

**WE START WITH YES.**



# ARGONNE NUCLEAR ENGINEERING: THERMAL HYDRAULIC TESTING CAPABILITIES



**DARIUS LISOWSKI**

**CRAIG GERARDI**

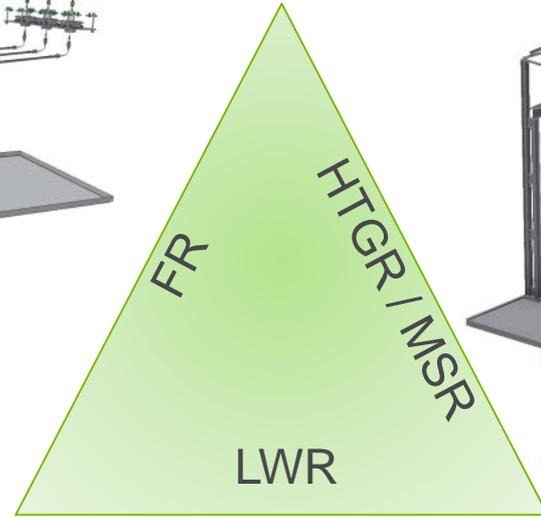
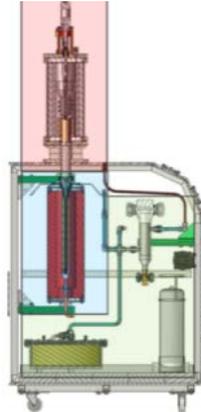
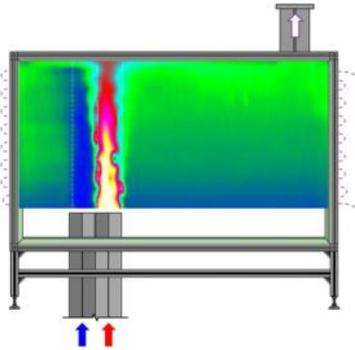
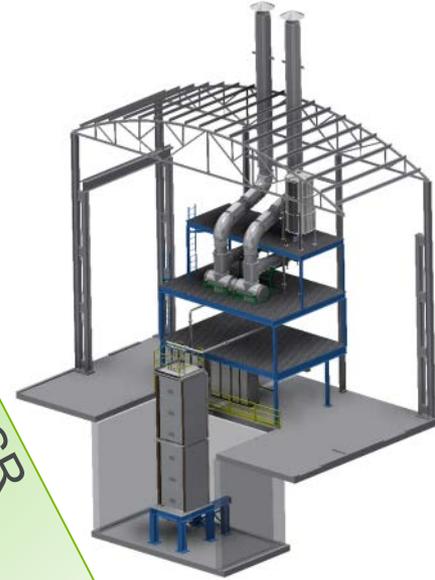
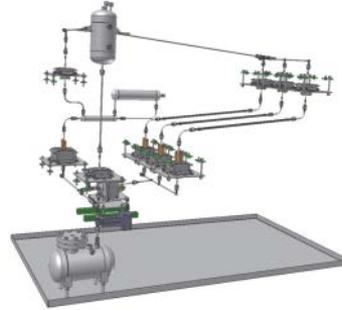
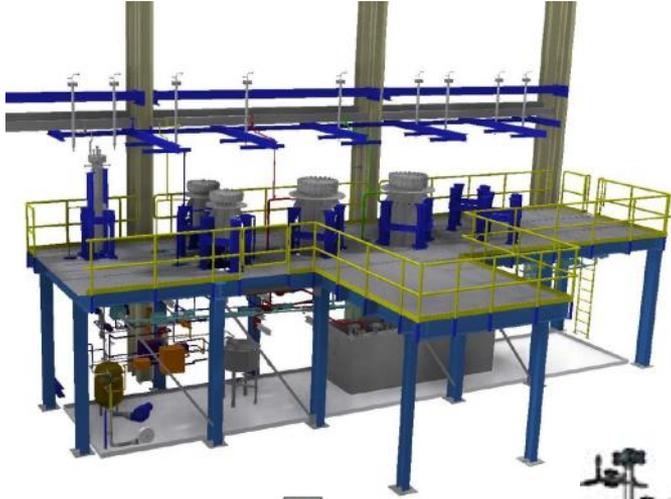
**CHRIS GRANDY**

