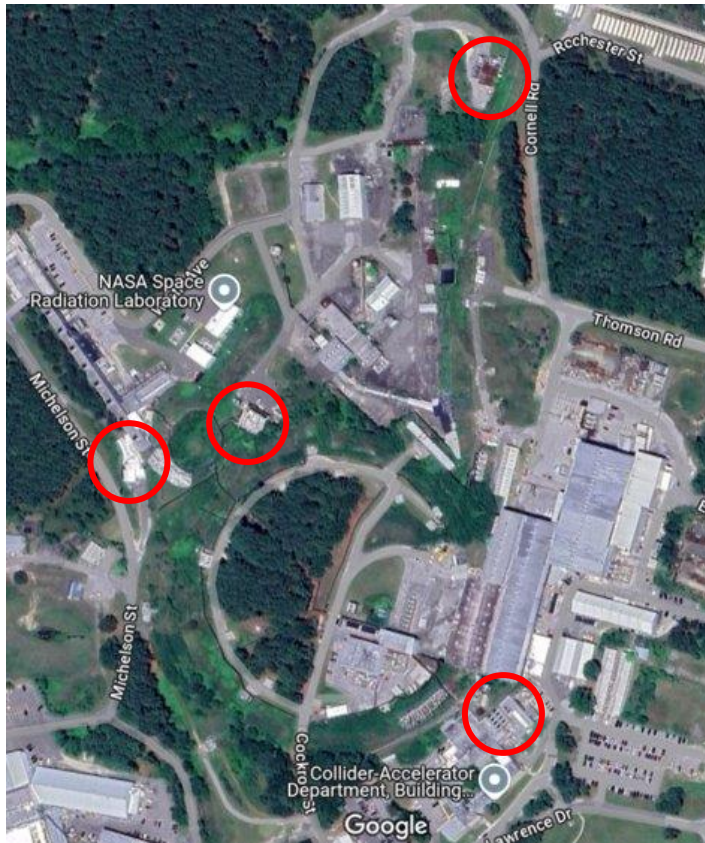


Results of Tritiated Water Events Common Cause Analysis CAC Meeting

Sharon Kohler, Associate Lab Director, ESH

October 10, 2024

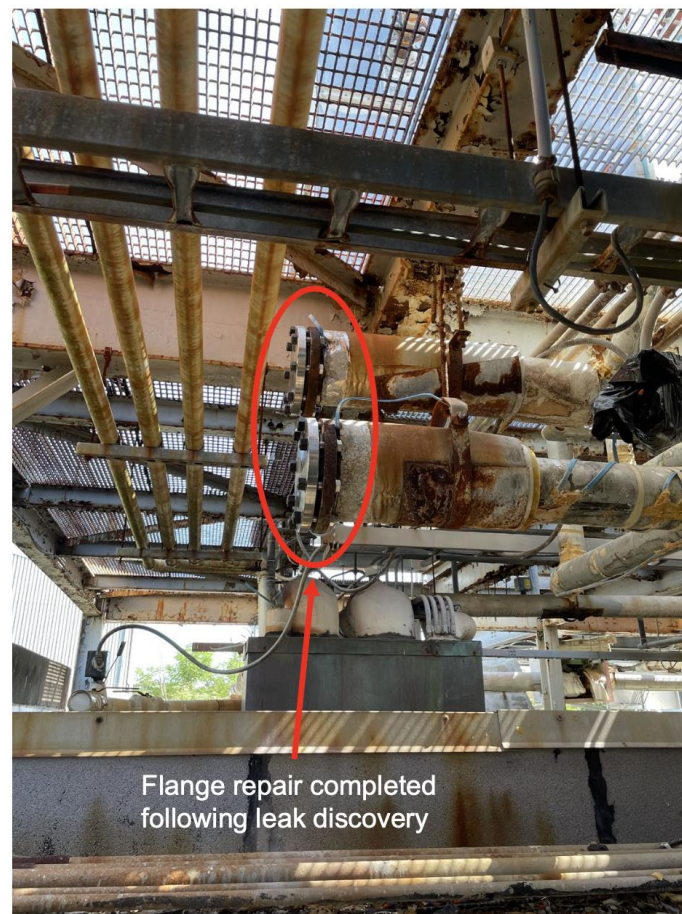
BNL Leadership determined additional evaluation was warranted



- BNL commissioned an external, independent team of Causal Analysis Specialists
- Conducted further analysis of 7 prior identified leaks between 2017 – 2024
- Events were similar enough in nature to be indicative of a possible adverse trend of latent, underlying issues
- Team identified several cause commonalities:
 - End of life failures
 - Defective or failed parts
 - Maintenance less than adequate (2 events)

