

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Inspection Report: 50-416/96-07

License: NPF-29

Licensee: Entergy Operations, Inc.  
P.O. Box 756  
Port Gibson, MS 39150

Facility Name: Grand Gulf Nuclear Station

Inspection At: Port Gibson, Mississippi

Inspection Conducted: February 25 through April 13, 1996

Inspectors: J. Tedrow, Senior Resident Inspector  
K. Weaver, Resident Inspector  
D. Proulx, Resident Inspector, River Bend Station

Approved:

  
P. H. Harrell, Acting Chief, Project Branch D

5-1-96  
Date

Inspection Summary

Areas Inspected: Routine, announced inspection of operational safety verification, maintenance observations, surveillance observations, onsite engineering, plant support activities, followup of maintenance, and onsite review of a licensee event report (LER).

Results:

Plant Operations

- An automatic isolation of the reactor water cleanup system (RWCU) occurred while operators isolated the associated nonsafety-related demineralizer system for maintenance. A known problem with the marginal design of closure springs for the air-operated isolation valves necessitated the use of gagging devices to keep the valves closed. Before all gagging devices could be installed, several valves drifted open and diverted some of the system flow to the backwash receiving tank causing a high differential flow isolation signal. Plant equipment responded as designed, and operators properly implemented the off-normal event procedure (Section 2.1).

### Maintenance

- The licensee worked on the wrong trip unit when replacing the unit for the turbine control valve/stop valve fast closure scram bypass. Poor communication among craft personnel and the maintenance planner, and poor supervisory review of the work package resulted in the work order being written for Trip Unit C rather than Trip Unit A. Although this specific event did not result in an actuation of the reactor protection system, working on the wrong component could have had more severe consequences. This item was considered to be a noncited violation (Section 3.1).
- Because of cleaning practices to keep foreign material out of susceptible systems, solder was introduced into the control rod drive air system during maintenance in May 1995. This solder lodged underneath the seat of a scram discharge pilot valve and caused a set of scram discharge volume vent and drain valves to fail to properly stroke during testing. This item was considered to be a noncited violation (Section 3.2).

### Engineering

- The engineering basis for a plant modification and the assumptions/methodology used in engineering calculations were considered to be valid (Sections 3 and 5).

### Plant Support

- Plant housekeeping was considered poor in the reactor core isolation cooling pump room and in several contaminated areas (Sections 2.2 and 6.1).
- Improvement was noted in the appearance of several plant areas due to painting (Section 2.2).
- The storage of material following roof repair work was poor and resulted in the blockage of a residual heat removal heat exchanger blowout panel (Section 2.2).
- Radiological areas were found to be properly posted (Section 6.1).
- The licensee properly planned for a strike of security personnel (Section 6.2).

Summary of Inspection Findings:

New Items

- A noncited violation was identified for failure to provide proper work instructions to replace the correct trip unit in the reactor protection system (Section 3.1).
- A noncited violation was identified for failure to perform appropriate post maintenance cleaning of the control rod drive air system (Section 3.2).

Closed Items

- LER 50-416/93-017 (Section 9.1)
- Violation 50-416/9421-03 (Section 8.1)

Attachment

Persons Contacted and Exit Meeting

## DETAILS

### 1 PLANT STATUS

Except for minor power reductions to perform automatic turbine valve testing and control rod sequence exchanges, the plant was operated at 100 percent power during this inspection period.

### 2 OPERATIONAL SAFETY VERIFICATION (71707)

#### 2.1 Onsite Review of Events (93702)

On March 27, 1996, at 5:21 a.m.(CST), an automatic isolation of the RWCU system occurred. A preplanned evolution was in progress to remove the nonsafety-related RWCU demineralizer system from service for maintenance. To isolate portions of the system to be worked, air-operated valves were selected to be tagged closed as boundary valves. Because of the marginal design of the valve closure springs, the licensee has experienced previous problems with these valves remaining closed following removal of air. Therefore, the tagout specified that the valves be gagged closed. The boundary valves were closed, and the air supply was isolated to install the gagging devices. Before all the gagging devices were installed, several valves drifted open allowing flow through Filter Demineralizer A to the RWCU backwash receiving tank. The resultant differential between inlet flow to the RWCU system and return flow to the reactor vessel exceeded the isolation setpoint of 79 gpm which generated a valid isolation signal.

The inspectors arrived in the control room approximately 1 hour after the isolation had occurred. The inspectors discussed the event with the operating shift and verified the automatic isolation valve closure. Plant equipment responded as designed. Plant operators properly implemented Off-Normal Event Procedure 05-1-02-3-5, "Automatic Isolation." The licensee plans to submit an LER on this event. The inspectors will review the corrective actions in conjunction with the LER review.

