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

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Report Nos.: 50-335/93-01 and 50-389/93-01

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33102

Docket Nos.: 50-338 and 50-389 License Nos.: DPR-67 and NPF-16

Facility Name: St. Lucie 1 and 2

Inspection Conducted: January 25-29, 1993

Inspectors: M D Hunt for 2/23/93
M. Thomas Date Signed

G. Wiseman 2-23-93
Date Signed

Accompanying Personnel: A. DiBiasio, NRC Consultant
F. Grubelich, NRC/NRR

Approved by: M W Branch 2-23-93
M. Branch, Chief Date Signed
Test Programs Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of the licensee's programmatic activities associated with safety related check valves. The inspection was performed in accordance with NRC Temporary Instruction TI 2515/110, Performance of Safety Related Check Valves, dated November 19, 1991.

Results:

The licensee has implemented a satisfactory check valve program to ensure the operability of check valves. Knowledgeable and experienced personnel are involved in the program to ensure adequate actions are taken to address check valve problems when identified. The following findings were identified:

Non-Cited Violation (NCV): A NCV was identified relative to the design control process during implementation of a modification which installed safety related check valves in the main steam supply bypass line to the turbine driven auxiliary feedwater pump. The check valves were not added to the licensee's Inservice Testing (IST) program until a year after the modification was completed.

Unresolved Item: Two check valves in the containment spray system and the two check valves added to the main steam system by the modification discussed above were not tested in accordance with ASME Section XI requirements. Operability determination of the valves per NRC Generic Letter 91-18 and submittal of relief requests to the IST program were being performed by the licensee.

Strengths: Management has provided positive support and adequate resources to the check valve program.

The licensee has been involved with the Nuclear Industry Check Valve Users Group (NIC) since its inception, and was also involved in other industry activities related to check valves.

Knowledgeable and experienced personnel in the Mechanical Maintenance Engineering Support group are involved with check valves.

All check valves in the IST Program were included in the check valve program.

Check valves in systems beyond those identified in INPO SOER 86-03 were included in the check valve program.

The ongoing use of the check valve database to identify individual valve parameters, and summarize valve maintenance history was a strength.

Weaknesses: The basis for check valves included in the check valve program was not documented.

There was no documented basis for why check valves, designated as either quality groups A,B, or C, were not in the IST Program.

There were a number of inconsistencies between the licensee's IST Program, the IST Basis Document, and the implementing procedures.

The amount of time (nearly 10 months) to update control room drawings to reflect the as- built plant configuration was also considered as a weakness.

REPORT DETAILS

1. Persons Contacted

*G. Boissy, Plant General Manager
*J. Brady, Mechanical Maintenance Engineering Supervisor
*C. Burton,Operations Manager
*J. Connor, Inservice Testing Program Coordinator
*T. Coste, Quality Assurance Supervisor
L. Croteau, Maintenance and Specialty Training Supervisor
*R. Dawson, Maintenance Manager
*J. Dyer, Quality Control Supervisor
*R. Englmeir, Site Quality Manager
*P. Fulford, Project Engineering Supervisor
*J. Holt, Licensing Engineer
*J. Kagan, Valve Engineer
C. Lauver, Failure Analysis Supervisor
*O. Lowens, ISEG Engineer
*J. Martin, Valve Engineer
*L. McLaughlin, Licensing Manager
*A. Menocal, Mechanical Maintenance Department Manager
*S. Mohn, Inservice Testing Engineer
*C. Pell, Services Manager
*J. Price, Valve Specialist, Equipment Support and Inspections
*G. Pustover, Lead Mechanical Engineer
D. Sager, Site Vice President
*T. Sanders. Valve Engineer
*J. Scarola, Site Engineering Manager
M. Snyder, Section Supervisor, Shift Technical Advisors
*S. Valdes, PCM Coordinator, Technical Staff
*J. West, Operations Supervisor

NRC Resident Inspector

*S. Elrod, Senior Resident Inspector
*M. Scott, Resident Inspector

2. Background and Scope

The NRC regulations require that check valves be 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 Appendices A and B to Part 50, Section 50.55a of the NRC regulations requires application of the ASME Boiler and Pressure Vessel Code. Paragraph (g) of Section 50.55a requires that the provisions of Section XI of the ASME Code be met for inservice testing of components covered by the Code.

On August 29, 1988, the NRC staff issued Information Notice 88-70, "Check Valve Inservice Testing Program Deficiencies," as a result of inspections 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 Inservice 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 Inservice Testing Programs," to assist licensees in correcting several weaknesses that the staff had found in IST programs. Positions 1 through 4 and 10 address the inservice 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 50.55a 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 50.55a. 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.

