Nebraska Public Power District

GENERAL OFFICE
P.O. BOX 499, COLUMBUS, NEBRASKA 68601-0499
TELEPHONE (402) 564-8561

CNSS907024
January 29, 1990

Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Response to Generic Letter 89-13
Cooper Nuclear Station
Docket 50-298, DPR-46

Gentlemen:

On July 18, 1989, the NRC issued Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment". This guidance requested licensees to supply plant-specific information about the service water system to assure the NRC of compliance to listed General Design Criteria and quality assurance requirements, and to confirm that the safety functions of the service water system are being met.

Accordingly, attached is a summary of actions taken and planned by the Nebraska Public Power District (District) to comply with the guidance provided in Generic Letter 89-13 and to provide further assurance that the Cooper Nuclear Station service water system will function as designed.

As requested in Generic Letter 89-13, the District will provide written notification upon completion of those efforts still ongoing. The District will also maintain assembled documentation of the attached for a minimum of two years from the date of this submittal to accommodate future NRC audits of the District's submittal.

This response is submitted under oath in accordance with the provisions of 10CFR50.54(f).

Please contact me at this office if you have any questions.

Sincerely,

L. G. Kuncl
Nuclear Power Group Manager

LGK:sa
Attachment

cc: NRC Regional Office
Region IV
Arlington, TX

Resident Inspector Office
Cooper Nuclear Station

A065
1/1

STATE OF NEBRASKA)
)
PLATTE COUNTY)

L. G. Kuncl, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this response on behalf of Nebraska Public Power District; and that the statements contained herein are true to the best of his knowledge and belief.

L. G. Kuncl

Subscribed in my presence and sworn to before me this 29th day of January, 1990.

Colleen M Kuta
NOTARY PUBLIC

GENERAL NOTARY-State of Nebraska
COLLEEN M. KUTA
My Comm. Exp. Aug. 4, 1993

NEBRASKA PUBLIC POWER DISTRICT
RESPONSE TO NRC GENERIC LETTER 89-13

"SERVICE WATER SYSTEM PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT"

1.0 INTRODUCTION

By letter dated July 18, 1989, the NRC issued Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment". Generic Letter 89-13 requested licensees to perform the following or equally effective actions to ensure that their service water systems are in compliance and will be maintained in compliance with 10CFR50 Appendix A, General Design Criteria (GDC) 44, 45, 46, and Appendix B, Section XI.

Generic Letter 89-13 listed the following specific actions for service water systems:

I. Implement and maintain an ongoing program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling.

II. Conduct a test program to verify the heat transfer capability of all safety related heat exchangers cooled by service water.

III. Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of the safety related systems supplied by service water.

IV. Confirm that the service water system will perform its intended function in accordance with the licensing basis for the plant.

V. Confirm that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety related equipment cooled by the service water system will function as intended and that operators of this equipment will perform effectively.

For clarity, the specific CNS raw water system will be designated with capital letters as "Service Water", while the all inclusive cooling water systems as defined in the Generic Letter will be designated with lower case letters as "service water" in this response.

2.0 BACKGROUND

Cooper Nuclear Station (CNS) plant design considerations support the intent of 10CFR50 Appendix A GDC 44, 45, 46, and Appendix B, Section XI. Supporting examples are as follows:

- Startup testing provided initial design verification and a baseline for subsequent testing.
- Intake spargers for suspension of particulate to prevent deposition and blocking.
- Weir wall was added to the river bottom in front of the intake structure as a result of a silt deposition study to reduce silt loading. This design facilitates the intake of cleaner water near channel surface.
- Traveling screens remove particulate in excess of 3/8" in diameter.
- Service Water system strainers provide for removal of particulate in excess of 1/8" in diameter.
- Closed loop Reactor Building Closed Cooling Water system (for brevity, this system is annotated REC, for Reactor Equipment Cooling, at Cooper Nuclear Station).
- Closed loop Diesel Generator Jacket Water (DGJW) system.

The District has addressed the NRC's concerns regarding service water system operability at nuclear plants. In April, 1981, the NRC issued IE Bulletin No. 81-03. This bulletin required licensees to assess macroscopic biological fouling at their respective facilities.

The District responded to Bulletin 81-03 on May 29, 1981. The following steps were taken:

- Additional preventive maintenance tasks written.
- Upgraded condenser/heat exchanger inspection procedures.

In response to NRC Inspection Report 87-10 (SSFI) findings, the District completed actions to verify that the service water system is capable of removing safety design basis heat loads. These actions are as follows:

- Periodic Service Water system post-LOCA flow testing to verify that post-LOCA flows are being maintained.
- Quantitative performance testing of REC and Residual Heat Removal (RHR) heat exchangers each refueling outage.
- Service Water system initial design basis review.
- Service Water system casualty procedure revisions for post-LOCA equipment configuration.

