Attachment I to JPN-93-070

PROPOSED TECHNICAL SPECIFICATION CHANGES
ESW PUMP SURVEILLANCE TESTING

(JPTS-93-002)

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

3.11 (cont'd)

D. Emergency Service Water System

1. To ensure adequate equipment and area cooling, both ESW systems shall be operable when the requirements of specification 3.5.A and 3.5.B must be satisfied, except as specified below in specification 3.11.D.2.

4.11 (cont'd)

D. Emergency Service Water System

1. Surveillance of the ESW system shall be performed as follows:

	Item	Frequency
a.	Simulated Automatic Actuation Test	Each operating cycle
b.	Flow Rate Test - Each ESW pump shall deliver at least 1500 gpm to its respective loop. The pump total developed head shall be greater than or equal to the corresponding point on the pump curve, reduced by a maximum of 7%, for the measured flow.	Once/3 months
c.	Pump Operability	Once/month
d.	Motor Operated Valves	Once/month

3.11 & 4.11 BASES

A. Main Control Room Ventilation System

One main control room emergency ventilation air supply fan provides adequate ventilation flow under accident conditions. Should one emergency ventilation air supply fan and/or fresh air filter train be out of service during reactor operation, a repair time of 14 days is allowed because during that time, a redundant 100% capacity train is required to be operable.

The 3 month test interval for the main control room emergency ventilation air supply fan and dampers is sufficient since two redundant trains are provided and neither is normally in operation.

A pressure drop test across each filter and across the filter system is a measure of filter system condition. DOP injection measures particulate removal efficiency of the high efficiency particulate filters. A Freon-112 test of charcoal filters is essentially a leakage test. Since the filters have charcoal of known efficiency and holding capacity for elemental iodine and/or methyl iodine, the test also gives an indication of the relative efficiency of the installed system. Laboratory analysis of a sample of the charcoal filters positively demonstrates halogen removal efficiency. These tests are conducted in accordance with manufacturers' recommendations.

The purpose of the emergency ventilation air supply system capacity test is to assure that sufficient air is supplied to the main control room so that a slight positive pressure can be maintained, thereby minimizing in-leakage.

B. Crescent Area Ventilation

Engineering analyses indicate that the temperature rise in safeguards compartments without adequate ventilation flow or cooling is such that continued operation of the safeguards equipment or associated auxiliary equipment cannot be assured.

C. Battery Room Ventilation

Engineering analyses indicate that the temperature rise and hydrogen buildup in the battery, and battery charger compartments without adequate ventilation is such that continuous operation of equipment in these compartments cannot be assured.

D. Emergency Service Water System

The ESWS has two 100 percent cooling capacity pumps, each powered from a separate standby power supply. The ESW system supplies lake water to cool equipment required to function following an accident. This equipment consists of: emergency diesel generators, electric bay unit coolers, cable tunnel/emergency switchgear room coolers, crescent area coolers, control room air handling units and relay room air handling units. Emergency service water is initially supplied to the control room chillers and chiller room air handling units unless ESW is manually realigned to supply the control room and relay room air handling units. ESW will also supply water to the control rod drive pump coolers which are not automatically isolated following an accident. The surveillance requirement compares pump performance with the pump curve to determine pump operability. It also specifies testing at a

3.11 and 4.11 BASES (cont'd)

flow rate greater than the minimum flow necessary to cool the equipment listed above. The minimum flow requirement was determined from calculations and testing to validate flow and/or heat removal capability at a maximum design lake water temperature.

E. Intake Deicing Heaters

The general objective of this specification is to ensure adequate water (30,000 gpm Ref FSAR Q.2.1 is available to the ESW and RHRSW systems to fulfill the cooling requirements of the associated ECCS loads. Since it is required that an opening large enough to satisfy the demand (10% of the total area) be preserved, it is justifiable to assume that no more than 20% of the heaters be available at anytime.

The weekly check of 6 heater feeder ammeters shall be made to prove that the system is supplying adequate heat to the bar racks. If a major deviation from rated current is detected, heater breakers can be checked to see if they have tripped or the individual heaters can be tested for open circuits.