3. Management Involvement

The inspectors interviewed site and corporate personnel and reviewed documents provided by the licensee to assess the degree of management involvement in the development and implementation of a comprehensive check valve program. Strong management involvement and support was evidenced by 1) the establishment of a check valve team in December 1986; 2) performance of inspections on selected valves over several refueling outages; 3) investigating the use of non intrusive diagnostic testing; 4) purchase of a check valve diagnostic system in late 1992; and 5) scheduling of 1993 training for the use of the diagnostic equipment. In addition, the licensee assigned a corporate coordinator for the check valve program and identified a maintenance engineer as the site specialist for the program.

The inspectors found site management to be knowledgeable and involved in check valve program activities and decisions, and found the site and corporate coordinators to be competent and knowledgeable of plant and industry activities related to check valves. The licensee has been involved with the Nuclear Industry Check Valve Users group (NIC) since its inception, and was also involved in other industry activities related to check valves. The inspectors considered the positive support and resources provided by management to be a strength of the check valve program.

4. Check Valve Inspection Program

The check valve program defined by procedure GMP-01, "Check Valve Inspection Program" and documented in the Check Valve Inspection Database, incorporated 576 check valves for both units. This database was approximately 80 percent complete and included valve size, type, function, manufacturer, model, maintainability priority, quality group, inspection frequency, and maintenance history. The licensee's maintenance personnel described the remaining 20 percent as missing valve nameplate data and maintenance histories. The database, when complete, will contain maintenance reports back to 1985. A total of 28 plant systems, including the seven systems identified in INPO SOER 86-03, "Check Valve Failures or Degradation", are included in the Check Valve Inspection Database as "monitored" valves, i.e., valves for which the maintenance history is monitored. Of the 576 check valves monitored, 332 valves are scheduled for inspection at least once every ten years. These 332 valves included all the check valves in the IST program (220 check valves), valves identified during the licensee's detailed review of the seven systems identified in the SOER and the instrument air system; valves with a poor maintenance history and/or a high maintainability priority; and valves whose failure can significantly affect personnel safety and plant operation (e.g., extraction steam valves). It should be noted that 59 of the check valves to be inspected are non-safety related.

During the review of the valves which had been assigned to the Check Valve Inspection Program, the inspectors found that no formalized method existed to determine which valves should be placed into the program nor were there documented bases for all the valves that were included in the program.

Each of the inspected valves was assigned an inspection frequency based on the design application review, maintenance history, and Generic Letter 89-04, Position 2 recommendations. However, no documented basis existed for determining the inspection frequencies beyond those documented in the design application review documentation and the Generic Letter. The design application review recommended near term inspection actions and inspection frequencies for selected systems. Other valves were scheduled to be inspected over a ten year period, spread evenly, such that all the valves will be inspected at least once before 1999. Each of the valves subject to inspection is initially inspected at least once every ten years. As of the date of this inspection, the licensee has only decreased the inspection intervals based on poor maintenance histories, not increased them. The feedwater pump check valves are an example where the inspection interval was shortened due to a poor maintenance history. The design application review recommended inspecting these valves "every second refueling outage," while the licensee's database requires inspecting them every refueling outage.

To date, 182 individual check valves had been inspected at both units, at least once, since the program was initiated in 1987-1988. Of these valves, the licensee estimates that approximately two-thirds were inspected solely as part of the Check Valve Inspection Program. The Check Valve Inspection Program depends entirely on disassembly and inspection. The licensee is investigating non-intrusive methods, but, no credit was given to these methods at the time of the inspection.

Based on the above review, the inspectors concluded that the licensee was actively progressing in the establishment of a check valve reliability program, and that the assigned personnel were knowledgeable and proactive.

