

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-416
License No.: NPF-29
Report No.: 50-416/96-18
Licensee: Entergy Operations, Inc.
Facility: Grand Gulf Nuclear Station
Location: Waterloo Road
Port Gibson, Mississippi
Dates: October 28 through November 8, 1996
Inspector: Clifford A. Clark, Reactor Inspector
Approved By: Dr. Dale Powers, Chief, Maintenance Branch
Division of Reactor Safety

Attachment 1: Supplemental Information

Attachment 2: G33-FO12A - Licensee Information Concerning
Radiation Exposure During Work

EXECUTIVE SUMMARY

Grand Gulf Nuclear Station NRC Inspection Report 50-416/96-18

This inspection was performed using the guidance of NRC Inspection Procedures 62700 and 73753. Inspection Procedure 62700, "Maintenance Program Implementation," dated April 30, 1993, was used to verify that maintenance activities for structures, systems, and components were being conducted in a manner that results in the reliable and safe operation of the plant. Inspection Procedure 73753, "Inservice Inspection," dated May 4, 1995, was used to determine whether the inservice inspection, repair, and replacement of Class 1, 2, and 3 pressure retaining components at Grand Gulf Nuclear Station, were performed in accordance with Technical Specifications, the applicable ASME Code, correspondence between NRC and the licensee concerning relief requests, and requirements imposed by NRC/industry initiatives.

Maintenance

- The work order instructions and referenced documents issued to perform the scheduled work on Discharge Check Valve 1G33F012A were inadequate and incorrect for work performed in a high dose radiation area by offsite personnel not familiar with the valve. The other observed maintenance activities and post-maintenance testing were properly performed (Section M1.1 and M4.2).
- Except for loose fasteners on a limit switch compartment cover of one valve actuator, the material condition of toured plant areas was good (Section M2).
- Maintenance and inservice inspection procedures and associated documents were adequately developed for the identified tasks (Sections M3.1 and M3.2).
- Erosion/corrosion examinations were properly performed by knowledgeable personnel (Section M4.1).
- Nondestructive examinations were performed in accordance with the appropriate procedures (Section M4.3).

Report Details

Summary of Plant Status

The unit was in Mode 5 for a refueling outage (RF08) during this inspection period.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Observation of Maintenance Activities

a. Inspection Scope (62700)

During the inspection, the inspector observed various elements of maintenance in progress and assessed the performance of individual elements of the licensee's maintenance process. These elements included coordination, control, testing, and documentation of unexpected or satisfactory conditions.

b. Observations and Findings

The inspector observed portions of various maintenance activities and post-maintenance testing performed for the following work orders:

- 00155775 Reactor Water Clean-up (RWCU) Pump C001A Discharge Check Valve 1G33F012A; perform internal inspection.
- 00171577 Main Steam Safety/Relief Valve Operability Test; perform valve replacement and testing.
- 00176785 Division III Standby Diesel 1P75B015A; troubleshoot to determine if turbo intercooler is leaking, and replace intercooler as required.
- 00176907 Low Pressure Core Injection (LPCI) A Testable Check Valve 1E12F041A; perform inspection and trouble shooting of internal valve position indicator.

Plant operations, engineering, and other maintenance personnel provided good support during these observed maintenance activities.

During the observation of maintenance activities performed on Check Valve 1G33F012A, the inspector noted the following:

- (1) Both the supervisor and craft personnel assigned to perform the dayshift work were Entergy Operations, Inc., shared resource personnel from two

other sites. These personnel had not previously performed work on the subject valve.

