U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Inspection Procedure 71111.21N.04 Age-Related Degradation Inspection Public Workshop

Amar Patel and Douglas Bollock
U.S. Nuclear Regulatory Commission
April 18, 2023

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

ARD Public Meeting Agenda

- Why we are Inspecting Age-Related Degradation (ARD)
- ARD Inspection Procedure Requirements and Guidance
- Lessons Learned from Previous Inspections
- Run through inspection scenarios
- Industry comments/Public Comments
- Question and Answer Period

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Why Are We Inspecting ARD?

- NRC's engineering inspection working group identified aging-related degradation as an overall gap in the engineering inspections.
- This inspection is meant to cover age related degradation in both active and passive components and address gaps and recommendations originally identified by the working group.
- ARD is important to ensure structures and components continue to meet their safety function.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Why Are We Inspecting ARD?

- Operating experience indicates issues exist regarding ARD performance.
- NRC Engineering Inspection Working Group in 2017 identified aging-related degradation as an overall gap in the engineering inspections.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Applicable Regulations

- 10 CFR 50.65, “Requirements for monitoring the effectiveness of maintenance at nuclear power plants,” (also known as the Maintenance Rule) help to assure proper plant maintenance and enhanced plant safety, particularly as plants age.

- NRC also has many individualized requirements relative to maintenance (e.g., 10 CFR 50.34(b)(6)(iv), 10 CFR 50.36 technical specifications (TS), 10 CFR 50.49 environmental qualifications for electrical equipment, 10 CFR 50.55a inservice testing (IST) and inservice inspection (ISI) requirements, 10 CFR Part 50 Appendix B quality assurance, 10 CFR Part 50 Appendix J primary reactor containment leakage testing, etc.).

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

ARD Procedure and Guidance

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

IP 71111.21N.04 Objective

- IP 71111.21.04 (December 20, 2022), “Age-Related Degradation,” specifies that the objectives are:

- To verify that engineering performance and maintenance activities to address age-related degradation for structures and components (SCs) are being conducted in a manner that provides reasonable assurance of the safe operation of the plant.

- To verify that age-related degradation for plant SCs are appropriately identified, addressed, and corrected.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

General Guidance
Section 02.01 Sample Selection

- The Inspectors will request the licensee to make available:
  - Site specific functional failures, performance indicators, and corrective action documents associated with components failures related to aging, age-related, wear, abnormal wear, etc. in the past 5 years.
  - See Enclosure 1 to the ARD inspection procedure
- With the information provided, the inspection team lead will select 12 to 24 ARD structures or components to sample.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

General Guidance Section 02.01 Sample Selection

The inspectors will consider the following for selection of an ARD sample for detailed inspection review:

- System Risk
- ARD SCs with potential to be susceptible to the effects of aging, that have indicators that they have age-related issues, or are susceptible to age-accelerating phenomenon
- SCs focused: addressing active, passive, long-lived, short-lived SSCs; focusing on those with the greatest risk significance, susceptibility to aging, and history of degradation
- Operational Experience (industry, NRC, site specific)

