U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

DOCKET/REPORT NO: 50-333/94-14

LICENSEE: New York Power Authority
Lycoming, New York 13093

FACILITY NAME: James A. FitzPatrick Nuclear Power Plant

DATES: May 2-6, 1994

INSPECTORS:

Daniel Moy, Reactor Engineer — Date
Systems Section
Division of Reactor Safety

Fred Bower, Reactor Engineer — Date
Systems Section
Division of Reactor Safety

APPROVED BY:

Eugene M. Kelly, Chief — Date
Systems Section
Division of Reactor Safety

Areas Inspected: An announced safety inspection of the safety-related check valve program and its implementation was conducted in accordance with NRC Temporary Instruction 2515/110. The areas inspected included the check valve program, check valve testing, control of industry information, check valve maintenance and trending, maintenance procedures, design modifications, design applications, and component walkdowns.

Results: No safety issues, unresolved items, or violations were identified.

EXECUTIVE SUMMARY

Although NYPA did not have a formal program specific to safety-related check valves at FitzPatrick, existing programs are adequate to ensure the operability and reliability of safety-related check valves. NYPA is evaluating safety-related components that are not in the inservice test program to ensure that they are receiving an adequate level of testing during the ongoing surveillance test adequacy review that is scheduled for completion by December 1994. NYPA is also resolving differences between the ISI and IST program scopes. A good initiative has been established to ensure that an IST program basis document is prepared to support the FitzPatrick third interval IST program submittal (Section 3.0).

NYPA has established appropriate controls for coordinating the inspection and maintenance of check valves at FitzPatrick. Procedures are established to maintain as-found inspection information and maintenance history data, monitor degradation trends, and review the effectiveness of the overall check valve inspection program. The preventive maintenance evaluation (PME) of 749 check valves at FitzPatrick evaluated seventeen years of maintenance history. A preventive maintenance periodicity was assigned based on a mean time between failures. Considerable efforts were expended to develop this PME and appropriate actions were taken to update the plant equipment database, the vendor technical manuals and spare parts requirements during this process. The trending reports for check valves were satisfactory. It was noted that the latest maintenance history trending report concluded that component preventive maintenance was most effective on check valves and check valve maintenance resulted in the least impact on overall plant maintenance (Section 5.0).

The maintenance procedures reviewed were technically adequate, sufficient to perform check valve maintenance tasks, and to provide for the identification and evaluation of equipment deficiencies (Section 6.0).

The programs and procedures for reviewing industry information were adequate and a review of a sample of FitzPatrick's industry information evaluations identified no concerns (Section 7.0).

Design modification packages, safety evaluations, and a design application review were technically adequate (Sections 8.0 and 9.0). A visual inspection of the exterior of the accessible check valves in the selected sample found them in good material condition (Section 10.0).

DETAILS

1.0 BACKGROUND AND SCOPE

1.1 Background

The NRC regulations require that check valves are treated in a manner that provides assurance of their performance. Criterion 1 of Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," states, in part, that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The quality assurance program (which includes testing) to be applied to safety-related components is described in Appendix B to Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."

In addition to the general requirements of Appendixes A and B to Part 50, Section 50.55(a) of the NRC regulations requires application of the ASME Boiler and Pressure Vessel Code. Paragraph (g) of Section 50.55(a) requires that the provisions of Section XI of the ASME Code be met for in-service testing of components covered by the Code.

On August 29, 1988, the NRC staff issued Information Notice 88-70, "Check Valve In-service Testing Program Deficiencies," as a result of inspection of check valve activities at several nuclear power plants. A common finding from those inspections was that not all safety-related check valves had been included in the in-service testing (IST) programs. Another finding was that some of the check valves within the IST programs were not being tested in a manner that verified their ability to perform their safety-related functions.

