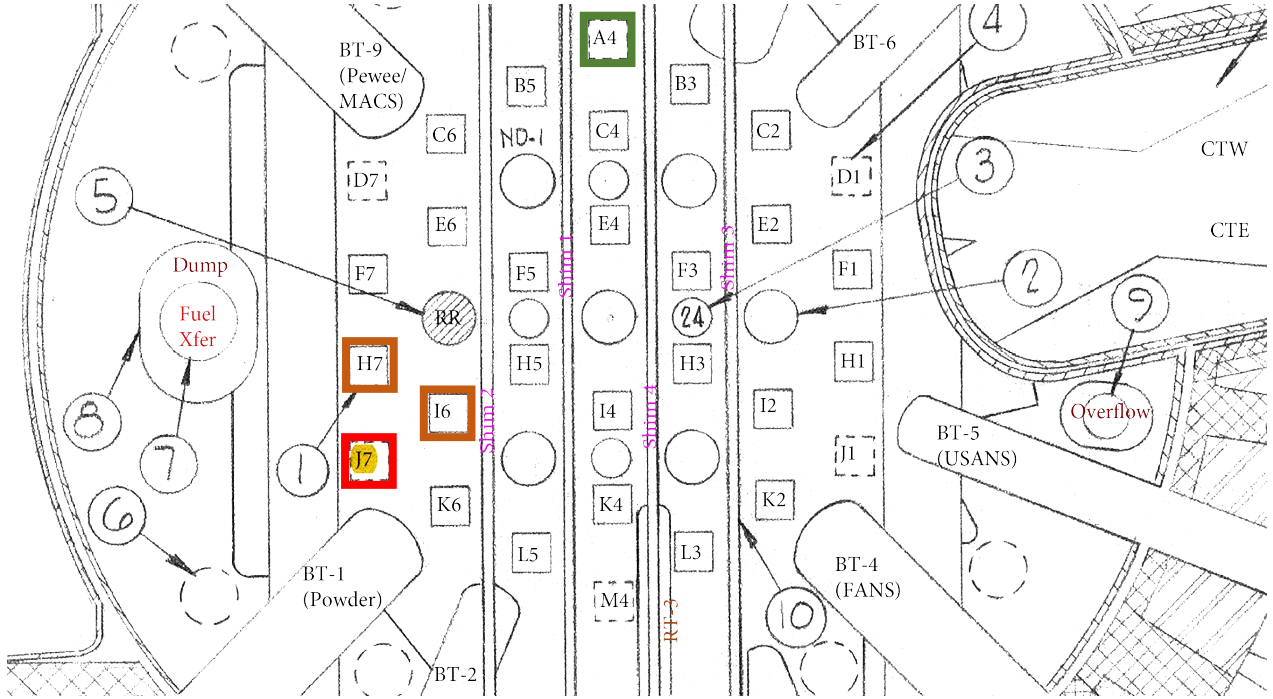
NCNR Status Update

February 3rd Unplanned Shutdown

- Fission products detected in confinement building upon normal reactor startup causing reactor to automatically shut down
- 10 staff members contaminated (sent home after decontamination)
- No health/safety impacts to staff, public, or environment
- The event posed no risk to personnel nor the community
- The NIST reactor will remain shut down until we determine the root cause of the failure, implement corrective and preventive actions, and NRC authorizes restart

Progress to Date

- Good progress on confinement building decontamination
- 26 fuel elements moved from vessel to spent fuel storage pool



Progress to Date

Phase I of incident analysis complete by NCNR Technical Working Group (TWG)

- Determination that safety limit (temperature) exceeded for a fuel element
- Direct cause: a fuel element was not latched in place when the reactor started up on February 3rd
- Causal factors: inadequacies in refueling procedures, proficiency, training, oversight, and tooling
- Corrective actions proposed to address the causal factors to ensure no recurrence

Photo credit: R. Dimeo

What's Happening Now?

- Planning for additional video inspections, including detailed inspections of each fuel element
- Planning to offload the entire core, including damaged fuel element
- Planning (and procurement actions) for remediation (filtering) of primary coolant system
- Decontamination efforts continue in the confinement building

What's Happening Now?