# INFRASTRUCTURE / OVERALL CAPABILITIES

- Containment experiments – Two 1,000m<sup>3</sup> cells for high hazard work (3.7 atm.)
- Large scale test assemblies – Interior high-bay space able to accommodate article heights from 8-m to 23-m
- High voltage power delivery – 400 kW average, up to 3 MW, per building
- Two sodium scrubbers owned and operated by NE staff (30,000 SCFM)
- In-house services – Radiography, ASME qualified weldors, full range machine shop, hoisting & rigging, canal water, analytical & material testing, etc.
- Hot work – On-site Irradiated Materials Laboratory (IML) hosts four beta-gamma hot cells, labs, and glove boxes for hazard category <3
- Prototypic conditions
  - Half-height heated cavity with  $q''$  and  $\epsilon$  of HTGR
  - 3,000-L Na inventory (R-grade) up to 650°C at FR
  - Severe accident behavior with uranium and corium for LWR and FR

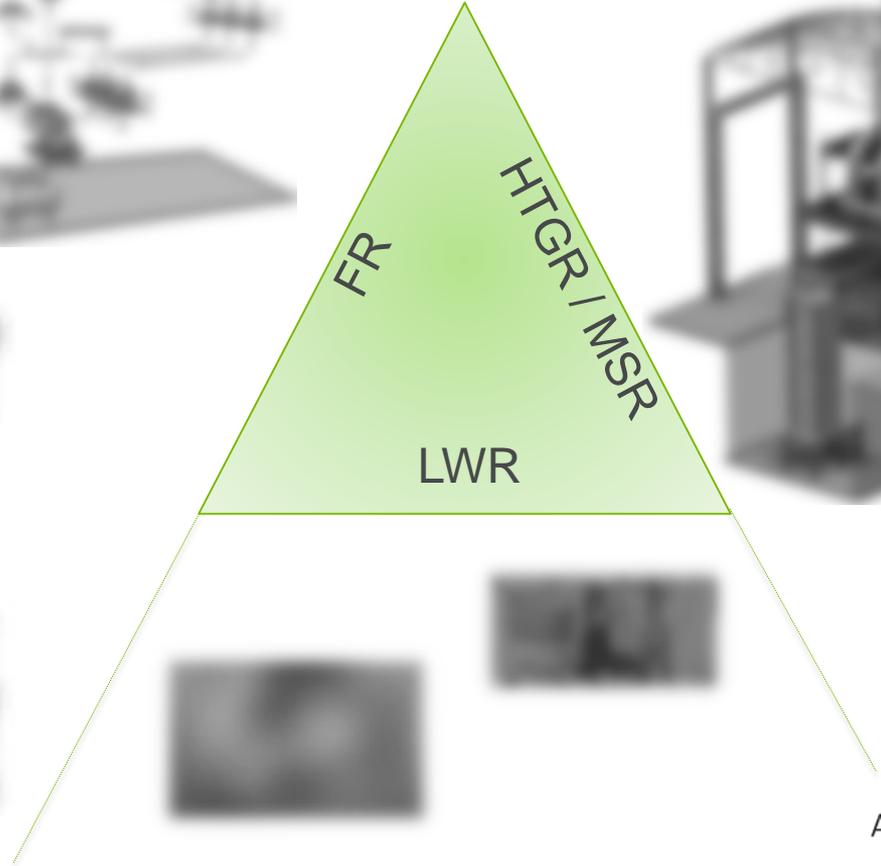
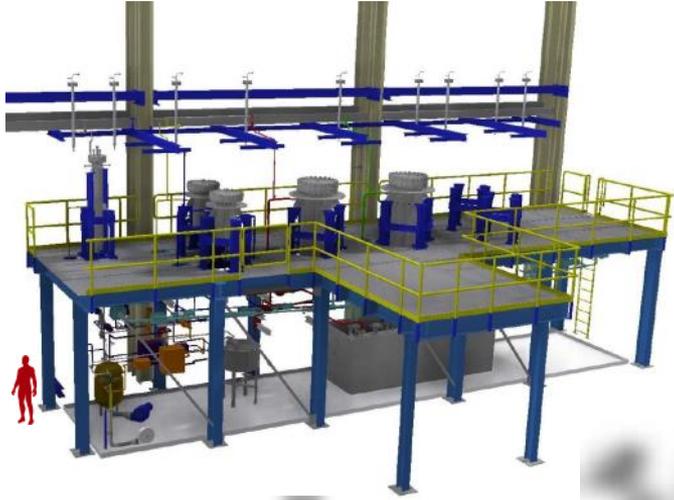
# ACTIVE FACILITIES

