APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-458/94-24

License: NPF-47

Licensee: Entergy Operations, Inc.
P.O. Box 220
St. Francisville, Louisiana

Facility Name: River Bend Station

Inspection At: St. Francisville, Louisiana

Inspection Conducted: November 14-18, 1994 with in-office inspection through December 13, 1994

Inspectors: L. E. Ellershaw, Reactor Inspector, Maintenance Branch
Division of Reactor Safety

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Approved: for Dr. D. A. Powers, Chief, Maintenance Branch
Division of Reactor Safety — 1/7/95 Date

Inspection Summary

Areas Inspected: Routine, announced inspection of the inservice testing program.

Results:

- Plant Operations

  The licensee exhibited a proactive posture by taking advantage of an unscheduled short outage, and performed main steam isolation valve air supply system pressure drop tests to verify functionability of the associated accumulator check valves (Section 3.2).

- Maintenance

  Performance of inservice testing was performed in accordance with procedures that had been upgraded to correct deficiencies found during the inservice test program reverification effort (Section 2.6).

All of the test personnel were verified to have received Phase 1 of the inservice test program training (Section 2.6).

Since the observed testing was conducted both locally at the equipment and remotely in the control room, the inspectors verified that communication between the two locations had been established and that the communication was effective (Section 2.6).

- Engineering

The licensee was proactive in performing a re-evaluation of the inservice test program. The re-evaluation resulted in the identification of numerous programmatic deficiencies (Section 2 2).

The licensee was aggressive in the development of actions to prevent recurrence of identified program deficiencies. The efforts to improve the inservice test program and its implementation were considered a strength (Section 2.2).

The establishment of a component basis document which clearly defined and documented the inservice test program scope and population, the bases for including and excluding components from the program, and all test requirements, including applicable requests for relief, was considered an excellent step towards achieving an effective inservice test program (Section 2.3).

The inspectors concluded that the current inservice test program efforts were in compliance with the ASME Code and regulatory requirements (Section 2.4).

- Plant Support

The development of a training program for inservice test personnel was a strength. The methodology was appropriate and the training material was excellent (Section 2.5).

The initiation of an assessment of the inservice test program was commendable. The assessment verified that no additional inservice test programmatic deficiencies, beyond those already identified by the licensee during its re-evaluation of the program, existed (Section 2.7).

The scope of the assessment was excellent and the expertise of the team members was considered a strength (Section 2.7).

- Management Overview

  Once management became aware of problems associated with the inservice test program, a concerted effort was initiated to identify and correct problems, and establish and implement an inservice test program which would meet the requirements of the ASME Code and NRC regulations (Section 2.1).

Summary of Inspection Findings:

- Violation 458/9406-02 was closed (Section 3.1).
- Unresolved Item 458/9417-01 was closed (Section 3.2).

Attachment:

- Attachment 1 - Persons Contacted and Exit Meeting
- Attachment 2 - Self Assessment Objectives and Inservice Testing Component Sample Identification

DETAILS

1 PLANT STATUS

During this inspection period, River Bend Station was in full-power operation.

2 INSERVICE TESTING (IST) OF PUMPS AND VALVES (73756)

The objectives of this inspection were to ascertain whether the licensee's IST program was: (a) consistent with the positions, criteria, and guidelines provided in Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs"; and (b) in conformance with the requirements of Subsections IWP and IWV of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through the Winter 1981 Addenda.

2.1 Discussion

On March 28, 1994, the licensee submitted to the NRC "River Bend Station 1994-1996 Performance Improvement Plan," which was developed as a result of internal and external assessments, including NRC inspections, that identified needed performance improvements. The plan is comprised of two parts: the "Near-Term Performance Improvement Plan," which defined required actions to effect immediate performance improvements, and the "Long-Term Performance Improvement Plan," which defined activities and priorities, and provided for solutions over a 3-year period. In conjunction with development of the Plan, the licensee conducted a review to ensure previously identified problems had been captured, and their root causes identified. Key strategies were defined and developed, and strategic programs were drafted to implement each of the key strategies. One of the key strategies, "Support for Safe Plant Operation," contained seven programs, including engineering support. Engineering support was considered particularly significant for its impact on performance due to its effect on plant material condition and the nature and extent of concerns identified in various assessments. Inservice testing was identified as a major element within engineering support; therefore, an IST improvement plan was established to upgrade the technical adequacy and functionality of the IST program.

The specifics regarding the bases for establishing the IST improvement plan and the resultant corrective actions, including status, are discussed in Section 2.2.