5. Design Application Review

The inspectors examined the design application review documents prepared by the licensee's engineering department or a consultant, which were reviewed by the engineering department. These documents comprised the engineering studies conducted to select and assess some of the check valves incorporated into the Check Valve Program. The documents titled, "Check Valve Application Review," dated October 20, 1988, contained a listing of all check valves in the systems discussed in SOER 86-03. Additional categorization included a list of those check valves which were considered to be in critical applications, based on safety function, location in high-energy lines, and size (for the non-safety related valves). The critical valves were subjected to a detailed design application and maintenance history review, while the remaining valves were classified as lower priority and would be evaluated later. All safety related and non-safety related valves greater than category 2 in high energy lines were subject to this review. Although the low priority valves had not been subject to a design application review at the time of the inspection, they are included in the database unless they have a low maintainability priority and no adverse maintenance history. Check valves were grouped during the design application review based on system, function, manufacturer, size, and valve type. A design application review, including unit walkdowns and isometric reviews, was performed for orientation and location of the valves. Calculations of minimum velocity requirements were performed for the check valves. The calculations and design application review followed the guidance contained in EPRI NP-5479 for valve application factors, and input for valve data was obtained from vendor information. A consultant prepared a computer program which calculated minimum velocity, considering upstream piping configurations and valve physical variables, and a quantitative prediction of wear and fatigue life (low, medium, high), based on the specified flow rates and their duration, the severity of disc motion and its frequency and the materials used in the hinge pin/bushing area and the disc stud. These parameters were used, in addition to the maintenance history, to determine the inspection requirements.

The design application review recommended replacement of the MSIV accumulator check valves with a valve design having a soft seating material. The licensee reported that engineering is also evaluating the feedwater pump discharge check valves and intake cooling water pump discharge check valves due to poor maintenance histories. The design application review identified these valves as problem valves, i.e., valves with a high usage and wear index and a maintenance history. Replacement of the valves was not, however, recommended in the design application review documents.

The inspectors reviewed the design application review documents against the Check Valve Inspection Database. No deficiencies were found. The inspection interval recommendations given in the design application review were, in some cases, decreased based on the valves maintenance history or maintainability priority, e.g., the feedwater check valves. The inspectors found the design application review to be a strength due to the consideration given to the factors beyond flow, location and orientation, and the evaluation of the air systems. The inspectors also reviewed the check valve database and found that its ongoing use in identifying individual valve parameters and summarizing valve maintenance history for all potential check valves was a strength.

6. Control, Evaluation and Implementation of Industry Information

The inspectors discussed the process of receipt, control, evaluation, and implementation of industry information with responsible licensee personnel. All NRC generic communications, vendor reports, and industry information received at the site are handled by the STA Section if no formal response is required. If a formal response is required, the information is handled by licensing. The responsibilities and instructions for evaluation of industry information and station events are established by St. Lucie Administrative Procedures ADM-17.02, In House Event Reports/Summaries and ADM-17.03, Operating Experience Feedback.

The inspectors reviewed the status list of industry operating experience items that related to check valves from 1980-1991, and the licensee's review and response to the items. The inspectors also reviewed in house event reports from 1987-1991, and the licensee's review and response to the items. From this review it was determined that the program developed for the purpose of reviewing the industry related and in house information was functioning in a satisfactory manner and producing the results for which the program was intended.

7. Check Valve Testing Program

Inservice testing was being performed under the recently issued Revision 4, dated January 25, 1993, (Unit 1) and Revision 2, dated August 11, 1992, (Unit 2) of the IST program. Revision 2 of the IST Program, for both Units 1 and 2, incorporated the guidance contained in Generic Letter 89-04. The staff reviewed Unit 1's

Revision 2 and transmitted a Safety Evaluation, dated February 26, 1992. The NRC had not reviewed Unit 2's Revision 2 as of the date of the inspection. Revision 3 of the Unit 1 IST Program incorporated changes based on the October 17, 1990, letter from the NRC. Revision 4 incorporated changes identified during the licensee's self assessment in preparation for this inspection. Unit 2's IST Program is scheduled to be revised for the second inspection interval which begins August 8, 1993. The inspectors reviewed the licensee's current Unit 1 IST Program and verified that the anomalies, associated with check valves, identified in the February 26, 1992, Safety Evaluation were appropriately incorporated.

The inspectors reviewed selected check valves in plant systems. The reviews were conducted to verify that selected valves were properly included in the ASME Section XI IST Program; that test procedures reflected testing of all safety-related functions; that the test procedures correctly reflected valve testing requirements; and that the guidelines and issues of GL 89-04 were adequately addressed in the valve testing.

A total of 60 valves were selected for review from the main steam, main and auxiliary feedwater, component cooling water, containment spray, intake cooling water, safety injection, instrument air and emergency diesel air start and fuel oil systems.