- (2) A backshift crew had staged tools and removed three of four hex nuts retaining the valve cap in place. The day shift crew and a check valve engineer were scheduled to complete disassembly of the valve, perform an internal valve inspection for the Check Valve Program, and reassemble the valve as required in accordance with Procedure 07-S-14-381, "Check Valve Maintenance and Trending Program, Revision 4. Section 6.2.1 of Procedure 07-S-14-381 stated, "... disassemble the valve in accordance with the approved work order." Neither document provided detailed work instructions for valve disassembly.
- (3) A prejob radiological briefing identified that the dose rate for the valve work area was approximately 200 mrem/hour, and that the craft estimated that it should take approximately 30 minutes to disassemble, inspect, and close the valve. As a result of the high dose rate in the work area, the craft made the decision that only one person, at one time, would initially work on the valve, and the other craftsman would wait outside the area, in case additional tools or material were required to complete the job.
- (4) The craft encountered a delay during the removal of the valve retainer plate and the valve segmental thrust ring. The delay was due to the lack of detailed valve disassembly instructions, required tools, knowledge of the valve internals, and rust corrosion buildup between the valve body and segmental thrust ring. In addition, the work package did not contain a list of tools required to perform the scheduled work.
- (5) The check valve engineer was present in a low dose radiation area, while work was being performed. After working in excess of an hour in the high radiation area, the craft stopped work and exited the radiation area to notify the supervisor of the thrust ring removal problem.
- (6) A majority of the licensee work orders were written for work to be performed based on "skill of the craft." The work order issued for this valve inspection did not provide any detailed valve disassembly or reassembly instructions; it only referenced a vendor drawing and technical manual. The vendor drawing and technical manual referenced in Work Order 00155775 were not correct. The vendor Valve Drawing M-242.0-Q1-01.1-036 showed a valve actuator instead of the subject check valve. The vendor Technical Manual 460001080 did not show the valve configuration.

These deficiencies had been recognized by the supervisor, but the work order was not revised by planners. Inasmuch as the valve was classified as

nonsafety, the licensee's personnel did not initiate a condition report on the situation.

- (7) After the craft notified the supervisor of the thrust ring removal problem, the supervisor reviewed Drawing 9645-M-242.0-Q1-1.2-36-1, which the craft had at the job site, but was not referenced in the work order. The supervisor noted that the valve body had knockout holes behind the valve segmental thrust ring for removal of the ring sections. Using proper tools and the knock out holes, a back shift crew later completed the valve disassembly, inspection, and reassembly.
- (8) At the time of the exit meeting, the inadequate work order was characterized as a potential violation. The licensee subsequently, at the NRC's request, provided information on the craft radiation exposure for this work activity. The estimation was that the total dose received by the craft was low and that no personnel had exceeded administrative limits.

c. Conclusions

The work order instructions and referenced documents issued to perform the scheduled work on Discharge Check Valve 1G33F012A were inadequate and incorrect for work performed in a high dose radiation area by offsite personnel not familiar with the valve. The other observed maintenance activities and post-maintenance testing were properly performed.

M2 Maintenance and Material Condition of Facilities and Equipment

a. Inspection Scope (62700)

The inspector observed the material condition of the plant and determined the effectiveness of licensee's actions implemented to maintain the appropriate material condition of the plant.

b. Observations and Findings

During tours of various areas of the plant the inspector noted the following:

- Reactor Heat Removal Jockey Pump A Isolation Motor-Operated Valve Q1E12F082A: On November 2, 1996, the inspector noted the nuts installed on the two stud and nut fastener assemblies of the actuator limit switch compartment cover were loose. The socket head cap screws installed in the actuator limit switch compartment cover remaining fastener positions were tight. However, loose fasteners found in one location on a safety-related component can indicate potential problems with fastener installations in other safety-related equipment locations.

On November 2, 1996, a licensee representative stated that Valve Q1E12F082A had been abandoned in place and removed from the licensee's valve program. The licensee representative noted that the nuts should have been wrench tight in accordance with "skill of the craft" when installed, and notified the inspector that all the limit switch compartment cover fasteners would be checked for proper tightness, and loose fasteners would be wrench tightened per "skill of the craft" in accordance with a minor maintenance work order.

On November 7, 1996, the inspector was notified that the fasteners used to install the Valve Q1E12F082A actuator limit switch compartment cover had been checked for tightness, and only the two identified loose nuts were required to be wrench tightened. The licensee also noted that the fasteners used to install Valve Q1E12F082B actuator limit switch compartment cover had been checked for tightness and no loose fasteners were found.

The inspector noted that during initial observation of the loose nuts installed in the actuator limit switch compartment cover installed on Valve Q1E12F082A, that there was no evidence (tags, label plates, cut and capped piping) indicating that the valve had been abandoned in place. The inspector requested the licensee representative to verify the current operability status of the Valve Q1E12F082A. Later that day, the licensee representative notified the inspector that they had made a mistake and that Valve Q1E12F082A was an operable valve that had not been abandoned in place. The licensee representative acknowledged that it was poor maintenance practice to leave loose fasteners on a valve actuator limit switch compartment cover when it was replaced.

At the time of the exit meeting, this matter was characterized as a potential violation. Upon further in office review, it was determined that there was no violation of NRC regulatory requirements.