2.2 Licensee-Identified Deficiencies Associated with the IST Program

The licensee initiated Condition Report 93-0835 to document two violations identified by the NRC during a routine walkdown of the low pressure core injection pump on November 19, 1993. The violations involved a failure to follow procedures while installing IST test gauges, and procedural inadequacies regarding the low pressure core injection pump testing. This event, along with numerous other previously identified IST deficiencies, caused the licensee to re-examine its IST program.

This was accomplished by presenting the IST program and its identified problems to the general corrective action review board. The purpose of the corrective action review board was to address issues that repeatedly occurred within the same area in order to identify programmatic deficiencies.

In preparation for the general corrective action review board that was conducted on March 15, 1994, a system engineering program supervisor was assigned to the IST program. The program supervisor researched historical IST deficiencies and found that 30 condition reports, 9 quality assurance finding reports, and 3 NRC violations had been written against the program since 1986. These conditions were grouped into three major categories: lack of organizational ownership of the IST program; inadequate personnel training; and inadequate test procedures.

Based on this research, the program supervisor recommended the following actions to the general corrective action review board. These actions were subsequently added to the Long-Term Performance Improvement Plan, which was discussed above.

- Define and implement the role of engineering and operations to maintain the IST program. This resulted in system engineering being given ownership of the IST program, and system engineering and operations being given joint ownership of IST procedures.

- Designate a program supervisor, assess and assign dedicated resources.

- Perform a self assessment to check adequacy of the program from the design basis perspective.

- Upgrade approximately 187 IST procedures to meet ASME Code and design basis requirements. The upgrades were to be based on the results of the IST program review, and were to be made using the licensee's and adopted industry procedure writing guides as reference.

- Perform a complete reverification of the IST program. The reverification process included a review of all pumps and valves for inclusion into the IST program based on ASME Code Section XI and regulatory requirements, development of a design basis document for each component in the IST program, and review of all relief requests.

- Develop a component-to-test cross reference database. The licensee indicated this database would allow data from various sources to be input and automatically trended. The database would also contain leak rate information, ASME Code requirements, component drawing and location information, IST information, and a component-to-procedure search feature, as a minimum.

- Develop and provide training to operations and IST personnel that perform inservice testing. The training was to assure that all IST personnel were brought to a maximum level of understanding of the IST

program. The training was to cover performance testing, trending, use of vibration equipment and data interpretation, component program basis, and use of IST testing equipment.

- Install new, and upgrade existing permanently installed test equipment to meet ASME Code requirements, and reduce the dependency on temporary equipment. Relying on permanent equipment would reduce the possibility of error during equipment installation, reduce radiation dose, and reduce system downtime.

- Revise the IST program for the second 10-year interval. This revision would identify and develop all necessary documentation changes to the program plan, identify all procedure changes that were planned to be implemented for the second 10-year interval and develop component basis documentation for all affected equipment.

At the time of this inspection, the licensee had completed reverification of the IST program, and phase one of the training actions. The inspectors were able to determine that the adequacy of procedures has improved and the program established to assure adequacy of procedures in the future appears to be effective. Full implementation of the procedures upgrade program could not be fully assessed because of the short implementation time of the program. The remaining actions were in progress, with the last being scheduled for completion by September 30, 1995.

During the reverification process, the licensee discovered the following conditions: not all components had been properly tested; some safety-related components had never been tested (i.e., not included in the IST program); alternate testing had not been performed in accordance with Generic Letter 89-04; and inadequate test documentation existed.

On July 18, 1994, the licensee submitted Licensee Event Report 94-017, which identified seven check valves that had not been properly tested in accordance with ASME Code Section XI requirements. Further, the licensee event report addressed the Long-Term Performance Improvement Plan, including the IST improvement plan, and, in general, the above corrective actions. The inspectors were informed that a supplement to the licensee event report was scheduled for submittal to the NRC on November 30, 1994, and would essentially provide a status update and report any other identified conditions.

2.3 Review of IST Program for Pumps and Valves

The inspectors reviewed Revision 6 of the licensee's IST program for pumps and valves, which was issued on January 29, 1993, and represented the first 10-year inspection interval. The program was developed to meet the rules of the 1980 Edition through the Winter 1981 Addenda of the ASME Code, and specified Section XI testing requirements for certain pumps and valves providing a

safety-related function. The selection criteria used for including components in the program were based on: (1) a component being safety-related and active; and (2) valves that are safety-related and passive with specified leakage values and position indication requirements.

The IST program is currently being revised to represent the second 10-year inspection interval, and will be submitted to the NRC in conjunction with requests for relief that require NRC approval.

