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New York Power Authority

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April 15, 1991
JAFP 91-0228

U. S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Attn: Mr. Charles W. Hehl,
Director - Division of Reactor Projects

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT - DOCKET NO. 50-333
UPDATE OF THE STATUS OF ACTIVITIES FOR THE EMERGENCY SERVICE WATER SYSTEM

References:
a. NRC letter, C.W. Hehl to W. Fernandez dated October 9, 1990 regarding August 21, 1990 enforcement conference.
b. NYPA letter, J.C. Brons to NRC dated January 16, 1990 (JPN-90-011) regarding proposed change to the Technical Specifications regarding crescent area unit coolers improvement (JPTS-89-032).
c. NRC letter, D.E. LaBarge to J. C. Brons dated April 11, 1990 regarding issuance of Technical Specification Amendment 156.

Attachments:
1. Update of the Status of Previous NRC Commitments presented at the August 21, 1990 Enforcement Conference
2. ESW System Testing Program
3. As-built Crescent Area Unit Cooler Control Configuration Description

Dear Mr. Hehl:

In Reference (a) the NRC staff requested that the Authority prepare and submit a report summarizing the current status of known commitments associated with the FitzPatrick Emergency Service Water (ESW) System and the crescent area coolers. The staff also asked that the Authority address the ESW system testing program, any ESW system related Technical Specification changes that the Authority might propose, and a revised response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment."

NRC Generic Letter 89-13

The Authority will submit an updated response to NRC generic letter 89-13 not later than April 30, 1991.

ESW - Crescent Area Cooler Commitments

Authority commitments associated with either the ESW system or crescent area coolers are summarized in Attachment 1. This version reflects the current status of ESW/crescent area cooler commitments and minor editorial improvements. A previous version was distributed at the August 21, 1990 enforcement conference.

ESW Test Program Description

The Authority's ESW test program at FitzPatrick is summarized in Attachment 2. It briefly describes each of the surveillance tests, the test frequency and the components tested.

Technical Specification Improvements

During the August 21, 1990 ESW enforcement conference, the Authority identified the limitations of the "shut off head" ESW pump surveillance test currently required by the FitzPatrick Technical Specifications. The Authority will propose a Technical Specification change to revise the test requirements to be consistent with the appropriate portions of ASME Section XI and the FitzPatrick inservice inspection and test program. The surveillance tests and minimum acceptance criteria will be similar to those approved by the NRC for other licensees. The test currently under consideration will require relief from Section XI. The Authority will prepare and submit technical specification changes no later than September 1, 1991.

Update on Crescent Area Unit Cooler Modifications

To improve the reliability of the crescent area coolers, the Authority recently completed modifications that will reduce the potential for silt accumulation in the coolers. Instead of

throttling cooling water flow to the coolers, continuous cooling water flow is being supplied to the coils of 8 of the 10 unit coolers. Control circuits were modified to actuate the cooler fans as a function of area temperature. Technical Specification changes associated with these improvements were submitted by the Authority (Reference b) and subsequently approved by the NRC (Reference c).

The current configuration of the crescent area unit cooler control system is not consistent with the description included in the authority's application. A design change, prepared and approved after Amendment 156 to the Technical Specifications had been issued by the NRC, reduced the number of coolers affected by the modification from ten to eight. However, the actual Technical Specifications pages issued by the NRC are unaffected by these alterations; the FitzPatrick Technical Specifications are correct and accurate. The conclusions in the Authority's safety evaluation are still valid.

The NRC Project Manager for FitzPatrick, after being notified of this change, asked that the Authority submit a description of the modifications as they were installed. Attachment 3 is a brief description of the crescent area cooler control system as it exists today.

Any questions regarding the matters discussed above should be addressed to Mr. Christopher Ponzi of my staff at (315) 349-6564.