- Division II Standby Diesel Room Fire Door 1D303: On October 30, 1996, the inspector found the door was not completely closed and latched. The Division II Standby Diesel was the only available operable standby diesel, as both Division I and Division III Standby Diesels were out for maintenance. The inspector found that the door had to be pulled or pushed shut each time it was opened. The inspector notified the licensee of the inoperable fire door.

The licensee representative stated they were already performing hourly fire tours in the area for other defective doors, and that the subject fire door/area would be added to the hourly tour. Licensee's management informed the inspector that, as a result of their identification of problems with existing latch assemblies installed in both fire and security doors and the difficulties

encountered in obtaining replacement parts, they were developing long-term corrective actions to address the door latch problems. Since hourly fire tours were already established in the area, the operability of the subject fire door was of minor safety significance.

c. Conclusions

Although the above observed loose fasteners on the Valve Q1E12F082A actuator limit switch compartment cover was evidence of poor maintenance practice, it was of minor safety significance. Except for the one observation of loose fasteners, the observed general material condition of other plant areas appeared to be good.

M3 Maintenance Procedures and Documentation

M3.1 Review of Maintenance Procedures, Records, and Work Orders

a. Inspection Scope (62700)

The inspector reviewed the maintenance documents identified in the attachment to this report during the review of observed maintenance activities. The inspector reviewed these documents and assessed if they had been developed in accordance with the licensee's administrative requirements to ensure maintenance activities were conducted in a manner that resulted in the reliable and safe operation of the plant.

b. Observations and Findings

Work delays, and therefore additional radiation exposure were observed during work performed in accordance with Work Order 00155775 on RWCU Pump C001A Discharge Check Valve 1G33F012A. The delays appeared to be the result of: (1) inadequate reference documents, (2) inadequate identification of the tools required to perform valve disassembly, and (3) the lack of detailed work instructions in the work package for work performed by Entergy Operations, Inc., shared resource personnel from another plant, who were not familiar with the specific valve and disassembly actions required to remove the valve segmental thrust ring. A majority of the reviewed maintenance work procedures and work orders were written with little or no detailed work instructions. The licensee normally expected craft personnel to review reference documents and perform component disassembly, repair, and reassembly activities in accordance with "skill of the craft."

c. Conclusions

With the exception of the inadequate work instructions and incorrect reference documents identified in Work Order 00155775, the inspector concluded that the

maintenance documents reviewed provided the minimum work instructions and were adequately developed for the identified tasks.

M3.2 Review of Inservice Inspection Certifications, Procedures, and Records

a. Inspection Scope (73753)

The inspector reviewed the inservice inspection documents listed as reviewed in the attachment to this report and determined if they had been developed in accordance with regulatory requirements and the applicable ASME code requirements.

b. Observations and Findings

The inservice inspection examinations were scheduled to be performed in accordance with the ASME Section XI Inservice Inspection Program Plan, First Ten Year Interval (ending January 1, 1997), third 40-month period, and eighth refueling outage (96) schedule. The Inservice Inspection Program Plan was written in accordance with the requirements of the 1977 Edition of Section XI of the ASME Boiler and Pressure Code, through the Summer 1979 addenda. The inspector found that the documents (procedures, records, reports, and personnel certifications) reviewed had been developed in accordance with licensee procedures, regulatory requirements, and applicable ASME Code requirements.

c. Conclusions

The inspector concluded that the reviewed inservice inspection procedures and documents were adequately developed for the identified tasks.

M4 Maintenance Staff Knowledge and Performance

M4.1 Erosion/Corrosion Staff

a. Inspection Scope (62700)

The inspector observed the performance of erosion/corrosion ultrasonic thickness examinations of feedwater piping. The inspector reviewed work control policy and procedures in order to understand the licensee's work control and validation process. The inspector assessed licensee and contractor personnel knowledge and performance in this area during observation of examination activities, and during discussions with erosion/corrosion contractor, licensee, supervisory, and administrative personnel.

b. Observations and Findings

The inspector observed ultrasonic thickness examinations properly performed by qualified nondestructive examination personnel on feedwater piping inspection

areas EC No. 358 and EC No. 359. The results of these two examinations were documented in Nondestructive Examination Reports 1057-056-1996 and 1057-098-1996.

c. Conclusions

The inspector concluded that the observed erosion/corrosion ultrasonic examinations were performed in accordance with the appropriate procedures by knowledgeable personnel.