#### 2.2 Plant Tours

During routine tours of the plant, the inspectors noted that a Division 1 safety related cable tray located in the reactor core isolation cooling pump room contained a rope, trash, and debris inside the tray. The inspector informed the licensee of this concern, and the rope and all trash and debris were removed. The inspectors considered housekeeping in this room to be poor.

During a tour of the Auxiliary Building rooftop to check on the status of roof repairs, the inspectors noted that some of the material used by the workers had been stacked up against one of the blowout panels for the residual heat removal Heat Exchanger Room A blowout shaft. Two 5 gallon buckets, with an approximate weight of 40 pounds each, had been stacked atop one another, thereby, blocking free movement of one of the eight blowout panels for this

shaft. The panels are hinged at the top and secured with two shear pins at the bottom. The inspectors reviewed Sections 3.3, 3.6A, and Appendix 3E of the Updated Final Safety Analysis Report (UFSAR) that described the purpose and function of these components. The purpose of the shaft and panels is to limit the pressure differential between the Auxiliary Building and the atmosphere, which could develop during a rupture of high energy piping systems or during a tornado event. The blowout panels are designed to open at 0.5 psid based upon the failure of the shear pins. However, the analysis calculations and UFSAR assume the panels open at 1.0 psid.

The inspectors informed licensee personnel of the material blocking the blowout panel and immediate actions were taken to remove the roofing material from the blowout panel area. In addition, a deficiency report was generated to document the condition and evaluate the consequences. Licensee personnel showed the inspectors the analysis calculations which indicated that the conservatism in the calculations, based on an opening pressure of 0.5 psid, would allow for an additional resistive force of 240 pounds before an internal pressure of 1.0 psid was achieved. The inspectors concluded that the buckets did not prevent the panel from performing its intended function. However, the inspectors considered housekeeping practices in this area to be poor for not considering the potential effects of blocking these panels. Licensee management informed the inspector that the blowout panel area would be posted to specify that the panels remain clear of obstructions.

Improvement was noted in the general appearance of the standby gas treatment rooms, low pressure core spray pump room, and the component water cooling system pump and heat exchanger area due to recent painting.

### 3 MAINTENANCE OBSERVATIONS (62703)

During this inspection period, the inspectors observed portions of the following maintenance activities, which included a review of the following work orders (WO):

- WO 132292/149541: Drywell Purge Compressor B minor maintenance to sample oil and inspect the discharge check valve
- WO 162083: Replace trip unit for turbine control valve/stop valve fast closure scram bypass
- Modification Work Permit 19961008: Install airline filter for scram discharge volume solenoid pilot valves

The inspectors found that these items were properly performed with the following exceptions.

### 3.1 Replacement of Turbine Control Valve/Stop Valve Fast Closure Scram Bypass Trip Unit

On March 26, 1996, the inspectors witnessed performance of portions of WO 162083 that replaced safety-related Trip Unit 1C71N652C. This WO was initiated to correct intermittent annunciators alarming in the control room when the turbine control valves/stop valves fast closure reactor scram was bypassed. The inspectors noted that the instrumentation and controls (I&C) craft performed the trip unit replacement in a formal manner and in accordance with the procedure. However, shortly after completion of the work, the I&C supervisor informed the inspectors that the WO had directed the wrong trip unit to be replaced.

On March 6, the licensee began receiving intermittent alarms of the "Turbine CV/SV Close Trip Bypass" annunciator. Operators initiated Condition Identification 054356 to document this deficiency. Following this documentation, the licensee wrote WO 162083 to troubleshoot this problem. The initial work description for WO 162083 stated, "Annunciator Sealed in with No Applicable Trip Unit Tripped. Troubleshoot Annunciator Circuit to Determine Problem." On March 7, licensee personnel lifted leads that went to each of the four trains (A, B, C, and D) that provided a common input for the annunciator. The licensee found that when the lead for Train A (Division I) was lifted, the annunciator cleared. When the lead was reterminated, the annunciator illuminated. The craftsmen documented this observation in the troubleshooting activity log of the WO.

The licensee performed further troubleshooting and isolated the problem to Trip Unit 1C71N652A. I&C personnel requested that maintenance planning provide further instructions to replace the unit. While developing these work instructions, the maintenance planner went to the Division I back panel area and observed I&C craft working in the vicinity of Train C equipment. Therefore, he assumed that WO 162083 required Trip Unit 1C71N652C to be replaced and wrote the work instructions based on this assumption. The planner did not read the troubleshooting log to formally ensure that the revised instructions were written for the proper trip unit. The planner also did not contact I&C personnel to determine if the instructions were correct. Therefore, the craft was provided a WO to change out the wrong equipment.

