



# Nuclear Energy University Program (NEUP) Fiscal Year (FY) 22 Annual Planning Webinar

## High Temperature Gas Reactor

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# Program Vision and Strategy

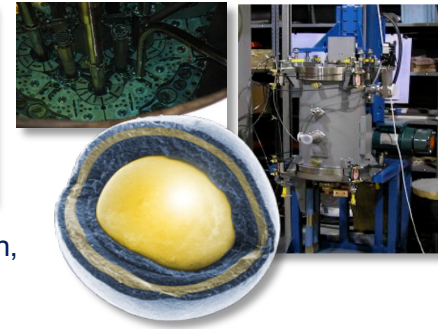
**Develop and qualify advanced reactor technologies necessary for the design and licensing of modular HTGRs, and reduce technical risks and barriers to commercial deployment**



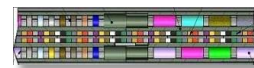
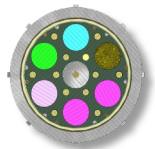
High Temperature Alloy  
Characterization, Testing and  
Codification



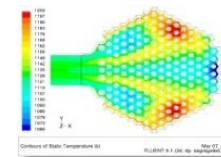
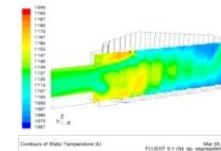
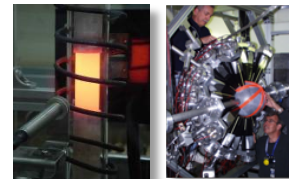
Fuel Fabrication,  
Irradiation, and  
Safety Testing



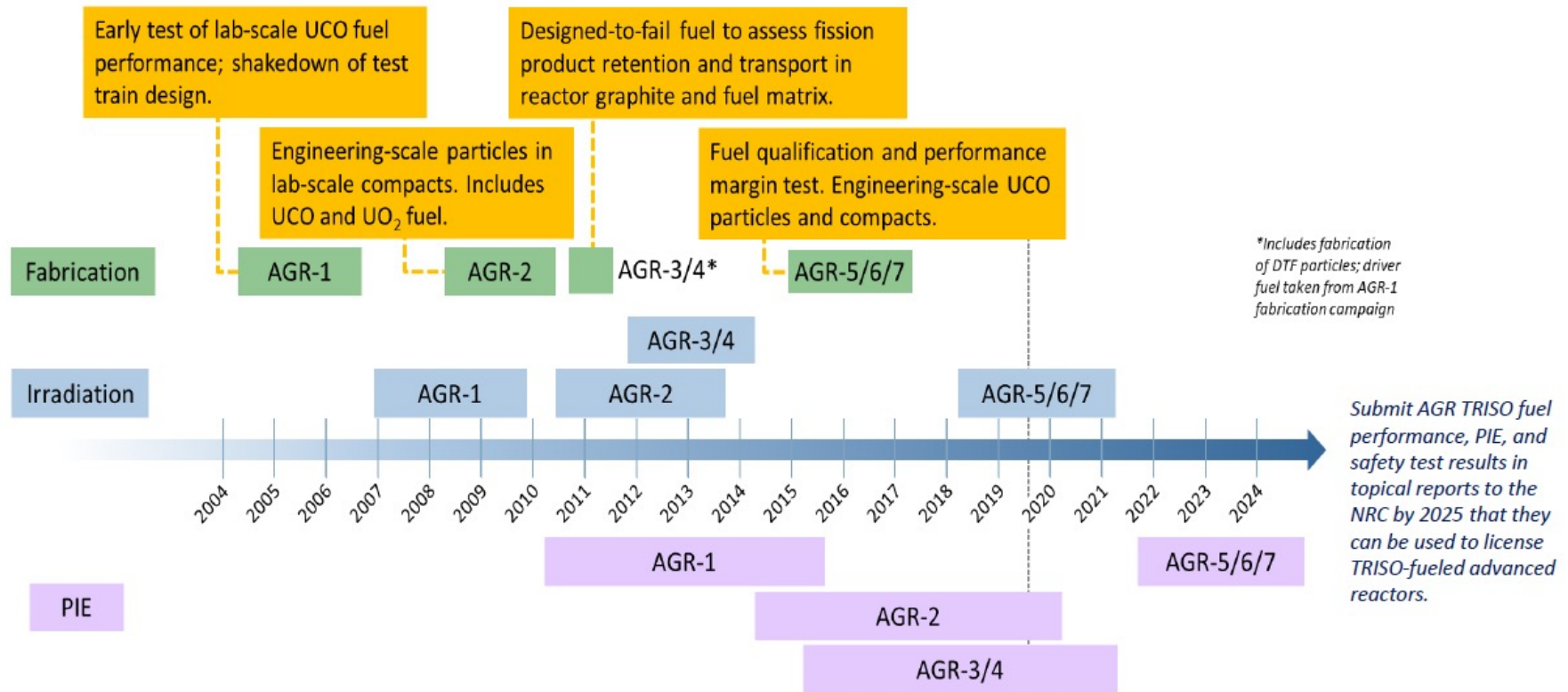
Graphite Characterization,  
Irradiation Testing, Modeling and  
Codification



