

ATTACHMENT

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Inspection Report: 50-458/95-28

License: NPF-47

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

Facility Name: River Bend Station

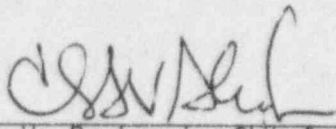
Inspection At: River Bend Station

Inspection Conducted: October 16-20, 1995

Inspectors: M. Runyan, Reactor Inspector, Engineering Branch  
Division of Reactor Safety

C. Myers, Reactor Inspector, Engineering Branch  
Division of Reactor Safety

Approved:

  
Chris A. VanDenburgh, Chief, Engineering Branch  
Division of Reactor Safety

10-21-95  
Date

Inspection Summary

Areas Inspected: Routine, announced inspection of followup of engineering issues.

Results:

Engineering:

- The inspectors verified that the licensee had properly assessed the immediate operability of seven motor-operated valves, which had been previously determined to be potentially susceptible to pressure locking (Section 1.2).
- In response to a previously identified weakness on the control of design basis information for relief valves, the licensee had implemented a comprehensive improvement initiative in the area of design basis reconstruction (Section 1.3).

- The inspectors were previously concerned that the licensee had not conducted as-found testing of removed main steam safety relief valves when they were replaced with spares. In response to this concern, the inspectors verified that the licensee had begun to perform this as-found testing and proactively committed to continue to conduct the testing of valves removed during scheduled refueling outages (Section 1.4).

Summary of Inspection Findings:

- Inspection Followup Item 458/9304-07 was closed (Section 1.1).
- Inspection Followup Item 458/9304-11 was closed (Section 1.2).
- Inspection Followup Item 458/9322-01 was closed (Section 1.3).
- Inspection Followup Item 458/9322-03 was closed (Section 1.4).
- Inspection Followup Item 458/9416-01 was closed (Section 1.5).
- Violation 458/9510-01 was closed (Section 1.6).
- Inspection Followup Item 458/9510-02 was closed (Section 1.7).
- Violation 458/9510-03 was closed (Section 1.8).
- Violation 458/9510-04 was closed (Section 1.9).

Attachment:

- Attachment - Persons Contacted and Exit Meeting

## DETAILS

### 1 FOLLOWUP OF ENGINEERING ISSUES (92903)

#### 1.1 (Closed) Inspection Followup Item 458/9304-07: Policy Change Affecting Commitment to Generic Letter 89-10

##### Background

This followup item concerned a change in the scope of the licensee's Generic Letter 89-10 program. The licensee had previously committed to test all motor-operated valves within their program under the highest achievable differential pressure conditions. At the time of the previous inspection, the licensee was considering eliminating differential pressure testing of valves which were not considered to provide meaningful performance data. This item was open pending review of the change implemented by the licensee.

##### Followup

The inspectors reviewed licensee letter, RBG-41580, dated June 1, 1995. In this letter, the licensee notified the NRC of a change in their commitment to Generic Letter 89-10 regarding the elimination of differential pressure testing that did not provide meaningful performance results. The inspectors also reviewed licensee Procedure EP-G-001-00, "MOV Program Guidelines," dated July 12, 1995, Procedure M/C95-006, "MOV Program Description," Revision 0, and VECTRA Technologies Report 0103-00090-RPT-04, Revision 1. The inspectors found that the licensee had established criteria for the elimination of dynamic testing, which included consideration of the available valve margin and the safety significance of the valve.

##### Conclusion

The inspectors concluded that the licensee actions were consistent with the recommendations of Supplement 6 to Generic Letter 89-10. The inspectors found the licensee had revised their motor-operated valve program consistent with their revised commitment to Generic Letter 89-10.

#### 1.2 (Closed) Inspection Followup Item 458/9304-11: Evaluate 16 Normally Open Valves and Rapid Depressurization

##### Background

During a previous pressure locking and thermal binding evaluation, the inspectors had identified that the licensee had not addressed the susceptibility of normally-open valves and had not fully evaluated the effects of rapid depressurization. The licensee had agreed that additional efforts were needed to determine which of its valves were susceptible to pressure locking and thermal binding.

### Followup

The licensee hired a contractor to reevaluate its valve population for susceptibility to pressure locking and thermal binding. This effort was undertaken to address the concerns expressed by the NRC during the previous motor-operated valve inspection and also to formulate a response to Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," which was issued on August 17, 1995. At the time of this inspection, the contractor study had not been completed.

As a parallel effort to the contractor's work, the licensee reviewed several pressure locking and thermal binding evaluations performed by other boiling water reactor licensees. This was to anticipate which valves the contractor would eventually identify as being susceptible. From this review, seven motor-operated valves were considered likely to be susceptible at River Bend Station. The licensee had prepared two modification requests (95-48 and 95-49) addressing some of the susceptible valves to install a bypass line from the valve bonnet to the upstream piping. These modifications were to be installed during Refueling Outage 6, scheduled to begin January 6, 1996.