The inspectors noted a number of deficiencies relative to the IST program. For example, the Unit 1 containment spray discharge valves (V-7269 and V-7270) were identified in the IST Basis Document as having a safety related function in both the open and closed direction. The IST Program, however, did not address the closed safety function. The licensee had previously submitted relief request (VR-22) to use disassembly and inspection to verify the valves' forward flow (open) capability during refueling. Since the relief request did not address the closed safety function, the inspectors questioned whether the closed safety function (reverse flow) had been verified in accordance with ASME Section XI requirements and, if not, whether the licensee had performed an operability determination for the valves in accordance with NRC Generic Letter 91-18. Licensee personnel indicated that relief request VR-22 would be revised and resubmitted to use disassembly and inspection to verify both the open and close capabilities. In addition, licensee personnel performed an evaluation and determined that there was not a concern for operability of the check valves because the disassembly and inspection acceptance criteria were the same for forward and reverse flow. When the valves were disassembled to comply with the relief request for the open position, the closed position was also verified. Since relief had not been previously granted to verify the closed position during refueling, this item will be identified as Unresolved Item 50-335, 389/93-01-01, Pending the NRC Review of Relief Request VR-41.

The licensee's IST Basis Document provided an explanation of the valves and pumps included in the IST Program, their safety function, and required testing; and identified selected valves that were not included and the reason. The inspectors identified a number of check valves in the Check Valve Database that were categorized by the licensee as Quality Group A, B, or C, but are not included in the IST Program or the Basis Document. In the licensee's letter to the NRC, L-92-224, dated August 12, 1992, the licensee provided an explanation on how the IST Program was developed. This letter stated that a narrative description was prepared for each component "that "could" potentially be included in the IST program scope." The licensee provided an acceptable explanation why selected valves identified by the inspectors were not included in the IST Program, however documentation did not exist for all valves. This was noted as a weakness. The IST Program includes numerous valves that, although safety related, are not required to be designated as ASME Code Class 1, 2, or 3 in accordance with Regulatory Guide 1.26 and are, therefore, not required to be tested in accordance with Section XI. As discussed in the Minutes to Generic Letter 89-04, the "IST Program is a reasonable vehicle to provide a periodic demonstration of the operability of pumps and valves not covered by the Code." The licensee has proposed revising the IST Program to clearly identify those components outside the scope of 10 CFR 50.55a and Section XI.

The inspectors reviewed selected IST test procedures. The IST periodic test procedures are contained or referenced in Administrative Procedures No. 2-0010125 and 1-0010125, Schedule of Periodic Tests, Checks, and Calibrations, and 2-0010125A and 1-0010125A, Surveillance Data Sheets. The inspectors found a number of valves that are required to be tested in accordance with the IST Program that are not addressed in these procedures, for instance, the Unit 2 diesel air start valves, V-59156, 59158, 59159, 59236, 59203, 59204, 59205, 59206. These valves are tested in accordance with the diesel generator procedure, 2-2200050A. However, this procedure does not reference Section XI or the IST Program, and changes could be made without the knowledge of the IST personnel.

Additionally, the Unit 1 and 2 instrument air valves, V-18290, 18291, 18294, 18295, are not addressed in Procedures 1(2)-0010125A. The instrument air valves are tested in accordance with Procedures 1(2)-1300057. The licensee has agreed to revise Procedures 1(2)-0010125A to address these valves. The inspectors reviewed Procedures 1(2)-1300057 for their adequacy and determined that the test procedure leak tests two and three valves in series. The Unit 2 valves were categorized by the licensee as "AC" and accordingly the Code requires individual valve leakage rates be determined. The licensee agreed to submit relief requests to address this inadequate testing procedure.

A number of valves were not being tested in accordance with the procedures referenced in Procedure 1(2)-0010125A. Procedure 1-0010125A references Procedure OP-1300051 to test the instrument air valves V-18279 and 18289 in the closed direction. This procedure, however, requires that these valves be open. The licensee informed the inspectors that these valves are tested in accordance with Procedure, OP-1300057. The Unit 1 diesel fuel oil valves, V-17214 and 17204, are required to be tested in accordance with Procedure 1-2200050A and B per Procedure 1-0010125A. The inspectors reviewed this procedure and determined that this procedure does not full-stroke open the valves in accordance with the Generic Letter. The licensee provided a Letter of Instruction, LOI-T-57, Revision 1, which is used to full-stroke these valves. The licensee has agreed to revise the references to the correct procedures.