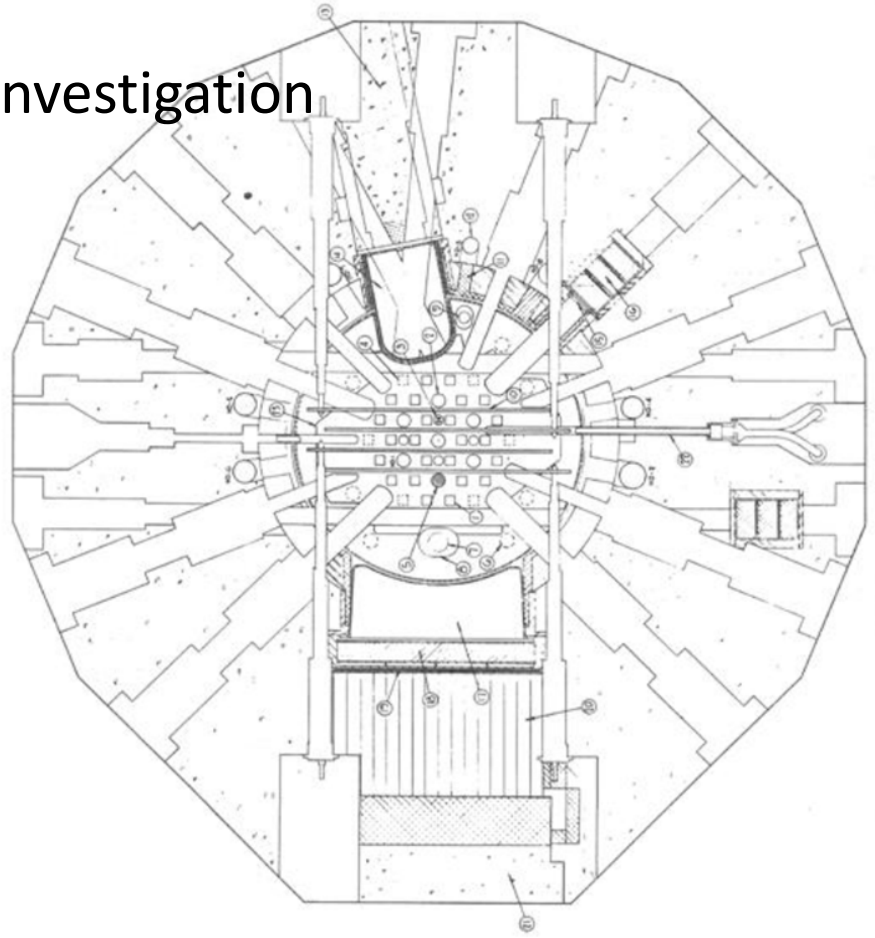
- Measurements of refueling tooling in progress
- Corrective actions in development (several implemented)
- Subcommittee to NCNR Safety Evaluation Committee convened to analyze incident response and review the root causes and corrective actions identified by TWG
- NIST Incident Response Team continues to meet weekly to coordinate the NIST-level response and incident follow-up

NIST engineer Dan Adler using laser scanning arm to characterize the reactor index plate

Photo credit: David Hix

What's Next?

- Continue remediation and recovery
- Safety Evaluation Committee will complete phase II of investigation
- External assessment by subject matter experts
- Implement corrective and preventive actions
- Restore reactor to operational readiness
- Seek authorization from the NRC to restart the reactor
- Schedule user experiments



Impact

- Nearly ½ of all neutron research in the U.S. is performed at NIST
  - > 3000 research participants annually
  - Serve 180 universities, 50 U.S. companies, 40 government agencies annually
  - > 300 publications annually
  - $150K/day opportunity cost

- When NIST was operating, demand for measurement time at all neutron user facilities exceeded supply by more than a factor of 2

Assisting Our Users

Facilitation of beamtime and coordination of experiments at other neutron facilities: ORNL, RAL, MURR and ANSTO (exploring possibilities at PSI, J-PARC)

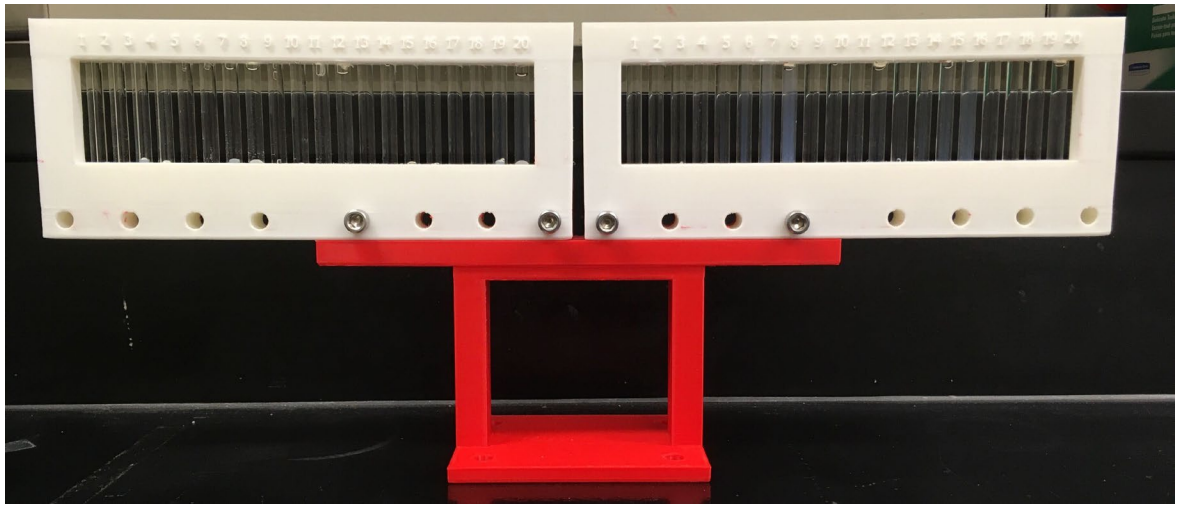
Assisting users with data analysis and subsequent publications

Education & outreach (e.g. annual summer school)

CHRNS Initiative for the Non-Equilibrium Structure of Materials is being brought forward

Production of new user software

Travel restrictions due to pandemic are major barrier for experiments involving sophisticated sample environments



3d-printed multi-sample holder being prepped for an nSoft experiment (3M and Dow) at the Australian Centre for Neutron Scattering at ANSTO