NCNR Procedure Overhaul

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11/16/2022

Photo credit: Brian Renegar

Procedures Prior to Incident

4.3. Rotation Check

4.3.1. This test is to be done prior to the final starting of the main D_2O pumps for reactor startup.

4.3.2. Lower vessel level about 5" below the normal level.

4.3.3. Rig and attach the latch-check tool to the pickup tool.

4.3.4. Lower the tool through the maze and then align the notch in the orientating collar with the insertion slot in the index plate. Lower tool until it rests on the element head ears.

4.3.5. With no downward pressure, rotate tool counter-clockwise until the J slot slips over the ears.

4.3.6. Rotate tool counter-clockwise until it stops. Confirm proper height by checking tool collar flush with the index plate. Confirm proper orientation by checking the collar notch aligned with the correct index plate mark.

4.3.7. Withdraw pickup tool to its stowed position.

- Critical fuel handling procedures:
  - lacked detail
  - associated schematics
  - applied lessons learned
  - references
- Gaps in procedures were filled in by:
  - Tribal Knowledge
  - Experience of licensed operators

Procedure Routing/Document Control Pre-Incident

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- Retention policy for super seeded procedures not enforced
- Procedure routing was done by hand and comments/changes were not adequately captured.
- Determination of reviewers was left completely up to authors outside of Tech Spec required reviews.

February 3rd Incident Root Cause

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The training and qualification program for operators was not on par with programmatic needs.

Procedures as written do not capture necessary steps in assuring elements are latched.

Procedural compliance was not enforced.

Inadequacies existed in the fidelity of latch determination equipment and tools.

There was inadequate management oversight of refueling staffing.

CARRI Team 2 Construction

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- Established from the root cause analysis report.
- Form, Fit, & Function
- Contained members of Reactor Operation/Engineering & NCNR Health Physics
- Experience level spanned 10+ years to 2 years at the facility. Licensed and non-licensed operators.

CARRI Team 2 Plan & Implementation

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Procedure, Compliance, Adherence & Audit

Sub-group 1: Procedure Compliance, Writing, Routing and Human Resource Tools

Sub-group 2: Observation Program

Sub-group 3: Operator Aids for evacuation of Confinement

Sub-group 4: Confinement Re-entry Procedure Issue

Procedure Writing, Routing, & Compliance

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- AR 5.0 Procedure Use and Adherence
- Procedure Writing Guide
- Document Routing & Control
- Observation Program
- Human Performance Tools

Major References

- **INPO 12-012 –** Traits of a Healthy Nuclear Safety Culture
- **INPO 11-003** - Guideline for Excellence in Procedure and Work Instruction Use and Adherence
- **PPA AP-907-005 -** Procedure Writers Manual
- **ANSI z535.6-2011 -** Product Safety Information in Product Manuals, Instructions and Other Collateral Material

Human Performance Tools

Effective usage can lower the chance of human error which can lead to an increase in safety.

One way to look at human error

- Active
- Latent

Key Tools

Pre-Job Briefs

Critical Steps

Watch Team/Crew Back-up

Procedure Use & Procedure Writing

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- **Must be uniform throughout the facility**
- **Training and proficiency must be part of your structure**
- **Human Performance Tools**

Document Routing & Control

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Lessons Learned

- **Based on the size of our facility, Revamping every procedure has proven to be a challenge.**
- **Document management is a full-time job**
- **Capturing the history of a facility is vital to its safe operation**

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Questions?

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