

NRC Activities Related to Advanced non-LWR Reactor Fuel Cycles

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Strategic Objective

NRC staff is positioning itself to conduct efficient licensing reviews of advanced reactor technologies (including fuel cycle) on a timeframe consistent with industry applications.

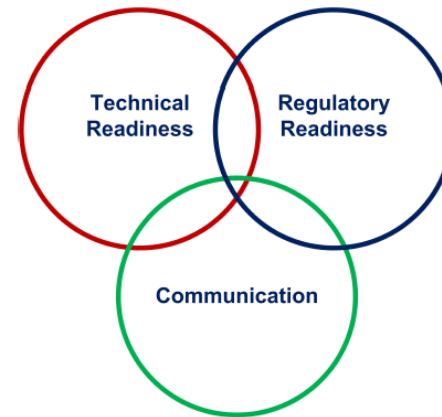
Vision and Strategy

NRC has published
its Vision and
Strategy document



ML16356A670

NRC Vision and Strategy:
Safely Achieving Effective and Efficient
Non-Light Water Reactor
Mission Readiness



December 2016

June 2017

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Vision and Strategy (cont.)

Focus and Pace of resolving licensing issues is determined by

- applicant's actions/initiatives
- NRC budget

Interactions

- NRC-DOE Advanced Reactor Workshops
- DOE GAIN workshops
- Periodic Stakeholder on Advanced, Non-light water Reactor Regulatory Issues

Participants include:

- Nuclear Innovation Alliance
- U.S. Nuclear Infrastructure Council
- Nuclear Energy Institute
- Electric Power Research Institute

See <https://www.nrc.gov/reactors/new-reactors/advanced.html> for highlights on NRC interactions

See <https://gain.inl.gov/SitePages/Home.aspx> for DOE's Gateway to Accelerated Innovation in Nuclear Program

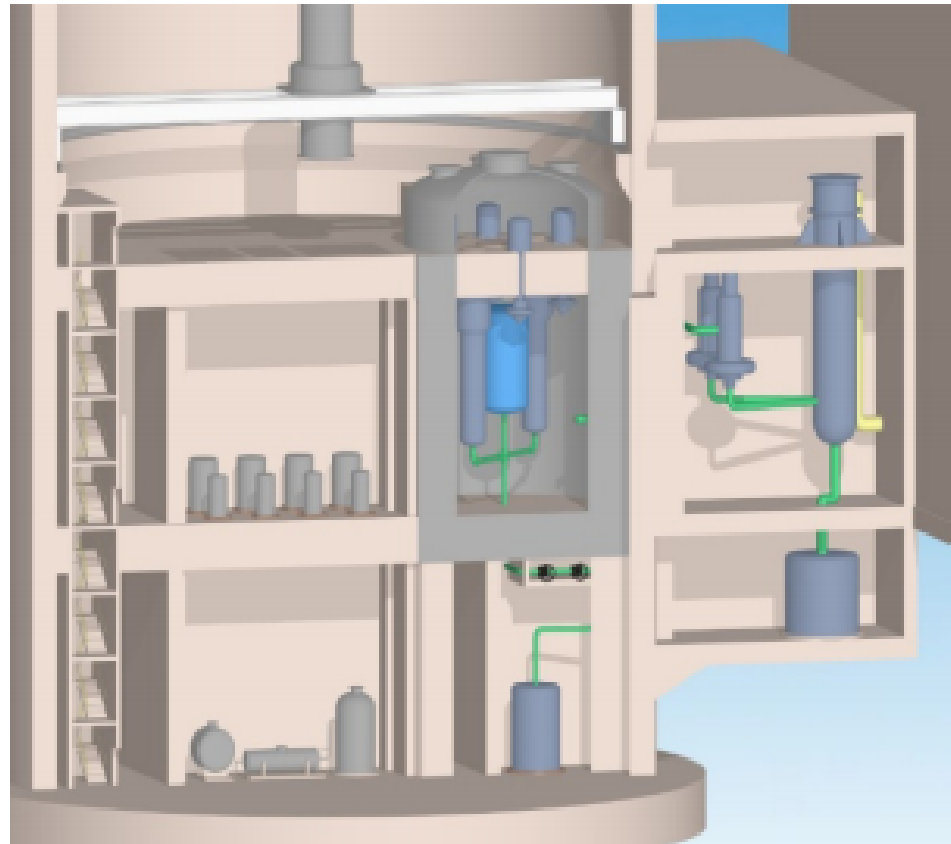
Potential Applicant Meetings

➤ Initial Interactions

- Oklo, sodium cooled fast reactor
- Transatomic, molten salt reactor
- Terrestrial Energy, molten salt reactor
- X-Energy, modular high temperature gas-cooled reactor

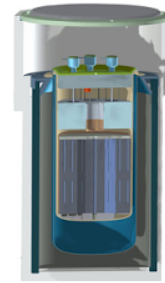
See <https://www.nrc.gov/reactors/new-reactors/advanced.html> for information on meetings with potential applicants

