UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

March 14, 2000

William A. Eaton, Vice President
Operations - Grand Gulf Nuclear Station
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, Mississippi 39150

SUBJECT: NRC INSPECTION REPORT NO. 50-416/00-02

Dear Mr. Eaton:

This refers to the inspection conducted on January 9 through February 19, 2000, at the Grand Gulf Nuclear Station facility. The enclosed report presents the results of this inspection.

During the 6-week period covered by this inspection, your conduct of activities at the Grand Gulf facility was generally characterized by safety-conscious operations, sound engineering and maintenance practices, and careful radiological work controls.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. The violation is being treated as a noncited violation (NCV), consistent with Section VII.B.1.a of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or severity level of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Grand Gulf Nuclear Station facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if requested, will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/

Joseph I. Tapia, Chief
Project Branch A
Division of Reactor Projects

Docket No.: 50-416
License No.: NPF-29

Enclosure:
NRC Inspection Report No.
50-416/00-02

cc w/enclosure:
Executive Vice President
and Chief Operating Officer
Entergy Operations, Inc.
P.O. Box 31995
Jackson, Mississippi 39286-1995

Wise, Carter, Child & Caraway
P.O. Box 651
Jackson, Mississippi 39205

Winston & Strawn
1400 L Street, N.W. - 12th Floor
Washington, DC 20005-3502

Sam Mabry, Director
Division of Solid Waste Management
Mississippi Department of Natural
Resources
P.O. Box 10385
Jackson, Mississippi 39209

President, District 1
Claiborne County Board of Supervisors
P.O. Box 339
Port Gibson, Mississippi 39150

General Manager
Grand Gulf Nuclear Station
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, Mississippi 39150

The Honorable Richard Ieyoub
Attorney General
Department of Justice
State of Louisiana
P.O. Box 94005
Baton Rouge, Louisiana 70804-9005

Office of the Governor
State of Mississippi
Jackson, Mississippi 39201

Mike Moore, Attorney General
Frank Spencer, Asst. Attorney General
State of Mississippi
P.O. Box 22947
Jackson, Mississippi 39225

Dr. F. E. Thompson, Jr.
State Health Officer
State Board of Health
P.O. Box 1700
Jackson, Mississippi 39205

Robert W. Goff, Program Director
Division of Radiological Health
Mississippi Dept. of Health
P.O. Box 1700
Jackson, Mississippi 39215-1700

Vice President
Operations Support
Entergy Operations, Inc.
P.O. Box 31995
Jackson, Mississippi 39286-1995

Director, Nuclear Safety
and Regulatory Affairs
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, Mississippi 39150

Vice President, Operations
Grand Gulf Nuclear Station
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, Mississippi 39150

bcc to DCD (IE01)

bcc electronic distribution from ADAMS by RIV:
Regional Administrator **(EWM)**
DRP Director **(KEB)**
DRS Director **(ATH)**
Senior Resident Inspector **(JLD)**
Branch Chief, DRP/A **(JIT)**
Senior Project Engineer, DRP/A **(DNG)**
Branch Chief, DRP/TSS **(LAY)**
RITS Coordinator **(NBH)**

Only inspection reports to the following:
D. Lange **(DJL)**
NRR Event Tracking System **(IPAS)**
Document Control Desk **(DOCDESK)**
GG Site Secretary **(MJS)**
Wayne Scott **(WES)**

bcc hard copy:
RIV File Room

DOCUMENT NAME: R:_GG\GG2000-02RP-JLD.wpd
To receive copy of document, indicate in box: "C" = Copy without enclosures **"E"** = Copy with enclosures **"N"** = No copy

RIV:SRI		RI		C:DRP/A					
JLDixon-Herrity		PJAlter		JITapia					
3/13/00 (T)		3/13/00 (E)		3/14/00 ***/RA/***					

OFFICIAL RECORD COPY

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-416
License No.:	NPF-29
Report No.:	50-416/00-02
Licensee:	Entergy Operations, Inc.
Facility:	Grand Gulf Nuclear Station
Location:	Waterloo Road Port Gibson, Mississippi 39150
Dates:	January 9 through February 19, 2000
Inspectors:	Jennifer Dixon-Herrity, Senior Resident Inspector Peter Alter, Resident Inspector
Approved By:	Joseph I. Tapia, Chief, Project Branch A

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Grand Gulf Nuclear Station
NRC Inspection Report 50-416/00-02

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection

Operations

- The plant was maintained in good condition, with one minor exception. Loose items left in the Train C residual heat removal room resulted from poor housekeeping and inattention to detail by operators and mechanics. The licensee documented the observation in the corrective action program as a repeat concern with housekeeping in safety-related rooms (Section O2.1).