The inspectors noted that Procedure 1-0010125A had not been revised to delete valves V-8448 and V-8492 which had their internals removed per Unit 1 plant change modification PCM 541-191, Modification to Check Valves in the Auxiliary Feedwater Steam Supply Piping. In addition to removing the internals from valves V-8448 and V-8492, PCM 541-191 also added valves V-8372 and V-8373 to the main steam supply piping in December 1991. The main steam flow diagram, 8770-G-079, Sheet 1 was revised October 16, 1992 (Revision 31) to incorporate this design change. The inspectors noted the significant delay in updating this control room drawing. Additionally, the IST Program was not revised until January 25, 1993, over a year after the valves were installed. The valves have not been tested quarterly or at cold shutdowns in accordance with Section XI. A relief request, number VR-41, that proposed to disassemble and inspect these valves at refueling outages in lieu of testing the valves closed quarterly or during cold shutdowns, was recently prepared and submitted to the NRC. There has not been a Unit 1 refueling outage since the valves were installed. The inspectors noted that the modification did not address adding test connections in the steam supply piping in order to make the valves more accessible for testing quarterly or during cold shutdowns. This deficiency in testing check valves V-8372 and V-8373 will be identified and tracked with Unresolved Item 50-335, 389/93-01-01, Pending NRC Review of Relief Request VR-41.

During further review of this PCM, the inspectors noted that, although the PCM affected the IST Program, Section 5.0 of the PCM (Affected Document Checklist) indicated that the PCM had no affect on the IST Program. Section 5.0 was completed by the preparer of the PCM as required by Nuclear Engineering Quality Instruction JPN-QI 3.1-3, Engineering Packages. However, the plant technical review completed for the PCM prior to implementation did identified that IST Program surveillance procedures were affected by the PCM. The PCM was implemented in December 1991. Final review and closure of the PCM was performed by the plant Technical Staff in September 1992, as required by Plant Quality Instruction QI 3-PR/PSL-1, Design Control, and the Flow Diagram 8770-G-079, Sheet 1, was updated in October 1992, to reflect the

as-built plant configuration. The review by the Technical Staff prior to final closure of the PCM included verifying that affected documents had been updated. As stated above, the IST Program and surveillance procedures were not updated to reflect the change until January 1993.

The inspectors informed the licensee that failure to update the IST Program and applicable surveillance procedures to reflect the changes implemented by PCM 541-191, as required by the above referenced design control procedures, constituted a violation and will be identified as item 50-335/93-01-02. During further discussions with licensee personnel and review of the licensee's Check Valve Program Self Assessment performed from December 23, 1992, to January 22, 1993, the inspectors determined that the licensee had identified the finding prior to this inspection and had initiated corrective actions. The finding was attributed to personnel failing to follow applicable design control procedures.

The inspectors reviewed the corrective actions which included 1) updating the IST Program and submitting a relief request; 2) revising Administrative Procedure 1-0010125A to include the valves; 3) updating the MMEG check valve database and informing MMEG that the valves need to be disassembled and inspected during the upcoming Unit 1 refueling outage scheduled to begin in March 1993; 4) issuing a memo to the plant Technical Staff Design Control Group dated January 19, 1993, requiring that the IST group be notified prior to implementation of any modification which modifies or replaces any Class 1, 2, or 3 valve; and 5) screening over 400 PCMs to determine if any were implemented involving valves and whether the IST Program was affected. PCM 541-191 was the only PCM which required a change to the IST Program. The inspectors also noted that prior to the finding Nuclear Engineering had revised JPN-QI 3.1-3 to require that if a PCM affected ISI/IST, review is required by the Equipment Support and Inspections Section (which includes the ASME Section XI Program Group).

The inspectors determined that the actions taken by the licensee adequately addressed the finding. Therefore, this violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in Section VII.B of the Enforcement Policy.

The inspectors also noted an additional weakness during review of PCM 541-191. This weakness was related to the long period of time (nearly 10 months) before the control room drawing 8770-G-079, Sheet 1 was updated to reflect the as-built plant configuration. The drawing was updated in accordance with licensee administrative controls. However, the administrative controls allow control room drawings to be annotated with the PCM number and a copy of the PCM maintained in or near the control room for reference by control room operations personnel until the applicable drawings are updated. The inspectors considered the responsibility placed on operations personnel of having to review PCMs

to determine the impact on plant configuration was an added burden, particularly after a refueling outage where more than one modification could affect a control room drawing.

