WOLF CREEK
NUCLEAR OPERATING CORPORATION

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ET 94-0012

U. S. Nuclear Regulatory Commission
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Reference: Letter ET 90-0023, dated January 30, 1990, from F. T. Rhodes, WCNOC to R. D. Martin, NRC
Subject: Docket No. 50-482: Updated Response to Generic Letter 89-13

Gentlemen:

This letter updates information which was provided in the Reference. The Reference provided Wolf Creek Nuclear Operating Corporation's (WCNOC) response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." This generic letter required licensees to supply information about their respective service water systems to assure the NRC of compliance with General Design Criteria 44, quality assurance requirements, and to confirm that the safety functions of their respective service water systems were being met. WCNOC recently performed a functional self assessment of the service water systems. This self assessment focused on the areas of design, operation, maintenance, testing, training, regulatory compliance, chemistry and environmental controls, and corrective actions. As a result of the self assessment, it was determined that an updated response to Generic Letter 89-13 should be submitted to provide the current status of WCNOC's program.

The attachment to this letter provides the current status of WCNOC's program which was implemented to meet the recommendations of Generic Letter 89-13. As required by Generic Letter 89-13, the NRC will be notified within 30 days of implementation of all recommended actions or justified alternatives. This notification will indicate that all initial tests or activities have been completed and that continuing programs have been established. The recommended actions of the generic letter will be completed during the seventh refueling outage which is scheduled to begin in September 1994.

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If you have any questions concerning this matter, please contact me at (316) 364-8831, extension 4002, or Mr. Kevin J. Moles at extension 4565.

Very truly yours,

Forrest T. Rhodes
Vice President
Engineering

FTR/jra

Attachment

cc: L. J. Callan (NRC), w/a
G. A. Pick (NRC), w/a
W. D. Reckley (NRC), w/a
L. A. Yandell (NRC), w/a

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

Summarized below are Wolf Creek Nuclear Operating Corporation's (WCNOC) updated responses to each of the five recommendations of Generic Letter 89-13. The term "service water system" is defined in these responses as the system or systems that transfer heat from safety-related structures, systems, or components to the ultimate heat sink.

Recommendation 1: 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.

In WCNOC's original response to Generic Letter 89-13, it was stated that annual substrate sampling for Asiatic clams below, at and above the Make-up Water Screenhouse and monitoring clam movements on the Neosho River would be performed to identify movement towards the Wolf Creek Cooling Lake in advance of establishment of a population. In June 1991, Asiatic clams were discovered in the Wolf Creek Cooling Lake. Therefore, monitoring clam movement on the Neosho River will be discontinued since the clams have populated the cooling lake. Substrate sampling will continue to be performed in the cooling lake in addition to larval sampling that was initiated following the discovery of an Asiatic clam population. Larval sampling will be discontinued once spawning characteristics have been identified. Also, the chemical treatment program will continue to be utilized to prevent biofouling of the service water systems by the Asiatic clams. This methodology is consistent with the guidance of Enclosure 1 to the Generic Letter.

In accordance with the guidance of Enclosure 1 to Generic Letter 89-13, the circulating/service water and essential service water intake structures are visually inspected, once per refueling cycle, for macroscopic biological fouling organisms, sediment, and corrosion. Also, WCNOC has an established chemical treatment program for open-cycle service water systems. This treatment program consists of the addition of biocide, dispersant agents and corrosion inhibitors as required for biofouling and corrosion control.

Procedure SYS EP-204, "ESW Low Flow and Stagnant Component/Piping Chemical Treatment," provides instructions for the chemical layup and continuous chemical treatment of certain equipment and piping which are susceptible to stagnant or low flow conditions. The steps required to implement equipment or piping treatment, the chemical concentration and flow rates, and the injection times are provided in this procedure. Also, in order to ensure that redundant and infrequently used cooling loops are not fouled or clogged, procedure STN PE-037, "ESW Heat Exchanger Flow and DP Trending," is performed periodically to monitor flow and pressure drop through the safety-related service water heat exchangers. These units are normally flushed during the performance of STN PE-037 to aid in the elimination of silt buildup and in maintaining expected flows through the heat exchangers. The data obtained from this test provides an indicator of tube fouling levels.