The semiannual check of each heater will verify that the weekly tests have been adequate. The annual check of circuit meggar readings will check against long term degradation of circuit insulations.

SAFETY EVALUATION FOR PROPOSED TECHNICAL SPECIFICATION CHANGES ESW PUMP SURVEILLANCE TESTING (JPTS-93-002)

I. DESCRIPTION OF THE PROPOSED CHANGES

The proposed change to the James A. FitzPatrick Technical Specifications addresses Emergency Service Water (ESW) pump surveillance testing. The proposed change is addressed below.

Minor changes in format, such as type font, margins or hyphenation, are not described in this submittal. These changes are typographical in nature and do not affect the content of the Technical Specifications.

1. On page 240, Surveillance Requirement 4.11.D.1.b, replace:

   "Flow Rate Test - ESW pumps shall deliver at least 3,250 gpm against a system head corresponding to a total pump head of ≥80 psi, as determined from the pump certification curve by measuring the pump shutoff head which shall be ≥117 psi."

   with

   "Flow Rate Test - Each ESW pump shall deliver at least 1500 gpm to its respective loop. The pump total developed head shall be greater than or equal to the corresponding point on the pump curve, reduced by a maximum of 7%, for the measured flow."

2. On page 243 into page 244, Bases Section 3.11 & 4.11 D., replace:

   "The ESWS utilizes lake water to the cooling system of the emergency diesel generators. The system will also supply water to those components of the RBCLCS which are required for emergency conditions during a loss of power condition. These include ECCS pumps and area unit coolers"

   with

   "The ESW system supplies lake water to cool equipment required to function following an accident. This equipment consists of: emergency diesel generators, electric bay unit coolers, cable tunnel/emergency switchgear room coolers, crescent area coolers, control room air handling units and relay room air handling units. Emergency service water is initially supplied to the control room chillers and chiller room air handling units unless ESW is manually realigned to supply the control room and relay room air handling units. ESW will also supply water to the control rod drive pump coolers which are not automatically isolated following an accident. The surveillance requirement compares pump performance with the pump curve to determine pump operability. It also specifies testing at a flow rate greater than the minimum flow necessary to

cool the equipment listed above. The minimum flow requirement was determined from calculations and testing to validate flow and/or heat removal capability at a maximum design lake water temperature."

II. PURPOSE OF THE PROPOSED CHANGES

During the August 21, 1990 ESW enforcement conference (References 1 and 2) the Authority identified the limitations of the "shut off head" ESW pump surveillance test currently required by the FitzPatrick Technical Specifications. At that meeting, the Authority committed to submit a Technical Specification change to require an improved ESW pump test.

In Reference 3, the Authority clarified its commitment and stated that the test requirements would reflect the appropriate portions of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code (Reference 4) and the FitzPatrick Inservice Testing (IST) program (Reference 5) based upon revised flow requirements.

In April and May of 1992, the NRC conducted an ESWS Safety System Functional Inspection (SSFI). The inspection report (Reference 6) identified concerns with testing and calculations that were to be used as the basis to revise the Technical Specifications. The resolution of these issues and the results of system testing were used to develop the proposed Technical Specification change.

In preparing the proposed Technical Specification change, the Authority has revised pump flow rate requirements and the system lineup. Heat removal calculations assume an 82°F lake water temperature.

III. SAFETY IMPLICATIONS OF THE PROPOSED CHANGES

The ESW system consists of two independent supply loops each with an emergency service water pump to provide cooling to equipment required for a safe reactor shutdown. In the event of failure of one of the two emergency pumps, the remaining loop can provide sufficient cooling water to support operation of the minimum required equipment during a DBA (Reference 7).