The inspectors' review of IST procedures identified a number of check valves that are not full-stroke tested in accordance with Generic Letter 89-04. Generic Letter 89-04, Position 1 states that verification that the maximum required accident condition flow rate flows through the valve is an acceptable full-stroke test. The Unit 1 auxiliary spray line valve, V-2431 is not full-flow tested in accordance with the Generic Letter and no relief request is included in the IST program. Procedure 1-0010125A states that the method used to verify the full-stoke is to "Initiate auxiliary spray, observe Delta T requirements and ensure proper PZR response." Additionally, the inspectors found the main steam to auxiliary feedwater pump turbine valves, V-8130 and 8163, to be verified full open by verification that the auxiliary feedwater pump meets the Section XI required pump discharge head and vibration requirements during testing. The procedure does not require measurement of steam flow through the valve as required by the Generic Letter. Additionally, in reviewing Unit 2 relief request VR-31 for these valves, the inspectors noted that the relief request was inconsistent with the IST Program tables, which indicated that the full flow test will be performed at cold shutdowns. The relief request states that the full-stroke test of valves V-8130 and 8163 will be performed at refueling outages.

The licensee's procedures were found to rely on subjective acceptance criteria. The procedures were found to contain such criteria as verify leakage "is not significant", "verify a temperature change", "observe Delta T requirements and ensure proper PZR response". Such criteria may be interpreted differently by different individuals performing the test. Although the reverse flow closure verification does not require the determination of a leakage rate and the partial-stroke test does not require the determination of flow rate, the inspectors noted that, where practical, the licensee should make these acceptance criteria more objective, or quantifiable. This would reduce the possibility of a severely degraded valve being declared acceptable.

The emergency diesel generator and associated support systems were also reviewed to assess the degree to which safety-related skid mounted check valves were addressed in the IST Program and Check Valve Inspection Program. Selected check valves were reviewed against the list of check valves in the IST program, and no deficiencies were identified. For valves not included in the IST program, their inclusion in the Check Valve Inspection Program database was reviewed. Four non-safety related "valve assemblies" were identified in the Unit 1 diesel air start system that were not included in the check valve maintenance program database. These untagged valve assemblies contain two small check valves.

The licensee agreed to provide component identification tags and add them to the check valve database.

Periodic test procedures for the component cooling and intake cooling water pumps were reviewed to determine the method for confirming the adequacy of idle pump discharge check valve function in a parallel pump situation, and no deficiencies were identified. The inspectors observed that the licensee confirmed backseating of idle pump valves by assuring that the running pump flow characteristics were not degraded and that the idle pump is not rotating backwards. The inspectors concluded that this method of backseat verification was acceptable.

8. Check Valve Inspection and Maintenance Program

Administrative department and mechanical maintenance technical procedures were reviewed to determine that the licensee has established an organized, controlled process to identify and track problems through the inspection, maintenance, repair and post maintenance activities. Documentation reviewed included, in part, portions of the following procedures:

-GMP-01, Revision 6, Check Valve Inspection Program

-GMP-02, Revision 5, Use of Measuring and Testing Equipment by Mechanical Maintenance

-QI 11-PR/PSL-2, Revision 1, Mechanical Test Control

-Administrative Procedure 0010432, Revision 63, Nuclear Plant Work Orders

General Maintenance Procedure GMP-01 governs the inspection and maintenance of check valves. This procedure addressed each type of check valve separately (i.e., swing, tilting disc, lift/piston, duo-check and stop check valves) and provided detailed instructions for the disassembly, inspection, refurbishment and reassembly. The procedure clearly defined the authority and responsibility of departments, groups, and individuals involved in the inspection and maintenance of check valves. Adequate details and references to other procedures for control of the maintenance process were included. An identified strength of the program is that the inspection procedure was required to be performed any time a monitored check valve is disassembled.

The check valve inspection program is NPWO driven and controlled. Any inspection or maintenance activity under the check valve inspection procedure requires a work order which will define; the scope of actual activities, proper preparation, proper procedures, post maintenance testing, and quality review follow up activities. NPWOs have been developed and computerized for check valve inspection and maintenance tasks. The NPWO process interfaces with other plant programs; such as

IST, Appendix J, Appendix R, etc.; to assure that appropriate post maintenance testing is performed.

The inspectors tracked six valves through the problem identification, disassembly and repair, and post maintenance testing. The six check valves were:

V-09119 - Unit 1, 1A AFW pump to 1A S/G

V-09135 - Unit 1, 1B AFW pump to 1B S/G

V-3525 - Unit 2, Hot Leg Injection Loop 2A

V-3527 - Unit 2, Hot Leg Injection Loop 2B

V-09164 - Unit 2, Main Feedwater Pump 2A Discharge

V-09174 - Unit 2, Main Feedwater Pump 2B Discharge

Problems with V-3525 and V-3527 were identified on October 31,1991, when the 2B Hot Leg Loop Pressure High annunciated and it was determined that check valve V-3527 was leaking as documented by IHE Report Number 91-066. The valves were inspected during the Spring 1992, Unit 2 refueling outage. The inspection indicated valve seat and disc pitting, causing degraded seat contact which allowed the leakage. The affected areas were lapped until satisfactory seating was achieved. The post maintenance testing verified the opening, closing, valve seat leakage, and external bonnet leakage of the valves. The problems with the other valves were identified during scheduled check valve inspections. The inspectors reviewed the NCRs, Root Cause Evaluations, NCR responses, check valve inspection and corrective action NPWOs, REA, PCM packages and post maintenance testing as applicable for the six check valves.

