

## INDEX OF CONCERNS

### RII-1996-A-0249

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Monday, July 07, 1997

**CONCERN:**

1

Maintenance

Former Licensee Employee

Power Reactor

**DESCRIPTION:**

THE ALLEGER STATED THEY (TVA, WATTS BAR) RECENTLY LAID HIM OFF BECAUSE THE SYSTEM ENGINEER FUNCTION HE WAS DOING ON THE ICE CONDENSER DID NOT REQUIRE A FULL TIME POSITION. HE STATED THAT THE SYSTEM DID REQUIRE FULL TIME ATTENTION DUE TO THE MANY CHALLENGES THE SYSTEM PRESENTS BASED ON HIS MANY YEARS OF EXPERIENCE WITH IT. HE IS CONCERNED THE SYSTEM MAY DEGRADE AND NOT RECEIVE SUFFICIENT ATTENTION. THE CURRENTLY ASSIGNED PERSON (RESERVED) HAS TWO OTHER SYSTEMS ALSO.

**SUBSTANTIATED**

N

**CLOSURE:**

The Inspector conducted a review of the System Engineer (SE) activities associated with the Ice Condenser System (ICS) and reviewed ICS information to assess whether SE activities were in accordance with licensee requirements (Procedure SSP-12.52, "System Engineering Program," Rev. 7) and the ICS exhibited adverse trends regarding performance. This included a review of Work Orders and Problem Evaluation Reports issued during the previous six months, review of the open Work Order list, review of the system status report (first quarter, 1997), review of surveillance results, review of trend information, review of SE notebook information, and discussions with the SE.

The inspector noted that some individual component problems had occurred, however, no system adverse performance trends were noted. The SE was performing required duties including system walkdowns, trend reviews, maintaining system notebook information, reviewing testing results, and developing the system status report. The SE indicated he was assigned one other small system and assists on the valve testing program. He stated that this affords him sufficient time for ICS overview. The SE exhibited good knowledge of the ICS and was maintaining good documentation. Significant trend data, such as ice bed temperature, was maintained and charted. Some minor problems had been noted during recent surveillance observations. These included blockage of three channels and minor amounts of ice noted on the upper plenum top deck blankets and support beams. The channels were unblocked and the ice removed. Additional inspections found no other problems. Overall, the ICS was rated White (acceptable) with the possibility of being rated Green (excellent) during the second quarter and category (a)(2) (acceptable) for the Maintenance Rule. Unreliability was rated at zero.

The ICS had been adequately maintained to prevent any adverse performance trends. The SE was performing his duties well and has provided sufficient oversight of the ICS.

**CONCLUSION:**

The results of our inspection are documented in NRC Inspection Report No. 50-390/97-04, paragraph E2.2 and E2.3.

The concern that the Ice Condenser System may degrade and not receive sufficient attention was not substantiated.

Information in this record was deleted  
in accordance with the Freedom of Information  
Act, exemptions 7C  
FOIA 2001-0012

X/15

**CONCERN:**

2

Maintenance

Former Licensee Employee

Power Reactor

**DESCRIPTION:**

THE ALLEGER ALSO HAD A TECHNICAL CONCERN INVOLVING BROKEN SCREWS WHICH WERE FOUND IN THE ICE CONDENSER IN 1995. A PCR WAS INITIATED TO PERFORM AN EVALUATION. TVA INITIALLY PERFORMED A METALLURGICAL ANALYSIS. SUBSEQUENT TO THAT REPORT, THE ISSUE WAS GIVEN TO WESTINGHOUSE TO ANALYZE. THE ISSUE WAS VERY QUICKLY ANALYZED AWAY AND THE FIRST REPORT WAS NOT USED TO SUPPORT THE ANALYSIS. HE IS CONCERNED WHETHER THE ANALYSIS WAS ADEQUATE. THE ALLEGER CALLED DUKE POWER TO ASK IF THEY HAD EXPERIENCED A SIMILAR PROBLEM. THEY STATED THAT THEY FIND BROKEN SCREWS REGULARLY DURING OUTAGES AND REPLACE THEM WITH STAINLESS STEEL SCREWS. THEY IMPLIED TO HIM THAT THEY HAD PERFORMED AN INFORMAL INTERNAL ANALYSIS OF THE ISSUE AND DID NOT INVOLVE WESTINGHOUSE NOR DID THEY HIGHLIGHT THE ISSUE AS AN INDUSTRY PROBLEM. HE STATED THAT HE WOULD MAIL COPIES OF TWO REPORTS TO THE NRC OFFICE AT WATTS BAR.