The present surveillance requirement for a flow rate test of the ESW pumps specifies a minimum pump total developed head at zero flow for each ESW pump (i.e., shut off head test). The proposed Surveillance Requirement will overcome the shortcomings of the current test by demonstrating the capability of the pumps to provide flow to the system and minimize the wear attributable to shutoff head testing. This change provides a positive safety benefit. The proposed Surveillance Requirement also decreases the minimum required flow to provide operational flexibility to deal with the microbiologically induced corrosion (MIC) restricting flow to the crescent area coolers. To allow for reduced flow, the system lineup has been revised, credit has been taken for margin in the original cooler design and calculations have been used to remove excess conservatisms from the heat loads. The added operational flexibility

reduces the margin required by the original design but provides adequate margin for the system to perform the required functions.

The proposed change will require a revision to the FSAR. FSAR Sections 9.5 and 9.7.1 discuss minimum flow requirements, heat loads and system alignment. The FSAR will be changed to reflect the ESWS safety evaluation (Reference 7) justifying these changes.

The proposed Surveillance Requirement will demonstrate that the ESW pump continues to remain operable. The acceptability of the proposed surveillance test to demonstrate this was determined considering three factors: 1) a determination of minimum system flow requirements; 2) an evaluation of the system hydraulic characteristics, and; 3) the IST program procedures.

1. System Flow Requirements

   The proposed surveillance requirement specifies that each pump is to be tested by delivery of flow of "at least 1500 gpm to its respective loop." The proposed Surveillance Requirement is written so that the pump test flow requirements are above the minimum flow of the ESWS. This assures that pump operability testing, which is performed while delivering flow to the system, is done with flow above the minimum flow required by the system. As discussed in the next item, pump operability is based on the pump curve. The minimum flow requirement to all components in the normally aligned configuration, which includes components required for design basis events, is 1,400 gpm and 1,438 gpm for trains A and B, respectively (Reference 7). This is a reduction from prior flow requirements.

   The reduction in flow for the Surveillance Requirement is an acceptable reduction in the heat removal capacity. The system will perform the intended functions since it continues to provide adequate heat removal capacity. The determination of heat removal adequacy considered a revised system lineup, calculations to remove conservatism from the heat loads and calculations of the flow required to remove the heat load. The flow calculations identify heat loads for design basis conditions, identify equipment required to function and the required valve lineup to limit flow, assume degraded conditions in the unit coolers, and assume that the lake water is at 82°F. The equipment required to function and the minimum calculated flow requirements and system alignment are follows:

   a. One train of the following equipment must remain operational and the ESWS must provide the indicated minimum flow to remove the worst case heat loads:

      - emergency diesel generator jacket (93WE - A, B, C and D) - 500 gpm per EDG

      - electric bay coolers (67UC-16A and B) - 35 and 45 gpm for trains A and B, respectively

      - crescent area coolers (66UC - 22A, B, C, D, E, F, G, H, J and K) - 24 gpm per cooler (120 gpm per train)

- cable tunnel/switchgear room coolers (67E - 11 and 14) - 12 gpm per cooler

- control room air handling units (70AHU - 3A and B) - 110 gpm per cooler (normally isolated)

- relay room air handling units (70AHU - 12A and B) - 90 gpm per cooler (normally isolated)

b. The following equipment is non-safety related, will not be required to function following an accident but continues to remain aligned to the ESWS during normal operation. The ESWS will continue to supply water to this equipment if the normal service water system is lost and following an accident. The flow required by this equipment to perform its function is noted:

- control room chillers (70RWC - 2A and B) - 226 gpm per chiller

- chiller room air handling units (70RWC - 19A and B) - 14 gpm per AHU with both AHU supplied by train B

- control rod drive pump coolers (3P - 16A and B) - 7 gpm per cooler

c. The following equipment is non-safety related and is not required following an accident. ESW will normally be isolated (Reference 8) from the following systems to assure minimum flow is available to required components:

- RHR pump seal water coolers (10E - 3A, B, C and D)

- recirculation pump motor and seal (02-2P - 1A and 1B)

- equipment sump cooler (20E - 9A)

- drywell coolers (68E - 1A, 1B, 1C, 1D, 3A, 3B, 3C and 3D)

d. The following equipment is normally isolated but will be opened for intermittent use during the post accident period (for this reason it is not considered in flow calculations):

