Safeguards Philosophy and Needs

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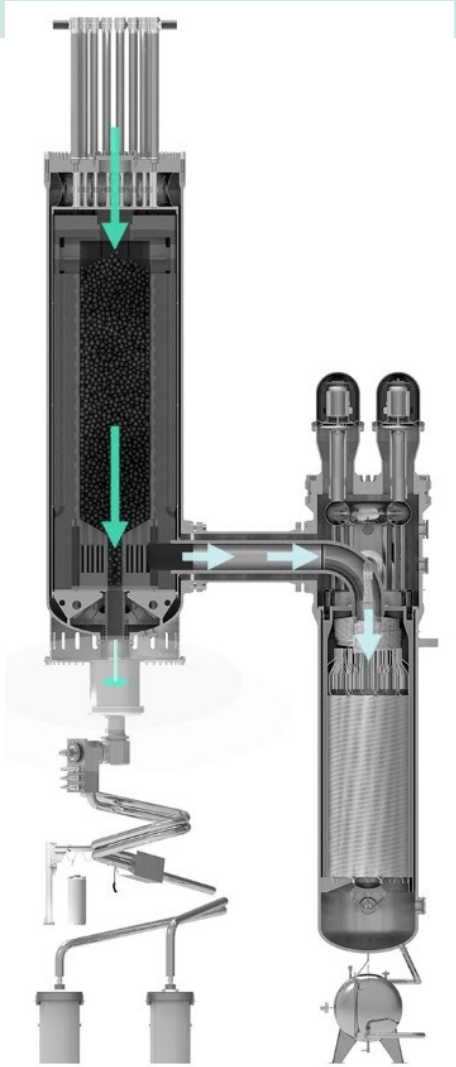
Xe-100 Reactor Design Status

- Gen-IV High-Temperature Gas-cooled Reactor (HTGR)
  - 4 x 80 MWe
  - TRISO fuel
  - 60-year operational life
  - Online refueling
  - high burn-up fuel cycle
- Planned for deployment in USA and Canada by 2028
- Currently undergoing a Vendor Design Review process

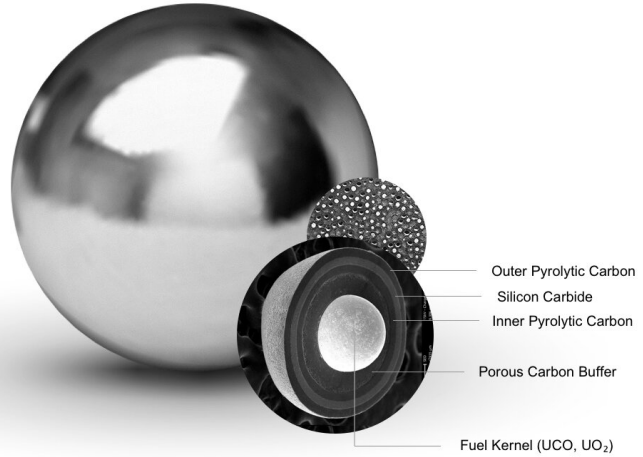
Description	Unit	Value
Ave. in-core residence time	days	1,320
Ave. discharge burnup	MWd/tHM	168,000
Ave. number of pebble circulated per day		1,020
Ave. number of fresh pebbles added per day		170
Fissile (U235) content of fresh pebbles	grams	1.085



XE-100 Reactor Schematic

Safeguards Requirements, Expectations and Obligations

- **X-energy recognizes the importance of integrating safeguards into the Xe-100 design.**
- **X-energy understands the need for a safeguards program that provides for the fulfillment of applicable safeguards requirements, including:**
  - Safeguards Equipment and Seals
  - IAEA access
  - Nuclear Material Accountancy
  - Provision of Information
  - Retention of Records



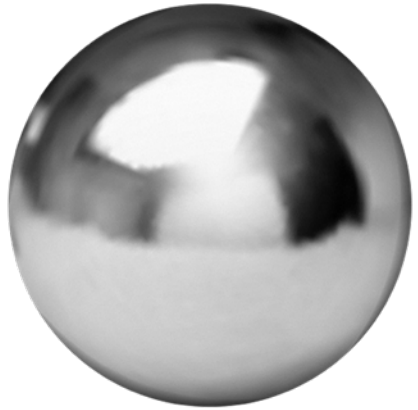
- **The Xe-100 design recognizes the unique safeguards characteristics a pebble-bed reactor has due to the continuous online refueling, defueling and recirculation of the pebble fuel.**
- **Sandia National Laboratories and Oak Ridge National Laboratories working together with X-energy for developing the *Xe-100 Safeguards Roadmap* for globally and domestically.**

Development Focus Areas (DFAs)

- Finalization and validation of a burn-up code with defined errors
- Development or adoption of an accounting software with defined errors
- Finalization and validation of a pebble counter design with defined errors
- Finalization of method for capturing and storing dust, debris and residue that results from broken pebbles throughout the Fuel Handling System
- Finalization of containment and surveillance systems and techniques

Scope and Compliance Review

- The Xe-100 design will meet safeguards requirements for recording and reporting accountancy data, and for monitoring flows and inventories related to non-irradiated fuel containing fissile material.
- Work continues to design the FHS (Fuel Handling System) fuel handling process, through the application of new technologies during the preliminary design.
- Such technologies are described in the *Xe-100 Safeguards Roadmap,* and X-energy continues to work on the Development Focus Areas (DFAs) identified therein.



QUESTIONS?

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