

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-461
License No: NPF-58

Report No: 50-461/96008

Licensee: Illinois Power Company

Facility: Clinton Power Station

Location: Route 54 West
Clinton, IL 61724

Dates: August 26-30, 1996

Inspector: M. S. Holmberg, Reactor Inspector, DRS

Approved by: John M. Jacobson, Chief
Engineering Branch 1

Report Details

II. Maintenance

M3 Maintenance Procedures and Documentation

M3.1 Inservice Inspection (ISI)

a. Inspection Scope (73753, 73051, 73052, 73755)

The inspector reviewed and evaluated the Inservice Inspection (ISI) program, procedures, ISI personnel certifications and ISI data taken during the prior refueling outages for compliance with technical specifications, ASME Code, SNT-TC-1A and NRC requirements.

b. Observations and Findings

Inspectors identified that the remarks column of the ISI plan incorrectly identified pipe to safe-end extension weld 1-RH-12-16 and pipe to valve 1-RH-20-6 weld as dissimilar metal welds. The program engineer stated that he was aware of errors with the remarks block of the ISI plan, however this block was not used to implement the technical requirements for these examinations. The program engineer acknowledged this opportunity for improvement in the ISI plan and agreed to correct these administrative errors. The inspector's review of the ISI program concluded that it met ASME Code Section XI, 1980 Edition through Winter 1981 addenda requirements.

The inspector reviewed ultrasonic testing (UT) data records for RFO-4 on the following welds:

- 1-FW-1-3-9 Feedwater elbow to elbow weld, Reference No. 112860
- 1-RR-BG-4 Pipe to safe-end extension weld, Reference No. 133320
- 1-RH-12-16 Pipe to safe-end extension weld, Reference No. 164520
- 1-RH-20-6 Pipe to valve weld, Reference No. 165440
- N6B-W-2 RHR safe-end ext. to safe-end weld, Reference No. 005760

The inspector noted that three of these five examinations used automated ultrasound equipment and four of the five examinations had been performed with refracted longitudinal transducers (in addition to shear wave transducers). ISI personnel performing UT of welds potentially susceptible to intergranular stress corrosion cracking (IGSCC) had been trained in EPRI area 910 for detection of IGSCC, consistent with licensee commitments to generic letter 88-01. The inspector concluded that procedures and personnel used for these examinations met ASME Code Section XI, 1980 Edition through 1981 winter addenda and requirements.

The inspector reviewed visual inspection data reports for visual inspections performed on core internal components during previous

refueling outages (RFOs). During visual examinations performed in 1989(RFO-1), a crack was discovered on the right side vertical weld (V-16) of steam dryer channel number eight. The crack was recorded as approximately eight inches long and extended from the bottom of the channel. This crack was re-examined during RFO-2 through RFO-5. Based on visual inspection and measurements completed in RFO-4 and 5, the crack had not changed in size and the licensee concluded that the crack growth had been arrested at 7.625 inches, which was below the GE established repair limit of 11.5" (established in the GE letter of November 2, 1989). Condition report 1-89-01-162 revision 2 documented GE's assessment of a postulated crack of 15" or greater in length and concluded that a steam bypass path could be created, which would degrade overall plant efficiency. The licensee concluded that postulated crack growth or additional cracking of the steam dryer did not affect safe plant operation, and issued a design change for the steam dryer to "use as is" and revised the ISI manual to reflect a 10 year re-inspection criteria as corrective actions. The inspector acknowledged that the steam dryer was a non-safety related component utilized for the steam/water separation process and as such was not subject to specific ASME Code inspection or repair criterion.

c. Conclusions

The ISI program complied with NRC and ASME Code requirements and no violations or deviations were identified. The use of automated ultrasonic equipment and supplemental scans using refracted longitudinal wave transducers demonstrated a commitment to a quality ISI program.

