VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

January 29, 1990

United States Nuclear Regulatory Commission Attention: Document Control Desk	Serial No. NO/JZL:	89-572
Washington, D. C. 20555	Docket Nos.	50-280 50-281 50-338 50-339
	License Nos.	DPR-32 DPR-37 NPF-4 NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY SURRY POWER STATION UNITS 1 AND 2 NORTH ANNA POWER STATION UNITS 1 AND 2 GENERIC LETTER 89-13: SERVICE WATER SYSTEM PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT

As a result of a review of various problems with service water systems which have, in the past, led to system degradation or failure, the NRC issued Generic Letter 89-13. Generic Letter 89-13 requires licensees to supply information about their respective service water systems to assure that such systems are in compliance with appropriate regulations, specifications, and licensing basis documentation and to confirm that system safety functions can be met. Our response to Generic Letter 89-13 is attached.

Please note that our proposed completion dates for design basis and procedure reviews associated with items IV and V extend beyond the completion dates given in Generic Letter 89-13. This schedule extension is justified based on the scope of work which we are undertaking in our Configuration Management Program. We also believe that it is appropriate to address the concerns of Generic Letter 89-13 within the context of established programmatic improvements.

Should you have any questions concerning this submittal, please contact us.

Very truly yours,

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Senior Vice President - Nuclear

Attachment

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U. S. Nuclear Regulatory Commission cc: Region II 101 Marietta Street, N. W. Suite 2900 Atlanta, Georgia 30323

> Mr. W. E. Holland NRC Senior Resident Inspector Surry Power Station

> Mr. J. L. Caldwell NRC Senior Resident Inspector North Anna Power Station

COMMONWEALTH OF VIRGINIA)

COUNTY OF HENRICO

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by W. L. Stewart who is Senior Vice President - Nuclear, of Virginia Electric and Power Company. He is duly authorized to execute and file the foregoing document in behalf of that Company, and the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this <u>29</u> day of <u>January</u>, 19<u>90</u>. My Commission Expires: <u>Jebruary 25</u>, 19<u>90</u>.

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ATTACHMENT 1

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RESPONSE TO GENERIC LETTER 89-13: SERVICE WATER PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT

Ι. For open-cycle service water systems, 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. A program acceptable to the NRC is described "Recommended Program to Resolve Generic Issue 51" in (Enclosure 1) [to Generic Letter 89-13]. It should be noted that Enclosure 1 is provided as guidance for an acceptable program. An equally effective program to preclude biofouling would also be Initial Activities should be completed before plant acceptable. startup following the first refueling outage beginning 9 months or more after the date of this letter. All activities should be documented and relevant documentation should be retained in appropriate plant records.

Response:

Generic Letter 89-13 recommends a surveillance and control program to reduce the effects of biofouling. The recommended program is comprised of four actions, which include:

- A. Visual inspection, once per refueling cycle, of the intake structure for macroscopic biological fouling organisms, sediment, and corrosion.
- B. Chemical treatment of the service water system with chlorine or another biocide, whenever the potential for macroscopic biological fouling exists.
- C. Periodic flushing and flow testing of infrequently used cooling loops to ensure that they are not fouled or clogged.
- D. Annual sampling of water and substrate to determine if Asiatic clams have populated the water source.

We have evaluated the above four recommended actions. Visual inspection of the intake structures at our nuclear stations will be performed as part of our routine inspection and maintenance program discussed in our response to item III.

The North Anna Power Station currently employs a chemical treatment program to mitigate biofouling and corrosion problems. We have reviewed the existing program and determined that it is adequate. At Surry Power Station, a chemical treatment system for biofouling is being considered. However, the issues associated with chemical treatment for Surry's service water discharge into the James River are complex due to environmental considerations. As such, we expect to have an evaluation concerning chemical treatment completed prior to the end of the next Surry refueling outage. We will report the results of our evaluation and our intended actions

with respect to chemical treatment in our next submittal for Surry Power Station, following the next refueling outage.