**SUBSTANTIATED**

N

**CLOSURE:**

By review of the licensee's metallurgical investigation results that were documented in Central Laboratory Services, Report No. 95-1021, dated June 19, 1995, and WBP/ER950246 Rev.0, the Inspector ascertained the following:

The chemical analyses determined that the screws were fabricated from material with carbon, manganese and sulfur contents that were within the typical range of AISI 1022 plain carbon steel. Microhardness surveys revealed a relatively high surface hardness and a significantly softer core. This condition indicated that the screws were carburized. This condition also corresponded with the microstructure described in the subject metallurgical investigation report and was confirmed by the associated photomicrographs.

On April 26, 1995, the licensee wrote an Adverse Condition Report to document the discovery of a rather significant quantity of Ice Condenser ice basket, sheet metal screws (screws), both in sections and in whole. The screws were found in the temporary waste ice melt tank. This report was assigned number WBP/ER950246, Rev.0, for tracking purposes. The task of loading the ice basket was completed on February 17, 1995. The tank where the screws were found had remained in place until April 1995, when it was removed for cleaning purposes. The subject screws were identified as Item No. 9 on Westinghouse (W), Drawing Number 1191E57, Contract No. 71C62-5411-1. Following this discovery, the licensee formulated an action plan which included a metallurgical investigation to determine the mode of the failure and verify the type of material used to manufacture the screws. The investigation included random samples of the broken screws, others that were removed from ice baskets in service for this purpose, and others that were removed from stores at the warehouse.

By review of the licensee's metallurgical investigation results that were documented in Central Laboratory Services, Report No. 95-1021, dated June 19, 1995, the Inspector ascertained the following:

In reference to the 170 broken sheet metal screw heads and the 32 whole screws found inside the temporary waste ice melt tank, the investigation report disclosed that the root cause assessment revealed the screws were broken because of apparent over-tightening at the time these ice baskets were being assembled. One complete ice meltdown and one cooldown since the initial assembly were regarded as possible contributing factors. A visual inspection of a random sample of ice baskets, showed no evidence of broken or missing screws from the interconnecting ice basket coupling rings.

The Westinghouse analysis and assessment indicated that the interconnecting ice basket coupling rings were capable of performing their design function against all design basis accidents loads and surveillance loadings with a minimum of 10 sheet metal screws instead of the 12 required by design.

In reference to the concern being applicable to the Sequoyah Nuclear Plant (SQN), the subject report indicated that no broken or missing sheet metal screws have ever been found at SQN during any of the post-servicing periods, with the exception of a few (<10), that were attributed to basket disassembly or upper reinforcement ring replacement.

The chemical analyses determined that the screws were fabricated from material with carbon, manganese and sulfur contents that were within the typical range of AISI 1022 plain carbon steel. Microhardness surveys revealed a relatively high surface hardness and a significantly softer core. This condition indicated that the screws were carburized. This condition also corresponded with the microstructure described in the subject metallurgical investigation report and confirmed by the associated photomicrographs.

By this review, the inspector concluded that the screws in question were fabricated from material made from AISI 1022 plain carbon steel that was heat treated to meet the requirements of W Equipment Specification No. 678956.