When the I&C supervisor, who was aware that Trip Unit A was the deficient component, received the revised work package, he did not adequately review the work package prior to giving it to the craftsmen to perform. This was another missed opportunity to identify the maintenance planner's error. The I&C technicians followed the WO as it was written. These technicians were unaware that Trip Unit A was deficient. After completion of the work, the I&C supervisor reviewed the WO for closeout purposes. At this time he identified that the wrong trip unit had been replaced. The I&C supervisor informed maintenance management, and a deficiency document was written.

The inspectors noted that this event had minor safety significance. Although these trip units were required to be operable in accordance with the Technical

Specifications (TS), the trip units in question did not provide inputs that would generate a reactor scram or initiate emergency core cooling systems. Instead, the trip units bypassed the turbine control valve/stop valve scram when reactor power was less than 21 percent. However, the inspectors were concerned that the process problems that caused this event could result in more severe consequences on other instrumentation. The maintenance planner did not formally review all applicable documentation when developing the work instructions, and I&C supervision did not properly review the WO prior to assigning it to be worked.

The trip unit replacement problem was discussed with the maintenance manager who informed the inspectors that corrective actions would be taken to address this example and the previous examples of poor craft supervision. For immediate corrective actions, the licensee revised the WO and replaced the proper trip unit satisfactorily. The work planner and maintenance supervisor were counseled on the importance of reviewing all applicable work documents prior to issuing the work instructions. In addition, the licensee developed a prejob brief checklist, which included reviewing the work instructions, to aid in maintenance craft preparation prior to commencing work. In addition, the prejob checklist will require more supervisory oversight to assure personnel have the correct tools, are properly trained and are working on the correct component.

TS 5.4.1.a requires procedures to be implemented for those procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Procedure 01-S-07-1, "Control of Work on Plant Equipment and Facilities," requires that work be properly preplanned and work instructions adequate to perform the desired task. The failure to properly preplan WO 162083, such that the correct trip unit was replaced, was a violation of TS 5.4.1.a. This licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. Specifically, the violation was identified by the licensee, it was not willful, actions taken as a result of a previous violation should not have corrected this problem, and immediate corrective actions were completed by the licensee. Additional corrective actions will be implemented as warranted by the root cause evaluation.

### 3.2 Control Rod Drive Air System Solder Intrusion

As a followup to the observations made in NRC Inspection Report 50-416/96-06 regarding the solder found in the valve seat for the safety-related scram discharge volume solenoid pilot valve, the inspectors interviewed licensee personnel and reviewed the root cause determination for this event. The maintenance history for the system was reviewed for similar events but none were found.

The licensee determined that prior maintenance had been performed on the nonsafety-related air system for these components during the prior refueling outage on May 11, 1995. During this work, a soldered pipe union upstream of the solenoid pilot valves was replaced with a new union. The replaced union

was located in a vertical section of the air piping approximately 8 inches above an elbow that directed the piping horizontally for approximately 2 feet to the solenoid pilot valves. The licensee believes that loose solder entered the air system during this maintenance, either during the removal of the old union or during installation and soldering of the new union. The licensee determined that the maintenance craft performing the work had noticed solder that had adhered to the elbow following removal of the union. This solder was removed by the worker by applying heat and wiping it off with a cloth. No further action was taken to ensure the system was free of loose solder, i.e., an inspection, system flush, or vacuuming. After the solder was found under the solenoid valve seat in February 1996, a system air flush and vacuuming were performed to ensure no further solder was present.

The inspectors interviewed the welder who performed the soldering and union removal. The welder confirmed the information presented in the licensee's investigation. The inspectors asked if a deficiency document had been generated or supervision had been informed about the discovery of solder in the air piping. The welder did not consider the presence of solder to be abnormal since his work activity involved the removal of the union by sweating the solder off the joint. Therefore, no deficiency document was generated, and his supervision was not informed.

The inspectors verified that the personnel performing the soldering and cleanliness inspections had been properly certified to perform the tasks in accordance with plant procedures.

The root cause analysis for this event determined that the cleaning process procedure was inadequate for not requiring the system to be inspected and flushed following the soldering. A new procedure was created to specify precautions to be taken when soldering is performed. Techniques to minimize solder intrusion and a required system flush were specified for work on high potential areas such as vertical piping.

Procedure 01-S-07-13, "Cleaning Processes", Section 6.2, recommends, when foreign material is introduced into a system, the work supervisor inspect the work area and try to locate the material introduced into a system. This procedure further suggests methods to identify and remove foreign material introduced into the system or component and recommends visual inspections, boroscope inspections, radiography, mirrors, vacuuming, system flush, and component disassembly. Since the work supervisor was not informed of the material intrusion, no additional action was performed.

