



RIC 2024 Hybrid

U.S. Nuclear Regulatory Commission
36th Annual Regulatory Information Conference

ADAPTING TO A **CHANGING LANDSCAPE**

MARCH 12-14, 2024

Bethesda North Marriott Hotel
and Conference Center
Rockville, Maryland

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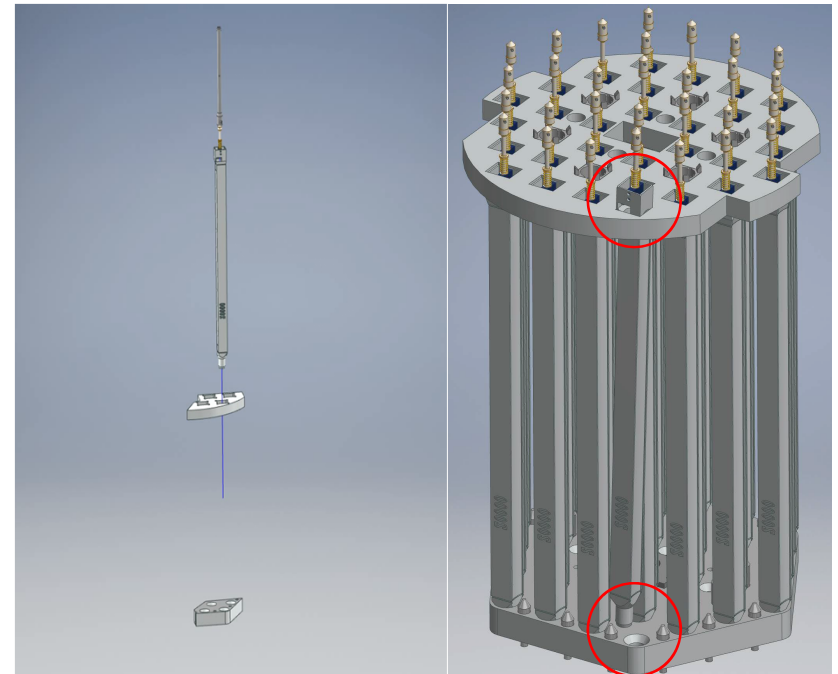
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NIST Introduction/General Information

- The National Institute of Standards and Technology (NIST) Bureau of Standards Reactor (NBSR), located in a containment-type building at the NIST Center for Neutron Research (NCNR), is a heavy-water-moderated and cooled, enriched-fuel, tank-type reactor designed to operate at 20 megawatts of power. It is used for a broad range of research, including thermal and cold neutron research and neutron activation activity research.
- On February 3, 2021, the NBSR scrammed in response to a higher-than-normal radiation level in air leaving the reactor building.
- It was later determined that the temperature of one of the fuel elements exceeded a safety limit, due to the element shifting out of position and blocking coolant flow, as it was not properly latched during a refueling outage. NIST technical specifications state that if a safety limit is exceeded, “[t]he reactor shall be shutdown and reactor operations shall not be resumed until authorized by the NRC.”



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Significant Regulatory Activities in the
Licensing and Oversight of
Nonpower Production and Utilization Facilities

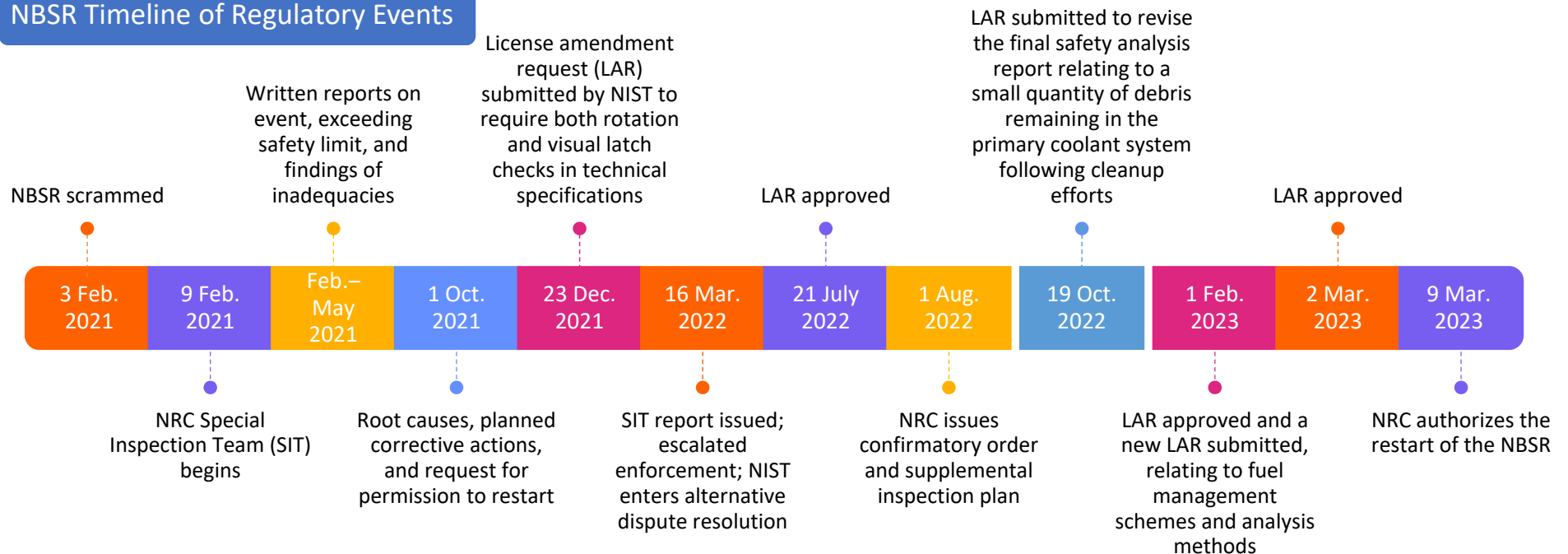
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NBSR Timeline of Regulatory Events



