

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/92007(DRS)

Docket No. 50-461

License No. NPF-62

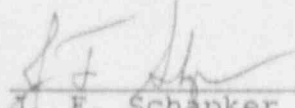
Licensee: Illinois Power Company  
500 South 27th Street  
Decatur, IL 62525

Facility Name: Clinton Power Station

Inspection At: Clinton, IL 61727

Inspection Conducted: March 11-12 and 24-26, 1992

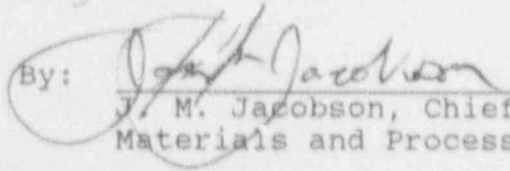
Inspector:

  
J. F. Schapker

4/20/92  
Date

Accompanied By: L. Cage, IDNS

Approved By:

  
J. M. Jacobson, Chief  
Materials and Processes Section

4-21-92  
Date

Inspection Summary

Inspection on March 11-12 and 24-26, 1992 (Report No. 50-461/92007(DRS))

Areas Inspected: Routine announced inspection of inservice inspection activities including review of program (73051), procedures (73052), observation of work activities (73053), data review and evaluation (73755), review and observation of the erosion/corrosion program (73755), and review of the licensee's action on Generic Letter (GL) 89-13 (92703).

Results: Of the areas inspected, no violations or deviations were identified. During the course of the inspection, the following was noted:

- ° The licensee adequately demonstrated the ability to properly implement the inservice inspection (ISI) program, including GL 88-01, Augmented Inspection of Intergranular Stress Corrosion Cracking (IGSCC) Susceptible Materials.
- ° The licensee has experienced continued degradation of the safe shutdown service water system (SX) due to microbiological corrosion.
- ° The licensee's erosion/corrosion program uses state of the art computer codes and inspection techniques.

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## DETAILS

### 1. Persons Contacted

#### Illinois Power Company (IP)

- \*J. Perry, Vice President
- \*F. Spangenberg, Manager, Licensing
- \*R. Kerestes, Director, Nuclear Safety Engineering
- \*S. Bell, Supervisor, ISI
- \*J. Cook, Plant Manager
- \*J. Miller, Manager, Nuclear Engineering
- \*R. Wyatt, Manager, Quality Assurance
- \*J. Taylor, Director, Administration
- \*J. Lewis, Principal Assistant to the Vice President
- \*J. Sipek, Supervisor, Regional Regulatory Interface
- \*R. Morgenstern, Manager, Nuclear Training
- \*R. Mendez, Director, Material Control
- \*R. Phares, Director, Licensing
- \*E. Turner, Nuclear Program Controller

#### Illinois Department of Nuclear Safety (IDNS)

- \*L. Sage, ISI Inspector

#### U. S. Nuclear Regulatory Commission (NRC)

- \*F. Brush, Resident Inspector

Other members of the plant staff and contractors were contacted and interviewed during the course of this inspection.

\*Denotes those present at the exit meeting on March 26, 1992.

### 2. Licensee Action in Response to Generic Letters (92703)

#### (Open) GL 89-13 - Service Water System Problems Affecting Safety Related Equipment

In response to GL 89-13, the licensee planned to open, inspect, obtain baseline data, and develop a program to monitor the performance of the safety related heat exchangers (HX) for the life of the plant. Inspection activities commenced prior to the plant's second refueling outage in the Fall of 1990 due to discovery of microbiological corrosion (MIC) in the [visions I and II diesel generator HXs. Because of the deficiencies discovered during the course of this inspection, the licensee has performed extensive system verifications (reference NRC Inspection Report No. 50-461/90005(DRS)).

The licensee performed appropriate corrective actions to assure adequate heat removal capability of the safety related service water system (SX) heat exchangers. However, continued MIC has been experienced. Due to the Illinois Environmental Protection Agency's (IEPA) restrictions on chemical releases to the Clinton Lake and the high pH of the lake water, the licensee has not been able to achieve the required chemical environment to arrest the MIC.