3.0 ACTIONS TAKEN IN RESPONSE TO GENERIC LETTER 89-13

This section describes the actions taken or planned by the District to comply with Generic Letter 89-13. The Generic Letter Recommended Actions are considered to be applicable to the Service Water, RHR Service Water Booster, Reactor Equipment Cooling, and Diesel Generator Jacket Water systems. The Service Water and RHR Service Water Booster systems are open-cycle systems. The REC and DGJW systems are closed-cycle systems.

The REC system has a program in place which controls and maintains the system chemistry within the limits of the Institute of Nuclear Power Operations (INPO) recommendations. Notwithstanding these controls, the District had previously identified the need for further enhancements to preclude any potential for fouling of safety related heat exchangers. These enhancements include the planned addition of a slip-stream filter demineralizer unit followed by a system flush and selected component inspection. Implementation of these enhancements will be completed prior to startup from the 1991 refueling outage.

The DGJW system also has a program in place which controls and maintains system chemistry within prescribed limits. At this time there are no upgrades planned for this system.

The following items are provided in response to specific actions contained in the Generic Letter:

1. Implement and maintain an ongoing program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling.

   The present intake structure inspection includes examination of the basin for silt, debris, and deterioration (including corrosion) and frequent monitoring of silt levels. The deterioration inspection is performed by using divers or dewatering the bay.

   During the design of CNS, a determination was made that the inherent scouring action of the sandy river water precluded any need for chlorination. Inspections made on condensers and heat exchangers since the station became operational serves as ongoing confirmation of the CNS design. Furthermore, the Corbicula species has not be detected at CNS.

   The REC heat exchangers are provided with demineralized water connections for flushing and layup with demineralized water during periods when a heat exchanger is out of service. The CNS operating procedures already include requirements to layup the heat exchanger with demineralized water when it is expected to be out of service for extended periods. The use of demineralized water for layup precludes the need for chlorination because fouling from micro/macrobiological organisms is minimized. RHR heat exchangers are typically not taken out of service. During those periods when the heat exchangers are taken out of service, dry layup is employed; thus neither chlorination nor demineralized water is required. Service Water system cooling loops are regularly used and tested, making layup impractical during operation.

   The present CNS surveillance program provides for flow tests once per operating cycle to ensure the service water system and the associated required safety related components meet or exceed the post-LOCA design flow requirements. In addition, pump performance is monitored and trended quarterly to detect trends adverse to system performance.

Presently, heat exchangers, when opened, are inspected for indications of Corbicula and other macroscopic biological fouling organisms.

Program enhancements, as outlined below, are planned as a result of Generic Letter recommendations and guidelines.

1. A sampling and analyzing inspection of biological fouling organisms will be added to the intake structure basin inspection effective with the 1990 Refueling Outage.

2. Those safety related heat exchangers in the service water system that require and do not currently have layup instructions will have those steps added to existing operating procedures. This will be completed by June 1, 1991.

II. Conduct a test program to verify the heat transfer capability of all safety related heat exchangers cooled by service water.

The District currently verifies the heat transfer capability of RHR, REC, DGJW, and Diesel Generator Lube Oil (DGLO) safety related heat exchangers cooled by the Service Water system. Heat exchangers are tested at least once each operating cycle, except for the RHR A and B heat exchangers, which are alternately tested each operating cycle in order to meet design basis flow testing requirements. Where possible, testing is done at design heat removal rates. If design heat removal rates are not attainable, then temperature and flow compensation is made in calculations to adjust the results to design conditions. Both permanently installed and temporary instrumentation are utilized in the CNS heat exchanger performance monitoring program.

In addition to verification of heat transfer capability, the District verifies design service water flow rates to all safety related components in the Service Water and RHR Service Water Booster systems. Flow verification is performed once per fuel cycle for each of these systems. This program demonstrates that components are not significantly degraded by fouling or obstructions.

CNS programs for heat exchanger monitoring have been reviewed in detail with regard to the Generic Letter requirements. Program enhancements, as outlined below, are planned as a result of Generic Letter recommendations and guidelines.

These enhancements will be completed by the end of the 1991 Refueling Outage.

1. Those Service Water and RHR Service Water Booster system safety related heat exchangers whose heat transfer capability is not currently monitored will be added to existing performance programs or, alternatively, will be subject to maintenance inspections, as required in the Generic Letter. This will be partially completed during the 1990 Refueling Outage, with the remaining items completed during the 1991 Refueling Outage.

2. Applicable heat exchanger performance evaluation procedures will be revised by December 31, 1990, to require trending to ensure flow blockage or excessive fouling accumulation does not prevent the performance of safety related functions.

3. Instruction will be provided in applicable heat exchanger performance evaluation procedures by December 31, 1990, to ensure that tests are performed before and after any corrective actions are taken.

4. The current engineering practice of adjusting heat exchanger test results to design heat removal rates with calculations shall be formalized by revision of appropriate CNS performance procedures by December 31, 1990.

III. Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of the safety related system supplied by service water.

Heat exchanger inspection and cleaning are routine preventive maintenance activities at Cooper Nuclear Station. Plant maintenance procedures identify service water system heat exchangers to be inspected and provide opening, cleaning, and closing instructions. If found, accumulations of foulants are removed. It is required that appropriate personnel be present for cleanliness and corrosion inspection. Where possible, corrosion mechanisms are identified. Heat exchangers are also inspected for the presence of pitting and to verify the integrity of waterbox coatings.

Certain heat exchangers have been inspected and sampled to determine the presence of Corbicula and any other macroscopic biological fouling. None have been identified to date.

Present frequencies of heat exchanger inspections vary from once per cycle to once every three cycles. These frequencies have been established through operating experience and have proven to be adequate.

Only the Service Water system underground supply headers are coated with bitumastic primer and top coat. Review of the heat exchanger inspections has revealed no evidence of severe coating deterioration; therefore, no additional inspections are required. Monitoring of heat exchanger foulants is considered to be sufficient inspection to meet the Generic Letter requirements.

Ultrasonic testing (UT) to detect the degradation of piping and components has been performed on selected high wear areas of Service Water and RHR Service Water Booster system piping and components. Additional inspections are planned in the future. These measures are intended to identify and monitor areas of deterioration to ensure that the safety function of components is not adversely effected.

CNS inspection and maintenance program enhancements are planned as a result of Generic Letter 89-13 recommendations and guidelines. These enhancements as outlined below will be completed by June 1, 1991.

1. Those Service Water and RHR Service Water Booster system heat exchangers not currently inspected for fouling and corrosion will be added to existing programs or, alternatively, will be subject to performance evaluations.

2. Selected wall thickness testing (UT) of Service Water and RHR Service Water Booster system piping, fittings, and valves will be continued with periodic retesting of high wear areas. This program shall be formalized in accordance with Generic Letter recommendations with regard to documentation.

3. Certain heat exchanger and pump maintenance procedures shall be revised to provide better documentation with regard to the extent and results of the inspections.

IV. Confirm that the service water system will perform its intended function in accordance with the licensing basis for the plant.

The District will verify, prior to startup from the 1991 refueling outage, the following aspects of the licensing basis as defined in the CNS Updated Safety Analysis Report (USAR):

1. Flows as established to meet the CNS Accident and Transient Analysis.

2. That the system designs meet the applicable Single Failure Criteria.

3. That the heat exchangers are capable of removing the specified heat loads.

The District considers this verification applicable only to the germane portions of the Service Water system, RHR SW system, REC system, and DGJW system.

V. Confirm that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety related equipment cooled by the service water system will function as intended and that operators of this equipment will perform effectively.

CNS Operations Manual procedures are reviewed for current applicability no less frequently than every two years, six months. Administratively, the procedures are maintained current and correct with this process.

Maintenance practices on the service water system are controlled by established procedures. The confirmation review of maintenance practices and procedures for the Service Water, RHR Service Water Booster, safety related REC loops, and the DGJW systems has included review of instructions for clarity to help reduce human error in the repair and maintenance of components within these systems. Additionally, it was determined that these procedures provide sufficient technical guidance for pump and heat exchanger maintenance. However, revisions to existing procedures and development of new procedures to address the concerns of this Generic Letter will be undertaken, as previously identified in this response.

The operating and emergency procedures are reviewed as outlined above. These procedures, however, will again be reviewed to ensure that, as a minimum, the list of references are current, listed setpoints are correct, applicable design changes have been incorporated, and applicable Technical Specification changes have been incorporated.

The confirmation review of operating and emergency procedures for the Service Water and RHR Service Water Booster, safety related REC loops, and the DGJW system includes review of instructions for clarity to assist in reducing human error in the operation of these systems.

Reviews are conducted for design changes, NCRs, SOERs, SERs, LERs, and many other industry and plant documents to ensure that training materials are maintained current. This review is performed through the Documents and Events Review Committee (DERC) on a weekly basis. For changes of significance, Training Work Requests (TWRs) are generated which track revisions and/or updates to training materials.

The above confirmation process was followed in reviewing operations and maintenance training material for the Service Water, RHR Service Water Booster, safety related REC loops, and DGJW systems as applied to this generic letter. A review of existing training material was conducted and a determination was made that the material was in satisfactory condition and that the appropriate persons are being trained. Training actions for this generic letter are completed.

Program enhancements as outlined below are planned as a result of generic letter recommended actions and guidelines.

1. The confirmation review of maintenance practices and procedures will be completed when the previously identified new procedures are developed. This confirmation will be completed by September 1, 1991.

2. The confirmation review of operation and emergency procedures will be completed when revisions are completed on operating procedures previously identified in this response. This confirmation will be completed by June 1, 1991.