Leading the Way to a Bright Energy Future

Presentation to

U.S. Nuclear Regulatory Commission

IMSR® Regulatory Engagement, Fuels and Materials Qualification, and Research Activities

April 2021

IMSR® Technology Overview

- 442 MWth liquid fueled and cooled, thermal spectrum, graphite moderated, pool-type, molten fluoride salt reactor
- Hydrostatic operating pressure, 700 ^{o}C outlet, 620 ^{o}C inlet
- 195 MWe/44% thermal efficiency
- 600 °C liquid salt industrial heat supply
- Fuel enrichment <5%
- 7-year fuel cycle length
- 56-year plant design life
- Black start capable
- Inherent and passive decay heat removal, indefinite coping time, no operator action required
- Capable of 10% per minute from 100% to 50% to 100% load following ramp rate

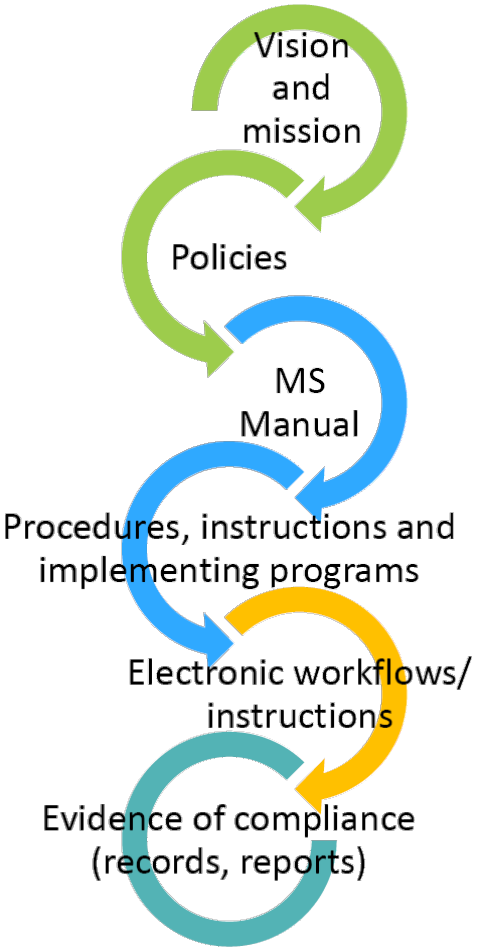
The Replaceable IMSR® Core-unit

Licensing and Regulatory Engagement

- Canadian CNSC Vendor Design Review (VDR)
  - *IMSR® successfully completed Phase I in 2017*
  - *VDR Phase II is on schedule to complete in 2021*
- US NRC regulatory engagement is underway
  - *10CFR52 Standard Design Approval of the IMSR® Core-unit*
  - *Prerequisite to 10CFR50 Construction Permit Application*
- IMSR® is the subject of a joint CNSC/USNRC collaborative regulatory review by both agencies
  - *Sharing of safety and licensing information, including data, methodologies, and evaluations on a broad spectrum of technical and licensing topics*
  - *Enables both regulators to leverage the work of the other in performing their country-specific regulatory activities*
  - *Opportunity to reduce regulatory burden in preparing applications for both the U.S. and Canada while maintaining country specific regulatory requirements*

Approach to Fuel and Materials Qualifications

- IMSR® is fueled by a fluoride-based homogeneous liquid fuel salt
  - *The MSRE proved that fluoride salts in a liquid fuel were invulnerable to both radiation and high temperatures during more than four years of operation*
- Comprehensive advanced reactor design process is developed and in place
  - *Defines the entire IMSR® technology development and qualification program*
  - *Encompasses all research, development, analysis, engineering, licensing, and testing*
  - *Leading to a fully designed, engineered, and licensed IMSR® nuclear power plant*
- Basic Engineering for the IMSR® plant is on schedule for completion in 2021
  - *Establishes the system level technical details to enable moving into detailed engineering to support construction*
- A "buy vs make" focused R&D program of validation and verification will be complete in 2024
  - *Physics, Thermal Hydraulics, Materials, and Chemistry*



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