The MIC has caused leakage only to the diesel generator's (DG) heat exchangers to date; however, MIC has been identified in other areas of the SX system. The licensee has initiated the following corrective actions:

- Initiated 2-hrs/day flow through the DG HXs (DGs Divisions I, II and III) - commenced October 1991.
- Design work for field alteration (Alt.) DG F047 is complete. This Field Alt. will install valves on the DG HXs to facilitate chemical layup when the HXs are not in use. A decision was made to install this Field Alt. in post RF-3 divisional outages (May and July 1992).
- An economic and technical evaluation of alternate tube material for DG HXs is in progress. Field Alt. DG F041 is currently in the design process. Final decision will be made by May 1992.
- In order to ensure the effectiveness of SX system chemical treatment, a random inspection program of HXs was initiated. The following HXs have been reinspected:

Standby Gas Treatment Room 1A Cooler, OVGO5SA (SX Div. 2)

Hydrogen Recombiner Room 1A Cooler, OVGO7SA (SX Div. 1)

Hydrogen Recombiner Room 1B Cooler, OVGO7SB (SX Div. 2)

Emergency Core Cooling System Low Pressure Core Spray Pump Room Cooler, 1VY01S (SX Div. 1)

No MIC has been found in these HXs.

The following two HXs are scheduled for the next inspection:

SX Pump Room Coil, 1VHO7SA (SX Div. 1)

Div. 4 Inv. Room Cooler, 1VX14S (SX Div. 2)

- ° A mobile lab leased from NALCO Chemical Company is being installed. It will start collecting on-line lake water data in April 1992. This continuous monitoring of data is critical for chemical treatment selection.
- ° Services of an independent water treatment consultant (Water Management Services, Inc.) have been retained to assist IP in identifying critical monitoring data, recommend treatment schemes, obtain necessary permits, use chemicals on a trial basis, and assist in a permanent modification design.

Future actions planned by the licensee include:

- ° Establish a regular monthly frequency of SX chemical treatment. IEPA approval was requested in October 1991 and is expected in April 1992.
- ° Chlorinate service water (SW) and component cooling water (CCW) systems for 2 hours/day on a regular basis. The Nuclear Safety Engineering Department (NSED) is evaluating installation of a dechlorination system to improve effluent quality and simplify the monitoring process.
- ° Develop a plan, initiate MIC treatment, and determine effectiveness of treatment for the SW system.
- ° Develop an interim plan to inspect and treat the Fire Protection (FP) system.

The NRC inspector reviewed the SX heat exchanger performance surveillance checklists and performance calculations for the high pressure pump room cooler HX and the Division I DG HXs. Heat transfer and volumetric flow rates for the HXs were in compliance with specified requirements. Further review of the licensee's action on the mitigation and prevention of MIC will be reviewed in a future NRC inspection.

The licensee's action in response to GL 89-13 issues has been adequate to ensure that safe shutdown heat removal capacities are maintained. The licensee's planned procedures to arrest the MIC in the service water systems appear to be adequate.

No violations or deviations were identified.

3. Inservice Inspection (ISI) (73051, 73052, 73753, 73755)

a. General (73051)

This was the third outage of the first period in the first ten-year plan. The ISI plan conforms to the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition, Winter 1981 Addenda. The services of an Authorized Nuclear Inservice Inspector (ANII) were procured and the ISI procedures and personnel certifications have been reviewed by the ANII.

The licensee contracted EBASCO, Inc., to perform ultrasonic (UT), liquid penetrant (PT), magnetic particle (MT) and visual (VT) examinations. The licensee's inspection plan of IGSCC susceptible components complies with the guidance procedure in GL 88-01.

b. Review of Procedures

The NRC inspector reviewed the following procedures:

- ° EBASCO-NDE-1, Revision 13 - Training, Examination and Certification of Nondestructive Examination Personnel.
- ° CPS-MT-W81-1, Revision 1 - Magnetic Particle Examination of Welds and Bolting.
- ° CPS-UT-W81-1, Revision 2 - Ultrasonic Examination of Classes 1 and 2 Piping Welds Joining Similar and Dissimilar Materials.
- ° CPS-VT-W81-1, Revision 1 - Visual Examination.
- ° CPS-PT-W81-, Revision 1 - Liquid Penetrant Examination.
- ° CPS-UT-W81-7, Revision 2 - Ultrasonic Examination of Pressure Retaining RPV Studs 2 Inches or Greater with Bore Holes.
- ° CPS-UT-W81-3, Revision 1 - Ultrasonic Examination of Class 2 Vessel Welds Less Than or Equal to 2 Inches.
- ° CPS-UT-W81-10, Revision 1 - Ultrasonic Examination of Class 1 Reactor Vessel Welds Covered by Regulatory Guide 1.150.