One of the actions identified above, was to develop a component basis document. This effort was accomplished with the establishment of the "Basis Document For IST Pump And Valve Program," dated August 1994. Each plant system was evaluated to identify all ASME Code Class 1, 2, and 3, pumps and valves that perform a specific function in shutting down the reactor to the cold shutdown condition, or mitigating the consequences of an accident. This evaluation was performed in conjunction with a review of the River Bend Station Updated Safety Analysis Report, the Technical Specifications, and related design basis documents, for determining which components are required to perform specific functions related to the variety of postulated accidents. The document established the basis by which the scope of the ASME Section XI IST program was determined, including which components are to be included and the extent and type of testing required for each. A page was devoted to each component and provided a complete description, including physical characteristics, system, drawing and location, normal and safety position, safety function, design document reference(s), ASME Code required testing, and special notes or comments. In addition, the document provided a listing of all components which were exempted from the IST program and the reason for the exemption.

The inspectors considered the establishment of the component basis document to be an excellent effort at clearly defining and documenting the scope and requirements necessary to have an effective IST program.

2.4 Evaluation of Licensee Program Regarding Positions Provided in Generic Letter 89-04

2.4.1 Full-Flow Testing of Check Valves

The licensee's IST program provided for full-flow testing (full-stroke exercise to the open position) of all check valves except where the tests were impractical to perform, in which case, relief was to be requested and granted. The full-flow tests met the position of Generic Letter 89-04 because flow is measured directly and is based on updated safety analysis report-specified maximum design-flow rates that the check valves must pass during accident conditions.

2.4.2 Alternative to Full-Flow Testing of Check Valves

For those check valves where it was found to be impractical to full-flow test, relief requests had been submitted in which alternative testing, as described in Generic Letter 89-04, was proposed. The alternative testing consisted of disassembly and visual inspection, and manually exercising of the check valve disk. Valve Request for Relief No. 24 identified the valves designated for the alternative testing, which was approved by the NRC in Safety Evaluation Report dated January 2, 1991.

2.4.3 Back-Flow Testing of Check Valves

All Category C check valves (valves which are self actuating in response to some system characteristic) were either full-stroke tested, or disassembled and inspected with a partial-stroke test (if possible). Section XI of the ASME Code requires that Category C check valves performing a safety-related function in the closed position to prevent reversed flow, be tested in a manner that proves that the disk travels to the seat promptly on cessation or reversal of flow. In addition, for Category A/C check valves (self-actuating check valves that have a specified leak rate), seat leakage must be limited to a specific maximum amount in the closed position. The inspectors verified that all Category A/C check valves listed in the IST program required the performance of leak testing, or that a request for relief had been submitted and approved by the NRC.

2.4.4 Pressure Isolation Valves

Pressure isolation valves are defined as two normally closed valves in series that isolate the reactor coolant system from an attached low-pressure system. The inspectors reviewed Technical Specification Table 3.4.3.2-1 to determine the identity of the pressure isolation valves (15) and then verified that they were included in the IST program as either Category A or Category A/C valves, and had been demonstrated operable by verifying that leakage limits were acceptable.

2.4.5 Limiting Values of Full-Stroke Times for Power-Operated Valves

The purpose of the limiting value of full-stroke time was to establish a value for taking corrective action on a degraded valve before the valve reached the point where there was a high probability of failure to perform its safety function if called upon. The generic letter guideline stipulated that the limiting value of full-stroke time should be based on the valve reference or average stroke time of a valve when it was known to be in good condition and operating properly. The guideline also stated that when the Technical Specification or safety analysis limit for a valve was less than the value established using the above criterion, the Technical Specification or safety analysis limit should be used as the limiting value of full-stroke time.

Conversely, if the Technical Specification or safety analysis limit for a valve was greater than the value established using the above criterion, then the limiting value should be based on the above criterion rather than the Technical Specification or safety analysis limit.

The inspectors verified that the baseline values had been established using the lower value of either the Technical Specification or safety analysis limits or a value based on the preoperational stroke times obtained during the initial startup testing.

2.4.6 Stroke-Time Measurements for Rapid-Acting Valves

The ASME Code specifies, for power-operated valves having stroke times of 10 seconds or less, that test frequencies be increased and mandatory corrective actions be taken if stroke times increase by 50 percent or more from the previous test. The generic letter recognized that many plants have power-operated valves that are capable of stroking in 2 seconds or less (rapid-acting valves), such as small solenoid-operated valves. This created much difficulty in applying the ASME Code 50 percent increase of stroke time corrective action requirements for these valves. It was found, for valves with stroke times in this range, that much of the difference in stroke times from test to test came from inconsistencies in the operator or timing device used to gather the data. As a result, the generic letter provided an acceptable alternative to the ASME Code requirements provided the licensee assigned a maximum limiting value of full-stroke time of two seconds to these valves and, upon any valve exceeding this limit, declare the valve inoperable and take corrective action in accordance with the ASME Code.