The inspectors questioned whether the licensee had evaluated the seven potentially susceptible valves for capability to open under the assumed pressure locking conditions. The licensee stated that the contractor had performed preliminary calculations for the valves and had determined that each of the valves was capable of opening under worst-case pressure-locked conditions. This evaluation was performed using standard Generic Letter 89-10 methodologies and assumptions (i.e., no conservatism was removed to increase calculated capabilities). Because of this fact, the licensee did not initiate a condition report for the valves. An evaluation method developed by the Grand Gulf plant, and used by many nuclear utilities, had been used in the contractor's calculation. The NRC has accepted this evaluation method to demonstrate short-term (until the next refueling outage) operability of motor-operated valves susceptible to pressure locking.

The inspectors reviewed a sample draft calculation of one of the seven valves evaluated by the contractor. The evaluation techniques appeared to be satisfactory. Based on review of the draft calculation and discussions with the licensee, the inspectors concluded that the licensee had acceptably demonstrated short-term operability of the seven valves for the interim period of operation preceding Refueling Outage 6.

### Conclusion

The ongoing contractor study to address Generic Letter 95-07 will include a review of normally-open valves and rapid depressurization events. As such, this inspection followup item was closed. The remaining concerns will be resolved during review of the licensee's response to Generic Letter 95-07.



1.3 (Closed) Followup Item 458/9322-01: Discrepancies in Vendor Calculations Regarding Relief Valve Capacities

Background

This inspection item remained open pending completion and review of the licensee's resolution of discrepancies in vendor calculations involving the relief capacity of certain relief valves. The design basis information regarding relief valve capacities contained in procurement specifications did not appear to agree with other vendor calculations.

Followup

In response to this concern, the licensee had contracted Stone and Webster Engineering Corporation to review and assemble the design basis information for their thermal and safety relief valves. Stone and Webster Engineering Corporation had completed that review and concluded that the pressure relief settings and capacities of existing relief valves were acceptable. The inspectors reviewed the Stone and Webster Engineering Corporation calculations and concluded that they were adequate to resolve the discrepancies originally noted. The inspectors also observed that the original vendor specifications and calculations had not adequately considered back-pressure on the relief valve introduced by the as-built configuration. The Stone and Webster Engineering Corporation calculations included evaluation of the as-built configuration in specifying the required setpoints and capacities.

The inspectors considered that the previous control of design basis information was weak because of the fragmented reference information which the licensee used to obtain the required information. This resulted in considerable time and effort on the part of the licensee to obtain what they considered to be the design basis information before they could determine whether the existing configuration was adequate. Although the inspectors did not identify any performance-based safety consequence related to this weakness, the inspectors were concerned that without a clear control of the design basis information, required design margins could not be identified and configuration modifications could not be adequately evaluated in a timely fashion. In response to a similar concern, the licensee had self-initiated improvement programs to reconstitute the design basis information for relief valves. The inspectors considered that the ongoing programs appeared to be comprehensive for relief valves. According to the licensee, the programs were to be completed by the end of the 1995.

Conclusion

The inspectors considered the licensee actions to be adequate to resolve the discrepancies originally observed. The inspectors identified a previous weakness involving the control of design basis information for relief valves; however, the licensee was in the process of implementing comprehensive improvement initiatives in the area of design basis reconstruction to resolve the concern.

1.4 (Closed) Followup Item 458/9322-03: As-Found Testing Not Performed

Background

This followup item concerned testing of main steam safety relief valves. The inspectors had found that the licensee did not conduct as-found testing of removed main steam safety relief valves when they were replaced with spares from the warehouse. It had been the licensee's practice to replace all 16 relief valves during each refueling outage with new spare relief valves from their warehouse. The spare relief valves were tested to be within required tolerance prior to installation. The licensee had planned to conduct as-found testing of 1 valve during Refueling Outage 5 and 16 valves during Refueling Outage 6. This item was open pending review of the results of the licensee testing.

Followup

The inspectors found that the licensee had completed as-found testing of 17 main steam safety relief valves. The licensee found that 6 of the 16 valves did not meet the tolerance required by Technical Specification. The licensee initiated Condition Report CR-95-0558 to document the results of the as-found testing. The inspectors also found that the licensee had adequately evaluated the reportability of the out-of-tolerance condition for the 6 valves. The licensee considered that the performance of the failed valves was typical of the industry experience and not indicative of an excessive setpoint drift problem. The licensee had initiated additional analysis to support a Technical Specification change to increase the allowable tolerance of the relief setpoints. Although not required under committed ASME requirements, the licensee planned to continue to conduct as-found testing of main steam safety relief valves for performance monitoring. The licensee planned to update their in-service testing program to a more current ASME code version, which does require as-found testing. At the exit, however, the licensee confirmed their commitment to continue to conduct as-found testing of removed main steam safety relief valves.

