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AGR Program Update and Highlights

January 2022

Paul A Demkowicz

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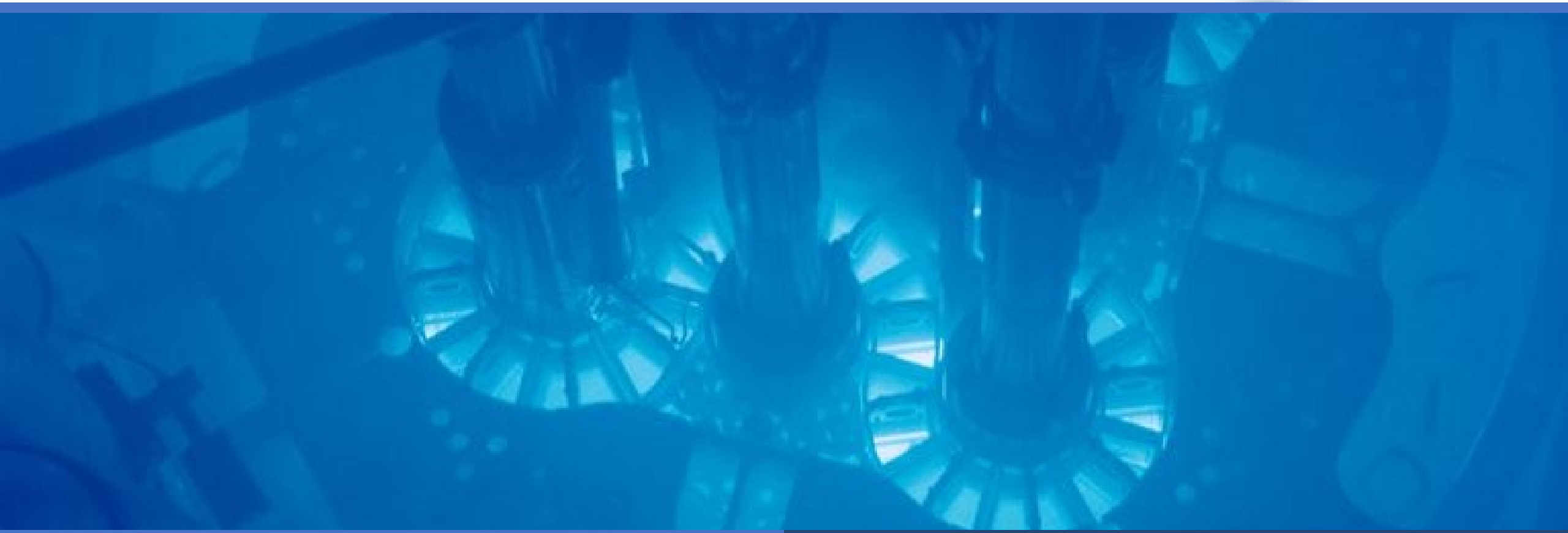


AGR Program Update and Highlights

DOE-NE Advanced Reactor R&D Meeting

January 19, 2022

Paul Demkowicz, Ph.D.