The licensee adopted this alternative to ASME Code requirements, and assigned a maximum limiting value of full-stroke time of two seconds to all rapid-acting valves. Since this position deviated from ASME Code requirements, the licensee documented the deviation in the IST program as an IST position.

2.4.7 Testing Individual Control Rod Scram Valves in Boiling Water Reactors

The NRC determined that those ASME Code Class valves that must change position to provide the scram function should be included in the IST program and be tested in accordance with the requirements of Section XI except where relief has been granted in a previously issued Safety Evaluation Report or as discussed below. The control rod drive system valves that perform an active safety function in scramming the reactor are the scram discharge volume vent and drain valves, the scram inlet and outlet valves, the scram discharge header check valves, the charging water header check valves, and the cooling water header check valves.

The inspectors verified that these valves were included in the licensee's IST program. Further, Position 7 of generic letter 89-04 is referenced in the inservice testing basis document regarding the methodology used in the reverse flow testing of these check valves.

2.4.8 Containment Isolation Valve Testing

All containment isolation valves that are included in the 10 CFR Part 50, Appendix J, program should be included in the IST program as either Category A or A/C valves.

The inspectors verified, on a sample basis, that the containment isolation valves contained in the 10 CFR Part 50, Appendix J, program were also contained in the IST program, and were classified as either Category A or A/C valves.

2.5 IST Training

The inspectors reviewed the licensee's IST training program, which was one of the areas designated for improvement in the Long-Term Performance Improvement Plan. Operations and IST personnel were trained in ASME Code requirements, Technical Specifications, relief requests, performance of pump and valve testing, the use of selected instrumentation, and the effects Generic Letter 89-04 and NUREG-1482 had on the IST program. In addition to these, numerous other program and performance objectives were identified.

The training was divided into two phases. Phase one was given to personnel who were identified as members of the designated IST team. The team was comprised of essential personnel from operations, the IST organization, and system engineering. This phase of testing was completed in October 1994. In phase two of the training, the designated core team was to be expanded to increase the pool of individuals who had received IST training and would, therefore, be qualified to perform inservice tests. Phase two was scheduled to be completed by September 1995.

The licensee contracted out the development of the IST training manual to BCP Technical Services, Inc., who in turn, subcontracted out the development of the training manual to Duke Engineering & Services, Inc. Duke Engineering & Services, Inc., developed the manual based on the criteria specified by the licensee and taught the initial phase of training in October 1994. The inspectors verified that the personnel designated by the licensee as members of the core IST team had attended and completed this training session.

In addition to the formal classroom training, the licensee also developed an IST handbook from the material presented during classroom training. The handbook was made available to all plant personnel to educate them on the purpose and importance of the IST program. The handbook also served as a guide for personnel that had received the formal training.

The inspectors considered the training effort established by the licensee to be a strength. The methodology was appropriate and well thought out, and the training materials were considered excellent.

2.6 Inservice Testing Observations

The inspectors locally observed the performance of selected portions of the following three inservice tests: standby liquid control system valve operability and pump flow test; low pressure core spray valve operability and pump flow test; and the penetration valve leakage control system valve operability test. All required testing prerequisites were satisfied prior to testing.

During testing, the inspectors ensured that all ASME Code required test parameters were identified and verified, and that the tests were conducted at the appropriate frequency. Each test was considered to be acceptable except for the penetration valve leakage control system valve operability test, which resulted in the licensee entering a Technical Specification limiting condition for operation. This condition is described in detail below.

The inspectors verified that personnel either performing or directing the testing had received phase one of IST training. The inspectors noted that the tests were conducted in accordance with the appropriately designated procedure, including the latest procedure revisions. The procedures had been updated to correct deficiencies found during the IST program reverification effort. Since the testing was conducted both locally at the pump and remotely in the control room, the inspectors verified that communication between the two locations had been established and that the communication was effective. The following specific observations were noted:

2.6.1 Low Pressure Core Spray Valve Quarterly Operability and Pump Flow Test

The purpose of this test was to (1) verify that low pressure core spray pump (1E21*PC001) developed enough flow to satisfy its test requirement, (2) verify operability of discharge check valve (1E21*VF003), and (3) verify that the isolation time of the test return valve to the suppression pool (1E21*MOVF012) was within specifications. This test was conducted using Revision 4 of Procedure STP-205-6301, dated November 9, 1994. Since the test was conducted in a high radiation area, the inspectors verified that all individuals in the area had signed onto an appropriate radiation work permit. The test personnel were observed to exhibit good radiological work habits with one exception. During the installation of a pressure gauge to measure suction pressure of the pump, testing personnel spilled potentially contaminated fluid onto the floor of the testing area. Radiation protection was immediately called and the spill was surveyed. Radiation protection determined that the spill was not contaminated and the spill was removed. The licensee stated that the reason the test instrument was installed was because the permanently installed instrument was not within the range specified by the ASME Code. Although personnel or equipment were not contaminated, installation of temporary test equipment for each test increases the potential for contamination. A modification package to install proper instrumentation has been initiated and was included as an element of the licensee's Long-Term Performance Improvement Plan for IST.

2.6.2 Penetration Valve Leakage Control System Quarterly Valve Operability Test

The purpose of this test was to verify operability and isolation times of valves in the leakage control system. The test was conducted using Revision 5 of Procedure STP-255-3300, dated November 11, 1994. The test was being satisfactorily completed until solenoid valve 1LSV*SOVY26B failed to stroke. The purpose of the solenoid valve was to allow the leakage control system to provide its own control air by failing open on loss of instrument air or control power. Since the valve failed, the licensee returned the system to a safe configuration and declared the system inoperable and entered Technical Specification 3.6.4. Permission was granted by the control room supervisor overseeing the test to modify the test procedure in order to return the system to a safe configuration.

Condition Report 94-1488 was written to document the failed valve. During performance testing, the solenoid valve's close reed switch initially gave an indication of the valve failing open, which was the valve's fail safe position. The close reed switch was used for local position verification and had no control function. During troubleshooting, the close reed switch functioned properly each time the valve was stroked. To verify operability of the valve, a portion of the test procedure normally performed during refueling outages was conducted. This testing verified valve position by observing the flow and stopping the flow of safety related control air. The valve passed this portion of testing. Based on this, the valve was declared operable and the licensee exited Technical Specification 3.6.4. The licensee initiated Maintenance Work Order R266675 to replace the close reed switch.

2.6.3 Standby Liquid Control Valve Quarterly Operability and Pump Flow Test

The purpose of this test was to verify that the Division 1 standby liquid control pump (1C41*PC001A) met its acceptance criteria, and to verify the operability of its discharge check valve (1C41*VF033A). The test was conducted in accordance with Revision 5 of Procedure STP-210-6311, approved August 12, 1994. During this test, temporary pressure meters and ultrasonic flow meters were installed to more accurately measure system parameters. The temporary equipment was either installed to measure a more precise indication of discharge flow rates or because the permanently installed gauges were not within ASME Code specifications.

During testing, a quality assurance inspector raised an issue regarding the N/A'ing of steps in the test procedure. At the completion of testing, testing personnel decided to leave some instrumentation installed in the system and to N/A portion of the test restoration section of the procedure. Testing personnel stated that the same test equipment would be reinstalled in the same position at the beginning of Division 2 testing that was scheduled for later that afternoon. Test personnel also stated that repeated installation of the

test equipment increased the opportunity for system and equipment damage. However, as a result of the quality assurance inspector's insistence on procedural compliance, the testing personnel removed all test equipment and performed the steps that had been N/A'ed.

2.7 IST Assessment

The inspectors reviewed the results of an assessment of the licensee's IST program conducted August 1-5, 1994. The purpose of the assessment was to verify that the licensee was in compliance with objectives derived from TI-2515/114, "Inspection Requirements for Generic Letter 89-04, Acceptable Inservice Testing Programs," and nine other objectives specified by the IST program supervisor. The nine objectives are outlined in Attachment 2 of this report. The team was comprised of nine individuals: two from River Bend Station, and seven from other nuclear plants. The expertise of the team members was varied and included an IST engineer, senior reactor operator, training specialist, and code and standards specialist. The inspectors noted that the scope of the assessment was appropriate to identify deficiencies in the IST program and its implementation.

The assessment included both documentation reviews and observations of IST testing. With the exception of one, all of the objectives were either met or partially met by the licensee. The objective that was not met involved inadequacies in the licensee's data trending program. The licensee was aware of this inadequacy and had written CR 940252, dated March 4, 1994, to document the inadequacy. Data trending was an area designated for improvement in the Long-Term Performance Improvement Plan. All actions associated with trending were to be completed by September 30, 1995. In addition to trending deficiencies, the assessment reiterated most of the issues that the licensee had previously identified.