On April 3, 1989, the NRC staff issued Generic Letter 89-04, "Guidance on Developing Acceptable In-service Testing Programs," to assist licensees on correcting several weaknesses that the staff had found in IST programs. Positions 1 through 4 and 10 address the in-service testing of check valves. Position 11 indicates that certain valves have been erroneously omitted from the IST programs in the past. The position further reminds licensees and permit holders that, while 10 CFR 55.55(a) delineates the testing requirements for ASME Code valves, the testing of valves is not to be limited to only those components covered by 10 CFR 50.55(a). Detailed information on the implementation of Generic Letter 89-04 was provided in the minutes of the public meetings held by the NRC staff to discuss the generic letter.

1.2 Scope

The NRC has developed a Temporary Instruction (TI 2515/110) to assess the effectiveness of licensee programs regarding the performance and testing of safety-related check valves. There are four objectives in performing this TI: (1) to verify that the licensee has a program in place to ensure the operational readiness of check valves in the nuclear power plant safety systems; (2) to select a sample of check valves from the population of check valves in safety-related systems and verify the presence in a testing program, types of testing, and testing

methodologies, maintenance and preventative maintenance activities, design application review aspects, and system walkdowns; (3) to verify that appropriate trending of check valve failures, maintenance, and test results is conducted and that effective action is taken to prevent repetitive failures; and (4) to verify management involvement by the licensee in the development and implementation of a comprehensive program to provide assurance of the operability and reliability of check valves at the plant.

2.0 EQUIPMENT AND DOCUMENTS REVIEWED

2.1 Selected Check Valve Sample

Level 1 probabalistic risk assessment (PRA) analysis information and the system P&IDs were reviewed to select a safety-significant sample of check valves for detailed inspection. Based on a station blackout being the most significant contributor to the probability of core melt frequency, the sample included check valves from the residual heat removal, standby liquid control, high pressure coolant injection, instrument air, emergency service water, feedwater, and emergency diesel generator systems. These valves and their function are listed as follows:

10RHR-431A	RHRSW Loop A Keep-Full SWS Supply Check Valve
10RHR-177A	RHRSW Loop A to RHR Cross-Tie Check Valve
*10RHR-14A	RHRSW Pump A Discharge Check Valve
*11SLC-43A	SLC Pump A Discharge Check Valve
*23HPI-32	HPCI Booster Pump P-1B Suction from CST 33TK-1A Check Valve
*23HPI-13	HPCI Drain Pot Drain to Torus Stop Check Valve
23HPI-22	HPCI Test Return to Condensate Tank Check Valve
*23HPI-62	HPCI Min Flow to RHR Check Valve
39IAS-2524	02RV-71A N_2 Supply Inboard Check Valve
*46ESW-1A	Emergency Service Water Pump A Discharge Check Valve
*46ESW-15B	Recirc Pump B Coolers ESW Loop B Supply Check Valve
*46ESW-40A	ESW Loop A Keep-Full Service Water Supply Check Valve
93EDG-22A	EDG A Air Start Compressor A1 Discharge Check Valve
93EDG-4A	EDG A Fuel Oil Transfer Pump A1 Discharge Check Valve
*34FWS-28A	FWS A RX FDWTR Supply Inboard Check Valve
46ESW-916	Reactor Building 66UC-21D Service Water Return Check Valve

* Note: These valves are included in the IST program

2.2 Documents Reviewed

The documents listed in Attachment 2 of this report were used by the inspectors in performing the inspection of the safety-related check valves at this site.

3.0 CHECK VALVE PROGRAM

The inspection was conducted to review and assess FitzPatrick's check valve program and implementation using the guidance of NRC Temporary Instruction 2515/110. The inspection included verification of adherence to the Code of Federal Regulation (CFR) requirements, conformance to ASME Code, Section XI requirements, and review of the IST program and its implementation to assure the NRC safety evaluation recommended actions were addressed. The inspectors found that NYPA did not have a formal program specific to check valves at FitzPatrick. Existing programs, such as the in-service test (IST) program, surveillance testing program, and the preventive maintenance program are adequately used to ensure the operability and reliability of safety-related check valves.