- Post Accident Sampling System Cooler (SSC - LSC - 1) - 10 gpm

The minimum ESW flow necessary to fulfill safety related requirements is less than the normally available ESW flow for all normally aligned components and systems. The minimum flow requirement for the normally aligned configuration discussed above is 1,400 gpm and 1,438 gpm for trains A and B, respectively. This flow is higher than the minimum flow required to remove heat in the worst case accident (i.e., 1,367 gpm and 1,377 gpm for trains A and B, respectively) because the safety related control room and relay room air handling units (70 - AHU - 3A, 3B, 12A and 12B) are normally isolated from the ESWS (they are supplied by the chillers). As long as the non-safety control room chillers and

chiller room AHUs remain functional, they are relied upon to provide cooled glycol to the control room and relay room AHUs. If functional capability is lost, the non-safety control room chillers and chiller room AHUs are manually isolated and ESW flow is manually realigned to the control room and relay room air handling units.

The non-safety related equipment has a safety grade pressure boundary and, when aligned normally, will not be isolated from ESW following an accident or transient which requires the ESWS to perform its required functions. The removal of the RHR pump seal heat exchanger and recirculation pump and pump motor was based on a safety evaluation of the safety functions performed (Reference 7). The RHR pump seal heat exchanger was not required for the pump to operate and the flow to the recirculation pump was not required for it to maintain the reactor coolant pressure boundary. The non-safety equipment that is isolated during normal operation will remain isolated during transient and accident conditions (Reference 8). Any revision to this alignment will require validation by calculation and test to assure minimum flow requirements continue to be met.

2. System Hydraulics

The proposed surveillance requirement specifies that "The pump total developed head shall be greater than or equal to the corresponding point on the pump curve, reduced by a maximum of 7%, for the measured flow."

Pump testing is performed in accordance with the requirements of the ASME B&PV Code, Section XI as implemented in the James A. FitzPatrick IST program. During pump inservice testing, the test is acceptable in accordance with ASME Section XI if the flow does not exceed the reference point pump curve by 3% or fall below the pump curve by 10% (Reference 9). The proposed Surveillance Requirement of 7% below the pump curve is more conservative and therefore has no safety significance with regard to code requirements.

The use of 7% verses 10% for allowable pump operation below the pump curve is based on a calculation (Reference 10) considering various ESW strainer differential pressure setpoints. Using the original ESW "Waternet" model, three correction factors were considered in the calculation: pump degradation, strainer differential pressure, and lake level.

The calculational results indicated that a 10% degradation of the ESW pumps at a minimum lake water level would still allow sufficient ESW flow to meet worse case requirements if strainer fouling was limited to 25% or less. The calculation also indicated that if worse case fouling (i.e., 75%) of the strainers occurred, sufficient ESW flow would be achieved if the pumps were limited to 7% degradation instead of the 10% level allowed by ASME.

Based on these results, the FitzPatrick In-Service Test for the ESW pumps (Reference 13) was revised to utilize the more conservative acceptance criterion of 7% for pump operability to allow for 75% strainer fouling. This proposed change to the Technical Specifications makes the specifications consistent with established plant testing requirements.

3. Testing Procedures

In addition to the shut off test, Surveillance Test (ST) - 8D (Reference 12) performed to meet Surveillance Requirement 4.11.D.1.b, the Authority performs an additional pump test, ST - 8N (Reference 13), that measures pump flow and total developed head and a system test, ST - 8Q (Reference 14), that determines and sets the flow through most required components. The test in ST - 8N will be used to meet tne proposed specification. The test in ST - 8Q, supported as necessary by heat removal testing of individual coolers, demonstrates the ability of the ESWS to perform the intended functions. Testing the pump at minimum flow rates in relation to the pump curve demonstrates pump operability. The shut off test (i.e., ST - 8D) will be discontinued upon approval of this Technical Specification change.