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

Currently, thirty-two components are included in WCNOC's Generic Letter 89-13 program. These components are:

Component Cooling Water Heat Exchangers	(EEG01A & B)
Diesel Generator Intercooler Heat Exchangers	(EKJ03A & B)
Diesel Generator Lube Oil Heat Exchangers	(EKJ04A & B)
Diesel Generator Jacket Water Heat Exchangers	(EKJ06A & B)
Auxiliary Feedwater Pump Room Coolers	(SGF02A & B)
Spent Fuel Pool Room Coolers	(SGG04A & B)
Control Room Air Conditioning Units	(SGK04A & B)
Class I/E Air Conditioning Units	(SGK05A & B)
Safety Injection Pump Room Coolers	(SGL09A & B)
Residual Heat Removal Pump Room Coolers	(SGL10A & B)
Component Cooling Water Pump Room Coolers	(SGL11A & B)
Centrifugal Charging Pump Room Coolers	(SGL12A & B)
Containment Spray Pump Room Coolers	(SGL13A & B)
Electrical Penetration Room Coolers	(SGL15A & B)
Containment Coolers	(SGN01A & B & C & D)

Initial heat transfer testing was completed by the end of the fifth refueling outage with testing scheduled through the seventh refueling outage. A performance verification was to be conducted each fuel cycle by empirical calculations using test data obtained while the components were under a significant load. Therefore, following three fuel cycles, the best frequency for testing could be determined based on the results of the empirical calculations. However, achieving plant line-up conditions providing heat loads coincident with valid test data has proved to be exceedingly complex, especially for some components. As an alternative, a representative room cooler was selected to indicate the performance capability of other coolers similar in design and configuration.

It was also determined that ten of the thirty-two heat exchangers were not well suited to heat transfer verification testing due to their unique design applications. These were the Diesel Generator Heat Exchangers (EKJ03A & B, EKJ04A & B, EKJ06A & B), the Control Room Air Conditioning Units (SGK04A & B), and the Class I/E Air Conditioning Units (SGK05A & B). The Diesel Generator Heat Exchangers carry heat loads which are not easily determined by field instruments due to temperature modulating valves and the Control Room and Class I/E Room Air Conditioning Units are water-to-freon heat exchangers which involve quantifying phase changes, enthalpy changes and, transient flow patterns. For these reasons, mechanical and/or chemical cleaning is performed for corrosion or deposit removal. Also, this group of heat exchangers is visually inspected for erosion, corrosion, biofouling, pitting, and wall thinning. This maintenance program is currently performed once per refueling cycle on these particular components.

During implementation of the heat transfer verification testing program in the fifth refueling outage, unforeseen "As Low As Reasonably Achievable" (ALARA) concerns restricted the testing program to only one, SGN01D, of the four Containment Coolers. The heat transfer capability of the sample cooler, SGN01D, will be indicative of the performance of the other three coolers and the test results obtained during the fifth, sixth, and seventh refueling outages will be used to determine an optimum testing frequency for the four Containment Coolers.

Component Cooling Water Heat Exchangers (EEG01A & B) were both tested during the fifth refueling outage. Since the main heat load for these heat exchangers originates from the Residual Heat Removal System, the time frame available for testing is quite limited. After reviewing test data, Component Cooling Water Heat Exchanger "B" was selected as the representative sample for the pair based on ease of testing. Heat Exchanger EEG01B test results obtained during the fifth, sixth, and seventh refueling outages will be used to determine an optimum testing frequency for both heat exchangers.

During the fifth refueling outage, all sixteen of the remaining coolers were heat transfer tested. Based on the results of these tests, Residual Heat Removal Pump Room Cooler "A" and Electrical Penetration Room Cooler "B" were selected as the representative sample coolers. The performance of these two room coolers will be indicative of the performance capability of the other coolers based on similar design and configuration. Additional test results obtained through the seventh refueling outage will be used to determine the best testing frequency for these sixteen coolers.