During this review, the inspectors noted a difference between the boundaries established for the in-service inspection (ISI) program and the IST program. The emergency diesel generator (EDG) support systems are included in the ISI program but are not included in the IST program. A 1988 letter, requesting additional information on the FitzPatrick Second Interval IST Program submittal, stated an NRC staff position that the EDGs perform a safety function and that the appropriate pumps and valves in the emergency diesel air start, fuel oil transfer, and external cooling water systems should be included in the IST program and tested to the ASME Code requirements. During this inspection, the licensee could not provide information concerning how this staff position was resolved. The inspectors did not perform an exhaustive search to determine how may similar areas exist.

Based on the safety-related check valve sample selected for inspection, the inspectors concluded that, although some check valves are not specifically identified as tested by the surveillance procedures, the existing surveillance test procedures adequately test the valves in the selected sample. During discussions with licensee representatives, the inspectors expressed concern that safety-related components outside the IST program boundaries may not be receiving the same level of testing as those within the boundary. The inspectors observed that the licensee's programs could be improved by ensuring that safety-related components that are not in the IST program are receiving an adequate level of testing to ensure that they are operable and will perform all of their design basis functions.

Licensee representatives initiated an action/commitment tracking system item (ACTS#11368) to review and resolve the differences between the ISI and IST program scopes. Additionally, this item was opened to track an action for all active safety-related components that are not currently included in the IST program to be identified for further review and evaluation during the surveillance test adequacy review that is scheduled for completion by December 1994.

During the review of the IST program, the inspectors noted that NYPA has established a good initiative to ensure that an IST program basis document is prepared to support the FitzPatrick third interval IST program submittal. ACTS item 10779 is tracking the completion of this item.

4.0 CHECK VALVE TESTING PROGRAM

The inspectors reviewed the test program and procedures for the sampled valves in the IST program to verify that the testing methodology demonstrates that the valves can perform their required safety functions. Discussions were held with licensee's testing coordinators and the test program and procedures were reviewed to assess the following:

- that the manner of these check valves are operable, per the requirement of ASME code by verifying the valves open/reverse seat properly;
- that sample check valves were in the FitzPatrick IST testing program;
- if the test methodology demonstrated these check valves were capable of performing all the required safety functions; and
- if test procedures correctly reflected valve testing requirements.

The inspectors reviewed selected check valve surveillance procedures and found that the sampled valves were adequately tested. The methods of testing of the sample valves were consistent with the FitzPatrick IST program plan and the associated NRC-approved relief requests.

The inspectors reviewed a copy of the surveillance test schedule that is generated and controlled by licensee's operation department. The schedule details all required plant surveillance tests, date last performed, next date due for performance and date due with calculated "grace" period added. The grace period equates to the +25% allowance in due date performance permitted by the Technical Specification Section 4.0B. This schedule is derived from the master ST schedule. The schedule provides the following information: ST number, frequency, date due, last allowable date for performance relative to the grace period, and the number of manhours anticipated for performance.

Ten surveillance tests, which support the IST program, were selected for review from 5/3/93 to 3/19/94. These particular ST's were ST-2 (RHR Service Water Flow Rate and In-service Test), ST-4N (HPCI Flow Rate), ST-8Q (Testing of the Emergency Service Water System), ST-6H (Standby Liquid Control Pump Test and RCIC Flow Test). Test procedures, test acceptance criteria, and data collection sheets were reviewed for each of these IST tests, and it was determined that the schedule had been effectively implemented as it applied to the licensee's IST program. No safety concerns were identified and all data were technically adequate.

5.0 MAINTENANCE HISTORY AND TRENDING PROGRAM

A review was conducted to verify that maintenance history records are maintained and appropriate trending of check valve failures, maintenance, and test results are conducted. Additionally, the review was performed to ascertain whether appropriate corrective actions were taken based on the maintenance history and trending results.

