



**New York Power
Authority**

April 18, 1991
JPN-91-015

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Mail Station P1-137
Washington, DC 20555

SUBJECT: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Updated Response to Generic Letter 89-13
Service Water System Problems Affecting
Safety-Related Equipment

- REFERENCES: 1. NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," dated July 18, 1989.
2. NRC letter, R. Hehl to W. Fernandez dated October 9, 1990 regarding results of the August 21, 1990 enforcement conference (Inspection Report 50-333/90-04).

Dear Sir:

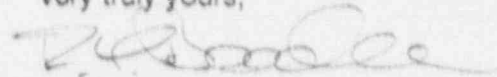
Attached is an updated response to NRC Generic Letter 89-13 (Reference 1) for the James A. FitzPatrick Nuclear Power Plant. The NRC staff requested that the Authority prepare and submit this update during an August 21, 1990 enforcement conference at the NRC's Region I offices (Reference 2). The updated response outlines the Authority's progress in each of the five issues in GL 89-13.

Based on the results of inspections and tests, the Authority's original plans are adequate to assure that these systems and components are capable of fulfilling their intended function. The Authority is implementing the plans and schedules as originally described. Other than service water system problems already described to the staff, tests and inspections have not identified any conditions that would degrade overall plant safety. Consequently, no additional tests or inspections are necessary to satisfy the recommendations of the Generic Letter.

Added 1/1

If you have any questions regarding this updated response, please contact
Mr. J. A. Gray, Jr.

Very truly yours,



Ralph E. Beedle
Executive Vice President
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cc: U. S. Nuclear Regulatory Commission
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New York Power Authority
James A. FitzPatrick Nuclear Power Plant

**Updated Response to NRC Generic Letter 89-13
Service Water System Problems
Affecting Safety-Related Equipment**

1.0 INTRODUCTION AND BACKGROUND

This is an updated response to NRC Generic Letter 89-13 (Reference 1) for the James A. FitzPatrick Nuclear Power Plant. The NRC staff requested that the Authority prepare and submit this update during an August 21, 1990 enforcement conference at the NRC's Region I offices (Reference 2). The updated response outlines the Authority's progress in each of the five issues in GL 89-13.

In its original response (Reference 3), the Authority adopted the recommendations of Generic Letter 89-13, or justified an alternate means of assuring that the FitzPatrick service water systems are capable of performing their safety functions. The NRC staff subsequently reviewed and approved the Authority's plans and schedules (Reference 4).

Since then, the Authority has made significant progress towards the program's goal. Work associated with each of the five Generic Letter items is on schedule. Baseline tests and inspections are nearing completion. Long-term programs will start replacing baseline tests and inspections in January 1992. Reviews of the service water system licensing basis as well as maintenance, operating and emergency procedures and a single failure analysis are on schedule and will be finished by January 31, 1992. As requested in the Generic Letter, the Authority will confirm in writing that all recommended actions or justified alternatives have been implemented.

Based on the results of inspections and tests, the Authority's original plans are adequate to assure that these systems will be capable of fulfilling their intended function. Other than service water system problems already described to the staff, tests and inspections have not identified any problems that could degrade overall plant safety. Consequently, no additional tests or inspections are necessary to satisfy the recommendations of the Generic Letter.

1.1 Other NYPA Initiatives

During the 1990 refueling outage inspection of the FitzPatrick service water systems, the Authority created a Service Water Task Force with four primary objectives:

- Identify Emergency Service Water (ESW) deficiencies
- Recommend ways of correcting deficiencies

- Recommend modifications to allow improved system testing
- Conduct system testing to assure that system performance meets design basis requirements

A Technical Service System Engineering memorandum was prepared (Reference 5) to summarize the task force's findings. The Authority will implement some of these recommendations during the next refueling outage.

2.0 REVISED RESPONSE TO FIVE GENERIC LETTER 89-13 ISSUES

2.1 Surveillance and control techniques to reduce the incidence of flow blockage as a result of biofouling (Item I)

Revised Test Procedures

Test procedures have been revised to require the flow testing of sections of "dead-leg" piping and check valves that are not exercised frequently.

Biofouling Controls - Zebra Mussels

The Authority started to test for the presence of zebra mussels in the FitzPatrick intake structure and lake cooling water during the 1990 breeding season. Mussels were detected but not in sufficient numbers to cause fouling or require countermeasures. Periodic tests will resume when lake water temperature rises to 40 degrees Fahrenheit.

The Authority plans to use two techniques to control biofouling at FitzPatrick: chlorine injection and thermal backwash. A chemical addition system is also under consideration.

Temporary Chlorine Treatment System

A temporary chlorination system, installed in 1990, was recommended by the Authority's Zebra Mussel Task Force (Reference 6). Chlorine injection will prevent biofouling in four of five systems drawing lake water (Normal Service Water, Emergency Service Water, Residual Heat Removal Service Water, and Fire Protection). Lake water entering the Circulating Water system will not be chlorinated because of the large quantity of water drawn by this system. Water entering the new diesel fire pump will not be chlorinated because this pump is used infrequently and takes suction upstream of the Circulating Water system pumps. However, the Fire Protection System is chlorinated from the system makeup pump.