Currently, a program is in place to periodically monitor flow and pressure drop through all thirty-two heat exchangers, to periodically clean and inspect the ten units aforementioned, and to verify the heat transfer capability of four representative heat exchangers. With these activities continuing through the seventh refueling outage, a monitoring, cleaning, inspecting, and testing strategy will be determined based on compiled test results and maintenance history.

Recommendation 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.

Currently, procedure ADM 01-100, "Lake Water Systems Inspections, Monitoring, and Maintenance Programs," establishes the methods and actions to monitor, inspect, and maintain systems which utilize raw lake water to prevent degradation caused by corrosion, erosion, silting and biofouling. Specifically, this procedure establishes that the inspection program consists of: periodic visual inspections of selected safety and non-safety related heat exchangers to search for evidence of erosion, corrosion, biofouling, and silt buildup; non-destructive and visual examinations of selected piping and components identified to be potentially degraded. In addition, the maintenance program consists of: periodic mechanical and/or chemical cleaning of heat exchanger tubes to remove corrosion and sediment deposits; coating of the interior surfaces of piping and heat exchanger heads when determined to be necessary; and heat exchanger repairs when results of visual inspections and non-destructive examinations indicate tube degradation requiring corrective action.

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

In response to Generic Letter 89-13, a review was conducted of the safety-related service water systems (Essential Service Water and Component Cooling Water) to confirm the ability of the systems to perform required safety functions in the event

of failure of a single active component. This review concluded that the two safety-related systems are designed to ensure that their safety function could be performed assuming a single active component failure coincident with the loss of offsite power (General Design Criteria 44, Safety Design Basis Three). Pre-operational system walkdowns were also conducted prior to initial plant operation to ensure that the as-built plant systems (including the service water systems) were in accordance with the appropriate licensing basis documentation. In addition, the service water systems' ability to perform their intended function is verified through the ASME Section XI "Inservice Inspections," program.

Recommendation 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.

In response to Generic Letter 89-13, an evaluation was performed of maintenance practices, operating and emergency procedures, and training related to the service water systems. Maintenance practices include corrective and preventive maintenance. The problem identification, corrective action, and post maintenance testing to verify operability of equipment are performed and documented in accordance with the established work control program. Preventive maintenance is performed in accordance with vendor recommendations, component history and industry experience. Review and detail of maintenance instructions is of sufficient depth to minimize human error in the performance of maintenance tasks.

Relevant operating and emergency procedures include alarm response, system operating, emergency response, surveillance, and off-normal procedures. These procedures are reviewed, revised, and upgrade, as necessary, periodically to ensure the technical accuracy of the procedures. The emergency response procedures have been reviewed and revised to ensure conformance with Revision 1B of the Westinghouse Owners Group Emergency Response Guidelines. Also, concurrent with the issuance of Generic Letter 89-13, a comprehensive review of Technical Specifications was conducted to ensure that all required surveillance's were specifically met by the surveillance program. The established procedure change process ensures that potential procedure problem areas are corrected or clarified upon discovery and the plant modification process incorporates provisions for necessary procedure changes to be in place when a modification is complete.

Training is provided for the operation and maintenance of the service water systems in several programs. Non-licensed operators receive comprehensive system training as part of the initial watch station segment training with requalification training determining satisfactory retention of system knowledge. Licensed operators receive detailed system training as a portion of both the hot license program and license requalification. This includes direct system training, industry event review and discussion, and simulator scenarios involving varying degrees of system malfunction. In addition, the operator training program conforms fully to NRC and Institute of Nuclear Power Operations (INPO) requirements. The maintenance training and requalification program documents classroom and "on-the-job" training and is fully accredited by INPO. Maintenance craft personnel also must demonstrate proficiency on a task prior to controlling the associated component work activities.

The above summary of the review conducted of maintenance practices, operating and emergency procedures and training related to the service water system confirms that established programs minimize errors in the operation, repair, and maintenance of the service water system.