5.1 Maintenance Program for Check Valves

Maintenance Department Standing Order (MDSO)-19, "Maintenance Department Standing Order for Check Valves (IST), "provides maintenance administrative requirements for in-service testing (IST) visual inspections, preventive maintenance inspections, corrective maintenance, check valve degradation trending, maintenance inspection effectiveness evaluations. The inspectors reviewed MDSO-19 and concluded that NYPA has established appropriate controls for coordinating the inspection and maintenance of check valves at FitzPatrick. Additionally, the procedure establishes a process to maintain as-found inspection information and maintenance history, monitor degradation trends, and review the effectiveness of the overall check valve inspection program.

5.2 Maintenance History and Preventive Maintenance Evaluations

MDSO-26, "Preventive Maintenance Evaluations," provides the administrative controls for the development of preventive maintenance evaluations (PMEs). The stated objective of this procedure is to develop a preventive maintenance program to optimize the reliability and availability of operable equipment and enhance plant safety by minimizing the hardships associated with breakdown maintenance. This MDSO has been used to develop PMEs for numerous types of plant components including, check valves, other major classifications of valves, pumps, fans, switchgear, instrumentation, and fire doors.

Preventive Maintenance Evaluation (PME)-116, "Preventive Maintenance Evaluation for Check Valves," is a report on an evaluation of 17 years of maintenance history for 749 check valves at FitzPatrick. This evaluation considered issues such as the component attributes, performance history, industry information for the check valves. For each component, these issues and factors such as condition detectability, effects on safety and power level, and potential maintenance, ALARA and operations hardships were considered in determining what preventive maintenance was warranted. Existing surveillance testing and IST inspections and testing were also considered. Where preventive maintenance was warranted, a periodicity was assigned based on a mean time between failures that was calculated using maintenance history information. Some of these results have already been included in the preventive maintenance (PM) scheduling program. The FitzPatrick action/commitment tracking system (ACTS) is tracking a plant internal commitment (ACTS 10097) to enter the remainder of the check valves into the PM program during the third quarter of 1994.

The inspectors reviewed the PME report and results for the 16 valves in the selected sample. The inspectors noted some errors in the tabular data and screening criteria, but determined that these errors did not affect the PME's results for the sampled valves. Deviation/Event Report 94-0414 was opened to evaluate and resolve these issues and correct PME-116. The inspectors concluded that, except as noted above, PME was a good effort in establishing the preventive maintenance program for the plant's check valves. Significant resources were expended to perform this evaluation, and appropriate action was taken to update the plant equipment database, the vendor technical manuals, and spare parts requirements during this process.

5.3 Trending

MDSO-06, "Maintenance History," specifies the process for performing maintenance history trending evaluations biennially to coincide with refueling outages. In addition to their maintenance work request database, the NYPA has developed and is maintaining a maintenance history database for this purpose. This database is reviewed to identify and evaluate components with multiple work requests. It is also reviewed to compare and trend: (1) corrective maintenance with previous maintenance periods, and (2) performance relative to the industry using the nuclear plant reliability data system (NPDRS).

This review also evaluates the effectiveness of the preventive maintenance and its impact on overall plant maintenance. The effectiveness is a relative measure based on how the degraded condition was found, the extent of the degraded condition, and the work priority that it was signed. The effectiveness impact is a relative measure of how corrective maintenance is affected by the effectiveness of preventive maintenance.

The inspectors reviewed two of these reports that were applicable to check valves: (1) dated April 5, 1993, for the period from June 25, 1990, to January 24, 1993; and (2) dated September 29, 1993, for the period from July 1, 1992, to January 1, 1993. These reports were found satisfactory. The inspectors noted that the report, dated September 29, 1993, compared all the major plant component types and concluded that as group, preventive maintenance was most effective on check valves and resulted in the least impact on overall plant maintenance.

6.0 CHECK VALVE MAINTENANCE PROCEDURES

The inspectors reviewed the maintenance procedures listed in Attachment 2 for technical adequacy and to determine if the procedures are sufficient to perform the maintenance tasks and provide for identification and evaluation of equipment deficiencies. The procedures were compared to the vendor technical manuals to verify that the vendor recommendations were incorporated into the procedures. The inspectors also compared the information in the procedures and the vendor technical manuals to the information in the licensee's plant equipment database.