The assessment identified six areas that needed improvement and recognized three program strengths. The areas needing improvements were all areas that the licensee had previously identified and in which actions had been initiated to correct these inadequacies. With regard to program strengths, the assessment recognized management for identifying IST program deficiencies and committing to their resolution. Also identified as strengths were the development and implementation of the improvement plan and improvements in communications during component testing.

2.8 Review of Historical Data Records

The inspectors reviewed historical testing data for 7 pumps and 20 valves in the licensee's IST program. The inspectors reviewed the test results from the last four quarterly tests for the pumps and valves identified in Attachment 2. The inspectors verified that the tests had been conducted at the proper frequency, that all the test parameters listed in the ASME Code had been

verified, that the test results were reviewed by designated IST personnel, and that operability determinations were made within the timeframe specified by ASME Code. None of the pumps reviewed were on increased frequency testing and all test results were acceptable except for the spent fuel pool cooling pump.

With regard to the spent fuel pool cooling pump, the inspectors noted that the pump failed to achieve its reference conditions on March 16, 1993, and was considered "failed" for inservice testing purposes. However, since the pump's flow rate was not a Technical Specification criteria, the licensee allowed the pump to remain in service based on an operability determination. The licensee concluded that the pump's flow was adequate to maintain temperature in the fuel pool below that specified in the safety analysis report. The inspector reviewed the licensee's evaluation and agreed that temperature in the fuel pool would be maintained at an acceptable level. The fuel pool temperature was being monitored and all results were acceptable. The inspector verified that the pump had been repaired and was scheduled to be rebaselined on the last onsite day of the inspection.

The inspectors noted that for some pumps, the reference values listed in the IST plan were different from the reference values listed on the test data sheets. When questioned, the licensee representative stated that since reference values were included in the IST plan, each time a component was rebaselined a new revision of the IST plan would need to be issued to reflect the new reference value. To alleviate this, the licensee stated that the new IST plan for the second ten year interval would remove all reference values.

The inspectors also noted that some test parameters listed in the IST plan were not being tested. When questioned, the IST project supervisor stated that he wasn't sure why these parameters were in the plan. The project supervisor stated that only the parameters required by the ASME Code were being tested and that test parameters not required by the Code would be removed from the plan during the next revision.

The inspectors also noted that some tests were performed more frequently than the required quarterly frequency. The licensee representative stated that their surveillance program operated on 12-week intervals. However, due to outages, some components were run more frequently in order to place the component back on the 12-week surveillance schedule.

3 FOLLOWUP - MAINTENANCE (92902)

3.1 (Closed) Violation 458/9406-02: Removal of IST Components From Alert Status Without Performing Corrective Action or Engineering Analysis to Document the Acceptability of Inservice Test Results

The licensee identified procedural inadequacies which allowed removal of pumps and valves from "Alert Status" without implementing corrective action or performing an engineering analysis. Procedure Change Notice CN 94-0325 was issued for Procedure ADM-0015 "Station Surveillance Test Program," Revision 15, on February 24, 1994. This change notice required system

engineering to provide written concurrence prior to equipment being removed from "Alert Status." Until the concurrence is received, a component in an "Alert Status" is to remain on an increased testing frequency until the written evaluation has been provided to the surveillance test procedure coordinator. Further, System Engineering Procedure PEP-009, "ASME Section XI Documentation," was revised to Revision 6 on March 31, 1994, to include the method of documentation for engineering evaluations on components removed from the "Alert Status." This was accomplished through the use of a standard form to inform the surveillance test procedure scheduling group of the need to return the component to its normal testing frequency. Without receipt of this form, the component is required to remain on an increased test frequency.

The inspectors reviewed the two instances of components being placed in an "Alert Status" since the implementation of the corrective actions, and noted that in both instances, the components (Valve 1SWP*AOV51B and Pump 1EGF*P1C) remained on "Alert Status" and increased test frequency until corrective actions were effected and the subsequent test results were determined to be satisfactory. In each case, an "Alert Evaluation Data Sheet/Justification" was completed by engineering, and the surveillance test procedure coordinator requested removal of the component from the increased frequency status and return to its normal testing frequency.