- METL
- Na-Plug
- NSTF
- MAX
- MUSE
- SNAKE
- CCI
- IML



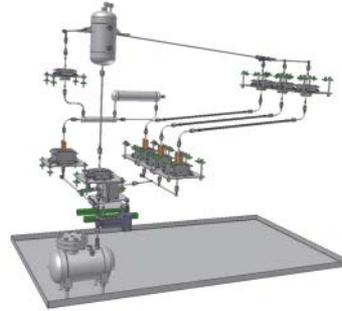
# ACTIVE FACILITIES

**METL** – Sodium component test facility: 3,000 liters across 4 vessels



# ACTIVE FACILITIES

Na Plugging – Plugging phenomena of sodium in PCHE channels



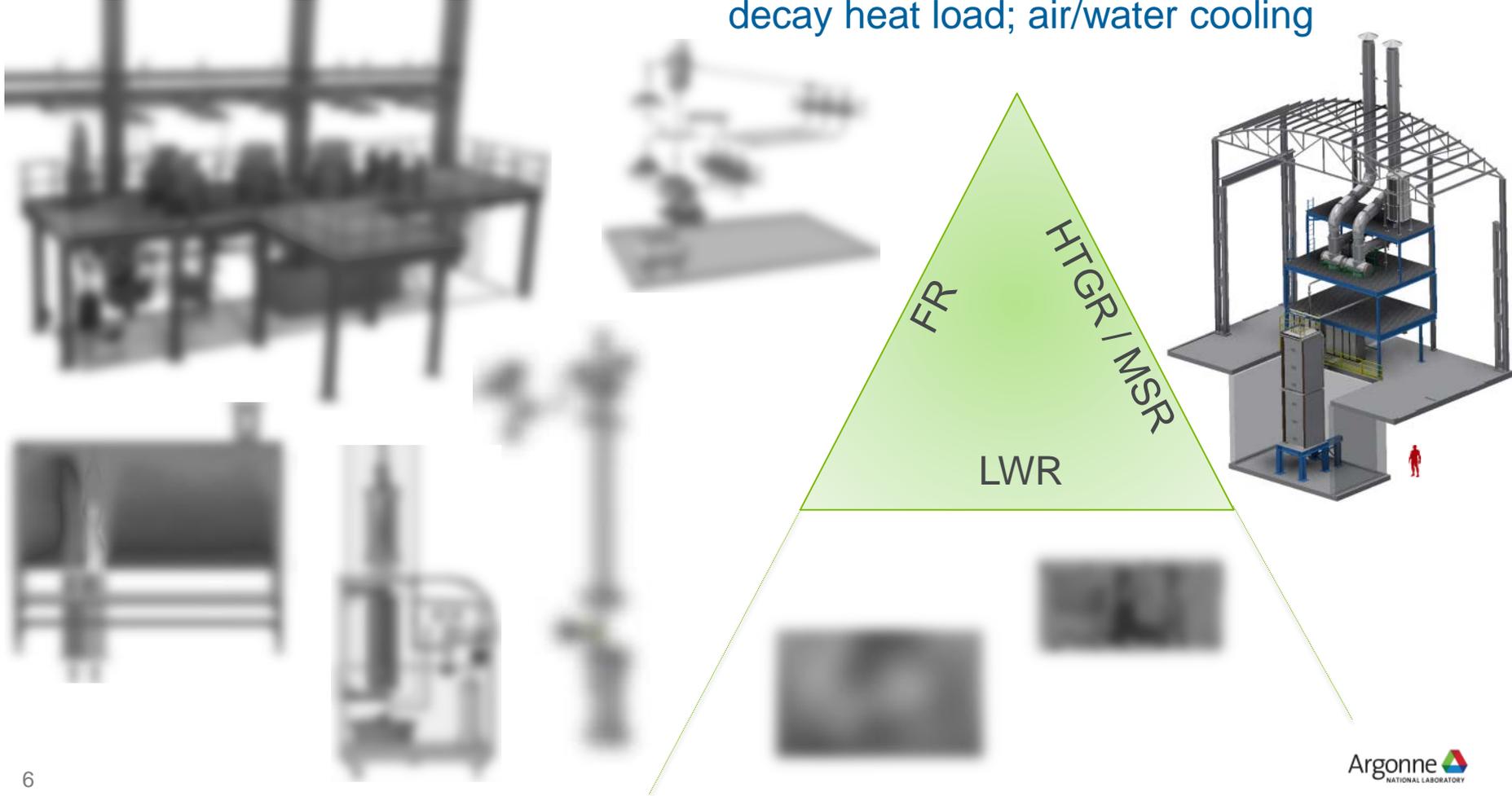
FR

HTGR / MSR

LWR

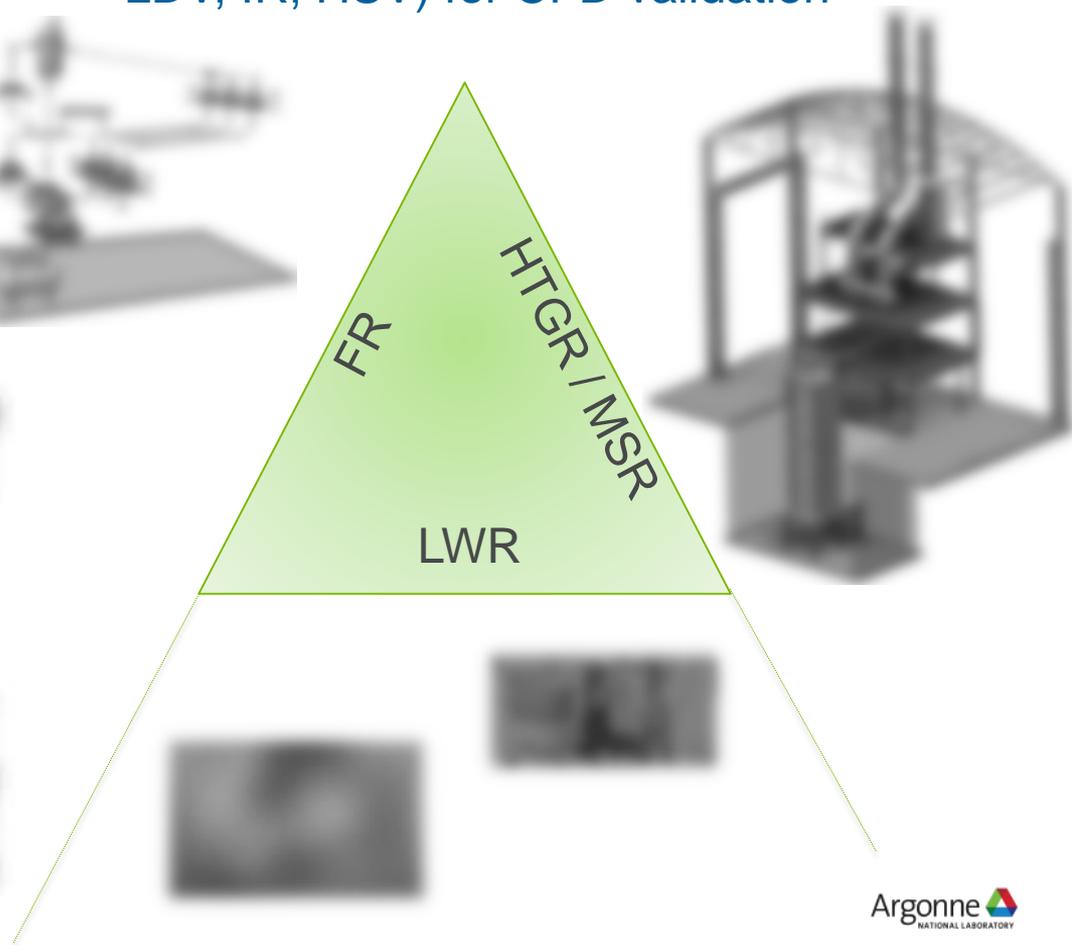
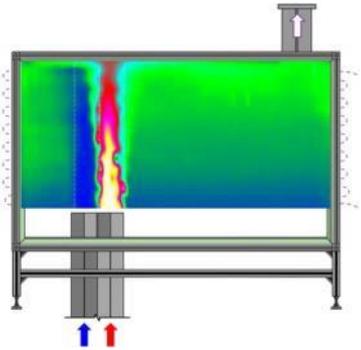
# ACTIVE FACILITIES

