VanWert, P. Clifford, *NUREG 2246, 2022*
Fuel Qualification for Advanced Reactors



Fast Modular Reactor (FMR) Fuel Test Plan

- **Accelerated testing** for long lifetime fuels: Advanced Test Reactor (ATR) high-burnup irradiation tests

- Fission accelerated steady-state testing (FAST) approach with irradiation system for high-throughput acquisition (ISHA) capsule to accelerate the irradiation in compact-size rodlets



- **Separate effects test:**

Transient Reactor Test (TREAT) facility transient tests

- Reactivity-initiated accident (RIA) power pulse test in a modified version of the dry in-pile fracture test (DRIFT) capsule

- **Sub-integral test** to bound fuel failure criteria: In-pile tests to component properties

- Confirm the hermeticity, pellet-cladding mechanical interaction to inform FMR design