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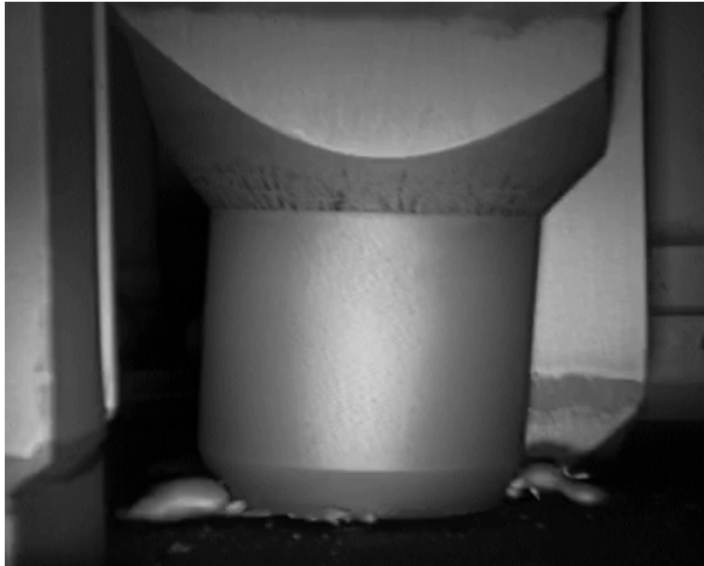
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Damaged fuel element as found in the
NBSR



A bottom view of the damaged fuel rod before its removal
from the core on August 5, 2021

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On March 9, 2023, the NRC authorized restart of the NBSR. The NRC based its decision on a finding of reasonable assurance that the facility will be operated in a safe manner and within its licensing basis. The NBSR is gradually returning to full power, and the NRC is continuing its enhanced oversight of the facility in accordance with the supplemental inspection plan and confirmatory order, which contain items still to be completed over the next 3 years.

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SHINE Regulatory Activity

- SHINE plans to produce molybdenum-99, the parent isotope of technetium-99m, which is used for diagnostic imaging.
- The NRC issued a construction permit on February 29, 2016, that authorizes SHINE to construct its Medical Isotope Production Facility in Janesville, Wisconsin.
- The facility consists of both a utilization facility (eight irradiation units) and a production facility containing hotcells used for isotope separation from the irradiated special nuclear material target.
- SHINE started construction of the facility in October 2019.
- Since the start of construction, the NRC has conducted three onsite inspections, during which no findings were made and no violations were identified.
- On December 15, 2022, the Advisory Committee on Reactor Safeguards issued a report to the Commission Chair recommending approval of the issuance of the SHINE operating license.
- On February 28, 2023, the NRC issued a safety evaluation for the review of SHINE's operating license application.

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Kairos Hermes 1 Regulatory Activity

- Kairos Hermes 1 is a 35-megawatt thermal test reactor with a 4-year lifetime and no electricity generation; its primary purpose is to test and demonstrate key technologies and design features for the Kairos Power-fluoride salt-cooled high temperature reactor (KP-FHR).
- Hermes 1 is located on a site previously owned by the U.S. Department of Energy in Oak Ridge, Tennessee.
- Kairos applied for a class 104c license for utilization facility useful in the conduct of research and development activities; under 10 CFR Part 50, the Hermes reactor meets the definition of a testing facility.



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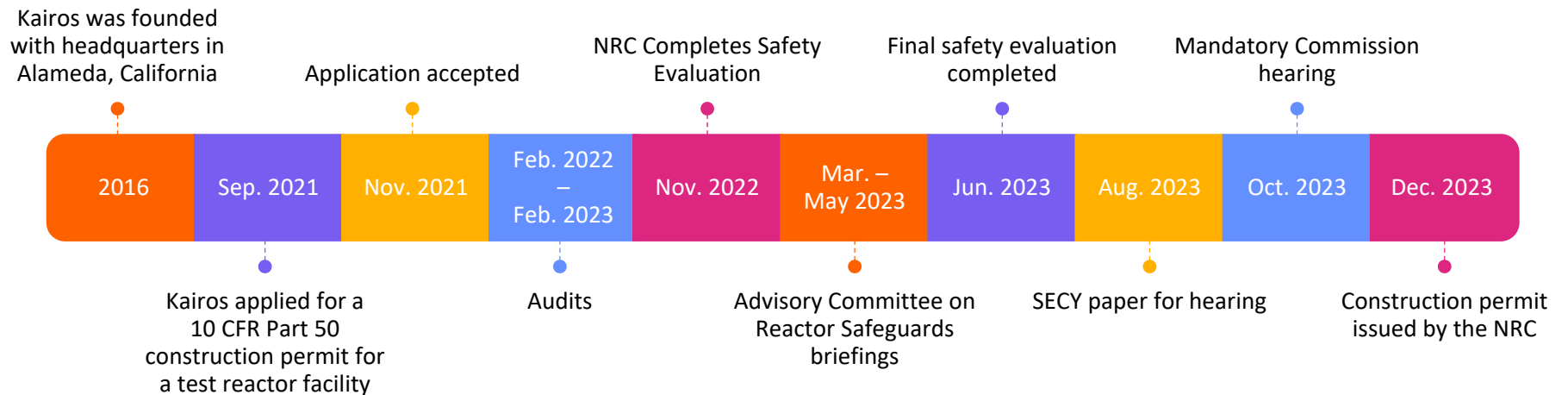
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