NSTF – ½ scale RCCS; 220 kW decay heat load; air/water cooling



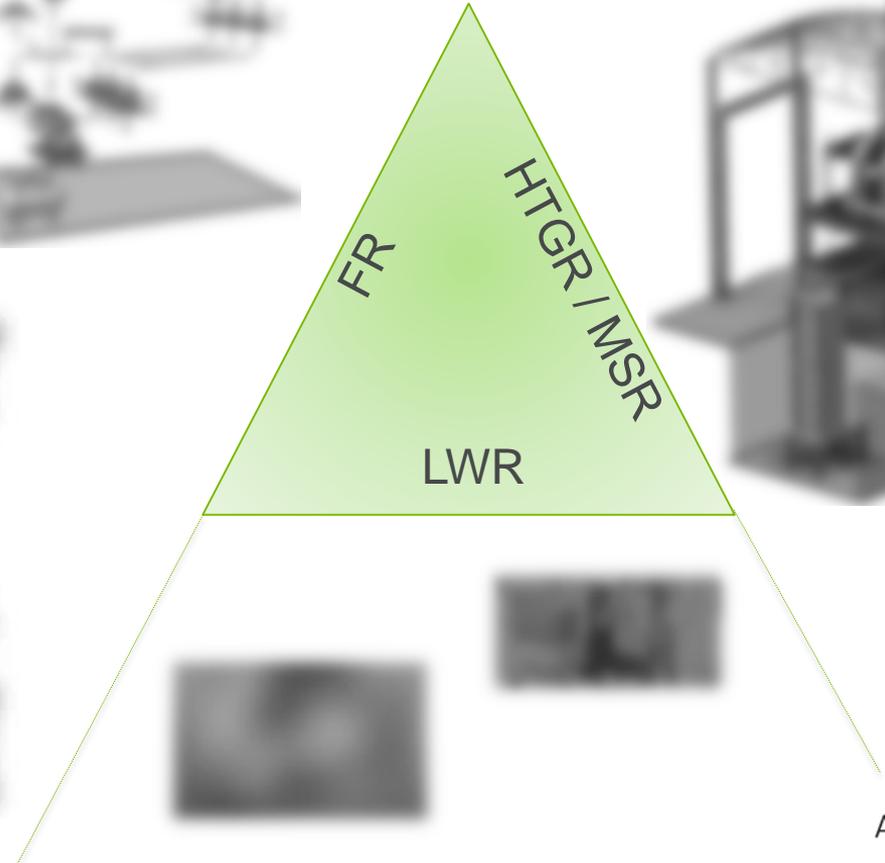
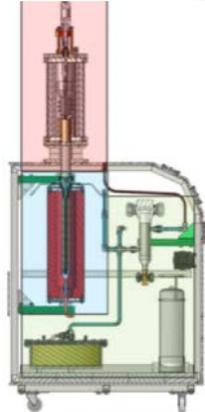
# ACTIVE FACILITIES