A 12.5 percent (by weight) solution of sodium hypochlorite (NaOCl) is injected into the service water forebays through preexisting access hatches. NaOCl is stored in a three-thousand gallon tank located on the north side of the FitzPatrick screenwell building. The tank is constructed of cross-linked high density polyethylene. A concrete dike capable of holding the contents of a full tank surrounds the tank. Two hydraulically actuated diaphragm type metering pumps with a maximum flow of 31 gallons per hour are located in the chlorine storage house. The flow from each pump is manually adjustable.

The system is manually controlled and can be used to continuously inject NaOCl solution into the Normal Service Water System. Since the safety-related service water systems are not normally in service, a solution will be supplied to the forebays serving these systems intermittently.

Based on two Normal Service Water pumps in operation, a design peak demand of 2 ppm and a residual chlorine demand of 0.1 ppm, approximately 25 gph of NaOCl will need to be injected. This is within the capacity of a single pump.

The Authority has evaluated the potential consequences of NaOCl tank rupture. This evaluation concludes that, because NaOCl is not toxic at the concentrations that would exist at the control room intakes, its onsite storage will not effect control room habitability.

Thermal Backwash

Thermal backwash may also be used to kill mussels in the FitzPatrick intakes. Heated water can be supplied to the intakes through a reverse flow tunnel. Although this feature was part of the original plant design (Reference 7), conditions have not necessitated its use until the recent detection of zebra mussels.

The Authority used divers to inspect the reverse flow tunnel during the 1991 maintenance outage. Divers found the tunnel to be clogged with sand and silt. The Authority evaluated this condition (Reference 8) and concluded that this condition has no affect on overall plant safety.

Samples of the deposits were taken and sent to a laboratory for analysis. During the next planned plant shutdown, the tunnel will be cleared of silt and a test conducted to confirm the operability of this design feature.

Divers also inspected portions of FitzPatrick's discharge tunnel, intake tunnel and Emergency Service Water pump forebays for evidence of silting and mussel infestation during the 1991 maintenance outage. No significant accumulation of sand or silt was found. Zebra mussels were detected at very low concentrations - less than 10 per square meter.

2.2 A test program to verify the heat transfer capability of all safety-related heat exchangers cooled by service water (Item II)

Crescent Area, Cable Tunnel and Electric Bay Coolers

Baseline performance tests of the Crescent Area Unit Coolers, Cable Tunnel Coolers/Switchgear Room Cooler and Electric Bay Unit Cooler heat exchangers were completed during the 1990 refueling outage. The results of these tests indicate that their performance is acceptable.

Modifications have been installed to reduce the personnel radiation exposure associated with routine surveillance testing and improve the performance and testability of Crescent Area Unit Coolers. Similar modifications are being considered for the Cable Tunnel and Electric Bay Unit Coolers.

The Authority has been testing the Crescent Area Coolers on an accelerated basis for approximately 3 years. The Cable Tunnel and Electric Bay Coolers have been tested biannually for the past year. The Authority believes it has a good understanding of what affects cooler performance. To avoid excessive testing, the Authority is considering revising the test procedures and test. This may include additional types of testing (visual, hydraulic, temperature, or heat transfer). Performance changes detected during one type of test would be used to trigger other more extensive tests. Heat exchanger performance testing would continue to be performed on a periodic basis, as determined by test results. This approach is still under evaluation and no schedule for its adoption has been set.

Control Room and Relay Air Handling Units (AHU)
Ventilation and Emergency Diesel Generator Heat Exchangers

The Authority will not conduct performance testing of either the Control Room AHUs, Relay Room AHUs or the Emergency Diesel Generator Heat Exchangers. In lieu of performance testing, the Authority will conduct periodic visual inspections of these heat exchangers. These heat exchangers are in closed-loop, glycol-based systems which are not prone to fouling.

Because the physical arrangement and nature of these heat exchangers, meaningful test results cannot be obtained without complicated and expensive testing. For example, the longest segment of piping in the closed loop portion of the EDG jacket cooling system is too short for accurate flow measurement. Testing is further complicated by the bimetallic thermostat which automatically adjusts flow as a function of coolant temperature.

Eddy Current Testing

As stated in the Authority's original response to Generic Letter 89-13 (Reference 3), eddy current was used during the 1990 refueling outage to assure heat exchanger tube integrity. Eddy current tests were performed on the Emergency Diesel Generator

Coolers and one Residual Heat Removal heat exchanger. These tests did not reveal any significant corrosion or fouling.

2.3 Inspection and maintenance program for service water system piping and components (Item III)

Piping Inspections/Maintenance

A piping inspection program is under development and will be in place before startup from the 1991 refueling outage. The program will focus on those areas most likely to trap silt or corrode and consider using nondestructive test methods currently under development by EPRI. The program will include periodic pipe wall thickness measurements and trending to detect areas of high corrosion.

