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SUBJECT: Forwards supplemental response to NRC Generic Ltr 89-13 re
 svc water sys problems affecting safety-related equipment.

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MAR 08 1991

SERIAL: NLS-91-050

G. E. VAUGHN
Vice President
Nuclear Services Department

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
SUPPLEMENTAL RESPONSE TO NRC GENERIC LETTER 89-13
SERVICE WATER SYSTEM PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT

Gentlemen:

On July 18, 1989, the NRC issued Generic Letter 89-13: "Service Water System Problems Affecting Safety-Related Equipment." The Generic Letter established extensive recommended actions in five major areas relative to monitoring and surveillance, testing, and design reviews of service water systems. Additionally, the letter requested that initial activities defined in each major area be completed before plant start-up following the first refueling outage beginning nine months or more after the date of the letter and that the NRC be notified within 30 days following implementation. Carolina Power & Light Company (CP&L) responded to Generic Letter 89-13 on January 26, 1990 indicating, with certain clarifications, our intent to comply with the letter and complete the initial activities by start-up from the next scheduled refueling for each of the CP&L units.

H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2) has devoted significant resources to improvements of the service water system during the current refueling outage. The work completed includes both a significant percentage of work planned prior to the outage, as well as several major emergent tasks which were identified either just prior to or during the outage. Major emergent tasks completed during the outage include:

- 1) Replacement of large-diameter stainless steel service water piping in the auxiliary building with AL6XN material, which is more resistant to microbiological attack. A partial replacement was planned until the issuance of NRC Generic Letter 90-05 dated June 15, 1990, at which time a decision was made to do the complete replacement on the basis of having material available, the engineering complete, and the implications of the Generic Letter.
- 2) Both underground 30" service water pipe headers from the intake structure required extensive analysis and repair that had not been anticipated. The details of these findings and repairs are addressed in CP&L letters to the NRC, NLS-90-261 dated January 2, 1991, and NLS-91-016 dated January 30, 1991 regarding the service water system pipe joint minimum wall evaluation and the buried service water system pipe evaluation, respectively.

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- 3) A section of 316 stainless steel service water pipe inside reactor containment and several stainless steel reactor containment pipe penetrations were unexpectedly found to have microbiologically induced corrosion (MIC) which required sleeving of welded joints in the affected piping. This issue is addressed in CP&L letter to the NRC, NLS-91-013 dated January 16, 1991.
- 4) Both component cooling water system heat exchangers were completely retubed to correct a tube and tube joint leakage problem. This work was originally planned for a future outage.

The completion of the work outlined above, as well as most of the tasks associated with Generic Letter 89-13, has resulted in a significant enhancement to the performance of the HBR2 service water system.

The attachment to this letter provides a detailed review of the Generic Letter 89-13 recommendations and the status of their implementation at HBR2. In summary, Generic Letter 89-13 Items I(a), (b), (d), IV, and V have been completed; Items II and III are essentially complete; and work is continuing on Item I(c). In implementing both emergent work items and Generic Letter 89-13 recommendations, tasks were prioritized, with those tasks resulting in the most improvement in the performance of the service water system being implemented first, and those tasks with minimal impact on the system performance postponed.

During the current refueling outage, CP&L undertook an extensive and aggressive effort to both enhance the performance of the service water system and comply with NRC Generic Letter 89-13. This effort has resulted in meeting our commitment to Generic Letter 89-13 to the extent practical. CP&L will notify the NRC following completion of the remaining activities.

If you have any questions concerning this information, please contact Mr. S. D. Floyd at (919) 546-6901.

Yours very truly,



G. E. Vaughn

G. E. Vaughn, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Eleanor C. Chappell

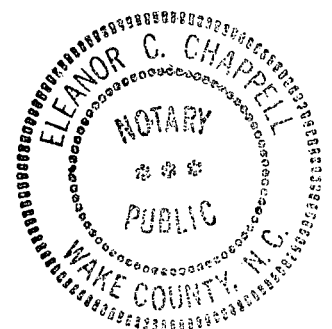
Notary (Seal)

My commission expires: 2/6/96

LSR/jbw (997GLU)

Enclosure

cc: Mr. S. D. Ebnetter
Mr. L. Garner (NRC-HBR)
Mr. R. Lo



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COMPLIANCE WITH NRC GENERIC LETTER 89-13

The following provides an item-by-item review of Generic Letter 89-13 recommendations, including identification of tasks yet to be completed and a schedule for their completion:

Item I(a)

The generic letter recommended that the intake structure be visually inspected, once per refueling cycle, for macroscopic biological fouling organisms, sediment, and corrosion.