Design and Safety Methods  
Development and Validation

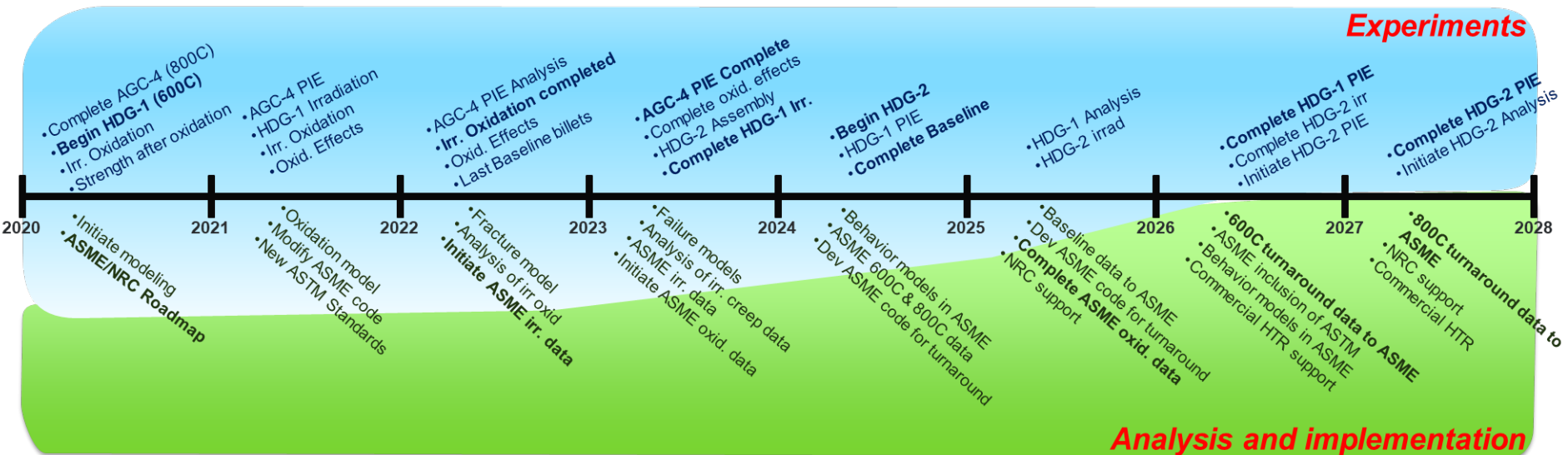
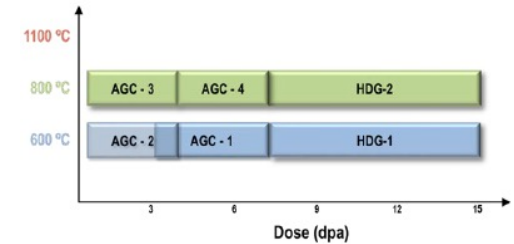


# AGR TRISO Fuel Qualification



# Plans and Expected Outcomes: Graphite

- Future Advanced Graphite Creek AGC major milestones:
  - (FY22) Re-insert HDG-1 irradiation, Complete irradiated oxidation
  - (FY23) AGC-4 PIE complete
  - (FY24) Begin HDG-2 irradiation, Complete HDG-1 irradiation
  - (FY26) Complete HDG-1 PIE, Begin HDG-2 PIE
  - (FY27) Complete HDG-2 PIE

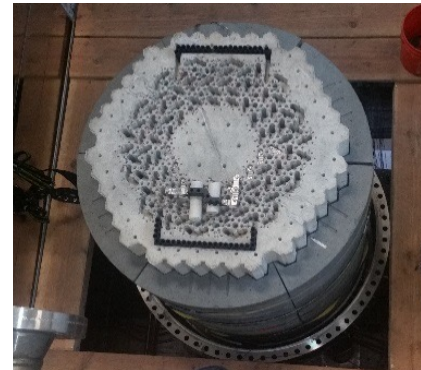
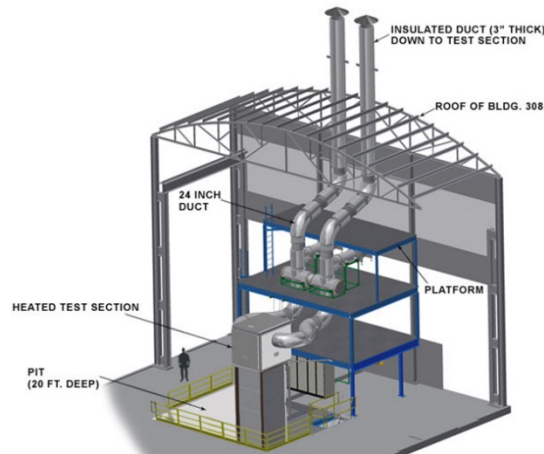