**MAX** – High fidelity instruments (DTS, PIV, LDV, IR, HSV) for CFD validation



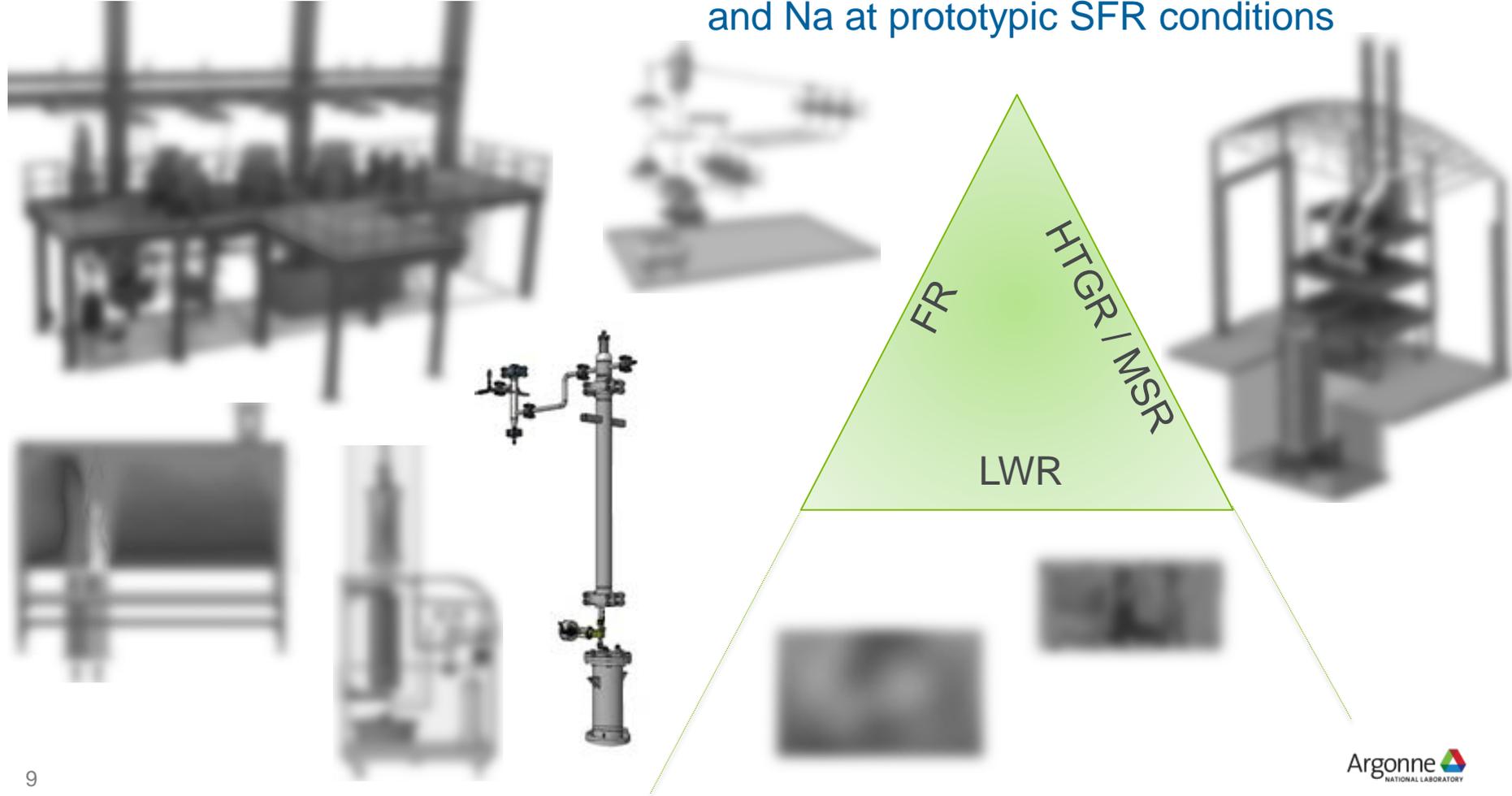
# ACTIVE FACILITIES

**MUSE** – Severe accident of metallic fuel in sodium cooled fast reactors



