

**American Nuclear Society
Human Factors, Instrumentation and Control
Lunch and Learn**

eVinci Micro Reactor

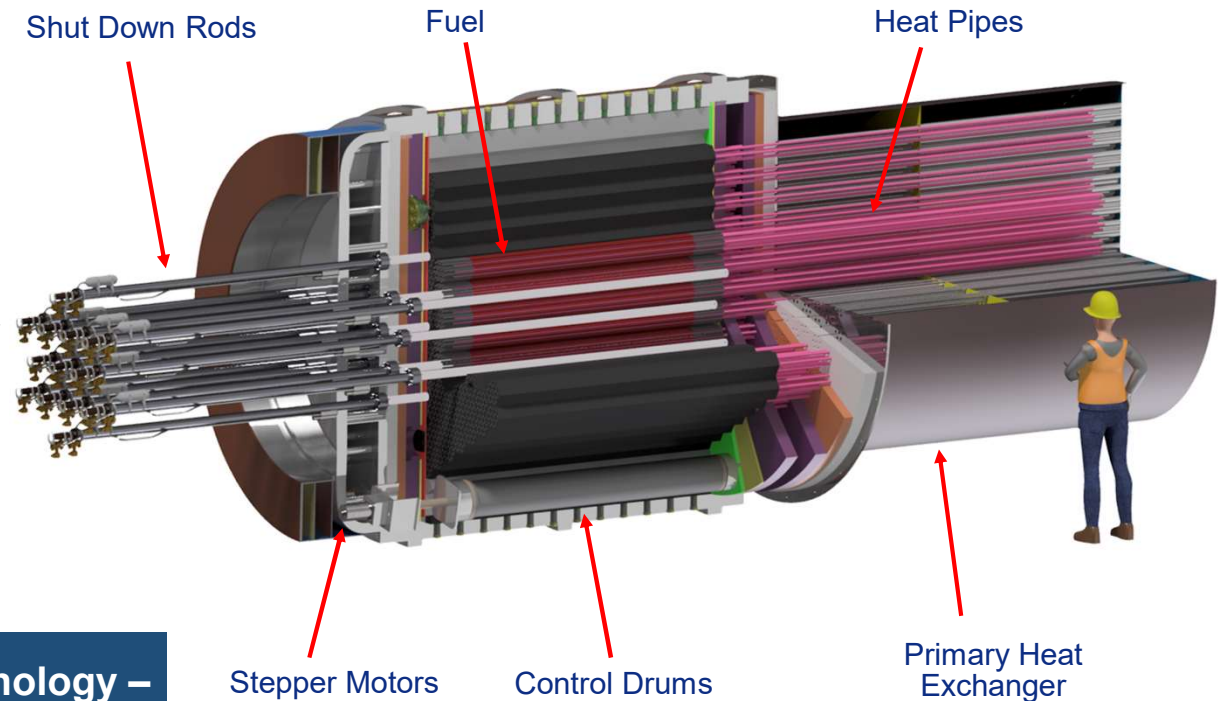
October 19th, 2021

**Thomas Tweedle, Principal Engineer, I&C Technical Lead
Westinghouse Electric Company**

eVinci Micro Reactor

Reactor Technology

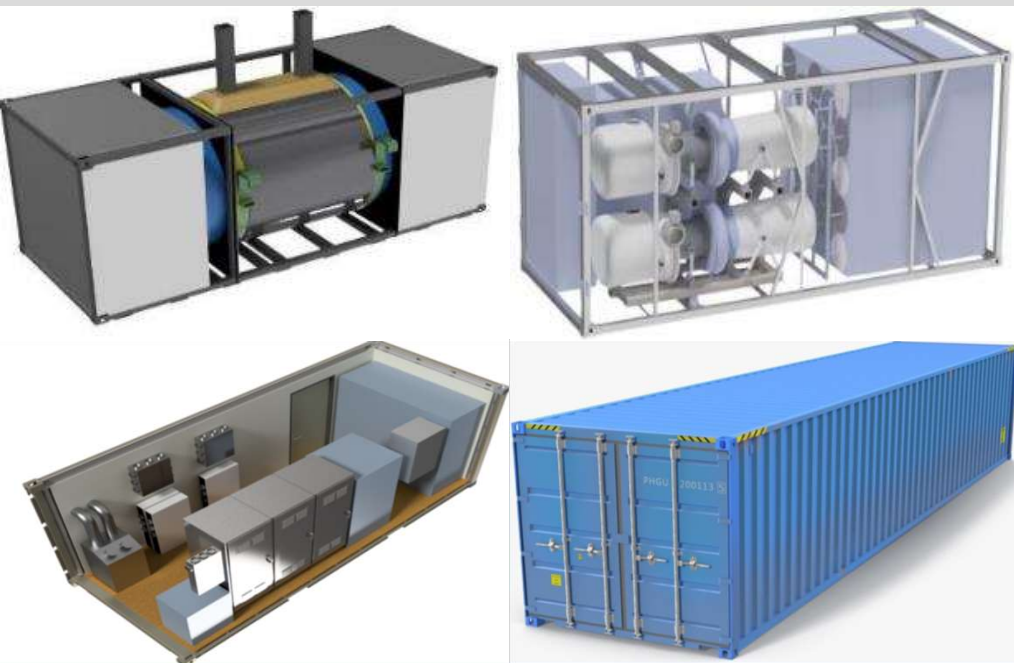
- Reactor Life: 10 full power years
 - 4-5MWe and ~7MWth@350F heat recovery
 - ~13MWth @ > 1300F heat only
- TRISO encapsulated fuel
- Sodium heat pipes provide reactor heat transfer
- Graphite core block is proven technology
- Diverse shutdown systems
- Open-air Brayton power conversion system