**CONCLUSION:**

The inspection determined the analysis for the cause of broken ice condenser screws reasonable and the licensee's technical report determined the ice condenser screws were fabricated from material made from AISI 1022 plain carbon steel that was heat treated to meet the requirements of W Equipment Specification No. 678956. The concern was not substantiated.

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Monday, July 07, 1997

**CONCERN:**  3 Maintenance Former Licensee Employee Power Reactor**DESCRIPTION:** THE ALLEGER CALLED DUKE POWER TO ASK IF THEY HAD EXPERIENCED A SIMILAR PROBLEM. THEY STATED THAT THEY FIND BROKEN SCREWS REGULARLY DURING OUTAGES AND REPLACE THEM WITH STAINLESS STEEL SCREWS. THEY IMPLIED TO HIM THAT THEY HAD PERFORMED AN INFORMAL INTERNAL ANALYSIS OF THE ISSUE AND DID NOT INVOLVE WESTINGHOUSE NOR DID THEY HIGHLIGHT THE ISSUE AS AN INDUSTRY PROBLEM.**SUBSTANTIATED**  Y**CLOSURE:** Coupling Screws at McGuire:

During refueling outage 1EOC9 in October 1994, a routine inspection revealed that basket(5-3-9) was damaged and would require repair. The repair which required the replacement of several basket sections, was performed on September 15, 1994.

The basket was apparently replenished with ice and placed in service until the present outage (1EOC11). The screws were discovered missing when the basket failed to pass a weight test during maintenance. However the inspectors ascertained that through an apparent lack of communications between shifts, technicians failed to install the screws used to attach the basket section to the coupling ring as required by the applicable procedure MP/O/A/7150/098. The missing coupling screws were subsequently installed under Work Order 99084988-01 and Procedure SMD/O/A/8510/07. The basket was tested and returned to service. TIC

Through discussions with [REDACTED] the inspectors ascertained that a search of the ice condenser floor produced no evidence of broken or whole screws that could be associated with the loose basket. In addition [REDACTED] stated that of the 2663 baskets that have been maintained at McGuire since 1990, this was the only basket found with coupling ring screws missing. [REDACTED] also stated that technicians have never found loose or broken coupling ring screws on the floor of the ice condenser since the plant went into commercial service.

The inspectors selected a sample of ice condenser baskets for observation. The emphasis of the inspection was the bottom ends of the baskets for evidence of damage and for loose or broken screws on the floor of the ice condenser. This inspection revealed that all the baskets inspected appeared to be in good condition and found no evidence of missing screws on the floor of the ice condenser.

As a followup to this work effort, the inspectors reviewed quality records pertaining to the subject screws and found them to be in order. The inspectors ascertained that all ice condenser basket coupling ring screws used at McGuire and Catawba have been purchased from Westinghouse (W).

The present inventory was procured on purchase order C19846-M3 in July 1992. The screws were identified as Ice Basket sheet Metal Screws No. 10x32x1/2 inch long, W part No. 1880E56H05. The screws were produced from AISI 1022 carbon steel material. The screws were heat treated to a minimum tensile strength of 140KSI which is consistent with McGuire's FSAR paragraph 6.2.2 requirements.

**Coupling Ring Screws used at Catawba:**

By telephone the inspectors discussed the subject screws with Catawba's cognizant engineer. Through this discussion the inspectors ascertained that Catawba used the same procedure to perform maintenance and tracking. Catawba also uses the same carbon steel 1022 material screws provided by W on their coupling ring application. In addition, the engineer indicated that loose or broken ice basket screws have never been found on the floor of the ice condenser since the plant began commercial operation.

**Conclusions:**

The ice condenser maintenance program at McGuire and Catawba appeared to be consistent with Technical Specification requirements and FSAR commitments. Procedures and quality records reviewed for technical

content, completeness and accuracy were satisfactory. Supervisors and technicians were very knowledgeable and dedicated to the task of keeping this equipment well-maintained and therefore, able to perform its design functions. Based on the information provided and the inspection results, this concern could only be partially substantiated and a Non-Cited violation was issued.

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