Based on the above review, the inspectors concluded that the licensee has been sensitive to check valve degradation and failure concerns. The inspection and maintenance program appeared to be dynamic in its application and capable of being improved as additional data from inspections, industry feedback and ongoing maintenance activities become available for input into the program.

9. Trending

Results of the check valve inspections and maintenance are documented on inspection data sheets which identify the as-found valve conditions and maintenance actions taken. This data from the inspection and maintenance activities for check valves are captured in the check valve inspection database. As-found dimensions of parts for certain types of valves are also recorded which are used for trending purposes. The MMEG approves the inspection data sheets, compares the results against previous information in the database, and reviews the results to determine adverse maintenance history trends and the need to modify valve inspection frequencies, inspection population, or the inspection

methods. Additionally, the mechanical maintenance engineers are directed by procedure to initiate a NCR for a defective component and/or a REA when repetitive or chronic problems are identified. This information is collected in a plant-wide database handled by the STA section.

The St. Lucie Plant Administrative Procedures (ADM) No. 17.02, "In House Event Reports/Summaries", and No. 17.03, "Operating Experience Feedback," assigns the STA section responsibility for tracking and trending the plant operating experience information in a computer database. This trending program is generic to all components and systems at St. Lucie Plant. These procedures define how the items are to be trended and requires that the data base be kept current. The STA section is required to evaluate and identify adverse trends, patterns, or potential common mode failures and issue summary reports to designated management personnel.

The inspectors reviewed the latest check valve events and check valve in-house events summary reports and concluded that the trending program for check valves was effective.

10. Corrective Action Program

The inspectors reviewed various licensee administrative controls concerning problem identification and resolution and confirmed that the licensee has delineated the responsibilities and processes for identification, assessment, implementation, tracking, and close out of corrective actions. Procedures reviewed included QI 15-PR/PSL-1, Nonconformance Reports, Revision 13, and Administrative Procedure 0005759, Maintenance Root Cause Tracking, Potential Repetitive Failures and Component Failure Analysis, Revision 3. Key elements in the process include NCRs; REAs; root cause evaluations; CFARs; and tracking systems such as the repetitive failures from Passport, repetitive failures from CFARs, and the maintenance root cause tracking log.

The inspectors traced six valves through the corrective action process and found the documentation adequate. These valves are discussed in paragraph 8 of this inspection report. In addition, the inspectors also reviewed CFARs from April 1991 - September 1992, for four Unit 1 check valves and six Unit 2 check valves.

Based on the sample reviewed, the inspectors concluded that the corrective action program for the check valve inspection program, has been effectively implemented.

11. Preventive Maintenance Program

The preventive maintenance program for check valves was in the process of development. A number of valves currently in the check valve inspection program had been disassembled and inspected previously, as confirmed by the review of the check valve inspection database. A positive maintenance practice noted was that the same general

maintenance procedures were used for disassembly of check valves under both the IST and check valve inspection programs.

12. Use of Non-Intrusive Test (NIT) Methods

The inspectors reviewed the use of NIT to measure check valve degradation under the PM program. The inspectors found that NIT has been used only on a limited basis by the licensee.

The licensee was an early participant in NIT activities. The licensee was directly involved in the Phase I and Phase II NIC nonintrusive diagnostic evaluations. Development of a plan to address SOER 86-03 by the check valve team in 1986 also included investigating the use of diagnostics. From 1987 - 1992 the licensee completed onsite demonstrations and evaluations for ultrasonic, magnetic, and eddy current diagnostics. The purchase of NIT diagnostics was budgeted for in the fall of 1991 and, after evaluating several vendors, the equipment was purchase by the licensee's corporate office in December 1992. The equipment will be used at both St. Lucie and Turkey Point during 1993. Training on the equipment is scheduled for spring 1993. The licensee plans to reevaluate the feasibility of the diagnostic equipment after its use in 1993.

The inspectors determined that, although NIT test methods have been used by the licensee on a limited basis, no credit was taken for its use.