3.2 <u>(Closed) Unresolved Item 458/9417-01: Categorization of the Instrument Air System Check Valves That Isolate the Main Steam Isolation Valve Air Accumulators From the Instrument Air Header</u>

While the procedures were found to adequately test the leakage of the main steam isolation valves, the licensee was questioned regarding the categorization of the instrument air system check valves that isolated the main steam isolation valve air accumulator from the instrument air header. The check valves (1B21*VF024A-D) were classified as Category C valves in the IST program. Category C valves require verification of open and closed positions only, while Category A valves require a test for seat leakage, limited to a specific maximum amount to ensure fulfillment of the safety function. General Electric Service Information Letter No. 477 recommended performance of a leakage test of the actuator and accumulator for leak tightness during each refueling outage. In response to this service information letter, Calculation G13.18.2.0 *30-1, "Minimum Pressure Required in MSIV Accumulator Tanks," Revision 0, was performed. The calculation demonstrated that the main steam isolation valve air accumulator must be at a minimum initial pressure of 48.46 psig to at least balance the peak drywell pressure following a recirculation line break in the drywell. In lieu of the pressure test, the inservice testing program relied on a pressure indicator in the control room to alarm if air header pressure fell below 50 psig. Operator response to this alarm was to close the main steam isolation valves. However, since the pressure indicator was on the discharge piping from the compressors, it did not measure the accumulator pressure directly and no documentation correlated the pump discharge pressure to that at the accumulator. Therefore, any accumulator pressure changes may not be monitored by this arrangement.

The licensee committed to re-evaluate the category for these check valves, and, during the next refueling outage, to conduct a leak rate test on the main steam isolation valve air operating system even if they determined that their categorization of the check valves was correct.

On November 7, 1994, the licensee initiated CR 94-1456, which recommended that the current testing method of the main steam isolation valve accumulator be revised to include a leak tightness test during the next refueling outage. On November 9, 1994, an inter-office memorandum (ED-94-0626) was written from the Manager, Mechanical/Civil Engineering to the Manager, Performance and System Engineering, regarding the testing of the main steam isolation valve accumulator check valves. The memorandum noted that the original engineering evaluation (EEAR 88R-0286) of General Electric Service Information Letter No. 477 would require additional review and a revised disposition, as a minimum, to clarify the design basis requirements for main steam isolation valve closure. It further stated that the original response incorrectly assumed air is required together with the spring force to ensure proper valve closure. The licensee initiated Engineering Evaluation EEAR 94-R0037 to re-evaluate the design basis requirements for the main steam isolation valve closure and the General Electric service information letter. In addition, Calculation G13.18.2.0*30 was revised to Revision 2 on December 2, 1994, to establish acceptance criteria for pressure decay testing of the inboard main steam isolation valve air accumulator tanks.

The licensee's evaluation concluded that the accumulator check valves were correctly categorized as Category C valves. The evaluation also concluded that the main steam isolation valves are capable of closing on spring force alone within the time established (5 seconds) by the design basis accident analysis. The valves' closures do not require air pressure as long as the pressure force across the actuator air cylinder pistons are balanced. The valves are functionally tested (i.e., full closure test using springs only during every cold shutdown, or after any packing adjustment, or prior to return to service after any maintenance on the valve or actuator). These tests are performed using surveillance test Procedure STP-109-6302, "Main Steam Isolation Valve Partial Stroke/Full Stroke Operability Test". The inspectors verified that Revisions 7 and 8 of this procedure had been used for successfully testing the valves on June 24 and October 6, 1994, respectively.

While the inboard main steam isolation valves are capable of closing on spring force alone, the evaluation recommended that the air accumulator system should be pressure decay tested. This was based on two identified postulated accidents that cause increased drywell pressure and require closure of the main steam isolation valves (i.e., recirculation suction line break, and main steam line break inside the drywell). Since these conditions could cause the underside of the air cylinder piston to be at a higher ambient pressure than the topside, Calculation G13.18.2.0*30 was reviewed and revised to determine the minimum air accumulator pressure required to aid the springs in closing the main steam isolation valves, and to provide acceptance criteria for pressure decay testing of the inboard main steam line isolation valve air accumulator system. The calculation, based on conservative assumptions,

determined that for a main steam line break, a minimum pressure of 24.37 psig for 6 seconds is required. This was considered to be the worse case condition, since the recirculation suction line break would cause a peak drywell pressure of only 18.47 psig. For purposes of establishing conservative acceptance criteria for pressure decay rate testing, the figures of 25 psig and 10 seconds were used. A pressure decay rate/time available curve was established which shows acceptance of any pressure decay rate which yields a remaining time of greater than 10 seconds.

The engineering evaluation also addressed Licensing Change Notice 5.04-118, which had been initiated to ensure the applicable sections of the River Bend updated safety analysis report (Chapter 5.4) will be revised as necessary to indicate the proper main steam isolation valve operation and capability. The updated safety analysis report change will clarify the valve operability and capability as being accomplished with air and springs, or springs alone, as opposed to the current description of air and/or springs.