Very truly yours,

WILLIAM FERNANDEZ II

WF:CJP:bnr
Attachments

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A. LER 88-009-01

	COMMITMENTS	STATUS
1.	Install permanent instrumentation to monitor crescent cooler thermal performance.	COMPLETE
2.	Biweekly crescent cooler testing until modifications are completed.	ON-GOING - Biweekly testing will continue until the current cooler performance reassessment is completed.
3.	Modify crescent unit cooler fan and water controls to allow full water flow, cycle the fan and install additional thermal performance instrumentation. The modification was to be installed prior to start-up from 1990 Refuel Outage. The Completion date was delayed until September 30, 1990 (JPN-90-11). The modification has been completed.	COMPLETE

B. RESPONSE TO VIOLATION 88-17 - INOPERABLE CRESCENT COOLERS

	COMMITMENTS	STATUS
1.	Revise ST-19A to better measure cooler performance bi-weekly.	COMPLETE
2.	Clean and inspect coolers.	COMPLETE
3.	Reanalyze crescent cooler heat loads to demonstrate acceptable cooling with service water temperature up to 82°F.	COMPLETE
4.	Modify piping to reduce accumulation of suspended solids.	INCOMPLETE - Modifications will be determined by the effects that full flow through the crescent coolers and chlorine injection have on silt and corrosion deposits.

B. **RESPONSE TO VIOLATION 88-17 - INOPERABLE CRESCENT COOLERS** (continued)

	COMMITMENTS	*STATUS*
5.	Install larger mesh strainers.	COMPLETE
6.	Replace missing section of flanged pipe to UC-22J.	COMPLETE
7.	Revise piping arrangement to UC-22D.	COMPLETE
8.	Initiate performance testing of other service water-cooled safety-related heat exchangers.	COMPLETE
9.	Maintain accelerated test frequency for crescent area unit coolers until performance trend improves.	ON-GOING - Biweekly testing will continue until the current cooler performance reassessment is completed.
10.	Review all Technical Specification surveillance requirements and ensure they are contained in STs and are performed on schedule.	COMPLETE
11.	Establish System Engineering Group.	COMPLETE
12.	Reorganize the WPO Engineering Staff so that engineering personnel are assigned exclusively to the Authority's nuclear plants. This corporate engineering organization reports directly to the Executive Vice President for Nuclear Generation.	COMPLETE
13.	Develop Modification Control Manual and Design Change Manual.	PARTIALLY COMPLETE The Modification Control Manual is complete. The Design Control Manual has been implemented at the corporate office and is scheduled to be implemented at the Site by 7/1/91.

B. **RESPONSE TO VIOLATION 88-17 - INOPERABLE CRESCENT COOLERS** (continued)

	COMMITMENTS	*STATUS*
14.	Develop a formal root cause analysis program.	PARTIALLY COMPLETE (WACP 10.1.27) - The procedure for root cause analysis methodology has been implemented. An integrated causal action program has been defined. The implementing procedure is being developed for initiation this summer.

C. **RESPONSE TO VIOLATION 88-23 - HIGH SERVICE WATER TEMPERATURE**

	COMMITMENTS	*STATUS*
1.	Revise FSAR to address 82°F lake temperatures. Awaiting incorporation into revision.	INCOMPLETE Safety Evaluation is complete. FSAR Change Request has been submitted and will be incorporated into the 1991 FSAR update.
2.	Train engineering personnel on 10 CFR 50.59 safety evaluation preparation and importance.	COMPLETE
3.	Formalize the method for promptly evaluating deviations from the FSAR.	COMPLETE (NGP-38)
4.	Train plant management personnel on the reportability requirements of 10 CFR 50.72.	COMPLETE

D. **ENFORCEMENT CONFERENCE**

COMMITMENTS	*STATUS*
In addition to the commitments contained in Section (B) above, the Authority committed to the following:	
1. Trend test data to establish testing and maintenance frequency to prevent flow restrictions.	CONTINUING Testing and maintenance is currently being reassessed. Trending of teste data will continue until reassessment is complete.
2. Evaluate the feasibility and necessity of testing other safety-related coolers.	COMPLETE
3. Develop administrative procedures describing the responsibilities and establishing the various channels to be utilized by the Systems Engineering Group.	COMPLETE

ATTACHMENT 2

ESW SYSTEM TESTING PROGRAM

1. The safety-related heat exchangers listed below are or may be supplied cooling water by the ESW system.

   - emergency diesel generator jacket cooling water heat exchangers (93WE-1A, -1B, -1C, -1D)
   - electric bay unit coolers (67UC-16A, -B)
   - cable tunnel/switchgear room coolers (67E-11, -14)
   - control room and relay room air handling units (70AHU-3A, -3B, -12A and -12B)
   - crescent area unit coolers (66UC-22A, -B, -C, -D, -E, -F, -G, -H, -J, -K)

2. The following is a summary of surveillance testing procedures for the ESW system valves, pumps, logic circuitry and heat exchangers.