The inspectors found that the maintenance procedures were appropriate to open, inspect, and perform routine repairs on the sampled check valves. In general, the vendor recommendations had been incorporated into the procedures. The inspectors found that JAF vendor manual A585-0089 for two Atwood - Morrill check valves had not been properly included in the list of developmental references in the applicable repair procedure, MP-059.12. The inspectors' review concluded that this did not have a significant impact on the technical adequacy and the licensee indicated that the procedure would be revised to include the appropriate references.

During the review of a Maintenance Procedure MP-059.12 against JAF Manual V080-0013, "Velan Instruction Manuals for Bolted Bonnet Gate, Globe, and Stop Check Valves," the inspectors noted that a Velan Service Bulletin and 10 CFR Part 21 recommendation had not been incorporated into the procedure. For specific sized swing check valves, Velan recommended that the disc hanger arm hanger assembly clearances should be verified not to be oversized to prevent the valve from jamming in the open position. Discussion with licensee representatives and further inspectors review found that the licensee had previously verified or corrected the clearances to manufacturers specifications. Additionally, licensee representatives indicated that the maintenance procedure would be revised so that the measurement of these tolerances would be reverified during future performances of the procedure. No other concerns were identified and the inspectors concluded that the maintenance procedures reviewed were satisfactory.

7.0 CONTROL, EVALUATION, AND IMPLEMENTATION OF INDUSTRY INFORMATION

The inspectors assessed the adequacy of the licensee's program to review, evaluate, and take corrective action based on industry information provided by vendors and third parties. Procedure ORG-SO-03.01, Industry Operating Experience Program, specifies the process for receipt, screening, prioritization and distribution of externally generated industry operating experience (OE) documents for information and evaluation. This procedure also includes the review of NRC generic communications and vendor technical information. The administrative procedure specifies that JAF will be proactive and will contact critical component vendors annually to ensure that the plant has received all pertinent information that the vendor has disseminated to the industry.

The inspectors reviewed a selected sample of industry information, including NRC generic communications, INPO operating experience and maintenance recommendations, and vendor technical information, related to check valves and concluded that they had been adequately reviewed and dispositioned in accordance with the administrative procedure. The inspectors concluded that the programs and procedures for reviewing industry information were adequate and no concerns were identified.

7.1 Review of Generic Letter 87-06, Periodic Verification of Leak-tight Integrity of Pressure Isolation Valves (PIVs)

The inspectors evaluated the licensee's actions to investigate and correct, as applicable, leak-tight integrity of the pressure isolation valves (PIVs) discussed in NRC Generic Letter 87-06. Related issues discussed in Generic Letter 89-04, "Guidance on Developing Acceptable In-service Testing Programs," were also reviewed. The issues identified by the NRC generic communications for review included: (1) adequacy of testing procedures to assure that PIVs are individually leak tested and evaluated against the leakage limits specified in the technical specifications; and (2) instances where the leak test procedures were adequate, but were not being followed. Specifically, some check valves were tested in series as opposed to individually and some check valves were not tested when required.

The inspectors reviewed responses for both Generic Letter 87-06 (JPN-87-034), dated June 11, 1987, and Generic Letter 89-04, (JPN-90-027), dated March 30, 1990. The inspectors compared FitzPatrick plant system configurations for PIVs with the recommendations outlined in the above generic letters and found them to be technically adequate. The system valve arrangement for the FitzPatrick PIVs was approved by the NRC in license Amendment Number 40, dated November 9, 1978.

The inspectors reviewed all the PIV surveillance test procedures and leak rate acceptance criteria against FitzPatrick technical specifications to ensure that all tests are completed accordance with ASME Section XI requirements. The licensee's engineering evaluations of the system addressed by the generic letters were technically adequate and documentation was generally good.

7.2 Review Check Valves Failures in Raw Water Cooling Systems of Diesel Generator, IE Bulletin 83-03.

The inspectors reviewed licensee's actions taken to investigate appropriate surveillance and testing of check valves in raw water cooling system for diesel generators. At the time of the inspection, there are only two check valves that fit the conditions of the subject NRC Bulletin.