At North Anna, periodic flushing and/or flow testing is conducted for some infrequently used service water loops. For those component loops that are currently flushed or tested, appropriate procedures will be reviewed and revised as necessary to ensure that minimum design flows are achievable. Applicable performance tests will also be revised to require inspections of associated service water lines if biological fouling is indicated. In other cases, flow testing of infrequently used cooling loops is not practical. This is particularly true in those cases where service water acts as a backup system and introduction of raw water to the primary cooling system or water source would be undesirable. As an alternative, inspection procedures will be developed to provide assurances that infrequently used cooling loops are not significantly fouled. North Anna Power Station does not have a history of biofouling causing flow blockage in the service water system. Accordingly, periodic surveillance of representative service water components will demonstrate the continued lack of biofouling. Necessary procedure changes and initial inspections will be completed prior to restart after the next refueling outage.

Surry Power Station has one portion of the service water system which is not normally operating. This section is the service water supply and return to the recirculation spray heat exchangers (RSHXs). The supply and return to the RSHXs are normally closed, and the RSHXs are maintained in a dry layup condition, resulting in a wetted stagnant pipe section up to the inlet valves on the supply and down stream of the outlet valves on the return. The remaining portion between the inlet and outlet valves is maintained in dry layup. It is undesirable to flow test this loop and wet the heat exchangers. As an alternative, the RSHX inlet and outlet service water lines will be inspected to ensure that they are not unacceptably fouled. In addition, the service water lines associated with the control room air conditioning chiller condensers will also be periodically inspected. While these lines are normally in use, they have a low flow rate and a history of biofouling. Periodic inspection and subsequent cleaning is therefore appropriate. Necessary procedure changes and initial inspections will be completed prior to restart following the next refueling outage for each Surry unit.

Annual sampling of the service water supply for North Anna will be conducted as recommended by Generic Letter 89-13 to monitor for marine fouling species. Sampling at Surry is not required because the service water supply is brackish.

II. Conduct a test program to verify the heat transfer capability of all safety-related heat exchangers cooled by service water. The total test program should consist of an initial test program and a periodic retest program. Both the initial test program and the periodic retest program should include heat exchangers connected to or cooled by one or more open-cycle systems as defined above. ... A program acceptable to the NRC for heat exchanger testing is described in "Program for Testing Heat Transfer Capability" (Enclosure 2) [to Generic Letter 89-13]. It should be noted that Enclosure 2 is provided as guidance for an acceptable program. An equally effective

program to ensure satisfaction of the heat removal requirements of the service water system would also be acceptable. ... If similar or equivalent tests have not been performed during the past year, the initial tests should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. ...

Response:

Virginia Electric and Power Company has evaluated the practicality of testing the safety-related heat exchangers cooled by service water. As a result, we have determined that testing cannot verify the heat transfer capability for most heat exchanger applications. For example, the RSHXs at both stations are maintained in dry layup and would require initiating containment spray to test. Verification of the RSHX's heat transfer capability is accomplished by assuring that the heat exchangers are maintained in their design basis dry layup condition. Another example includes those heat exchangers which have heat loads which are too small to facilitate meaningful testing. Accordingly, the Company will develop a specific program for each station to verify the heat transfer capability of the safety-related heat exchangers cooled by service water. The programs will take into account design limitations such as above. These programs, when fully developed, will provide equally effective actions utilizing a combination of performance testing, special testing and design verification analysis, and parametric surveillance with operational requirements and limitations. Our programs are under development and will be in place prior to restart following the next refueling shutdown on each unit.

Both North Anna and Surry Power Stations have taken certain programmatic steps to ensure the operability of various heat exchangers cooled by service water. The methods currently in use include design analysis, cooler inspections, routine surveillance of operational parameters, periodic flow or other testing, and periodic cleaning. These activities will be reviewed to ensure adequate verification of a heat exchanger's capability to perform its design basis function and integrated into the comprehensive program discussed above.