The Authority is also investigating an on-line chemical addition system that may reduce biofouling. However, the chemicals to be used require approval by environmental authorities. If the system is proven to be effective and the required approvals can be obtained, the Authority will consider installing this type of system.

Eddy Current Inspections/Maintenance

A Plant Standing Order (PSO-57, "Eddy Current Testing Program") has been prepared and implemented until a comprehensive program is prepared. PSO-57 establishes administrative controls for eddy current testing, limits the number of tubes that may be plugged in safety-related heat exchangers and recommends tube plugging limits for non-safety-related heat exchangers. PSO-57 also outlines personnel responsibilities. A table in PSO-57 summarizes heat exchanger characteristics - tube and shell fluids, QA category, eddy current or thermal performance testing, number of tubes, and type.

Procedures for eddy current inspection of Emergency Diesel Generator and Residual Heat Removal (RHR) heat exchangers have been written. These procedures include opening, cleaning and inspecting heat exchanger tubes, channels and other accessible areas for degradation.

Past inspections of the closed-loop side of the Reactor Building Closed Loop Cooling Water System (RBCLWS) identified corrosion product buildup. During the 1990 refueling outage, the only safety-related heat exchangers serviced by the RBCLWS (the RHR pump seal coolers) were inspected. The pump seal coolers exhibited no evidence of fouling or corrosion. Consequently, no chemical corrosion inhibitors were added to the system.

2.4 Service water system licensing bases review (Item IV)

The Authority has started its review of the FitzPatrick service water system licensing bases, past plant modifications and equipment specifications. This work is on schedule and will be completed by January 31, 1992. (As the Authority noted in its original response, Reference 3, the FitzPatrick plant licensing basis for the service water system was established prior to the issuance of General Design Criteria 44, 45 or 46.)

Walk-downs to confirm the as-built configuration of safety-related service water systems have been completed (Reference 9). Using plant drawings, walk-downs of Emergency Service Water and RHR Service Water Systems confirmed the existence and location of pumps, heat exchangers, coolers and isolation valves. The configuration of main and branch lines was also confirmed. Non-safety related portions of these systems, including instrumentation, manual valves and dimensions were not checked. These walkdowns identified drawings errors, like a missing restricting orifice, and missing or incorrectly located valves. Drawings will be revised to correct these errors.

A draft single-active-failure analysis of the FitzPatrick Service Water System has been completed and is currently under review by the Authority. This draft analysis indicates that the system is capable of performing its intended safety function even assuming a single active failure. The Authority will finish its review and complete the final report by January 31, 1992.

**2.5 Maintenance practice, operating and emergency procedures and training
(Item V)**

The Authority has started its review of SWS procedures and training materials. This review will assure that the safety-related features of FitzPatrick's SWS are described in training materials and maintained by procedures. Operating procedures, maintenance procedures, abnormal and emergency procedures, inspection procedures and training manuals are included in the review. These reviews are on-schedule. Procedures and training materials will be revised to incorporate the results of this review by January 31, 1992.

NUREG-1275 (Reference 10) is being reviewed by the Authority. This review will be completed and problems applicable to the FitzPatrick SWS will be identified by January 31, 1992. Plans and schedules for plant modifications or other corrective actions to address these concerns will be completed by July 31, 1992.

3.0 REFERENCES

1. NRC Generic Letter 89-13 "Service Water System Problems Affecting Safety-Related Equipment," dated July 18, 1989.
2. NRC letter, C. W. Hehl to W. Fernandez dated October 9, 1991 regarding results of the August 21, 1990 enforcement conference (Inspection Report 50-333/90-04).
3. NYPA letter, J. C. Brons to USNRC (JPN-90-015) dated February 13, 1990 responds to Generic Letter 89-13.
4. NRC letter, D. E. LaBarge to J. C. Brons dated March 26, 1990 regarding response to Generic Letter 89-13, TAC 74003).
5. NYPA Technical Services System Engineering Memorandum JSEM-91-010 dated February 14, 1991 regarding Emergency Service Water System Modifications and Maintenance Activities Planned for the 1991 and 1993 Refueling Outages.
6. NYPA Nuclear Safety Evaluation JAF-SE-90-074 dated October 10, 1990 regarding modification F1-90-038 entitled "Temporary Chlorine Water Treatment System for the JAF Service Water Systems."
7. FitzPatrick Final Safety Analysis Report, Section 12.3.7, "Intake Structure and Tunnels."
8. NYPA FitzPatrick Technical Services System Engineering Memorandum JSEM-91-0021 dated March 16, 1991 regarding "Reasonable Assurance of Safety (JAF-RAS-91-001) Circulating Water Reverse Flow Gate Blocked with Sand."
9. NUTECH Report "New York Power Authority, James A. FitzPatrick Nuclear Power Plant, Emergency Service Water (ESW) and Residual Heat Removal Service Water (RHRSW) Design Basis Configuration Walkdown in Response to NRC Generic Letter 89-13" dated July 1990, NUTECH project number XNY-10.
10. NUREG-1275, "Operating Experience Feedback Report - Service Water Failures and Degradations," Volume 3, November 1988.