M4.2 Mechanical and Electrical Staff

a. Inspection Scope (62700)

The inspector observed portions of the maintenance activities performed in accordance with the work orders identified in the attachment to this report, and other available refueling outage (RFO8) maintenance activities. The inspector reviewed work control policy and procedures in order to understand the licensee's work control and validation process. The inspector observed the various maintenance activities associated with safety-related component removal, as-found testing, disassembly, troubleshooting, repair, replacement, and post-maintenance testing.

b. Observations and Findings

The inspector assessed licensee and contractor personnel knowledge and performance in this area during observation of maintenance activities, and during discussions with maintenance contractor, licensee, supervisory, and administrative personnel. Maintenance personnel had the work package instructions available at the work sites and were performing their activities in accordance with available work instructions and "skill of the craft." Supervision was present, or were closely monitoring most of the work activities observed.

c. Conclusions

The inspector concluded that the observed maintenance activities were performed in accordance with the appropriate procedures by knowledgeable personnel under appropriate supervision.

M4.3 Inservice Inspection Staff

a. Inspection Scope (73753)

The inspector observed inservice inspection examinations and assessed the contractor and licensee personnel knowledge and performance in this area.

b. Observations and Findings

As a result of various refueling outage schedule changes, the inspector was only able to witness ultrasonic examinations performed on a total of three reactor vessel shell welds. The inspector observed ultrasonic examinations performed by qualified nondestructive examination personnel on reactor vessel shell welds (weld identification Nos. B13-AC, B13-BF, and B13-BG).

c. Conclusions

The inspector concluded that the observed nondestructive examinations were performed in accordance with the appropriate procedures.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.3 Review of Final Safety Analysis Report Commitments

A recent discovery of a licensee operating their facility in a manner contrary to their Final Safety Analysis Report description highlighted the need for a special focused review that compares plant practices, procedures, and/or parameters to the Final Safety Analysis Report descriptions. While performing the inspections discussed in this report, the inspector reviewed sections of the Updated Final Safety Analysis Report associated with the applicable sections of the maintenance and inservice inspection programs. The inspector did not identify any discrepancies between the Updated Final Safety Analysis Report and the reviewed maintenance program and inservice inspection program activities.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection. The licensee acknowledged the findings presented. On November 14, 1996, the licensee provided additional requested information (Attachment 2) on radiation exposure received by craft personnel during observed maintenance activities performed on Reactor Water Clean-up (RWCU) Pump C001A Discharge Check Valve 1G33F012A, discussed in Section M1 of this report. After reviewing the information received November 14, 1996, the NRC provided the licensee with an update of the latest inspection results during a followup telephone conference call on November 19, 1996. During the telephone conference call, the inspector informed the licensee representative that two potential violations discussed in the exit meeting were now considered inappropriate.

The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Bottemiller, Superintendent, Operating Events
C. Brooks, Senior Licensing Specialist, Operating Events
J. Burton, Manager, Mechanical/Civil Engineering
L. Daughtery, Technical Coordinator, Plant Licensing
W. Eaton, General Manager, Plant Operations
J. Edwards, Superintendent, Mechanical Maintenance
W. Ganer, Supervisor, Quality Programs Audits
J. Hagan, Vice President, Operations - Grand Gulf
C. Hays, Director, Quality Programs
K. Hughey, Technical Advisor, Operation Superintendent
R. Moomaw, Manager, Plant Maintenance
L. Moulder, Superintendent, Electrical/Instrument & Control Maintenance
M. Renfro, Supervisor, Inservice Inspection
C. Smith, Manager, Planning and Scheduling
T. Tankersley, Technical Coordinator, Operations
J. Venable, Manager, Operations
G. Vining, Manager, Plant Modification and Construction

NRC

J. Tedrow, Senior Resident Inspector
D. Powers, Chief, Maintenance Branch

INSPECTION PROCEDURES USED

IP 62700 Maintenance Program Implementation
IP 73753 Inservice Inspection

LIST OF DOCUMENTS REVIEWED

<u>Procedure</u>	<u>Revision</u>	<u>Title</u>
01-S-03-10	0	"GGNS Condition Report (CR)"
01-S-07-1	31	"Control of Work on Plant Equipment and Facilities"
01-S-07-28	101	"ASME Section XI Repair/Replacement Program"
07-S-03-16	5	"Safety Related MOV Program"
07-S-12-81	9	"Setting of Limitorque Valve Operators"