CP&L committed to perform a visual inspection during this outage and to base subsequent inspection frequencies on the results of the inspection. Inspection of the HBR2 intake structure this outage by scuba divers revealed no evidence of any macroscopic fouling, no notable accumulations of sediment or silting, and no evidence of significant corrosion. The next inspection is planned for the next refueling outage.

Item I(b)

The generic letter recommended that the service water system be chlorinated whenever the potential for a macroscopic biofouling species exists.

CP&L committed to chlorinate or provide an equivalent treatment program whenever the potential for macroscopic biofouling species exists, except when the system is undergoing maintenance. A water treatment program has been established to minimize the potential for microbiological activity which might contribute to microbiologically induced corrosion. The program utilizes a sodium hypochlorite solution and is controlled by plant procedures. Program results to date have been satisfactory.

Item I(c)

This item of the generic letter recommended that redundant and infrequently used cooling loops be flushed and flow tested at maximum design flow to ensure that there is no fouling or clogging. Further, it was recommended that the loops be filled with chlorinated water or equivalent before lay-up.

CP&L committed to have procedures in place to periodically flush these loops and to flow test at normal system flow rates to determine if loop performance has degraded and to complete initial testing prior to start-up from the next scheduled refueling outage. Where this was not possible, alternate measures of inspection and/or maintenance would be implemented before lay-up to provide adequate protection of piping and components within the system during lay-up.

Implementation of this program includes the following:

- 1) A review is performed to identify cooling loops to be considered as idle and/or infrequently used.
- 2) Each loop, due to its unique design characteristics, is evaluated to determine the appropriate method for inspection/flow testing and lay-up.
- 3) Existing procedures are reviewed to determine if they accomplish the required action. New procedures are developed as required to accomplish the activity on an initial basis.

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- 4) The activity is performed under the appropriate procedure. Performance of the activity is used to assess the condition of the piping and to determine the optimum method for establishing the ongoing monitoring program.
- 5) A set of procedures is then drafted and approved which will address these activities on an ongoing basis.

The activities associated with confirming that redundant and infrequently used lines are not significantly fouled or clogged are essentially complete. At the time of start-up from the current refueling outage, the notable exception will be the flow testing of the hot pipe penetration coolers from the service water header and finalization of the set of procedures defining ongoing activities. The need for flow testing of the hot pipe penetration coolers is still being evaluated.

Where it has been determined to be practical to do so, procedures for flush and flow testing of redundant and infrequently used lines are currently under development and will be based on the data obtained during this refueling outage. For piping which does not lend itself to flushing and flow testing, such as service water back-up supply to the auxiliary feedwater system, alternate measures for inspection and/or maintenance are being developed using EPRI/SWAP guidelines. Implementation of the lay-up program is an ongoing process which involves coordination of the plant Operations and Chemistry groups. Remaining activities associated with Item I(c) are scheduled for completion by September 30, 1991.

Item I(d)

The generic letter recommended that samples of water and substrate be collected annually to determine if asiatic clams have populated the water source.

CP&L committed to collect samples of water and substrate on an annual basis and to perform initial sampling prior to start-up from the next scheduled refueling outage. This sampling is performed annually and has to date revealed no indication of the presence of asiatic clams.

Item II

Item II of the generic letter recommended that a test program be conducted to verify the heat transfer capability of safety-related heat exchangers cooled by service water.

CP&L committed to develop a test program to verify the heat transfer capability of safety-related heat exchangers cooled by open-cycle service water and to ensure that necessary corrective actions were taken before the initial testing. Corrective actions completed during the current refueling outage included inspection of selected heat exchangers. Other actions included complete retubing of both CCW heat exchangers and the replacement of ECCS pump room cooler tube bundles. The initial testing of the safety-related heat exchangers has either been completed or will be completed during plant start-up when requisite conditions for testing are adequate, except for the CCW heat exchangers. As proper testing of the CCW heat exchangers is dependent on available heat load, satisfactory testing may not be possible until shutdown for the next refueling outage. An ongoing program for heat exchanger retesting and performance

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verification is based on EPRI's Heat Exchanger Performance Monitoring Guidelines for Service Water Systems. This program is in the final stages of development and will be in place by the end of refueling outage No. 14, currently scheduled for spring 1992.