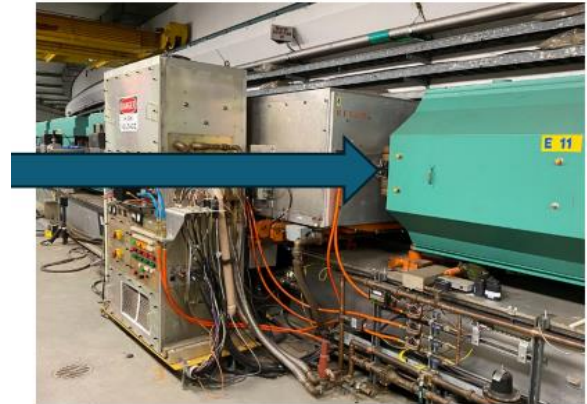
Mitigating actions completed or planned:

- ✓ Flange repair completed following leak discovery in January 2024
- ✓ Enhance active monitoring for status of a variety of system parameters across the collider complex
- ✓ Twice-daily visual inspections until end of 2025 RHIC run currently scheduled for October 2025
- ★
 - Flush the AGS system at end of 2024 collider operations during winter 2024/25
 - Replacement of AGS cooling system during EIC construction period following the end of the 2025 RHIC run



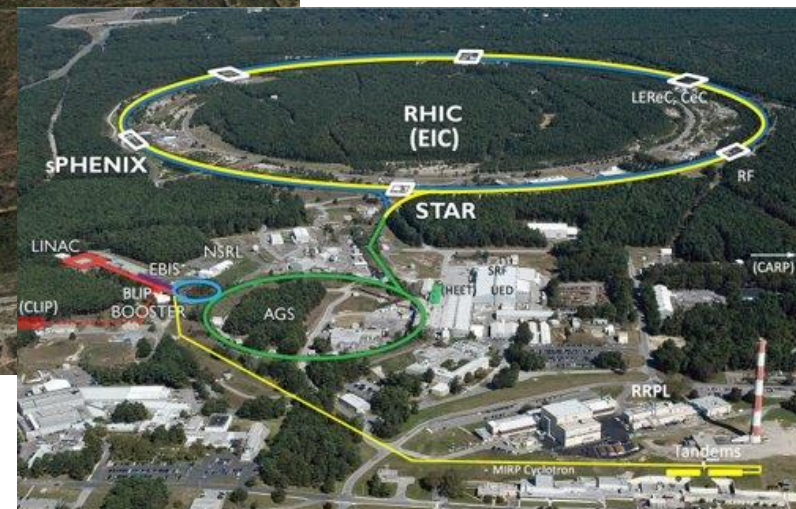
Additional actions were initiated and currently ongoing:


- Evaluation of complex regulatory reporting requirements:
 - BNL/DOE
 - U.S. EPA (CERCLA)
 - NYSDEC
 - Suffolk County
- Discussion with BNL/regulators to determine a common interpretation and understanding of when leaks need to be reported
 - Most spills/leaks occur inside, resulting in minimal potential for impact to the environment



Two leaks found inside the AGS tunnel, Sept 2024

Team identified short-term recommendations:



- Design leak containment systems for outside portions of water systems
 - Ensure potential leak flow paths from tritiated water systems are documented
 - Incorporate the checklist used to document daily monitoring of water systems into existing procedure
- 
- An aerial photograph showing a large industrial or commercial complex. The facility includes several large, interconnected buildings with flat roofs, extensive parking areas filled with vehicles, and surrounding greenery. The layout suggests a significant operational site, possibly related to the water systems mentioned in the text.

Team identified long-term recommendations:



- Issues should be managed through *Contractor Assurance* process, not limited to event reporting criteria
- Improve quality control process for the procurement of items installed in or on tritiated water systems
- Redesign the water piping system to reduce the number of potential failure points
- Implement monthly preventative maintenance on all tritiated water systems to check for degradation of components that could lead to leaks
- Remove and reroute outdoor portions of the tritiated water piping system to indoors

Summary and next steps:

- External causal analysis team is finalizing their report, expected to have additional context and details
- ★ Flush and evaporate the AGS main magnet water cooling system to maintain water system contents below the drinking water standard for tritium
- Continue BNL/regulator discussions on reporting requirements
- Implement actions to address short- and long-term recommendations



Booster Main Magnet Cooling System piping –
before replacement



Booster Main Magnet Cooling System piping –
after replacement