UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-369/85-04 and 50-370/85-04

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-369 and 50-370 License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Inspection Conducted: February 4-8, 1985

Inspector: W J Ross 2/26/85
W. J. Ross Date Signed

Approved by: J D Blake 2/26/85
J. J. Blake, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This special unannounced inspection entailed 38 inspector-hours on site in the areas of plant chemistry and inservice testing (IST) of pumps and valves.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

*M. D. McIntosh, Station Manager
*T. L. McConnell, Superintendent of Technial Services
*R. P. Michael, Station Chemist
A. C. Best, Primary Chemistry Supervisor
M. E. Bridges, Secondary Chemistry Supervisor
S. J. Chapman, Environmental Chemistry Supervisor
*R. P. Johansen, Test Engineer
L. R. Kimray, Power Chemistry Coordinator
T. Lukowski, System Performance

Other licensee employees contacted included engineers, technicians, and operators.

NRC Resident Inspectors

*W. T. Orders
*R. C. Pierson

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on February 8, 1985, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee.

Unresolved Item - (Open) 50-369/85-04-01 (ND) and (SI) Valve Stroke Times. (Paragraph 6).

The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved Items are matters about which more information is required to determine whether it is acceptable or may involve a violation or deviation. A new unresolved item is identified in Paragraph 6.

5. Plant Chemistry (92706)

The inspector reviewed the licensee's implementation of the secondary water chemistry program, since the last inspection of these activities in January 1984, and re-assessed the degree to which the integrity of the primary-coolant pressure boundary had been ensured by this program. Special attention was given to the licensee's response to an abnormal secondary chemistry transient, related to Unit 1, that had occurred immediately before this inspection, on January 31, 1985. The inspector also was informed that sludge lancing of the steam generators of Unit 2 had been initiated during the first refueling outage of this Unit; however, results of the lancing were not yet available.

On January 31, 1985, as the result of instrumentation failure while Unit 1 was operating at full power, the water in the high-pressure feedwater heater drains was dumped to the condenser hotwell and, subsequently, flashed to steam and caused the failure of one stainless steel condenser tube. The resulting inleakage of condenser cooling water (from Lake Norman) caused the condensate/feedwater/steam generator water to be contaminated to the extent that the lowest level of corrective action (Level 1) required by the water chemistry program was invoked for approximately 10 hours. This action was taken to bring the contaminated steam generator water (~83 ppb sodium and cation conductivity of 2.2 umho/cm) back within the limits established for plant operation (<20 ppb of sodium and cation conductivity of <0.8 umho/cm). Actually, the values for these two key parameters in the steam generators water are normally maintained below 5 ppb and 0.4 umho respectively.

The inspector discussed this transient with members of the Chemistry Staff and reviewed the strip recorder charts that had registered the changes in cation conductivity of the steam generators water during the transient. The licensee had been able to identify the inleakage very quickly and to correct the cause without power reduction and before the condition developed into a significant corrosion problem by taking the actions designated in Enclosure 3.4.4 to the McGuire Chemistry Manual. Recovery from the transient was achieved by increasing steam generator blowdown and by increasing the normal flow of condensate through the condensate polishers from 10 per cent to 75 per cent full flow.

The inspector credits the minimal time of exposure of the steam generator to potentially corrosive environment to both the design of the secondary cycle and the elements of the secondary water chemistry program. Further inspection of both of these factors indicated that the licensee is taking, or is planning to take, additional actions to increase its capability to protect the integrity of the steam generators. These actions include the following:

- adding three new pumps to the condenser hotwell so that samples can be taken from all four waterboxes and, thereby, expedite identification of leaking condenser tubes.

- test a new design of condensate polisher element in an attempt to reduce leakage of ion-exchange resins through the elements and into the

feedwater. The feasibility of installing filters in the feedwater lines to achieve the same goal is also being considered.

- replacing the original copper-alloy tube bundles in the moisture separator reheaters with stainless steel tubes to eliminate the possibility of transporting copper to the steam generators and, possibly, initiating localized corrosive environments.

- revising the McGuire Chemistry Manual to make it even more consistent with the guidelines developed by the Steam Generator Owners Group (SGOG) and the Electric Power Research Institute (EPRI).

The inspector established that the Chemistry Manual places limits on key chemical parameters in the secondary cycle when the plant is in Wet Layup and Cold Shutdown as well as when it is in four distinct modes of heatup, power escalation, and power operation. Both the condensate polishers and steam generator blowdown are used to achieve cleanup during plant startup and to minimize the amount of corrosion products that are transferred to, and retained in, the steam generators. Provisions are made in the operating procedure for Power Ascension (OP/1 or 2/A/6100/03) for ensuring that the quality of steam generator blowdown meets specified limits prior to power ascension above 5% (to verify cleanliness of the condensate/feedwater lines) and also above 30% power (to verify cleanliness of the extraction steam and feedwater heater drain lines). Similarly, during normal plant shutdown, cooldown is held at 350° to maximize sulfate hideout return. The 'hold' is maintained until the concentration of sulfate in the steam generator blowdown has been lowered to less than 100 ppb.