07-S-12-127	3	"Installation and Operation of Votes Diagnostic Test Equipment"
07-S-14-297	6	"Torquing Requirements for General Maintenance Tasks"
07-S-14-381	4	"Check Valve Maintenance and Trending Program"
07-S-17-18	0	"Predictive Maintenance Program"
GIN: 96/02314	-	"RF 08 Inservice Inspection Work Scope Changes (09/19/96)"
GGNS-M-489.1	8	"Program Plan For the Ten-Year Inservice Inspection Plan"
GGNS MS-41	3	"Standard for Monitoring Internal Erosion/Corrosion of Piping Components"
GGNS QAI-9.5	4	"Ultrasonic Thickness Measurements (Digital)"
GGNS-UT-CP-3	0	"Procedure for P-Scan Inspection System Performance Checks at Grand Gulf Nuclear Station"
GGNS-UT-S79-P4	0	"P-Scan Examination of Class 1 Reactor Vessel Welds Covered by Reg Guide 1.150"
GGNS QAI 9.13	6	"Liquid Penetrant (PT) Examination Solvent Removable (ASME Section XI)"

ISI Examination Reports Issued for the Current Unit 1 Refueling Outage (RFO8)

1251-001-1996/ PT
 1251-002-1996/ PT
 1251-003-1996/ PT
 1251-004-1996/ PT
 1251-005-1996/ PT
 1251-006-1996/ UT

E/C Examination Reports Issued for the Current Unit 1 Refueling Outage (RFO8)

1057-056-1996/ UT
 1057-098-1996/ UT

Contractor Examiner Certifications

Raytheon Engineers and Constructors

Assessments and Audits Reviewed

<u>Document Number</u>	<u>Date</u>	<u>Title</u>
GIN 96/02570	10/16/96	"Maintenance Supervisor Training Self Assessment Report"
SA 96-40	10/04/96	"Grand Gulf Nuclear Station Maintenance Department Assessment"
SA 96-39	09/06/96	"Grand Gulf Nuclear Station Planning and Scheduling Assessment"
GIN-96/01898	08/14/96	"High Voltage Safety Assessment, UWR 96/14"
GIN-95/02071	07/20/96	"Quality Programs Audit Report QPA 90.01-95, Maintenance Audit RF07"

Work Orders Reviewed

00154467	Disassembly/Inspection of Plant Service Water Header to Service Plant Chiller Isolation Valve 1P44F041.
00155775	Reactor Water Clean-up (RWCU) Pump C001A Discharge Check Valve 1G33F012A; perform internal inspection.
00171577	Main Steam Safety/Relief Valve Operability Test; perform valve replacement and testing.
00176785	Division III Standby Diesel 1P75B015A; trouble shoot to determine if turbo intercooler is leaking, and replace intercooler as required.
00176907	Low Pressure Core Injection (LPCI) A Testable Check Valve 1E12F041A; perform inspection and trouble shooting of internal valve position indicator.

Attachment 2G33 - F012A

Two shared resourcers entered the RWCU room to inspect the check valve per the generic check valve inspection procedure, 07-S-14-381. This component was being worked under a maintenance work order, in non-safety and not an appendix 'B' Q-List. A history search found that this is the first time this component has been opened.

The journeymen had difficulty removing the segment rings due to the length of time since the last disassembly. After spending approximately 20 minutes trying to get the segment rings out, the journeymen (cognizant of the dose rates) exited the room to debriefed with the supervisor and obtain additional guidance. The supervisor pointed out on the drawing that the valve had knock-out holes drilled in the body of the valve to assist in removal. The journeymen reentered using the knock-out rings and continued with disassembly. Difficulty with further disassembly also occurred with the valve bonnet due to the length of time since the last assembly. The valve was inspected and reassembled correctly and with no findings. While every possible problem or situation cannot be anticipated the approach that is used and constantly re-enforced to personnel is to stop and contact the supervisors when they encounter problems or situations that they are unsure of.

- 1) The journeymen had discussed the dose rates before starting the job and made the decision for one person to work on the valves at a time and for the other person to remain in the low dose waiting area.
- 2) The journeyman realized that too much time had been expended trying to get the rings out in the current dose fields and made the correct decision to stop work and notify their supervisor.
- 3) A total of 12 M/R was spent on the first trip to the valve of which only 20 M/R was attributed to the segment rings.
- 4) All work was done correctly; proper torquing, sequencing and measurements for the valve internals.
- 5) Personnel working the component were shared resourcers and had experience working check valves.