ST-8C, ESW Motor Operated Valves Operability Test*

Description: ESW MOVs are cycled by their control switches to verify proper remote manual operation.

Components Tested:		
	15MOV-101	46MOV-101A
	15MOV-102	46MOV-101B
	15MOV-103	46MOV-102A
	15MOV-175A	46MOV-102B
	15MOV-175B	

Frequency: Monthly

ST-8D, ESW Pump Flow Rate Test (IST)*

Description: The shutoff head of each pump is measured separately to demonstrate that the ESW pumps satisfy the Technical Specification flow rate requirements. The ESW MOVs are also stroke time tested during this test for IST.

Components Tested:		
	46P-2A,B	ESW pumps
	46MOV-101A,B	ESW system injection valves
	46MOV-102A,B	ESW system test valves

Frequency: Quarterly

2. Continued

ST-8E, ESW Logic System Functional Test and Simulated Automatic Actuation Test*

Description: Demonstrates the ability of Reactor Building Closed Loop Cooling (RBCLC) pump discharge header pressure switches and associated Lockout Matrix relays to cause Emergency Service Water Pumps to start and specific MOVs in the RBCLC and ESW systems to reposition to an ESW injection to RBCLC lineup.

Components Tested:

15PS-122A	pressure switches
15PS-122B	
15PS-122C	
15PS-122D	
46P-2A,B	ESW pumps
15MOV-175A,B	ESW return to service water MOVs
46MOV-101A,B	ESW system injection valves
46MOV-102A,B	ESW system test valves

Frequency: Quarterly

ST-8N, ESW Pump Inservice Test (IST)*

Description: Each ESW pump is run in a standard lineup to permit collection of required IST data. Pump discharge check valves and Emergency Diesel Generator (EDG) return line check valves are verified to open.

Components Tested:

46P-2A,B	ESW pumps
46ESW-1A,B	ESW pump discharge check valves
46ESW-6A,B	EDG return line check valves

Frequency: Quarterly

ST-8P, ESW Return Check Valves Reverse Flow Test*

Description: Verify EDG return line check valves close.

Components Tested: 46ESW-6A,B EDG return line check valves

Frequency: Once per cycle

2. Continued

ST-8Q, Testing of the Emergency Service Water System (IST)

Description: The ESW flow rates to raw water heat exchangers is measured to confirm that flow rates to the units meets the design basis. The test also demonstrates that various ESW check valves open.

Components Tested:

67UC-16A,B	electric bay unit coolers
67E-11,14	cable tunnel/switchgear room coolers
70RWC-2A,B	control room chiller condensers
70AHU-19A,B	control room chiller room coolers
66UC-22A to K	crescent area unit coolers
93WE-A,B,C,D	EDG jacket water coolers
46ESW-1A,B	ESW pump discharge check valves
46ESW-6A,B	EDG return line check valves
46ESW-7A,B	ESW to control rm. equip. check valves
46ESW-9A,B	ESW to reactor building check valves
46ESW-13A,B	ESW to crescent cooler check valves

Frequency: Quarterly

ST-8R, Emergency Service Water Check Valve Test (IST)*

Description: The proper operation of interfacing ESW and normal service water check valves is verified by flushing ESW through the check valves to verify they open and then manipulating the appropriate valves to reverse flow through the check valve and measuring leakage through a drain connection upstream of the check valve to verify it has closed. Safety-related SWS check valves are verified to close by measuring leakage through a drain connection upstream of the valve.