The inspector re-assessed the licensee's secondary water chemistry program in relation to the SGOG/EPRI guidelines for minimizing the magnitude and duration of off-normal chemistry events, especially if an event has the potential for rapid corrosion of the steam generator. While the objectives and philosophy underlying the three-level response to abnormal secondary water chemistry are clearly defined in the Chemistry Manual, the operating procedures used by Operations personnel do not refer to chemical parameters or to the actions needed if these parameters exceed levels that could result in corrosion of the steam generator. Also, since there are no monitors of secondary chemistry parameters available in the Control Room, the Control Room Operators are dependent on the Chemistry Staff for notifications of off-normal situations. After interviewing several operations personnel, the inspector was not certain that the concepts of the SGOG/EPRI limits, and action statements based on these limits, were well understood. Also, the inspector could not identify any instructions in the Operating Instructions relative to initiating corrective actions in the event of an abnormal secondary chemistry event.

The Chemistry Manual instructs the Chemistry Staff to alert the Control Room Operators of an abnormal secondary chemistry event and to recommend appropriate corrective action, including shutdown if necessary, based on the three Action Levels specified in Enclosure 3.5.4 to the Chemistry Manual. The inspector was also informed that the Chemistry Staff's recommendation would

be routinely discussed with personnel in the licensee's corporate office in Charlotte, North Carolina, before being given to the Control Room Operators.

The inspector discussed with plant management the possibility that in the case of a severe abnormal secondary chemistry event (Level 3 in the Chemistry Manual) the Control Room Operators would not take corrective actions in a timely manner for two reasons. Although these operators would be promptly notified that certain chemistry parameters were greater than Level 3 limits, the significance of this notification might not be understood to the extent that action would be taken on their own initiative, i.e., before receiving further recommendation from the Chemistry Staff. Secondly, the Chemistry Staff might not be able to make a recommendation in a timely manner, especially if the event occurred on a backshift or holiday. In response, the licensee committed to review the plant's procedures relative to abnormal secondary chemistry events.

The inspector also reviewed the licensee's procedures for managing data acquired with inline instrumentation and grab samples. During the past year, a comprehensive computer data base has been developed for all aspects of the Chemistry program. By use of this system, the inspector audited the results of tests performed per Technical Specifications and the Chemistry Manual and reviewed trends of selected chemistry parameters used to diagnose and control primary and secondary water chemistry. On the basis of this audit, no violations or deviations were identified.

The inspector was also able to establish that no significant 'out-of-specification' event had occurred in either unit during the past five months (since the computerized system has become available) except during the inleakage discussed earlier that was caused by a condenser tube failure.

The inspector also reviewed the licensee's use of the "Iontrac" ion-chromatrographic system for the determination of very low concentrations of anions, monovalent cations, and divalent cations. The inspector considered that this system, as well as the computerized trending capability, is being used effectively to monitor 'throw' and leakage of resin from the condensate polishers and to maintain the concentrations of such corrosive ions as sulfate and chloride within the limits set for steam generator water (<20 ppb).

Within the areas inspected, no violations or deviations were identified.

6. Inservice Testing of Pumps and Valves (92706)

The licensee is currently implementing the requirements of the McGuire Technical Specifications and of Section XI of the ASME Code under interim NRC approval of a proposed Pump and Valve Test Program while a number of requests for relief from the code are being reviewed.

During this inspection, the inspector established that the licensee has established the administrative means for implementing the necessary elements of the program; i.e., preparation of procedures, scheduling and performance of tests, reviewing test results and taking appropriate corrective action

where needed, and calibration of test equipment. Each Periodic Test provides the following information and instructions pertinent to the test:

- types of test equipment
- limits and precautions
- required operational status of the plant and condition of the system to be tested
- description of test and acceptance criteria
- data required
- post-maintenance tests

The inspector audited test data acquired on Unit 1 with the following two procedures during the operational life of this Unit (since January 1981).

- PT/1/A/4204/02 Residual Heat Removal Valves (ND) Stroke Timing - Quarterly
- PT/1/A/4206/02 Safety Injection Valves (NI) Stroke Timing - Quarterly

As the result of this audit, the inspector identified two valves where the stroke times appeared to be inconsistent with the type of valve and with the reference values. Valve ND34 is a Category B, 8-inch, motor-operated valve used to control bypass around the RHR (ND) heat exchangers. This valve has a reference stroke time of 60 seconds, yet all the test results have been documented as 0.0 seconds. The stroke time for the same valve in Unit 2 has been recorded as 17-18 seconds.

Likewise, valve NI 332 A in the crossover from the Chemical and Volume Control System to the Safety Injection Pump had recorded stroke times of 0.0 seconds for the first 3.5 years, then stroke times of 5 to 6 seconds have been recorded during the most recent tests. The reference stroke time for this valve is 10 seconds.

The licensee was not able to explain the significance of the instantaneous stroke times documented for these two valves or why the valves had been considered to be operable. Inasmuch as both of these valves provide safety-related functions, the licensee committed to immediately verify that the valves are actually operable and will pass design flow when required. This matter is designated as Unresolved Item 50-369/85-04-01, ND and SI Valves Stroke Times, until additional information is provided by the licensee.

Within the areas inspected, no violations or deviations were identified.