- 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. The maintenance program should have at least the following purposes:
 - A. To remove excessive accumulations of biofouling agents, corrosion products, and silt;
 - B. To repair defective protective coatings and corroded service water system piping and components that could adversely affect performance of their intended safety functions.

This program should be established before plant startup following the first refueling outage beginning 9 months after the date of this letter. A description of the program and the results of these maintenance inspections should be documented. All relevant documentation should be retained in appropriate plant records.

Response:

Various activities exist at both North Anna and Surry Power Stations that constitute elements of an inspection and maintenance program. As noted in our response to item II, various heat exchangers are currently subject to inspection and periodic cleaning. We also will inspect the service water intake structures and those additional pipe sections which provide assurance that infrequently used cooling loops are not significantly fouled. Accordingly, we will review our current activities and organize them into an integrated inspection and maintenance program. Additional areas of inspection will be evaluated on a case by case basis. Our inspection and maintenance program will be developed prior to restart following the next refueling outage for each respective unit.

IV. Confirm that the service water system will perform its intended function in accordance with the licensing basis for the plant. Reconstitution of the design basis of the system is not intended. This confirmation should include a review of the ability to perform required safety functions in the event of failure of a single active component. To ensure that the as-built system is in accordance with appropriate licensing basis documentation, this confirmation should include recent (within the past 2 years) system walkdown inspections. This confirmation should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. Results should be documented and retained in appropriate plant records.

Response:

Virginia Electric and Power Company is currently undertaking an extensive Configuration Management Project. Included in this effort is establishing the design basis for the service water systems at both stations. The resulting Design Basis Documents and associated references will be reviewed to confirm that the service water system will perform its intended safety function. The above review will also ensure that safety functions of the service water system are not vulnerable to a single failure of an active component.

The Configuration Management Project also includes system walkdowns to verify the as-built system. These walkdowns will be completed for each unit prior to restart following the next refueling outage. However, some of the items identified during the walkdowns may remain open. Any item of safety significance will be resolved prior to restart. As part of the recent operational readiness assurance program, Surry Power

Station has performed system walkdown inspections of those portions of the service water system relied upon for performance of emergency operating procedures.

Completion of the design basis documentation and associated reviews and walkdowns prior to restart following the next refueling outage is limited to the opencycle service water system, as defined in Generic Letter 89-13. Associated intermediate systems will be completed over the course of the Configuration Management Project. Under the current schedule, closed-cycle service water systems will be completed by December 15, 1992.

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. This confirmation should include recent (within the past 2 years) reviews of practices, procedures, and training modules. The intent of this action is to reduce human errors in the operation, repair, and maintenance of the service water system. This confirmation should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. Results should be documented and retained in appropriate plant records.

Response:

As noted in our response to item IV above, Virginia Electric and Power Company is currently involved in a Configuration Management Project. As the design Basis documentation is completed, we intend to review our maintenance, operating, and emergency procedures, and training, to ensure that they are consistent with the design basis.

At Surry Power Station, a review of various maintenance practices and procedures, operating and emergency procedures, and training programs was performed for the open-cycle service water system in response to a Safety System Functional Inspection (SSFI) in 1988. Action items associated with the findings resulting from this review have been completed. In addition, we will review appropriate procedures and training following completion of the design basis documentation, as previously discussed. Completion of the reviews is expected within twelve months following issuance of the design basis documentation. While this completion date extends beyond the next refueling outage, it is justified based on the scope of work necessary to generate the design basis documentation and perform the associated procedure reviews.

Similar procedure and training program reviews will be completed for North Anna Power Station. As previously noted, these reviews will be completed within twelve months following the issuance of the design basis documents. As with Surry, the extended completion dates are justified based on the scope of work. In addition to the programs described above, both stations are involved in a procedures upgrade program to review and upgrade the station procedures. This program will provide further assurance of the adequacy of service water procedures. Completion of the procedure upgrade program is planned for 1995.