The following describes the test procedures and their relevance to the proposed Surveillance Requirement:

a. Surveillance Test 8Q - This test is performed to determine ESW flow to safety related equipment by providing flow to all of the equipment aligned during normal operation except the CRD pump coolers (these have no effect on the test due to the small flow). If flow is less than the minimum flow determined by calculation, the results of surveillance testing on the individual coolers can be used to determine operability.

b. Surveillance Test 19 Series - These tests (References 15, 16, 17 and 18) are performed to demonstrate operability of area coolers by measuring cooler heat removal capability with actual flow and, for the crescent area coolers, air flow. The results of the cooler performance tests are used to calculate the maximum lake water temperature that would allow the calculated heat load (Reference 7) to be removed. If the lake temperature remains below that value, the cooler(s) are operable even if the flow is below the calculated value. The air flow test demonstrates the air flow path is not blocked or excessively fouled.

c. Surveillance Test 8N - This test will be performed to meet the proposed revised Surveillance Requirement. It is currently performed quarterly to meet IST requirements. Flow is established to all of the equipment aligned during normal operation except the CRD pump coolers.

IV. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

Operation of the FitzPatrick plant in accordance with the proposed Amendment would not involve a significant hazards consideration as defined in 10 CFR 50.92, since it would not:

1. involve a significant increase in the probability or consequences of an accident previously evaluated.

The changes identified in the proposed amendment revise pump surveillance testing for the ESWS to require flow testing under the IST program using Section

XI of the ASME B&PV Code as a basis. This change involves no hardware modifications to the plant or changes in the capability of the system to perform the intended functions. The existing Surveillance Test procedure is used to perform the test.

The changes in the proposed amendment revise the flow requirements of the pumps to meet system requirements based on actual heat loads without excessive conservatisms, an assumed 82°F lake water temperature and a revised valve lineup to isolate loads not required to receive cooling water during normal operation. The isolation of the RHR pump seal water coolers and recirculation pump motor and seal does not affect the performance of any safety related function. There is no change to the capability of the ESWS to perform its intended functions. The proposed changes provide operational flexibility to deal with the microbiologically induced corrosion (MIC) which can restrict flow to the crescent area coolers. The reduced flow requirements were based on calculations. The capability of the ESWS to remove the required heat was demonstrated by testing. Since the ESWS continues to perform its intended functions, there is no increase to the probability or consequences of an accident.

2. create the possibility of a new or different kind of accident from those previously evaluated.

   The proposed changes involve no hardware changes and do not change the capability of the ESW system to perform the intended functions.

   The procedure for testing the ESW pumps to meet the proposed Surveillance Requirement is currently used to meet IST requirements. The changes to the system lineup were considered and the changes do not affect the performance of any plant safety function. The flow rate used to establish the acceptance criteria for the new ESW test is based on current accident analyses.

3. involve a significant reduction in the margin of safety.

   These changes do not affect the capability of the ESWS to perform its intended functions. The ESW system flow rate requirements for individual components have been reduced by calculation and the system alignment has been changed to isolate most systems not required to receive cooling water following a design basis event. With reduced flow there is ample margin in coolers for degradation so the change does not prevent the system from performing the required safety functions. Testing demonstrates this capability. Isolation of systems not required to receive cooling water provides additional cooling water for other components without affecting the operability of safety related systems or components.

V. IMPLEMENTATION OF THE PROPOSED CHANGES

Implementation of the proposed changes will not adversely affect the ALARA or Fire Protection Program at the FitzPatrick plant, nor will the changes impact the

environment. The results of these changes are expected to have no impact on these programs since access to radiation areas is not increased, the testing process to meet ASME Section XI requirements has no interfaces with, and therefore no affect on, fire protection systems and the testing procedures currently in use to meet IST requirements have no adverse environmental affects.

VI. CONCLUSION

The changes, as proposed, do not constitute an unreviewed safety question as defined in 10 CFR 50.59. That is, they:

1. will not change the probability nor the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the Safety Analysis Report;

2. will not increase the possibility of an accident or malfunction of a type different from any previously evaluated in the Safety Analysis Report; and

3. will not reduce the margin of safety as defined in the basis for any technical specification.

The changes involve no significant hazards consideration, as defined in 10 CFR 50.92.

VII. REFERENCES

1. NRC letter, C. W. Hehl to W. Fernandez, dated August 2, 1990, "Routine Inspection of Plant Activities," NRC Region I Inspection Report No. 50-333/90-04.