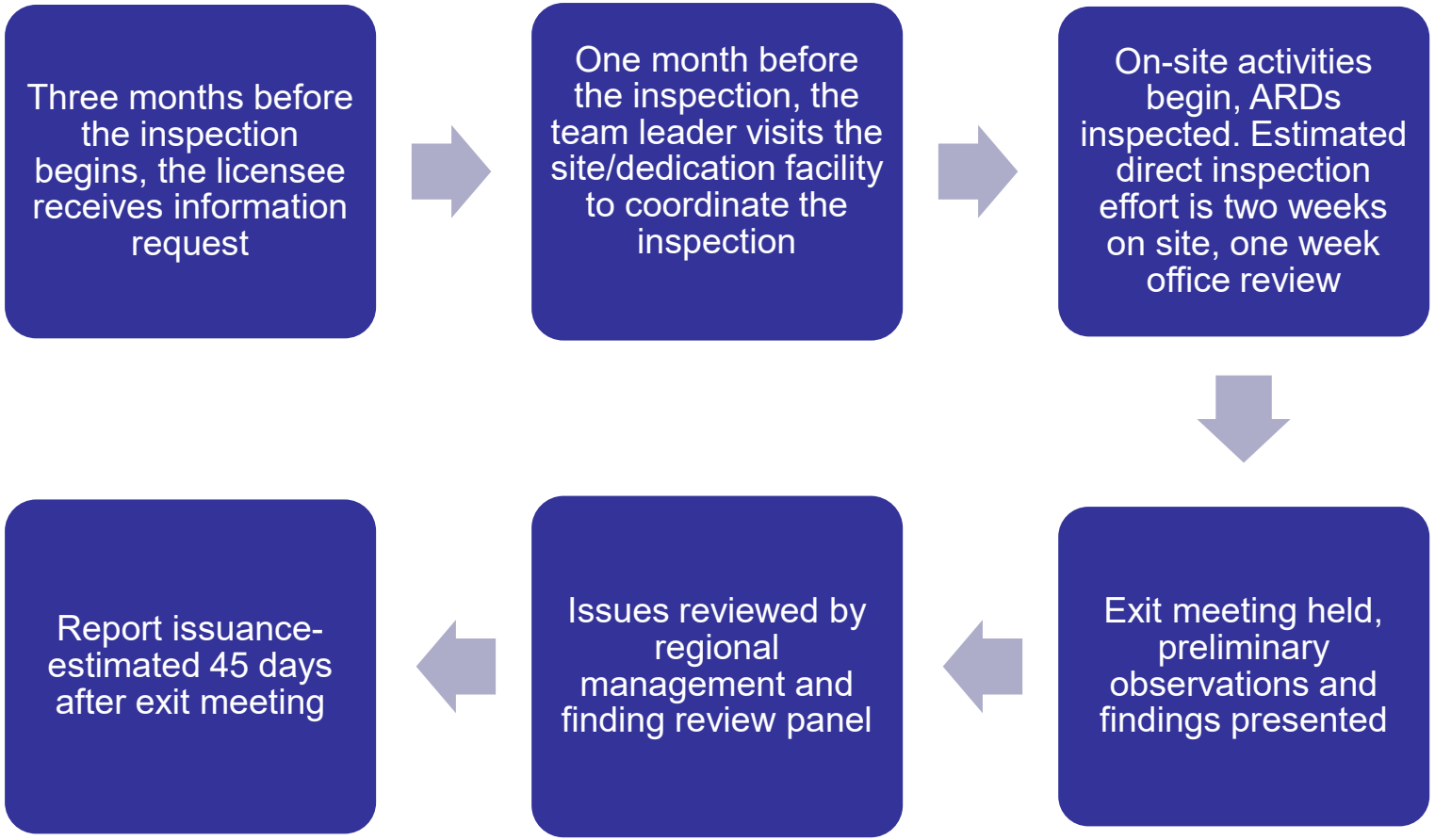
U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Pre-Inspection Activities

- Discuss inspection with licensee staff and obtain information needed to perform inspection.
- Potential bagman trip to site.
- Coordinate inspection logistics (site access, badging, inspection team space) with licensee.
- Early, open communications between NRC inspection staff and licensee staff is key to successful and efficient inspection implementation.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Inspection Process Flow



U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

EQ/POV Inspection Lessons Learned

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

EQ Lessons carried into POV inspections

- Included background guidance and regulatory basis and regulatory guidance in the inspection procedure.
- Ensured inspectors were properly interpreting each nuclear power unit's unique licensing basis.
- Ensured consistent communication between inspectors and NRR technical/program office.
- Modified the minor/more-than-minor screening examples contained in NRC guidance.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

POV Lessons carried into ARD inspections

- Identified technical and programmatic points-of-contact within the NRC.
- Enhanced training for inspectors was developed (technical/process and inspection implementation focused.)
- Tabletop dry runs performed using minor/more-than-minor examples.
- Findings review panel established proactively for at least the first 6 months of implementation for consistency, then as needed.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

FAQs

- Q: What has been communicated to stakeholders?
- A: ROP monthly public meetings since July 2022
  - ARD inspections is the next FEI beginning after July 2023
  - NRC incorporated lessons learned from EQ and POV inspection implementation

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

FAQs

- Q: What is publicly available in regards to ARD material?
- A: Publicly available now:
  - Inspection Procedure IP71111.21N.04 (ML22210A107)
  - ARD implementation training

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

FAQs

- Q: What are the NRC resources uses per CGD inspection?
- A: 3 NRC inspectors, 2 weeks onsite
  - 210 hrs of direct inspection

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

FAQs

- Q: Will each operating reactor site receive an ARD Inspection?
- A: Yes.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

FAQs

- Q: Will there be other public workshops?
- A: Staff is open to date and location and will consider any input received.
  - This is the first public workshop.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Scenario Discussion

- Discuss 2 scenarios of ARD issues and how the NRC staff would assess them.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Q & A Session

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

For additional information, contact

Amar Patel
Amar.Patel@nrc.gov

Doug Bollock
Douglas.Bollock@nrc.gov