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Protecting People and the Environment

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

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Outline

- Background and Motivation
- NRC Harvesting Experience
- Recent NRC Activities
  - Criteria for Prioritizing Data Needs
  - Database for Sources of Materials
- Path Forward

Background and Motivation

- Recent trends in global nuclear industry:
  - Interest in extending nuclear power plant (NPP) lifespans
  - Numerous NPPs, both in U.S. and internationally, have announced plans to or already have shut down
- Limited budgets have restricted the resources available to support new research, including harvesting programs
  - Aligning interests and leveraging with other organizations is important to maximize value

NRC Harvesting Experience

- NRC has participated in numerous harvesting programs over the years:
  - RPV, CRDM penetrations, RCS piping, RPV internals, neutron absorbers, and cables
  - From unfinished, operating ,and decommissioning plants in U.S. and internationally
- Significant value in using harvested components to confirm data from other research programs

Technical Lessons Learned

- Harvesting can provide highly representative aged materials for research
  - May be only practical source of representative aged materials
  - May be able to use limited harvested materials to validate larger accelerated aging data set
- Important to gain as much information as possible in advance before committing to specific harvesting project

Logistical Lessons Learned

- Harvesting is an expensive, time-consuming effort
- Leveraging resources with other research organizations helps mitigate cost challenges
- Transporting irradiated materials, particularly internationally, is cumbersome and time-consuming

Lifting operation for irradiated materials transport cask

Recent NRC Activities

- Strategic approach to materials harvesting
  - Due to limited opportunities, past harvesting efforts have generally been reactive to individual plants shutting down
- Prioritize the data needs best addressed by harvesting
- Workshop held in March 2017 at NRC HQ to discuss all aspects of harvesting with other interested stakeholders

Potential Criteria for Harvesting Prioritization

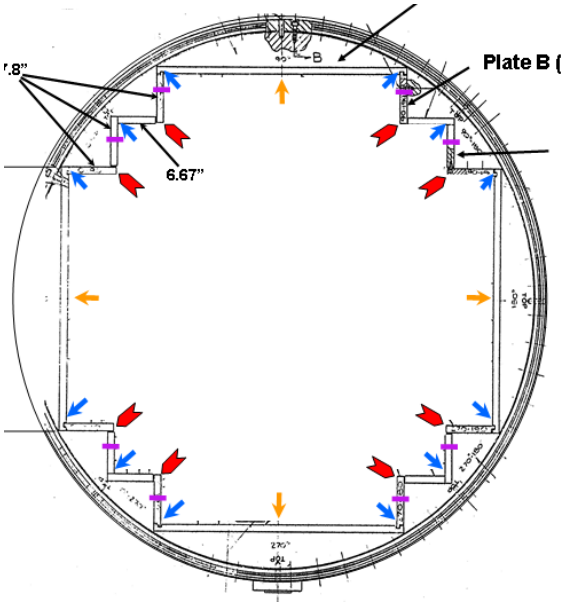
- Applicability of harvested material for addressing critical gaps
- Ease of laboratory replication of the degradation scenario
- Unique field aspects of degradation
- Fleet-wide vs. plant-specific applicability of data

Potential Criteria for Harvesting Prioritization

- Harvesting cost and complexity
- Availability of reliable in-service inspection (ISI) techniques for the material / component
- Availability of materials for harvesting
- Timeliness of the expected research results relative to the objective

Database for Sources of Materials

- NRC is pursuing the development of a database for sources of materials for harvesting
- Allow for aligning of high-priority data needs to the available sources of materials
- NRC is interested in engaging with other organizations in developing the database



Example of reactor internals harvesting plan

Conclusion and Path Forward

- Harvesting can yield highly representative and valuable data on materials aging
- Data Needs Prioritization and Sources of Materials Database
- As specific harvesting opportunities are identified, NRC welcomes opportunities for cooperation and leveraging with other interested research organizations