Item III

The generic letter recommended that a routine inspection and maintenance program be established for open-cycle service water piping and components such that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of the safety-related systems supplied by service water.

CP&L committed to establish a routine inspection and maintenance program as recommended in the generic letter and to have the program documented and in place prior to start-up from the next scheduled refueling outage. Major elements of the program completed during this refueling outage include large bore piping inspections, pump testing and refurbishment, valve testing and repair, heat exchanger inspection and maintenance, strainer inspection and repair, and pipe cleaning and flushing. Specifically:

Large-Diameter Piping Inspections

Large-diameter (16" and larger) safety-related lines were internally inspected, either by direct visual or remote camera method. Inspection items included the condition of protective coatings or liners, incidence of corrosion/erosion, and piping cleanliness. Any identified deficiencies were evaluated and corrected as required.

Pump Testing and Refurbishment

An aggressive pump performance and verification program was undertaken during the refueling outage. Four of five service water pumps and pump motor assemblies (includes spare) were returned to the manufacturer for disassembly, inspection and repair. Worn or corroded parts, including pump bowls and impellers, were repaired or replaced. Subsequent to reassembly, new pump specific curves were generated for each. Additionally, both service water booster pumps and motors were disassembled, inspected, and repaired as necessary.

Valve Testing and Repair

A large number of safety-related valves were inspected and repaired or replaced during this refueling outage.

Heat Exchanger Inspection and Maintenance

Commensurate with the recommendations for Item III of the generic letter, specific service water supplied safety-related heat exchangers were disassembled and inspected as necessary during the refueling outage. Cleaning was performed when required to restore design capability heat transfer.

Strainer Inspection and Repair

Both service water supply header strainers were completely disassembled, inspected, and repaired as necessary.

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Pipe Cleaning and Flushing

As a result of interior inspection of piping performed during the outage, a program was initiated to clean small-diameter safety-related lines to ensure full design flow. This was largely accomplished by the use of small pipe pigs which were forced through the pipe to dislodge any fouling material and clean the pipe walls. The small quantity of material removed and the ease with which the pigs traversed the piping demonstrated that the piping was essentially clean and that concern of blockage was minimal. Other small-diameter lines such as safety-related instrument lines were inspected and manually cleaned or replaced as necessary.

The work scope performed this outage represented an extensive effort to address the recommendations of generic letter Item III. An ongoing routine inspection and maintenance program is being developed based upon information gathered during the performance of these initial activities. An evaluation of this information indicates that the next regular interval for routine inspection and maintenance need not occur before the next refueling outage for the unit, currently scheduled for spring 1992. This program will be in place prior to that time.

Item IV

The generic letter requested that licensees confirm that their service water systems will perform their intended functions in accordance with the licensing basis for the plant. It was recommended that this include a review of the ability to perform required safety functions in the event of failure of a single active component.

A review of the service water functions considering a single active failure has been completed by CP&L's Nuclear Engineering Department. The review confirms that no single active failure will result in the inability of service water to perform its required safety functions. A specific procedure was performed during the refueling outage to address the recommendation for a verification of the as-built system against licensing basis documentation. This procedure provided direction and documentation for a field walkdown to ascertain existing plant configuration. Several minor deficiencies were identified (i.e. missing name tags, damaged insulation), but none which might affect the ability of the system to perform required safety functions.

Item V

Item V requested licensees to confirm that maintenance practices, operations and emergency procedures, and training that involve the service water system are adequate such that safety-related equipment cooled by service water will function as intended and that operators of the equipment will perform effectively.

CP&L committed to complete and document reviews of the maintenance practices, operations and emergency procedures, and training prior to start-up from the next scheduled refueling outage. These reviews and documentation thereof are now complete. As a result of the reviews, only minor enhancements/procedural needs were identified. These items will be scheduled in accordance with the normal work procedures for the unit.