- QAP 509-1.6 - VT-1, Visual Examination.
- QAP 510-0.9 - VT-2, Visual Examination.
- QAP 510.10 - VT-3, Visual Examination of Component Supports.
- QAP 510.13 - VT-3, Pump and Valve Internals.
- CPS 2400-01, Revision 4 - CPS Corbicular (Asiatic Clam) Control.
- CPS 2400.01C001, Revision 2 - SW-CCW Bay Diver Inspection Checklist.
- CPS 2400.01C002, Revision 2 - Unit 1 SX Pump Bay Diver Inspection Checklist.
- CPS 2602-01, Revision 6 - Heat Exchanger Performance of Shutdown Service Water (SX)
- CPS 2600.00, Revision 0 - HX Performance Monitoring Program.

c. Observation of Work Activities (7375)

The NRC inspector observed the following work activities in progress:

- Magnetic particle examination of high pressure core spray, residual heat removal piping and main steam piping welds.
- Ultrasonic examination of residual heat removal high pressure core spray, and main steam piping welds.
- Visual examination of reactor vessel internals.<sup>1</sup>
- The licensee's QA surveillance of ISI activities.

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<sup>1</sup> Previous visual examination (reference NRC Inspection Report No. 50-461/90023) identified a crack in the steam dryer. General Electric performed a safety analysis and determined that the crack was not safety significant and that the licensee should regularly inspect the crack to verify that the crack growth has arrested. No appreciable growth of the crack was evident in the last two visual inspections (refueling outages 2 and 3).



- Ultrasonic thickness examination of feedwater reducing elbow for erosion/corrosion monitoring (Reference Paragraph 4 of this report).

Remote visual examination of shroud head bolts and locking mechanisms in response to GE SIL No. 506, Supplement 1, "BWR/6 Shroud Head Stud Bolt Wear," identified minor wear in the previous refueling outage. Visual examination during this outage identified significant wear to the bolt spline and bolt retainer mechanisms. The licensee replaced four bolts and locking devices with new bolts and retainers designed to mitigate the wear caused by feedwater impingement. Remote visual examinations of the shroud head bolts will be continued during subsequent refueling outages to ensure the structural integrity of the bolts and retainers.

The steam dryer and shroud head bolts are not safety related equipment. However, a significant failure of either could jeopardize the operability of the reactor vessel and thereby challenge safety systems. The licensee has taken appropriate corrective action to prevent failure of these components.

No violations or deviations were identified.

d. Review of ISI Data, Calibration Standards, Equipment, and Personnel Certifications (73753, 73755)

The NRC inspector reviewed the following documents and determined that the applicable Code and regulatory requirements were met:

- NDE personnel certification to SNT-TC-1A requirements and EPRI certifications for GL 88-01 IGSCC examinations.
- NDE equipment calibration and material certifications (UT, MT, PT).
- ISI NDE data reports for UT, MT, PT, and VT.

The NRC inspector reviewed NDE data reports for the examinations observed in Paragraph 3.c. of this report. The NDE data was in agreement with the NRC inspector's notations of recordable indications identified during the course of the inspections. Indications of UT geometric reflectors were evaluated and recorded in accordance with ASME Code and applicable procedure requirements.

Visual examination (VT) data for component supports were reviewed. VT data for snubber supports 1RH02013S and 1RH02014S, documented conditions consisting of areas not painted and rusty, and containment liner paint peeling and flaking. Further review revealed that the licensee did not have a documented system to ensure that conditions noted during visual examination of component supports were corrected. This observation was discussed with the licensee at the exit interview. The licensee agreed to look into this finding and take appropriate corrective action.

No violations or deviations were identified.

4. Erosion/Corrosion Activities (73052, 73753, 73755)

The licensee implemented their erosion/corrosion (E/C) program in 1987. Special procedures and administrative controls were established to ensure continued long term implementation of the E/C monitoring program for piping and components. The program is applicable to both safety and nonsafety related equipment. This program was established to identify E/C, record the data and to establish predictable wear rates to preclude failure of pressure boundaries. The program was established using state of the art EPRI Chec and Checkmate computer programs.

The NRC inspector reviewed the E/C procedures, and observed the methodology for collecting and recording the data (UT). The data points are permanently scribed on the pipe or component to facilitate trending of wear rates. The data analysis program was developed by the licensee and appears to be conservative in accessing and evaluating wear rates and requiring replacement or repair to system components.

The licensee's E/C program appears to be adequate to ensure that appropriate components in both single phase and two phase systems are inspected and maintained to prevent failure of pressure boundaries.

5. Exit Meeting

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on March 26, 1992. The inspector summarized the scope and findings of the inspection activities. The licensee acknowledged the inspection findings. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such document/processes as proprietary.