RAS J-102

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SUBJECT: Pilgrim Nuclear Power Station Chemistry Corporate Assessment

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Pilgrim Nuclear Power Station
Chemistry Program Corporate Assessment
November 17-21, 2003

EXECUTIVE SUMMARY

SUMMARY

The team's evaluation of each performance objective and focus area is documented within the Strengths, Areas for Improvement (AFIs), and Noteworthy Observations contained in the body of this report. The team documented one Strength, six AFIs, and one Noteworthy Observation.

Overall the team found the PNPS Chemistry Program effective. While effective, the team did identify six Areas for Improvements (AFIs).

The team found the Pilgrim staff to be hospitable, candid and supportive. The Chemistry team was determined to be professional and customer service oriented.

The Strength is summarized as follows:

- The routine and sustainable practice of performing electronic reviews of chemistry trends every other month and including technicians in these reviews allows a comprehensive view of plant chemistry performance that allows checks and adjustments to improve station chemistry performance. (CY-3.J)

The Areas for Improvement are summarized as follows:

- The availability and reliability of Hydrogen Water Chemistry Injection system does not meet industry or site standards reducing the effectiveness of the system to mitigate IGSCC (Intergranular Stress Corrosion Cracking) of reactor vessel internals and piping. (CY-1.E.4, CR-PNP-2003-04346)

- The lack of post-UV anion diagnostic analysis as recommended by EPRI increases PNPS' potential for sulfate or chloride contamination of the CST, condensate, or reactor water system (CY-3.B, CR-PNPS-2003-3514)

- The Chemistry organization has not been fully effective in the implementation of some Quality Control Measures to ensure reliable Bench Top Instrument availability and accuracy as required by ENN-CY-102. (CY-4 E, CR-PNP-2003-04281)

Area for Improvement CY-1.E.4

The availability and reliability of Hydrogen Water Chemistry Injection system does not meet industry or site standards reducing the effectiveness of this system to mitigate IGSCC (intergranular stress corrosion cracking) of reactor vessel internals and piping.

Examples:

1. The hydrogen water chemistry injection system (Extended Test System) has tripped or cycled 15 times since May 2003. The system tripped or cycled 55 times during cycle 14.
2. During the assessment the A train of the system was in service. The B train was not available and has not been since March 2003.
3. Hydrogen injection occasionally trips due to a low oxygen signal from panel C-610 when condensation gets in the lines.
4. Hydrogen Water Chemistry Availability currently is 83%. It will be very difficult to achieve the site goal of 95% by the end of the cycle.

Actual or Potential Consequences

Hydrogen addition is needed to protect the reactor internals from IGSCC. Temporary cycles of this system cause changes to the oxidation potential inside the reactor vessel and could cause increases in growth of existing cracks. There is also a potential for increased drywell dose rates.

Failure to achieve availability rate of hydrogen injections will results in increased vessel inspections during outages. This will result in increase personnel dose and outage scope.

Emergent work effects manpower and schedule efficiency.

Causes and Contributors

There is a tendency to fix the immediate symptoms and get the system back in service and not take the time to assess the causes to prevent reoccurrence. The station hasn't taken an integrated, multi-department approach to resolve the system problems.

5. Trends are displayed on a large screen and are easily viewed to allow technicians see the results of their daily, weekly and monthly efforts. The station uses WinCDMS to trend data that is input by Technicians to support this program

6. Schedule adherence is trended to determine effectiveness of shift schedule.

Area for Improvement CY-3.B

The lack of post-UV anion diagnostic analysis as recommended by EPRI increases PNPS' potential for sulfate or chloride contamination of the CST, condensate and reactor water systems.

Examples

1. Post-UV anion analysis is not done on plant waters that enter the reactor. This includes Waste Sample Tanks, Demineralized Water Storage Tanks, and Condensate Storage Tanks.

2. Chemistry management indicated that post-UV analysis is not being considered for inclusion to the chemistry sampling program.

3. Appendix B of the EPRI Guidelines recommends that a technical evaluation be performed if a recommended analysis or action is not performed. There is no technical evaluation available stating why it is acceptable not to perform this analysis on plant water systems. It also recommends having the ability to perform this analysis for assessment of reactor water chemistry transients.

4. Results from a recent questionnaire sent to BWR Chemists indicate that 90% of BWRs perform this analysis. PNPS was the only domestic BWR in the survey that is not performing the analysis.

Actual or Potential Consequences

Intrusion from undetected organochlorides and organosulfates can contaminate the condensate storage tanks resulting in increased chlorides or sulfates in the condensate system and reactor. Industry operating experience (O/E) has shown that performing post-UV analysis during plant startup and operation can prevent sulfate excursions. Current conductivity, sulfate analysis and TOC methods done at PNPS will not provide the information needed to prevent this.