Components Tested: Check Valves

46ESW-19A,B	46(70)SWS-101
46ESW-20A,B	46(70)SWS-102
46ESW-21A,B	46SWS-60A,B
46ESW-22A,B	46SWS-67A,B
	46SWS-68
	46SWS-69

Frequency: Monthly

2. Continued

ST-19A, Crescent Area Unit Cooler Performance Test

Description: Thermal performance of the crescent area unit coolers is measured. Normal service water is the cooling medium for this test.

Components Tested: 66UC-22A,B,C,D,E,F,G,H,J,K crescent area unit coolers

Frequency: Quarterly (presently the unit coolers are tested biweekly)

ST-19B, Electric Bay Unit Cooler Performance Test*

Description: The thermal performance of the electric bay unit coolers (67UC-16A,B) is determined. Normal service water is the cooling medium for this test.

Components Tested: 67UC-16A,B electric bay unit coolers

Frequency: Semi-annual

ST-19C, Crescent Area Unit Cooler Performance Test with ESW Flow

Description: This test determines the heat removal capability of the crescent area unit coolers. Emergency Service Water is the cooling medium for this test.

Components Tested: 66UC-22A,B,C,D,E,F,G,H,J,K crescent area unit coolers

Frequency: Semi-annual

ST-19D, Cable Tunnel Ventilation Cooler Performance Test*

Description: This test determines the heat removal capability of the cable tunnel/switchgear room coolers. Normal service water is the cooling medium for this test.

Components Tested: 67E-11,14 cable tunnel/switchgear room coolers

Frequency: Semi-annual

2. Continued

ST-19F, Crescent Area Unit Cooler Performance Verification Test*

Description: This test verifies crescent area unit cooler thermal performance using hand held monitoring test equipment instead of the permanently installed test equipment.

Components Tested: 66UC-22A,B,C,D,E,F,G,H,J,K crescent area unit coolers.

Frequency: Semi-annual

ST-19G, Electric Bay Unit Cooler Performance Test with ESW Flow*

Description: This test determines the heat removal capability of the electric bay unit coolers. Emergency service water is the cooling medium for this test.

Components Tested: 67UC-16A,B electric bay unit coolers

Frequency: Semi-annual

ST-19H, Cable Tunnel Ventilation Cooler Performance Test with ESW

Description: This test determines the heat removal capability of the cable tunnel ventilation coolers. Emergency service water is the cooling medium for this test.

Components Tested: 67E-11, 14 cable tunnel/switchgear room coolers

Frequency: Semi-annual

Other - Heat Exchangers that are not Currently Performance Tested

The following safety-related heat exchangers are capable of being supplied by the ESW system and are not presently subject to thermal performance testing. Other methods are used to assure their proper performance as described below.

A. Emergency Diesel Generator Jacket Water Coolers, 93WE-1A,1B,1C and 1D.

These units are periodically disassembled, inspected and eddy current tested in lieu of performance testing. The cooling medium for these units is ESW. Operability of these heat exchangers is demonstrated by monthly operation and surveillance testing of the Emergency Diesel Generators. ST-8Q verifies the design basis flow rates to these units are met.

B. Control Room and Relay Room Air Handling Units, 70AHU-3A, -3B, -12A and -12B.

These units provide cooling for the Control Room and Relay Room areas. The cooling medium for the units is a closed loop glycol system with a service water and Emergency Service Water backup which must be manually valved in. The development of performance tests for these units is currently under consideration. It is undesirable to drain the glycol from the AHUs and flush lake water through them. Presently, ST-8Q is performed to measure ESW flow to nonsafety-related control room ventilation equipment which is supplied by the same piping as the Control Room and Relay Room AHUs. Since the nonsafety-related units require a higher design basis flow rate than the safety-related units, this test verifies that adequate ESW flow to 70AHU-3A, 3B, 12A and 12B would be obtained if they were manually valved in.

New York Power Authority
James A. FitzPatrick Nuclear Power Plant

As-built Crescent Area Unit Cooler Control Configuration

Introduction

To improve the reliability of the crescent area unit coolers, the Authority recently completed modifications that will reduce the potential for silt accumulation. Instead of throttling cooling water flow to the coolers, continuous cooling water flow is supplied to the coils. Control circuits were modified to actuate the cooler fans as a function of area temperature. Technical Specification changes associated with these improvements were submitted by the Authority (Reference b) and subsequently approved by the NRC as Amendment 156 (Reference c).