Failure to properly implement the cleaning procedure to ensure that this work did not adversely affect the performance of the safety-related components in the control rod air system is considered a violation of TS 5.4.1.a and Procedure 01-S-07-13. This self-disclosing and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. Specifically, the violation was identified by the licensee, it was not willful, actions taken as a result of a previous



violation should not have corrected this problem, and appropriate corrective actions were completed by the licensee.

#### 4 SURVEILLANCE OBSERVATIONS (37551, 61726)

The inspectors observed the performance of the surveillance test below:

- Procedure 06-OP-1E21-Q-006, "Low Pressure Core Spray (LPCS) Quarterly Functional Test."

The inspectors discussed the test data with the system engineer and reviewed previous data trends for adverse conditions. In addition, the test procedure was reviewed for compliance with the TSs and inservice testing requirements. No deficiencies were identified.

#### 5 ONSITE ENGINEERING (37551, 71707)

The inspectors reviewed the engineering basis for the control rod drive air modification (inline air filters) and the following calculations:

- 9645-A-734.0, "Pressure Relief Panel Units"
- MC-Q1X77-96008, "Determine Temperature in the Diesel Generator Buildings"

During this review, the inspectors checked that the assumptions made and the methodology used to perform the calculations were valid. No deficiencies were identified.

#### 6 PLANT SUPPORT ACTIVITIES (71750)

##### 6.1 Radiological Protection

The inspectors toured all plant areas to verify appropriate radiological conditions were being maintained. Contaminated areas and locked high radiation areas were toured with the exception of the steam tunnel and the drywell. The inspectors found that the areas were properly posted and generally well maintained. Of the 34 contaminated areas, the inspectors observed improperly disposed of anti-contamination clothing and rags in four areas. The articles were quickly picked up upon notification of health physics personnel. The inspectors discussed this observation with licensee management to determine their expectations on housekeeping. Licensee management stated that they expected all plant areas to be maintained clear of debris such as the inspectors noticed. The inspectors concluded that more management attention was warranted to maintain the desired cleanliness standard. Licensee management subsequently informed the inspectors that good housekeeping practices have been emphasized with radiological workers.

## 6.2 Security

A strike by the contract security personnel occurred on April 8, 1996. Appropriate actions had been prepared by the licensee and the contractor to replace the striking security personnel with other qualified officers and supervisors. The inspectors periodically observed the performance of security personnel at the personnel access point, central alarm station, and secondary alarm station. These stations were found to be properly manned, and the security personnel were aware of the status of their equipment and knowledgeable of their assigned duties. In addition, the inspectors checked that vehicles inside the protected area were properly secured and that the perimeter fence was properly maintained. No deficiencies were identified.

A security inspector was dispatched to the site from April 6 to April 8, 1996, to perform a detailed review of strike contingencies and the training and adequacy of security replacement personnel. Details of the review are contained in NRC Inspection Report 50-416/96-09.

## 7 FOLLOWUP OF PREVIOUSLY IDENTIFIED ITEMS - MAINTENANCE (92902)

### 7.1 (Closed) Violation 50-416/9421-03: Inadequate Work Instructions for Spare Breakers

The inspectors verified that the corrective actions described in the licensee response, dated March 23, 1995, were complete. The listed corrective actions were considered to be reasonable and have prevented recurrence of this nonconformance.

## 8 ONSITE REVIEW OF LERs (92700)

### 8.1 (Closed) LER 50-416/93-017: Reactor Core Isolation Cooling System Not Operable As Required By TSS

This event was discussed in NRC Inspection Report 50-416/93-16 and was the subject of a noncited violation. The LER discussed an additional contributing cause for the event being the unavailability of feedwater because of out-of-specification chemistry. Operators, therefore, attempted to control reactor pressure by minimizing the opening of the main steam bypass valves. The inspectors verified that the corrective actions described in the LER were completed.

## 9 REVIEW OF UFSAR (71707)

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR description.

While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas

inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures, and parameters. No deficiencies were identified.

## ATTACHMENT

### 1 PERSONS CONTACTED

#### Licensee Personnel

D. Bost, Director, Nuclear Plant Engineering  
C. Bottemiller, Superintendent, Plant Licensing  
M. Dietrich, Manager, Training  
C. Dugger, Manager, Operations  
C. Ellsaesser, Manager, Performance and System Engineering  
J. Hagan, General Manager, Plant Operations  
C. Hutchinson, Vice President, Nuclear Operations  
A. Khanifar, Manager, Materials, Purchasing and Contracts  
M. McDowell, Operations Superintendent  
M. Meisner, Director, Nuclear Safety and Regulatory Affairs  
R. Moomaw, Manager, Plant Maintenance

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

### 2 EXIT MEETING

The inspectors conducted an exit meeting on April 16, 1996. During this meeting, the inspectors reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this inspection report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.