Conclusion

In the absence of any regulatory requirements, the inspectors found the licensee actions to be proactive and adequate to resolve the previous concerns. The licensee committed to continue to conduct as-found testing of main steam safety relief valves removed during scheduled refueling outages.

1.5 (Closed) Inspection Followup Item 458/9416-01: Track Eight Marginal Motor-Operated Valves

Background

The licensee had established a two-tiered categorization of its motor-operated valves. A margin criteria was developed using conservative, bounding assumptions for each of the variables in the thrust and capability

calculations. An operability criterion, which provided the definition for Technical Specification operability, was established using less conservative, but still supportable, assumptions. The licensee intended to upgrade each of its Generic Letter 89-10 motor-operated valves to meet the margin criteria. At the time of the previous inspection, though all valves met the operability criteria, eight motor-operated valves failed to meet the margin criteria, thereby, requiring modification.

#### Followup

The licensee stated that each of the eight marginal motor-operated valves would be modified before the end of Refueling Outage 6, scheduled to begin January 6, 1996. Three of the valves were to be reconfigured by replacing an existing 10 foot-pound motor with a 25 foot-pound motor and replacing the valve stem with a new stem of higher strength. The remaining five motor-operated valves were to have torque switch settings increased to provide more thrust at torque switch trip. Two of these valves had already been tested and reset. The remaining three were to be addressed during the outage.

The inspectors reviewed Modification Request MR 94-0013, which specified the motor and valve stem change for Valve 1B21\*MOV019. This modification was essentially identical to the packages prepared for the other two motor-operated valves receiving larger motors and stems. The inspectors concluded that Modification Request 94-0013 was satisfactory.

#### Conclusion

The licensee had established a tracking schedule sufficient to ensure that each of the marginal motor-operated valves would be upgraded to meet the margin criteria before the end of Refueling Outage 6. Accordingly, this item was closed.

#### 1.6 (Closed) Violation 458/9510-01: Design Control Deficiencies

##### Background

This violation identified five examples where design information was not correctly translated into drawings, specifications, or modifications. The NRC team had resolved the technical issues associated with each of the items and had previously concluded that no safety concerns existed. Therefore, the violation response focused on the programmatic deficiencies underlying the examples of poor design control.

### Followup

Since some of the examples involved inadequate work performed by a contractor, the licensee revised Procedure EDP-AA-20, "Engineering Calculations," Revision 9, to require that calculations performed by outside contractors be approved by a licensee engineer competent in the subject matter. The procedure revision also stipulated that the depth of review must be commensurate with the safety significance of the calculation.

Because several of the examples involved failure to consider all implications of a modification, the licensee revised Procedure EDP-AA-81, "Design Inputs," Revision 2, to improve requirements for establishing modification design inputs. In addition, to address a concern in one of the examples where a valve pressure rating was exceeded by a change to another part of the system, Procedure EDP-AA-81 was revised to require the responsible engineer to evaluate peripheral components and systems during and after installation of a modification.

Several corrective actions addressed quality assurance aspects of contractor work products. The contractor that had performed an inadequate modification for the licensee had developed a corrective action plan, which the licensee's materials requirements group intended to monitor. In addition, letters were sent to all major contractors used by the licensee to verify compliance with independent verification requirements.

The licensee was developing what was termed the "Design Review Board," consisting of senior level personnel from River Bend Station and other Entergy Operations, Inc., sites. This new review group was tasked with providing oversight of the modifications being developed for Refueling Outage 6 and Cycle 6. The board will perform design critiques of modifications to a depth commensurate with the safety significance.

The inspectors reviewed the procedure changes referenced above and the licensee's commitment tracking system which documented the other corrective actions. Although not all of the corrective actions were complete at the time of the inspection, it was clear that the licensee had established positive means for ensuring that they would be performed in a timely fashion.

### Conclusion

The inspectors concluded that the licensee had implemented a comprehensive corrective action plan to address the identified design deficiencies in response to this violation. The inspectors verified that the specific actions not yet completed were being tracked by a reliable commitment tracking system; therefore, this item was closed.



1.7 (Closed) Inspection Followup Item 458/9510-02: Valves Removed From Generic Letter 89-10

Background

The licensee had excluded seven motor-operated valves from the Generic Letter 89-10 program based on a probabilistic risk analysis. The seven valves functioned as test return isolation valves between emergency critical cooling system pumps and the suppression pool or condensate storage tank. The valves, normally closed, are periodically opened for pump testing. During this time, the valves would need to close in response to an accident requiring the associated cooling system. The failure of one of these valves to close could result in failure of the affected pump to deliver adequate cooling water flow to the reactor. The licensee had excluded the valves based on an original General Electric design basis stating that these systems were not assumed to recover from a test mode of operation. This position was supported by a calculation showing that the probability of the test return lines being open during an accident was very small.