M3.2 Flow Accelerated Corrosion (FAC) - Program Review

a. Inspection Scope (49001)

The inspector reviewed the FAC program for changes and upgrades since the last inspection (50-461/95009) of this area and to verify compliance with NRC requirements, commitments and industry standards.

b. Observations and Findings

The licensee's FAC program utilized Checworks™ computer software program version 1b. The FAC program engineer acknowledged that versions 1c and 1d of Checworks™ were available and stated that Illinois Power was evaluating these software upgrades. The "Pass Two" feature of version 1b to Checworks™ calculated "line correction factors" and the inspector identified that it was not being used. The program engineer stated that three systems would be chosen to "test" this software feature and the feasibility of including more systems would be evaluated. The inspector identified that the Checworks™ program predicted a negative time to reach minimum wall for many system components. The program engineer acknowledged that the "Pass Two" feature of Checworks™ version 1b may improve the accuracy of these predictions. The inspector's review of the piping erosion/corrosion inspection plan confirmed that the predicted time to minimum wall was

used only to establish the priority for selecting inspection locations (e.g. a ranking tool).

The established screening criteria for inclusion of systems and components into the FAC program were consistent with the guidelines established in EPRI document NSAC-202L "Recommendations for an Effective Flow-Accelerated Corrosion Program". In addition, grid spacings for examinations of components were generally more conservative than that recommended in NSAC-202L. However, the inspector identified that references in the FAC program and procedures had not been updated to include NSAC-202L revision 0, which was issued in November of 1993. The program engineer acknowledged this opportunity for improvement and agreed to update references in the FAC program to include NSAC-202L.

The Independent Safety Engineering Group (report 91-014, February 1992) and EPRI (letter dated October 1992) evaluated the licensee's FAC program and recommended including small bore piping systems/components in the program. The inspector identified that 22 of the 86 planned FAC inspections for RFO-6 included small bore piping components (2" or less nominal pipe diameter). The FAC engineer stated that the original FAC program included only 3" and larger piping systems susceptible to FAC and the smaller bore systems had been selected based on engineering judgement and industry experience. In addition, the FAC engineer reported that Illinois Power would participate in a collaborative effort with EPRI and other utilities later this year to develop an industry recognized program for small bore and large bore lines that cannot currently be accurately modeled by Checworks™. The EPRI evaluation of the FAC program performed in 1992, included a recommendation for an independent review of the licensee's FAC program. The inspector concluded that this recommendation had not been formally implemented.

c. Conclusions

No violations or deviations were identified. The inclusion of small bore piping into the FAC program and ongoing work with industry in this area demonstrated commitment to a quality FAC program. However, the inspectors also identified opportunities for FAC program enhancement, including use of an additional FAC computer software feature and implementation of EPRI recommendations for an independent review of the FAC program.

V. Management Meetings

X1 Exit Meeting Summary

At the conclusion of the inspection on August 30, 1996, the inspector met with licensee representatives identified herein and summarized the scope and findings of the inspection activities. The inspector questioned licensee personnel as to the potential for proprietary information in the likely inspection report material discussed at the exit. No proprietary information was identified.

PERSONNEL CONTACTED

Licensee

Illinois Power Company

D. Korneman, Engineering Director
D. Thompson, Engineering Manager
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NRC

M. Miller, Senior Resident Inspector, Division of Reactor Projects
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INSPECTION PROCEDURES USED

IP 49001: Inspection of Erosion/Corrosion Monitoring Programs
IP 73753: Inservice Inspection
IP 73755: Inservice Inspection, Data Review and Evaluation
IP 73052: Inservice Inspection, Review of Procedures
IP 73051: Inservice Inspection, Review of Program

LIST OF ACRONYMS USED

ASME American Society of Mechanical Engineers
BWR Boiling Water Reactor Plant
E/C Erosion-Corrosion
FAC Flow-Accelerated Corrosion
GE General Electric Nuclear Energy
EPRI Electric Power Research Institute
USAR Updated Safety Analysis Report
GL Generic Letter
IFI Inspection Follow-up Item
IP Inspection Procedure
IR Inspection Report
ISI Inservice Inspection
NRC Nuclear Regulatory Commission
RFO Refueling Outage
TS Technical Specification
UT Ultrasonic Testing