A design change, prepared and approved after Amendment 156 to the Technical Specifications had been issued by the NRC, reduced the number of coolers affected by the modification from ten to eight. This change was made due to potential technical problems associated with excessive fan cycling of the unit coolers. To prevent this problem only eight of the unit coolers were modified. The remaining two coolers (one in each crescent area) provide cooling as they did originally. The service water flow rate is still throttled by the TCV but at a higher flow rate because the other eight unit coolers provide little or no cooling during normal operating conditions when their fans are off. The actual Technical Specifications pages issued by the NRC as part of Amendment 156 are unaffected by these alterations. The FitzPatrick Technical Specifications are correct and accurate. The conclusions in the Authority's safety evaluation are still valid.

While the amended Technical Specifications pages issued by the NRC are unaffected by these alterations, the current configuration does not agree with the description included in the Authority's application.

The NRC Project Manager for FitzPatrick, after being notified of this change, asked that the Authority submit a description of the modifications as they were installed. The paragraphs below describe the crescent area cooler control configuration. Other unit cooler modifications, not related to the Technical Specifications, are not described.

Pre-modification Crescent Area Cooler Design

The Reactor Building Crescent Areas are cooled by ten air-to-water heat exchangers. These ten coolers are divided into two trains. Five coolers are installed in each crescent area. Air is drawn across the cooler's coils by a motor driven fan.

Under non-accident conditions, cooling water is supplied by the Service Water System (SWS). In the event of an accident, the Emergency Service Water (ESW) System supplies cooling water when the SWS may not be available.

Pneumatically-operated Temperature Control Valves (TCVs) installed in the supply line to each unit cooler originally throttled the flow of cooling water. Ten Temperature Indicating and Control Switches (TICS, one per cooler) were used to sense area temperature and regulate air pressure to the TCVs as a function of area temperature. Increased area temperature sensed by the TICS would in turn change the air pressure to the TCVs. The TCVs would open, thereby increasing flow to the cooler and lowering area temperature. On a loss of pneumatic supply, the TCVs move to their open position.

Prior to installation of this modification, the fans ran continuously during normal operating conditions. Ten control switches in the main control room could be used to turn each fan on or off.

These coolers were sized to reduce the temperature of the air in the crescent area in the event of a design basis loss-of-coolant accident (LOCA). Since heat loads in the crescent during normal plant operations are significantly lower than those seen during a LOCA, the TCVs were essentially closed allowing little or no flow through the coolers. With little or no flow through these lines, any suspended solids (such as silt) accumulated in the coolers. This condition was further aggravated by the fact that the coolers are situated at the lowest points in the SW/ESW piping.

1990 Refueling Modifications

During the 1990 refueling outage, eight of the ten coolers were modified. Two coolers were not modified and flow through those coolers are still controlled using TICS and TCVs in the supply piping.

For the eight modified coolers, TCVs were removed from the cooler supply piping. This will allow approximately 24 gpm to flow continuously through the coils of these eight coolers.

The fan control circuitry for these eight coolers was modified so that Temperature Control Switches (TCS) turn the fans on as a function of area temperature. Fans motors must be turned off (de-energized) manually to minimize excessive cycling of the fans and eliminate the need for frequent replacement of the TCS. The fan motors can also be started manually from the control room.

The TCS setpoints are staggered so that the fans are energized over a range of temperatures. As the temperature in each crescent increases, additional fans will automatically start. Within each crescent, one cooler fan will start when the temperature reaches 85 degrees F; a second fan in each crescent will start when the temperature reaches 90 degrees F; one more at 95 degrees; and, the last at 100 degrees F. When the air temperature exceeds 100 degrees, the four fans in that area will have automatically started.

One cooler in each crescent continues to function using the old TICS/TCV control system. During normal conditions, this one cooler will remove the heat generated by equipment in its area. The SWS flow to this cooler will still be throttled by a TCV but the flow rate in its coils will be increased since the other four coolers will provide little or no cooling.