The inspection team had expressed a concern that the test return valves were potentially incapable of returning to their closed safety position during testing or when operating procedures permit the valves to be open during operation for reactor water level control. Since the licensee was not declaring the valves inoperable during periods of time when they were open, there was no formal process (i.e., Technical Specifications) ensuring that redundant safety trains were not simultaneously degraded.

Followup

The licensee reinstated the seven test return isolation valves into the Generic Letter 89-10 program. The licensee stated that, after Refueling Outage 6, all of these valves will have been tested and fully qualified under the Generic Letter 89-10 program.

Conclusion

Upon reinstatement of the test return valves into the Generic Letter 89-10 program, the licensee resolved the original concern.

1.8 (Closed) Violation 458/9510-03: Inadequate Measures to Ensure Valves Remain Closed

Background

The licensee had issued Condition Report 95-0045, identifying four differential pressure indicators that were not seismically qualified. Interim corrective measures were taken to close the two root valves leading to each indicator and to ensure that the root valves remained closed through the use of

locally-positioned operator aids. During a plant tour, the NRC team found two of the root valves leading to one indicator open, thereby, revealing the inadequacy of the licensee's method for controlling valve position. A second example to this violation was previously withdrawn by the NRC.

#### Followup

The inspectors verified that the licensee had removed the operator aids and danger-tagged closed each of the root valves leading to the unqualified pressure indicators. In addition, the licensee revised Procedure OSP-0001, "Control of Operator Aids," Revision 8, following this incident. The revised procedure states that operator aids shall not be utilized in the place of safety tags used for the protection of personnel and equipment.

#### Conclusion

The licensee had taken actions sufficient to correct and preclude recurrence of this problem.

#### 1.9 (Closed) Violation 458/9510-04: Failure to Properly Implement Technical Specification Requirement

#### Background

Technical Specification 4.7.2.e.3 required that the heaters within the main control room air conditioning subsystem be tested every 18 months to demonstrate that they dissipated  $23 \pm 2.3$  kW at the design supply voltage. The test procedure implementing this requirement, Surveillance Test Procedure STP-402-1600, "Main Control Room Air Filter 18-Month Heater Capacity," Revision 9, did not provide a means to correlate the dissipation rate at the test voltage (typically 480 volts or above) to the design supply voltage of 460 volts. As such, compliance with the Technical Specification was not being demonstrated.

#### Followup

The licensee found two other examples analogous to the cited example. The licensee corrected the test results from these tests to account for the differences between test and design voltages and determined that the affected heaters were in compliance with the Technical Specifications.

In the violation response, the licensee committed to revise the test procedures for the three heaters such that the calculated heater dissipation rate would be based on the design supply voltage. According to the licensee's commitment tracking system, these procedures were scheduled to be revised by December 20, 1995. The inspectors verified that this schedule would predate the next time these tests will be performed.

Since the previous inspection, the inspectors noted that the licensee had implemented the improved Technical Specifications for River Bend Station. The improved Technical Specifications did not change the required heater dissipation rate, but no longer stipulated a correlation to the design supply voltage. Despite this fact, the licensee stated that the procedures would be revised as originally planned. The inspectors considered this to exemplify a good safety focus.

Conclusion

The licensee had satisfactorily addressed the identified discrepancy.

## ATTACHMENT

### 1 PERSONS CONTACTED

#### 1.1 Licensee Personnel

- \*R. Alexander, Manager, Project Management
- \*W. Brian, Manager, Strategic Planning
- L. Burell, Engineer, Design Engineering
- M. Cook, Engineer, Design Engineering
- \*E. Ewing, Manager, Maintenance
- \*J. Fisicaro, Director, Nuclear Safety
- A. Glass, Engineer, Engineering Support
- \*J. Holmes, Superintendent, Chemistry
- \*H. Hutchens, Superintendent, Plant Security
- \*M. Krupa, Manager, Operations
- \*T. Lacy, Outage Coordinator
- \*T. Leonard, Director, Engineering
- \*L. Lewis, Manager, Training
- \*D. Lorfing, Supervisor, Licensing
- \*J. McGaha, Vice President- Operations
- \*M. Sellman, General Manager, Plant Operations
- \*A. Shahkarami, Manager, Mechanical/Civil Engineering
- \*R. West, Acting Manager, System Engineering
- \*G. Zinke, Manager, Quality Assurance

#### 1.2 NRC Personnel

- \*D. Proulx, Resident Inspector

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

\* Denotes personnel attending the exit meeting on October 20, 1995.

### 2 EXIT MEETING

An exit meeting was conducted on October 20, 1995. During this meeting, the inspectors reviewed the scope and findings of this report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.