Improves safety with passive heat pipe technology – enabling a safe, low-pressure reactor

eVinci Micro Reactor Deployment

Transportability Advantages



**Minimizes construction cost and labor
Installation to operation in less than 30 days**

Entire plant delivered in four truckload size containers (40' x 14' x 14')

- Reactor container
- Power conversion unit
- Instrumentation and Control
- Support equipment

- ✓ **Weights and sizes allow for deployment in remote areas (truck/rail/barge)**
- ✓ **Allows for rapid scaling to meet demand**
- ✓ **No spent fuel or waste storage on site**
- ✓ **Minimizes decommissioning and effort to return site to green field**

eVinci Micro Reactor Safety Related Sensors

Robust Sensors for Reactor Process Measurement

Instrumentation

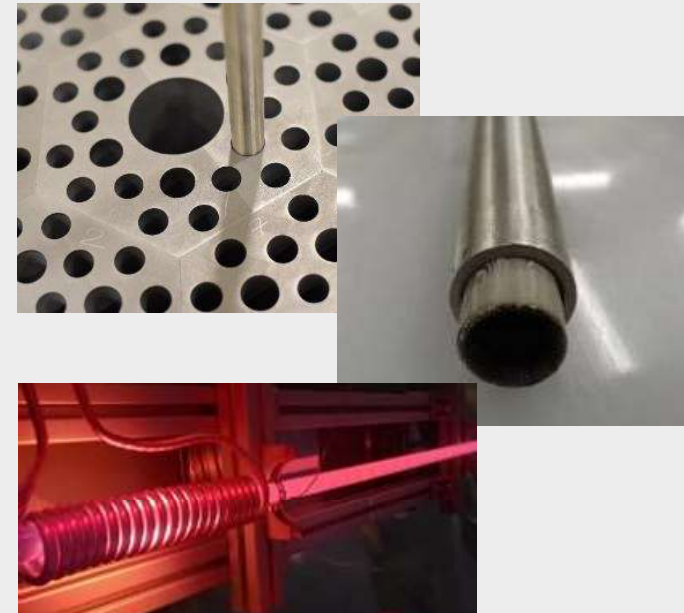
- eVinci implements sufficient instrumentation for autonomous operation
- Instrumentation has high reliability, high spatial resolution, qualified for nuclear safety related use

Core Sensors

- Fiber optic sensors for heat pipe temperature measurement
- Source range and power range neutron flux detectors

Challenges for Sensor Development

- High operating temperature
- I/O density, footprint considerations
- New reactor type
- High reliability



Testing, analysis and regulatory engagement required for FOAK eVinci sensor technologies

Autonomous Operation & Predictive Maintenance

Paradigm Shift for Nuclear Plant Operations

Fully autonomous operation with no operators present on site

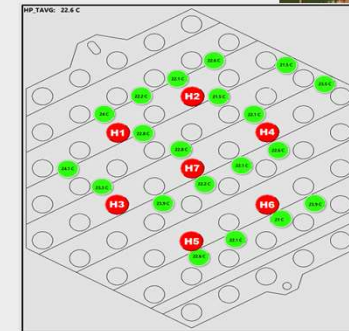
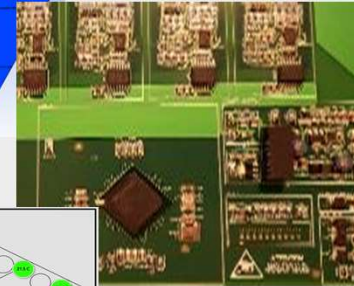
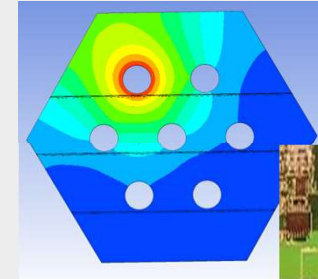
- Significantly reduces operating cost and LCOE

Remote monitoring capabilities enable

- Predictive analytics and predictive maintenance capabilities
- Data collection for big data and machine learning

Reducing the reliance on human operators and technicians

- Reduces O&M costs through predictive vs. prescribed maintenance
 - Reduced inventory cost of spare parts
- Reduce downtime of critical power infrastructure
- Enables remote locations where travel or logistics are difficult



Autonomous operation and predictive maintenance is possible with key enabling technologies and regulatory engagement