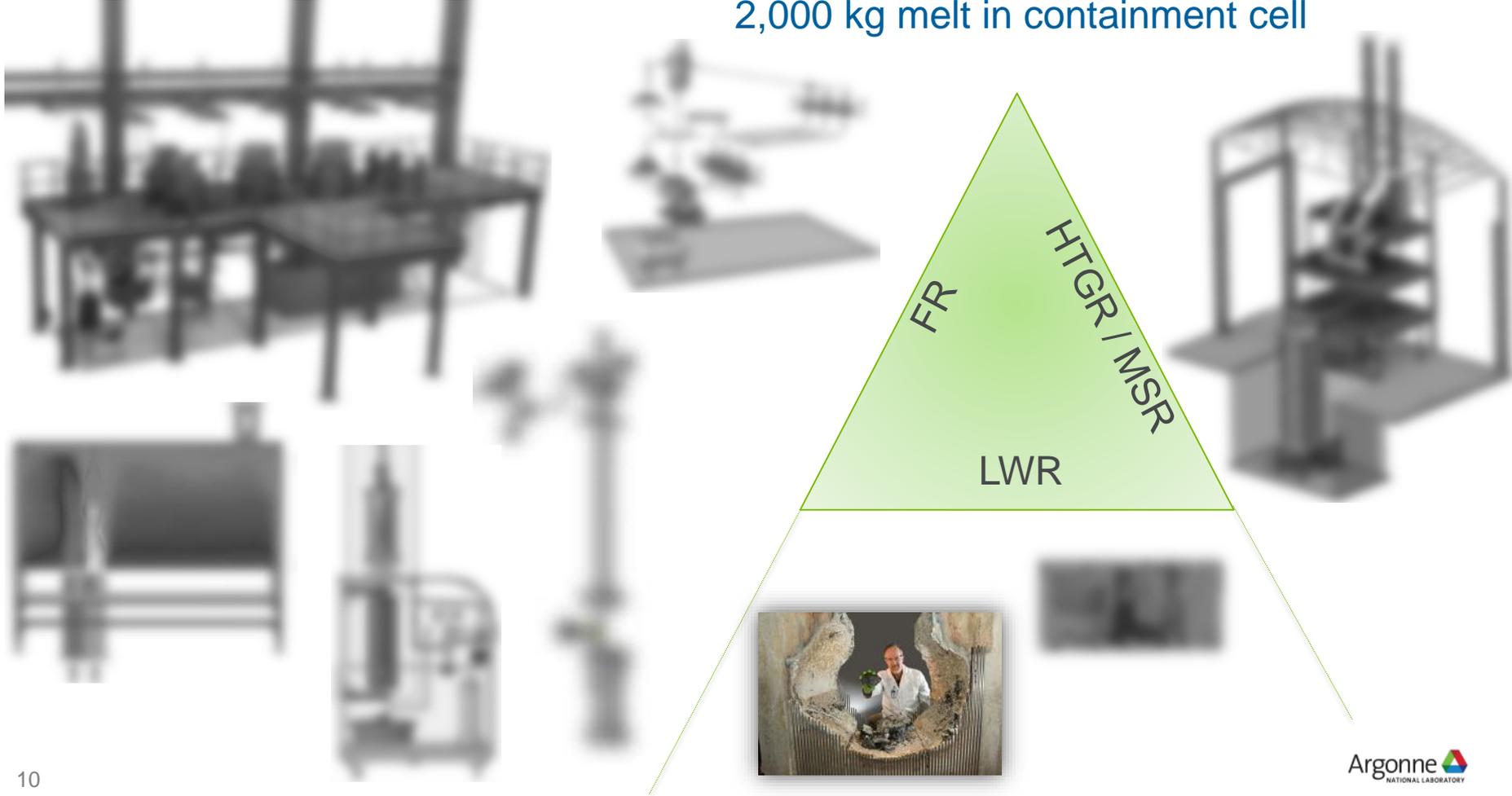
# ACTIVE FACILITIES

**SNAKE** – Chemical reaction of  $s\text{CO}_2$  and Na at prototypic SFR conditions



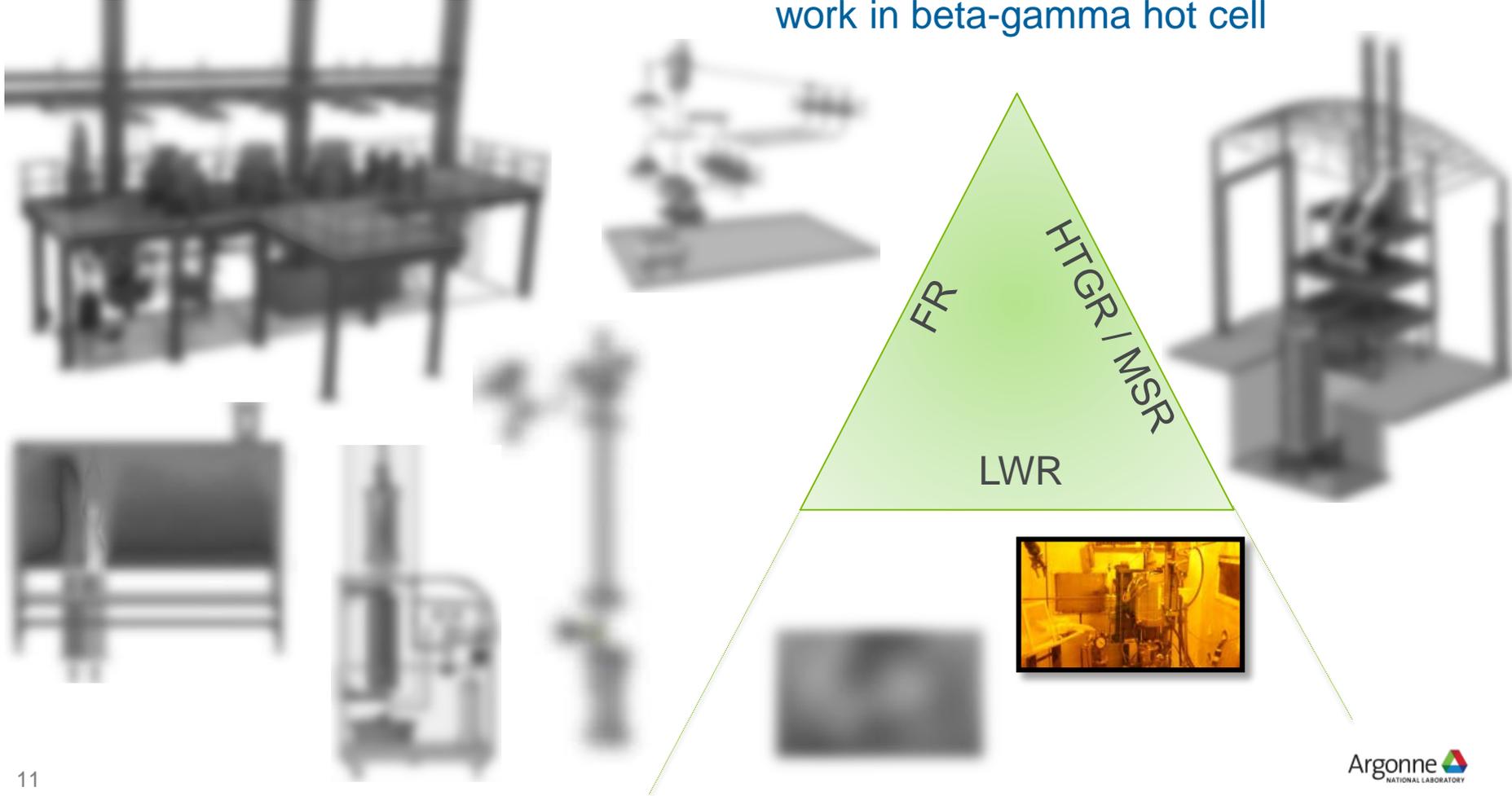
# ACTIVE FACILITIES

CCI – Concrete corium interaction:  
2,000 kg melt in containment cell



# ACTIVE FACILITIES

IML – LOCA and LWR cladding test work in beta-gamma hot cell



**WE START WITH YES.  
AND END WITH THANK YOU.  
DO YOU HAVE ANY BIG QUESTIONS?**