- The standby gas treatment and containment isolation systems were correctly aligned and controlled and maintained in good condition (Section O2.2)

Maintenance

- The eight maintenance and surveillance testing activities observed were well conducted (Section M1.1).

- The plant safety coordinator's response to a report of strong paint fumes in an enclosed switchgear room was thorough (Section M4.1).

Engineering

- The engineering reportability evaluation and calculations completed to support a proposed Technical Specification change were thorough and in accordance with accepted industry standards (Section E1.1).

- The engineering operability and reportability determinations for standby service water cooling tower Fan A following water contamination of gearbox oil were complete and thorough (Section E2.1).

- The licensee took thorough and prompt corrective actions to address an equipment deficiency on the main transformer, although a delay in reporting the problem to licensee management was identified (Section E4.1).

- The failure to take corrective action to preclude repetition of the failure of the main steam isolation valves to meet the leakage requirements was a violation of 10 CFR Part 50, Appendix B, Criterion XVI. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Condition Report CR-GGN-1999-1653. This closed LER 99-006 (Section E8.1).

Report Details

Summary of Plant Status

The plant operated at 100 percent power from the beginning of the inspection period until January 21, 2000, when the licensee lowered power to approximately 17 percent to remove the main generator from the grid in order to address a hot spot on a bolted connection on main Tansformer B. After greasing the bolted connection, the licensee returned the unit to 100 percent power on January 24, 2000, but reduced back down to approximately 17 percent power after finding that the hot spot on the transformer recurred. The licensee corrected the problem and returned the unit to 100 percent power on January 27, 2000. The plant operated at 100 percent power during the remainder of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspectors performed control room observations to assess operator knowledge and performance. Shift turnovers and shift briefs were thorough and well conducted. Operators were knowledgeable of the status of equipment, and applicable Technical Specification limiting conditions for operations were appropriately entered. The inspectors observed operators lower power to address the transformer concerns identified on January 24, 2000. The evolution was well controlled.

O2 Operational Status of Facilities and Equipment

O2.1 Plant Tours

a Inspection Scope (71707)

The inspectors conducted tours through safety-related portions of the plant.

b. Observations and Findings

The areas of the plant that were toured were maintained in good condition with a few minor exceptions. While conducting a tour of the engineered safety feature electrical switchgear rooms on January 20, 2000, the inspectors noticed a strong paint odor in the safety-related switchgear rooms on the 119-foot elevation of the auxiliary building. The inspectors questioned whether the safety of the personnel working in the area had been addressed. This observation is discussed further in Section M4.1. On February 11, 2000, the inspectors observed that sheets of plastic, rags, and equipment had been left in the residual heat removal Train C room. The plastic and rags had the potential to block floor drains during a flooding condition. The shift superintendent explained that maintenance personnel were cleaning the alternate decay heat removal heat exchangers in the connected room but had quit work for the weekend. The shift superintendent contacted maintenance personnel on shift and had the loose items

removed. The mechanical maintenance supervisor initiated Condition Report CR-GGN-2000-0207 to document the repetitive observation of inadequate housekeeping in the residual heat removal Train C room. The immediate corrective action was to ensure that all loose items were removed and to require that the supervisor walk down the area at the end of the shift. In addition, operations supervision discussed the concern during shift briefings and directed that operators verify good housekeeping during their rounds.

c. Conclusions

The plant was maintained in good condition, with one minor exception. Loose items left in the Train C residual heat removal room resulted from poor housekeeping and inattention to detail by operators and mechanics. The licensee documented the observation in the corrective action program as a repeat concern with housekeeping in safety-related rooms.

O2.2 Engineered Safety Feature System Walkdown

a. Inspection Scope (71707)

The inspectors conducted daily control board walkdowns to verify that engineered safety feature systems were aligned as required by Technical Specifications for the existing operating mode, that instrumentation was operating correctly, and that power was available. The inspectors performed a more detailed walkdown of accessible portions of the standby gas treatment system and the containment isolation system to independently verify operability and configuration. During these reviews, the inspectors reviewed Instructions 04-1-01-T48-1, “Standby Gas Treatment,” Revision 24, and 04-1-03-A30-3, "Locked Valve Checks,” Revision 0; Procedures 06-OP-1M10-M-001, “Containment Drywell Penetration Isolation Monthly Check,” Revision 105, and 06-OP-1M10-C-0001, “Containment & Drywell Penetration Isolation Cold Shutdown Check,” Revision 102; P&ID M-1102, “Standby Gas Treatment System,” Revision 21; and relevant sections of the Updated Final Safety Analysis Report.

