

# Construction Materials Strategy for MSR Deployment

Advanced Reactor Technologies Program  
Molten Salt Reactors Campaign Program Review  
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# Surveillance Test Article Development

- Work was presented at the June 8 & 10, 2021 ART Advanced Materials Program Review
- FY22 – Continue test article development and testing and Sizing App development (\$550K)
  - JAEA has expressed interest in selecting this technology development for CNWG collaboration
    - Leverage JAEA development and testing effort to accelerate schedule
    - Status - pending DOE approval

# Construction Materials Strategy for MSR Deployment

- **First to Market**

- Gaps in Codes and Standards for 316H
  - Extend stress rupture factor of weld metal with 16-8-2 chemistry from 1200 to 1,500F
  - Develop fatigue design curves at 1,400 and 1,500F
  - Qualify 316H and 16-8-2 weld metal to support safety analysis for short term (3000 h), elevated temperature (1800F) excursions

- **Near-Term Deployment**

- Use corrosion resistant clad on ASME qualified base metal
  - Development of design rules, acceptance testing criteria and metallurgical study on clad components initiated in FY18
    - Funding stopped since FY19
    - Completed development of design rules for W/316H and Ni/316H clad systems in 3/31/2021 through GAIN voucher support requested by Kairos Power

- Gaps in ASME Clad Component Code Case
  - Acceptance testing criteria and validation data for design rules

- **Mid-Term Deployment** **Funding source? AMMT?**

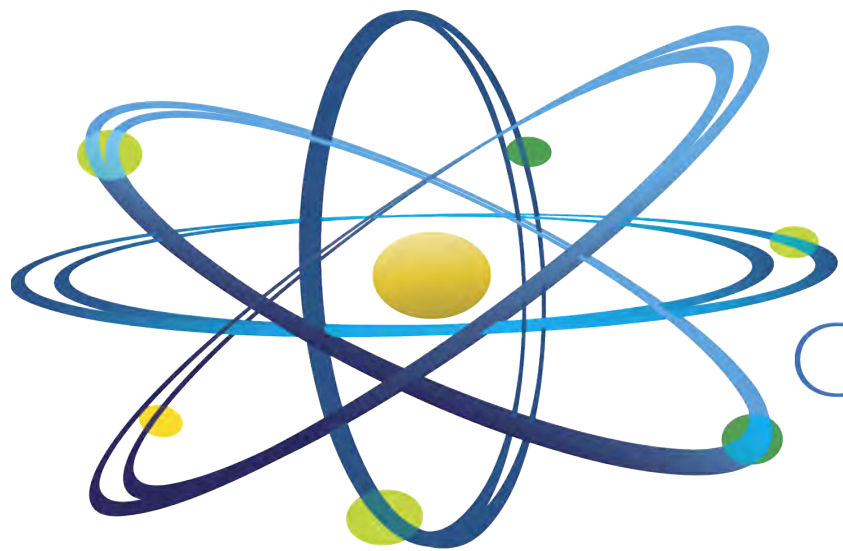
- Code qualify Hastelloy N or Haynes 244 to support advanced reactor developers' needs (Flibe Energy)

- **Long-Term Solution**

- Develop and qualify next generation structural materials for MSR
  - New alloys development through university programs
    - FY18 and FY19 NEUP projects - Develop new alloys for fluoride salt applications
    - FY20 NEUP project – Develop new alloys for chloride salt applications
- With industry input, down-select one to two alloys for accelerated ASME Code qualification

**Potential Collaboration:**

- **AMMT - Clad component fabrication processes (\$250K)**
- **MSR - Acceptance testing criteria and validation data (\$300K)**



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