2. NRC letter, C. W. Hehl to W. Fernandez, dated October 9, 1990, "Results of the August 21, 1990 Enforcement Conference."

3. NYPA letter, W. Fernandez to U.S. NRC, dated April 15, 1991, (JAFP-91-0228), "Update of the Status of Activities for the Emergency Service Water System."

4. ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition through Winter 1981 Addendum, Subsections IWP and IWY.

5. NYPA letter, R. Beedle to NRC, dated July 13, 1993 (JPN-93-048), "Revision 7 of the Second Interval Inservice Testing Program for Pumps and Valves."

6. NRC letter, M. W. Hodges to H. P. Salmon, dated June 11, 1992, "NRC Safety System Functional Inspection of the Emergency Service Water System," NRC Region I Inspection Report No. 50-333/92-81.

7. James A. FitzPatrick Nuclear Power Plant Safety Evaluation for Clarification of Design Basis Requirements for the JAFNPP Emergency Service Water System, JAF-SE-90-067, Revision 4, dated May 5, 1993.

8. James A. FitzPatrick Nuclear Power Plant Operating Procedure 21, Revision 19, "Emergency Service Water (ESW)."

9. ASME Section XI Interpretation: X1-1-79-19; Subject: Section XI, Division 1, Operability Limits of Pumps, IWP-3210.

10. James A. FitzPatrick Nuclear Power Plant, Stone and Webster Calculation 02268-M-5017-3, Revision 1, dated August 14, 1992, "Variation in Target Flows for Surveillance Test 8Q with Lake Level, ESW Pump Strainer Pressure Drop and Pump Head."

11. NYPA System Engineering Memorandum JSEM-92-079, dated December 4, 1992, "ESW Strainer DP Alarm Setpoint Basis."

12. James A. FitzPatrick Nuclear Power Plant Operations Surveillance Test Procedure, ST-8D, "ESW Pump Flow Rate Test," Revision 21, dated November 19, 1992.

13. James A. FitzPatrick Nuclear Power Plant Operations Surveillance Test Procedure, ST-8N, "ESW Pump Inservice Test (IST)," Revision 7, dated November 19, 1992.

14. James A. FitzPatrick Nuclear Power Plant Operations Surveillance Test Procedure, ST-8Q, "Testing of the Emergency Service Water System (IST)," Revision 8, dated March 19, 1993.

15. James A. FitzPatrick Nuclear Power Plant Operations Surveillance Test Procedure, ST-19C, "Crescent Area Unit Cooler Performance Test with ESW Flow," Revision 6, dated January 19, 1993.

16. James A. FitzPatrick Nuclear Power Plant Operations Surveillance Test Procedure, ST-19G, "Electric Bay Unit Cooler Performance Test with ESW Flow," Revision 3, dated March 19, 1993.

17. James A. FitzPatrick Nuclear Power Plant Operations Surveillance Test Procedure, ST-19H, "Cable Tunnel Ventilation Cooler Performance Test with ESW Flow," Revision 4, dated March 19, 1993.

18. James A. FitzPatrick Nuclear Power Plant Operations Surveillance Test Procedure, ST-19I, "Crescent Area Unit Cooler Air Flow Verification Test," Revision 0, dated June 19, 1993 .

19. James A. FitzPatrick Nuclear Power Plant Updated Final Safety Analysis Report, Sections 4.8, 6.0, 9.5 and 9.7.1.

20. James A. FitzPatrick Nuclear Power Plant Safety Evaluation Report (SER), dated November 20, 1972, and Supplements.

Attachment III to JPN-93-070

PROPOSED TECHNICAL SPECIFICATION CHANGE
ESW PUMP SURVEILLANCE TESTING
MARKUP OF TECHNICAL SPECIFICATION PAGES

(JPTS-93-002)

New York Power Authority

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Replace with Insert "A"

Amendment No. 71, 144,

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Replace with Insert "B"

Amendment No. ~~134~~ 179,

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Overflow of Insert "B"

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INSERT "A"

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