AGR Program Technical Director

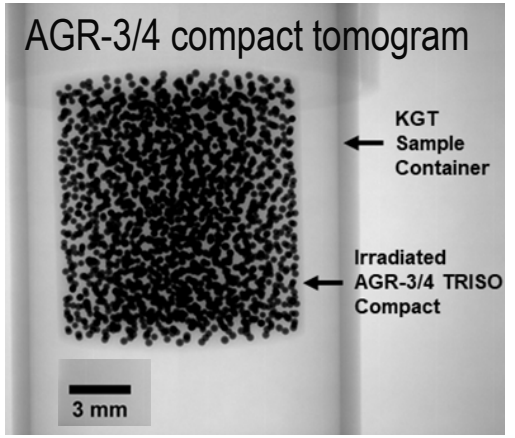
Idaho National Laboratory

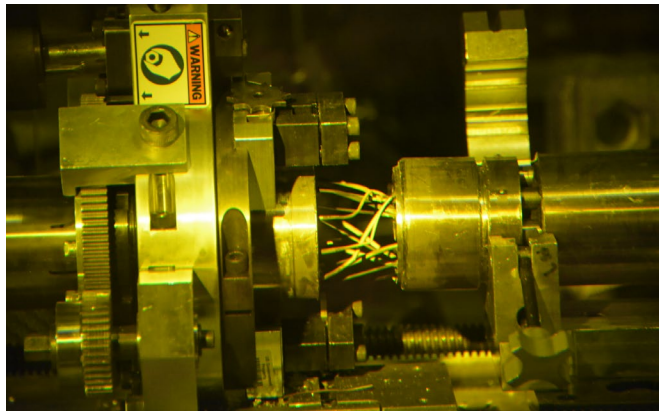
Major Objectives in FY22

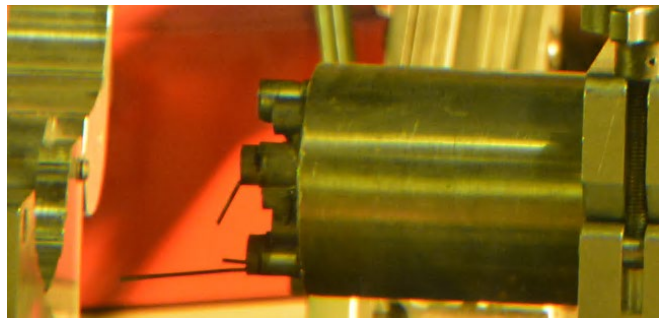
- AGR-5/6/7 PIE
  - Complete AGR-5/6/7 disassembly and component metrology
  - Complete all graphite holder and fuel compact gamma scanning
  - Five high-temperature safety tests (single or multiple fuel compacts)
  - Five fuel compact deconsolidation-leach-burn-leach (DLBL) analyses
  - Fuel compact and particle microanalysis
  - Complete initial evaluation of Capsule 1 fuel failures
- Complete Phase II qualification (out-of-cell remote qualification) for the Air-Moisture Ingress Experiment (AMIX)
- AGR-3/4
  - Complete all fuel compact radial DLBL; some radiochemistry to be completed next year
  - Prepare publication on X-ray tomography of irradiated fuel compact
  - Complete report on comparison of fission product transport to model predictions

Recent Activities and Highlights

- Completed AGR-2 Final PIE report (INL/EXT-21-64279, Sep 2021)
- AGR-3/4 PIE:
  - X-ray tomography of irradiated AGR-3/4 fuel compact
  - Completed all fuel compact heating tests
- AGR-5/6/7 irradiation reporting:
  - Issued AGR-5/6/7 Data Qualification Report (INL/EXT-21-62180)
  - Completed AGR-5/6/7 R/B Analysis (ECAR 5352)
  - Completed AGR-5/6/7 As-Run Thermal Analysis (ECAR-5633)
  - Issued AGR-5/6/7 As-Run Report (INL/EXT-21-64221)
- AGR-5/6/7 PIE:
  - Partial disassembly of Capsules 1 and 2 (all 122 fuel compacts removed)
  - Gamma scanning of 16 compacts completed
  - Capsule 1 and 2 compact/graphite metrology partially completed