On December 4, 1994, with the reactor at 100 percent power, a full main steam isolation valve isolation initiated as a direct result of a test being performed, and an automatic reactor scram occurred. The licensee proceeded into a short outage before restarting the unit on December 11, 1994. The licensee, taking advantage of the outage, performed a pressure drop test across the main steam isolation valve air supply system. On December 7, 1994, Permanent Change Notice CN-A was issued for Procedure STP-109-6301, "Main Steam Valve Operability," Revision 5. This change notice changed the method for testing the inboard main steam isolation valve accumulator check valves in the closed position. It provided the detailed steps necessary to perform a quantifiable pressure drop test across the main steam isolation valve air supply system, and the acceptance criteria (i.e., verify accumulator pressures are greater than, or equal to, 25 psig after 15 seconds have elapsed from achieving atmospheric pressure in the air supply header).

The test was successfully performed by attaching pressure test gages on each of the accumulators' drain valves (B21*TK A001A, B, C, and D). The recorded test results were: 116.0; 114.0; 106.0; and 82.0 psig, respectively, after a minimum of 15 seconds. This data confirmed that each of the associated check valves (1B21*VF024A, B, C, and D) were able to perform their safety-related function, and were considered operable.

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Licensee Personnel

L. Borel, Senior Design Engineer
* R. Buell, Supervisor, Nuclear Systems
* J. Fisicaro, Director, Nuclear Safety
*#T. Fredieu, Supervisor, Inservice Testing
*#T. Gates, Supervisor, Nuclear Licensing
*#M. Krupa, Manager, System Engineering
* T. Leonard, Director, Engineering
* M. Sellman, General Manager
*#J. Summers, Licensing Specialist
* R. Walton, Control Room Supervisor
*#A. Wilson, Inservice Testing Engineer

1.2 NRC Personnel

W. Smith, Senior Resident Inspector

In addition to the personnel listed above, the inspectors contacted other personnel during this inspection period.

*Denotes personnel attending the preliminary exit meeting on November 18, 1994.

#Denotes personnel attending the telephonic exit meeting on December 13, 1994.

2 EXIT MEETING

A preliminary exit meeting was conducted on November 18, 1994, followed by a telephonic exit meeting on December 13, 1994. During this meeting, the inspector reviewed the scope and findings of the report. The licensee acknowledged the inspection findings documented in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.

ATTACHMENT 2

Self-Assessment Objectives

1. Verify that the IST procedure provided appropriate direction for the support of the IST program including: data gathering, documentation, trending and other activities, as required, and that newly issued procedures implement the requirements of the "IST Procedures Writers Manual."

2. Verify that the River Bend IST program plan adequately and appropriately implemented the requirements of the ASME Code, Generic Letter 89-04, NUREG-1482, and the Entergy standard for inservice testing as outlined in the "Design Engineering Administrative Manual."

3. Verify that performance testing activities were completed in accordance with approved procedures, with calibrated test equipment that met ASME Code specified ranges and calibration accuracies, and in a manner that exhibited good radiological and work practices.

4. Verify that IST test result evaluations and trending, design basis documentation and administrative controls provided for a complete, systematic, and appropriately documented program. Evaluate test results, trending, and design basis documentation for a sample of components in the selected systems.

5. Verify valve testing, selection, methodology, acceptance criteria and identification of corrective actions supported the assessment of operational readiness of components and met both the regulatory and design basis requirements. Evaluate these areas for a sample of valves.

6. Verify pump testing, selection, methodology, acceptance criteria, and identification of corrective actions supported the assessment of operational readiness of components and met both the regulatory and design basis requirements. Evaluate these areas for a sample of pumps.

7. Verify IST group interfaces were well-defined and functioned effectively to accomplish assigned tasks.

8. Verify IST program documentation was consistent; working level procedures and plans accurately implemented the requirements and commitments of design basis and licensing basis documents.

9. Verify IST personnel knowledge, training, qualification, and performance support safe and reliable operation.

IST COMPONENT IDENTIFICATION SAMPLE

PUMP	VALVE
1SWP*P3A	1LSV*SOV26B
1E51*PC001	1RHS*VF240
1E12*PC003	1E12*MOVF023
1SFC*P1B	1E12*AOVF041B
1HVK*P1B	1E12*MOVF008
1SWP*P2A	1E21*MOVF005
1E22*PC003	1E22*AOVF005
	1E51*MOVF013
	1B21*RVF041A
	1B21*AOVF028A
	1SWP*V147
	1SWP*V150
	1EGA*V148
	1HVR*AOD10A
	1HVN*V544
	1SFC*V101
	1LSV*3032B
	1LSV*110EA
	1IAS*SOV41B
	1CNS*V86