13. Training

The inspectors reviewed the training provided to personnel involved in the maintenance, inspection, testing, and diagnostic evaluation of check valves. The training for use of non-intrusive testing equipment and the interpretation of test results had not begun, since the licensee had just purchased the equipment in December 1992. The training is scheduled for spring 1993.

The training of the craftsmen and technicians was addressed in Administrative Procedure 0005748, Nuclear Maintenance Journeymen/Specialist Training Program, Revision 8, which provided basic training for all craftsmen in their given field of expertise and then specialized training in the equipment to be maintained, repaired, or inspected. The program consisted of initial training, continuing training, and on-the-job (OJT) training.

The training program for maintenance engineering personnel was addressed in Administrative Procedure 0005749, Manager and Technical Staff Training, Revision 3. The inspectors noted that this procedure was in the process of being revised to incorporate additional criteria for engineering support personnel. Licensee personnel indicated that the revision is scheduled to be issued in February 1993. Training for predictive maintenance personnel and corporate engineering personnel assigned to the plant will be addressed in the revision. In addition to the training specified in Procedure 0005749, each department was

responsible for developing position specific training. The position specific training requirements for the MMEG was being developed.

The inspectors concluded that the licensee has an adequate training program which will assist maintenance personnel in achieving the skills and knowledge necessary to perform assigned duties involving safety related check valves.

14. Walkdown Observations

There was no check valve testing or maintenance being performed during this inspection. Walkdowns were conducted on parts of the Unit 1 auxiliary feedwater system to assess the material condition and installed configuration. The inspectors noted that check valves V-09119 and V-09157 were leaking. Licensee personnel had written NPWOs for the valves and repairs were scheduled for the Unit 1 refueling outage which is scheduled to begin in March 1993. No other concerns were identified.

15 Licensee Self Assessment

The inspectors reviewed the licensee's self assessment of its Check Valve Program that was performed from December 23, 1992 to January 22, 1993. The self assessment was performed to determine if the Check Valve Program was in compliance with ASME Section XI, the IST Program submittal to the NRC, Generic Letter 89-04, and the plant's Technical Specifications. The licensee identified a number of vulnerabilities in the Check Valve and IST Programs. During this inspection, the inspectors also identified some of the same findings that the licensee identified during the self assessment, including the violation of NRC requirements that is discussed in paragraph 7 of this inspection report. The inspectors reviewed that self assessment vulnerability list and the status of the actions taken to address the findings. The licensee had resolved all of the self assessment findings except two by the conclusion of this inspection.

16. Exit Interview

The inspectors met with the licensee representatives, denoted in Paragraph 1, at the conclusion of the inspection on January 29, 1993. The inspectors summarized the purpose and scope of the inspection and the findings listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee. However, licensee management questioned why the inspectors considered that by not having a documented basis for omitting certain quality group A,B, and C safety related check valves from the IST Program was a weakness in the IST Program. The following findings were discussed:

- One NCV associated with the implementation of plant change modification PCM 541-191, concerning failure to update the IST Program to reflect the addition of two new safety related check valves

in the main steam supply bypass line to the turbine driven auxiliary feedwater pump NCV 335/93-01-02 (paragraph 7).

- Unresolved Item concerning the two check valves added by PCM 541-191, and two check valves in the containment spray system that were not tested in accordance with ASME Section XI requirements. Operability determination of the valves per Generic Letter 91-18 and submittal of relief requests to the IST Program were being performed by the licensee URI 335, 389/93-01-01 (paragraph 7).

17. Acronyms and Initialisms

AFW	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
CFAR	Component Failure Analysis Report
CFR	Code of Federal Regulations
EPRI	Electric Power Research Institute
GL	Generic Letter
GMP	General Maintenance Procedure
IHE	In-House Event
INPO	Institute of Nuclear Power Operation
ISEG	Independent Safety Engineering Group
ISI	Inservice Inspection
IST	Inservice Testing
JPN	Juno Plant Nuclear
LOI	Letter of Instruction
MMEG	Mechanical Maintenance Engineering Group
MSIV	Main Steam Isolation Valve
NCR	Nonconformance Report
NCV	Non-Cited Violation
NIC	Nuclear Industry Check Valve Users Group
NPWO	Nuclear Plant Work Order
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OJT	On-the-Job Training
PCM	Plant Change Modification
PSL	Plant St. Lucie
PZR	Pressurizer
QI	Quality Instruction
REA	Request for Engineering Assistance
SOER	Significant Operating Experience Report
STA	Shift Technical Advisor
TI	Temporary Instruction
URI	Unresolved Item