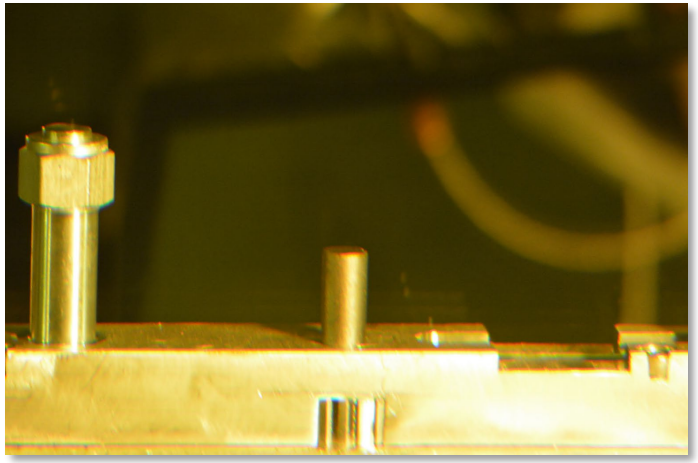


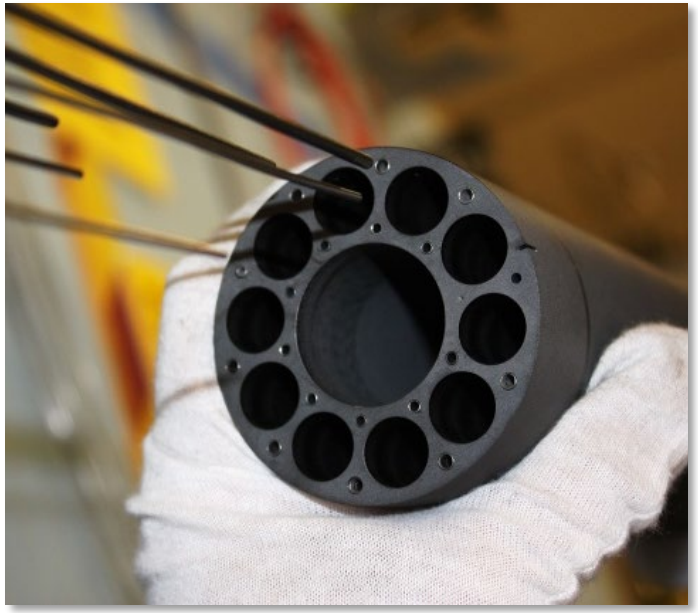




AGR-5/6/7 Capsule 1 Status

- Capsule opened and fuel compacts removed
- No obvious signs of degradation on compacts
- Gamma scanning of the graphite holder will be critical next step to identify the location of compacts with failed particles
- Selected compacts will be examined to find and examine failed particles:
  - Compact cross sectioning
  - Compact deconsolidation, particle gamma counting, and microanalysis
- Report on initial findings due April 15, 2022



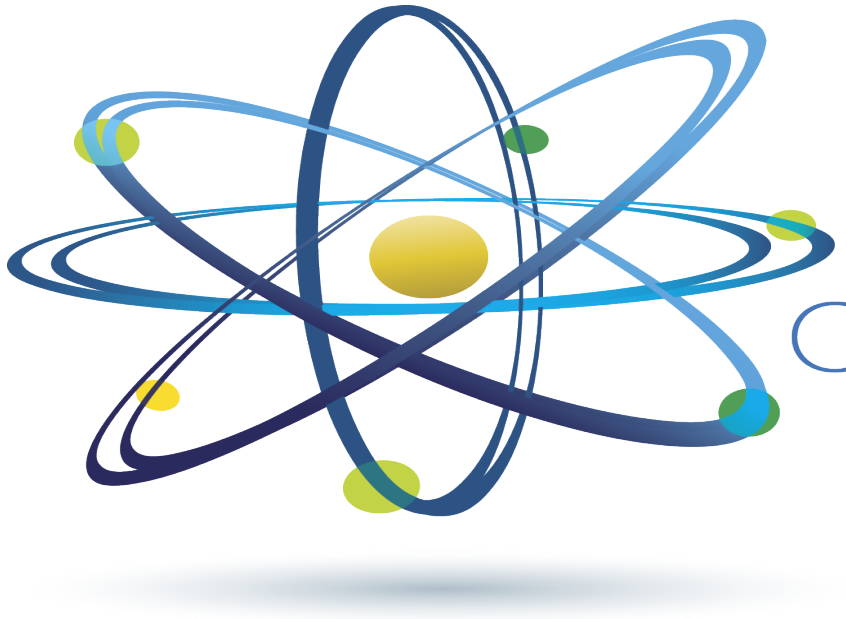


Issues and Concerns

- Schedule
  - AGR Program is now primarily focused on PIE and safety testing
  - ~80% of FY22 budget is in PIE & ST work package
  - Program performance is now primarily dependent on work at hot cell and supporting labs at INL (MFC) and ORNL
  - Workload at these facilities is very high from a variety of DOE and other programs (ATF, AFC, NSUF, NNSA/HPRR, JFC, NR) and future demand appears high as well with additional work (e.g., ARDP)
  - There is high risk for falling behind AGR program schedule

- Licensing topical reports
  - We are engaging with industry to assess needs for topical reports related to AGR scope
  - Accelerated reactor development timelines may mean that some of these reports may come too late to benefit certain license applicants

Questions ?



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