These two valves are in the supply to the generator coolers (ESW 1A & B). Two other valves, (ESW 6A & B), in the return from the coolers were removed by Modification No. F1-92-068. The purpose of this modification was to reroute the emergency diesel generator jacket cooling water common discharge lines so that its flow did not mix with the water in the emergency service water (ESW) pump suction. This modification was accomplished to

reduce the potential for increasing the ESW supply water temperature above maximum design lake temperature during emergency diesel generator operation. Therefore, the EDG jacket cooling water return flow was rerouted the circulating water discharge tunnel via two independent lines (P&IDs 11825-FM-46B, Rev. 18, & Rev. 22).

The inspectors reviewed above modification and Nuclear Safety Evaluation, JAP-SE-92-061 (10 CFR 50.59), to ensure that no safety concern relating to the modification.

8.0 DESIGN APPLICATION REVIEW

The inspectors reviewed the FitzPatrick check valve application program. This program provided a design application review for the check valves installed in the safety systems at FitzPatrick and established an inspection priority for each check valve. Each valve was evaluated and assigned a priority number. The physical arrangement of the valves, flow rate and velocity calculations were included in this design review. Furthermore, licensee's check valve inspection program included: (1) Measuring and recording of check valve dimensions, (2) Recording the results of examination, and (3) Recording the inspection results in an easily retrieved format.

The inspectors verified that the inspection frequency, maintenance intervals, and valve modifications were based on evaluation of the inspections detailed above. No technical issues were identified.

9.0 DESIGN MODIFICATION PACKAGE REVIEW

The 10 CFR 50.59 evaluations for several design modification packages were reviewed based on the following: (1) system and components affected by the changes, (2) the effect on their capability to perform the specific intended safety functions, (3) parameters of the accident analysis affected by the changes, and (4) safety evaluation should place emphasis on identifying potential failure modes in addition to examining the potential consequences of system or component failures.

The modification packages reviewed were: (1) F1-82-052 (RHR Pump Discharge Repiping and Relocation of Restrictive Orifices); (2) D1-90-059 (Replacement of RHR Pump Cooler Supply Check Valves, Rev.0); (3) M1-90-072 (Valve Replacement SWS-101, Rev.0); and (4) Safety evaluation, JAP-SE-90-067 (Clarification of the Design Requirements for the JAPNPP Emergency Service Water System). The inspectors concluded that the modification packages and the safety evaluation were technically adequate.

10.0 WALKDOWN OBSERVATIONS

A walkdown was conducted on the valves from the selected sample that were accessible with the plant operating at power. The walkdown was conducted in portions of the emergency diesel generator rooms, the reactor building, the service water pump rooms, and the

administration building to review the sampled check valves for material condition and proper orientation. The inspectors concluded that the accessible check valves in the selected sample were in good material condition based on a visual inspection of the exterior of the valves.

11.0 EXIT MEETING

Licensee management was informed of the scope and purpose of the inspection at an entrance meeting conducted on May 2, 1994.

During the course of the inspection, the inspectors' findings were discussed periodically with the licensee representatives listed in Attachment 1 of this report. An exit was conducted on May 6, 1994, at which time the preliminary findings of the inspection were presented and the licensee's commitments were verified.

Attachments:

1. Persons Contacted
2. Documentation Reviewed

ATTACHMENT 1

Persons Contacted

New York Power Authority Personnel

* R. Barrett, General Manager-Operations
  C. Brown, Sr. Quality Engineer, II
* M. Colomb, General Manager-Support Systems
* P. Donahue, Technical Services
* F. Edler, Technical Services Manager
* A. Giverson, ISTC
* A. Halliday, Maintenance Manager
* J. Hoddy, Licensing Engineer
* B. Horning, Operations
* D. Lindsey, General Manager-Maintenance
* T. Masaslyn, Sed. PO Engr. Supervisor
* H. Salmon, Resident Manager
* D. Simpson
  D. Topley, Training Manager
* J. VanBenCoten, Maintenance Mechanical Engineer
* A. Zaremba, Operations Review Manager

United States Nuclear Regulator Commission

* W. Cook, Senior Resident Inspector

The inspectors also held discussions with managers, supervisors and other licensee employees during the course of this inspection including operations, technical, quality assurance, and administrative personnel.