# Gas Reactor Technologies – Experimental Validation

## Scaled integral experiments to support design and licensing

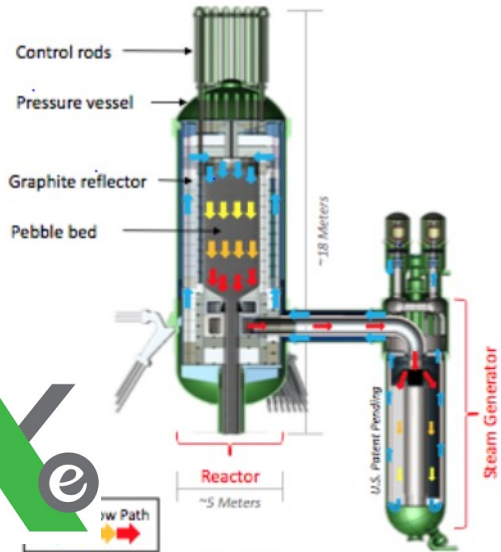
- Simulate coolant flow and heat transport in and from HTRs during accident scenarios – code validation to support licensing
  - Natural Convection Shutdown heat removal Test Facility (NSTF) at ANL for severe accident heat removal
  - High Temperature Test Facility (HTTF) at Oregon State University for core thermal hydraulics – heated prismatic block core simulator, 1/4 scale



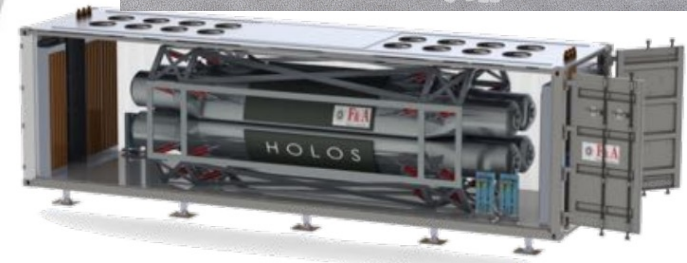
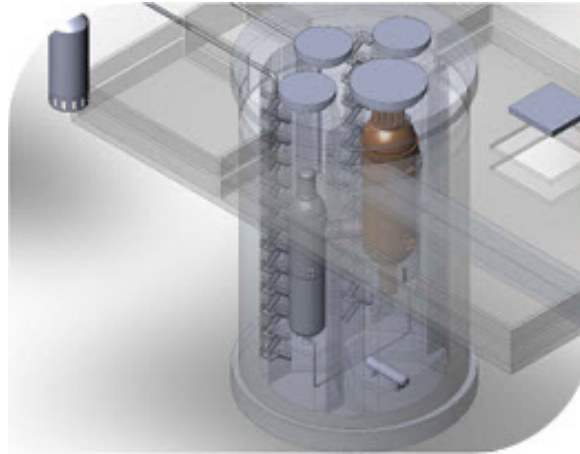
Natural convection Shutdown heat removal Test Facility (NSTF) for vessel cooling studies

High Temperature Test Facility (HTTF) at Oregon State University

# Examples of HTGR Industry Developers



framatome



BWXT



# RC-4: HIGH TEMPERATURE GAS REACTOR PEBBLE FUEL TESTING DEVELOPMENT

- There are no approved test standards available for pebbles
- A comprehensive test methodology must be developed and verified
- Areas of interest for this proposal include:
  - Literature review to determine past and current testing practices
  - Modelling to verify the optimal test practices for test methods
  - Testing program to validate the various testing methods
- The end product from this effort will be a series of test protocols in mechanical, chemical, and wear testing of fuel pebbles

*FEDERAL POC – DYLAN PREVOST*

*TECHNICAL POC – WILL WINDES*

# IRP-RC-2: High Temperature Reactor Graphite Core Waste Processing

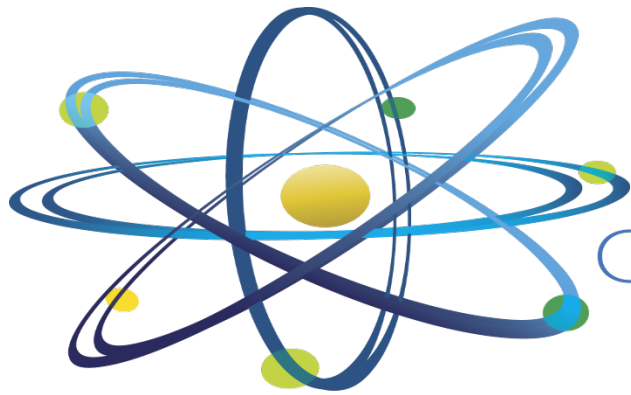
- Up to 3 years and \$3,000,000
- Waste minimization or volume reduction of the large amount of graphite core components must be considered
- Areas of interest for this proposal include:
  - Previous waste research and regulatory rules
  - Waste reduction of the graphite components:
  - Molten salt contamination issues

The end product from this research effort will be regulatory informed methods for handling irradiated graphite and waste volume reduction methods addressing the fundamental issues of processing large components, and activated material capture.

*FEDERAL POC – DIANA LI*

*TECHNICAL POC – WILL WINDES*





Clean. **Reliable. Nuclear.**