Transatomic 1250 MWth Molten Salt Reactor

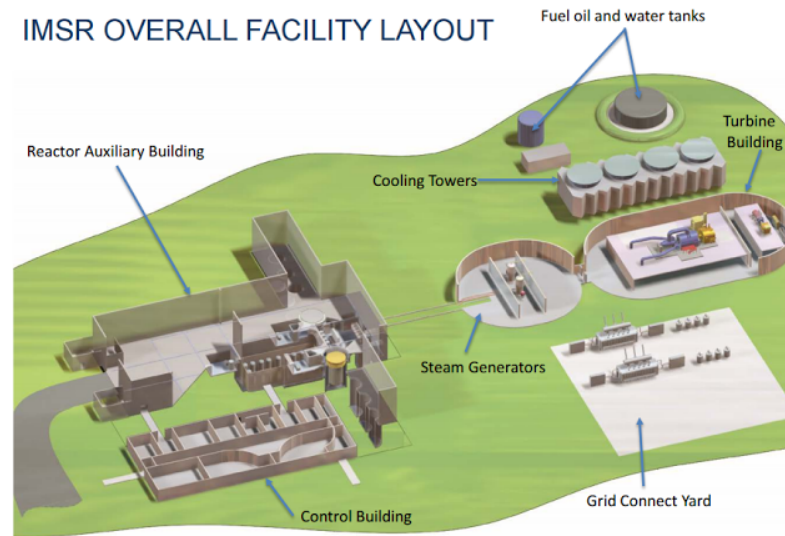


Terrestrial Energy 400 MWth Integral Molten Salt Reactor

Integral Molten
Salt Reactor

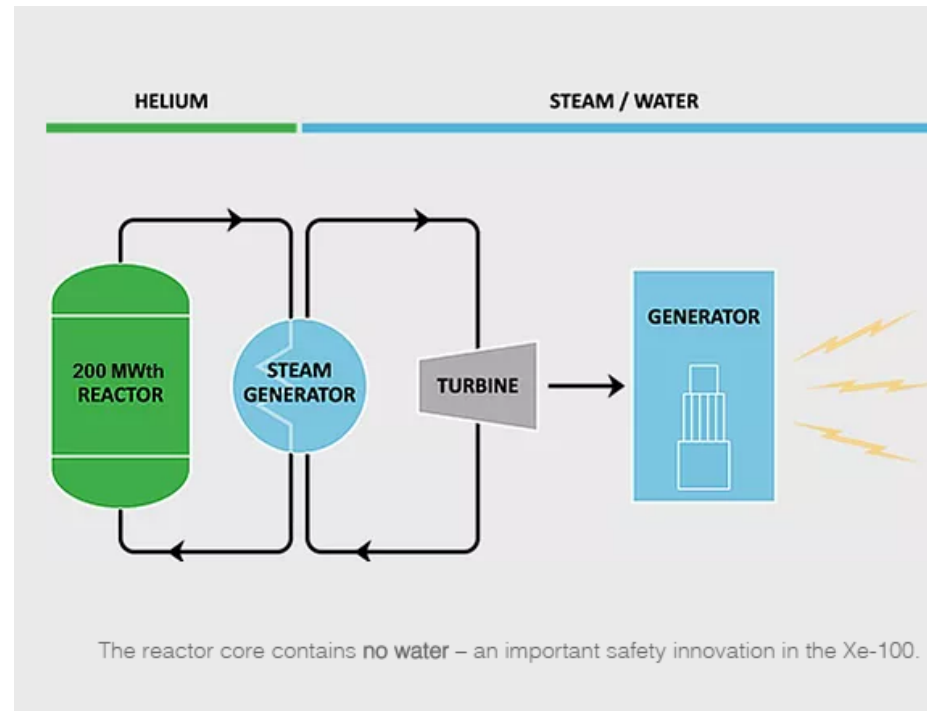


IMSR OVERALL FACILITY LAYOUT



X-Energy 100 MWth Pebble Bed Reactor

X Energy's 100 MWth Pebble Bed Reactor



<http://www.x-energy.com/>

Observations from Interactions

- Most of the discussions have focused on reactor design and licensing (e.g., general design criteria, reactor licensing policies, security, etc.)
- Existing fuel cycle regulations appear to be adequate
- NRC has pointed out that the fuel cycle, transportation, waste management and environmental impacts will have to be addressed in advanced non-LWR reactor licensing.
- NEPA documents will require information comparable to 51.51 (Table S-3) and 51.52 (Table S-4)

Observations (cont.)

- Fuel cycle issues will be technology, design specific
- Potential Fuel Cycle Regulatory Needs
 - Transportation cask certificates for uranium with > 5 % enrichment
 - New or modified fuel cycle facility licenses for processing advanced reactor fuel material
 - Irradiated material storage or transportation cask certificates

Next Steps

- Continue interaction with potential applicants to identify specific issues that are integral to licensing of applicant's fuel cycle
- Continue with staff training on reactor technology (e.g., molten salt reactors)
- NRC is expecting fuel cycle papers from NEI and NIC