* Denotes those personnel attending the exit meeting of May 6, 1994.

ATTACHMENT 2

Documentation Reviewed

Maintenance Procedures

MP-059.12, "Maintenance Procedure for Swing Check Valves without Operators (IST)," Revision 08, dated March 29, 1994 (Applicable to 10RHR-177A, 23HPI-32, 23HPI-22, 23HPI-62, 46ESW-15B, 46ESW-40A, 34FWS-28A)

MP-059.11, "Non-Pressure Seal Style Globe Valve Maintenance," Revision 05, dated December 6, 1993 (Applicable to 23HPI-13)

MP-059.12, "Maintenance Procedure for Piston Check Valves (IST)," Revision 04, dated February 9, 1994 (Applicable to 1ORHR-431A, 11SLC-43A, 93EDG-4A)

Maintenance Department Standing Order (MDSO)-19, "Maintenance Department Standing Order for Check Valves (IST)," Revision 02, dated March 29, 1994

MDSO-26, "Preventive Maintenance Evaluations," Revision 00, dated July 6, 1993

MDSO-06, "Maintenance History," Revision 03, dated January 28, 1994

Operations Surveillance Test Procedures

ST-2X, Rev. 10, "RHR Service Water Flow Rate, Strainer, and In-service Test"
ST-4N, Rev. 21, "HPCI Flow Rate and In-service Test"
ST-8Q, Rev. 10, "Testing of the Emergency Service Water System"
ST-6H, Rev. 9, "Standby Liquid Control Pump In-service Test"
ST-2A, Rev. 39, "RHR Pump Flow Rate and In-service Test"
ST-24J, Rev. 11, "RCIC Flow Rate and In-service Test"
ST-39B-X67, Rev. 0, "Type "C" Leak Test of RHR Pump B Cooler RBC Supply Line Valves"
ST-8N, Rev. 7, "ESW Pump In-service Test"

Procedures

ORG and Licensing Department Procedure ORG-SO-03.01, "Industry Operating Experience Program," Revision 0, dated April 1, 1994

Modification Control Manual Procedures

MCM3, Rev. 4, 12/15/93
MCM5, Rev. 4, 12/15/93
MCM23, Rev. 0, 12/11/89
MCM14, Rev. 0, 10/7/93

Check Valve Modifications

M1-90-072, Rev. 0, "Valve Replacement 46(70)SWS-101"
D1-90-059, "Replacement of RHR Pump Cooler Supply Check Valve," Rev. 0, 5/11/90
F1-82-052, "RHR Pump Discharge Repiping and Relocation of Restrictive Orifices"
F1-92-068, "EDG Jacket Cooler Return Line Rerouting"

Technical Manuals

JAF Manual P305-0012, "Handbook of Valve Information Form 321," - Powell

JAF Manual V080-0013, "Velan Instruction Manuals for Bolted Bonnet Gate, Globe, and Stop Check Valves"

JAF Manual V135-C001, "Vogt Forged Steel Gate, Globe, Angle and Check Valves," Bulletin CM-2R

Miscellaneous Documents

Preventive Maintenance Evaluation (PME)-116, "Preventive Maintenance Evaluation for Check Valves," Revision 0, "draft"

NYPA memo JMD-93-062, "Transmittal of Effectiveness of the Check Valve Preventive Maintenance Program," dated April 5, 1993

NYPA memo JMD-93-373, "Transmittal of Mechanical Maintenance History Review for Check Valves, Air-Operated Valves, Relief Valves, Manual Globe & Gate Valves," dated September 29, 1993

NRC letter, H. Abelson to J. C. Brons, dated August 11, 1988, "Request for Additional Information of the JAF Second Interval IST Program."