b. Observations and Findings

Equipment operability, material condition, and housekeeping for the standby gas treatment system and containment isolation valves were well maintained. The inspectors verified that the system was properly aligned for the existing mode of operation. The inspectors reviewed the maintenance records and found that there were no significant maintenance concerns open for the systems.

c. Conclusions

The standby gas treatment and containment isolation systems were correctly aligned and controlled and maintained in good condition.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance and Surveillance Observations

a. Inspection Scope (61726, 62707)

The inspectors observed all or portions of the maintenance, surveillance, and test activities listed below. Maintenance work was reviewed to ensure that adequate work instructions were provided, that the work performed was within the scope of authorized work, and that the work performed was adequately documented. For surveillances, the test procedures were reviewed and compared to the Technical Specification surveillance requirements and bases to ensure that the procedures satisfied the requirements. In all cases, the impact to equipment operability and applicability of Technical Specification actions were independently verified. The following are the maintenance action items and surveillance tasks observed:

Maintenance:

- 264040 Division I diesel generator breaker time delay relay calibration
- 270896 Lubrication of Division I diesel butterfly valves
- 276516 Stake adjusting ring for relief Valve 1P41F299A
- 272501 Safety-related Switchgear Room Cooler 1T46B002B-B acid flush

Surveillances:

- 04-1-01-P75-1 Division 1 diesel run (postmaintenance run)
- 06-OP-1000-D-001 Daily Operator Logs (Diesel Generator Lubrication)
- 06-OP-1C71-W-001 Reactor Manual Scram Switch Test
- 06-IC-1D17-R-1002 Main Steam Line High Radiation Monitor Calibration

b. Observations and Findings

The inspectors observed that the work performed during these activities was well conducted.

c. Conclusions

The eight maintenance and surveillance testing activities observed were well conducted.

M4 Maintenance Staff Knowledge and Performance

M4.1 Respiratory Protection during Painting

a. Inspection Scope (93001)

The inspectors discussed the strong paint odor in the safety-related switchgear room with the plant safety coordinator and the responsible supervisor.

b. Observations and Findings

The inspectors observed two painters working in the Division II switchgear room. The paint odor in the enclosed room was very strong and the painters were not wearing respiratory protection. After discussions with the plant safety coordinator, the painting contractor's foreman tested air samples in the room. The results indicated xylene and ethyl benzine levels above threshold limit values. The painters propped open the door and ventilated the room. The foreman instructed the painters to wear respiratory protection until levels decreased to below threshold limit values. The safety coordinator documented the event in Condition Report CR-GGN-2000-0089. Throughout the remainder of the inspection period, the inspectors observed that further painting was performed with the doors open and the rooms well ventilated.

c. Conclusions

The plant safety coordinator's response to a report of strong paint fumes in an enclosed switchgear room was thorough.

III. Engineering

E1 Conduct of Engineering

E1.1 Emergency Diesel Generators Fuel Oil Storage Requirements

a. Inspection Scope (37551)

The inspectors reviewed the licensee's "Proposed Change to the Operating License, LDC 1999-052, Revised Minimum Volumes for Diesel Generator Fuel Oil Storage Tanks," dated January 24, 2000, the supporting engineering calculations, and the reportability evaluation.

b. Observations and Findings

The inspectors examined the engineering documentation for a proposed Technical Specification change to the emergency diesel generator fuel oil storage requirements. Operations personnel appropriately requested the increased limits based on an engineering review of the existing storage requirements in response to Condition Report CR-GGN-1998-1020. Engineers had questioned the diesel generator loading

requirements addressed in Updated Final Safety Analysis Report Section 9.5.4.3. The loading requirements assumed that loads would be secured at some point during an event, but there was no procedural guidance to secure loads. The inspectors determined that the engineering reportability evaluation was correct in concluding that the current Technical Specification required storage capacity was sufficient for 7 days of continuous post-LOCA operation of all of the emergency core cooling systems. However, the loading calculation used in the reportability evaluation showed that the licensee did not maintain the 10 percent margin originally assumed using ANSI N195-1976, "Fuel Oil Systems for Standby Diesel Generators." The licensee initiated administrative controls over the emergency diesel generator fuel oil storage requirements and initiated Condition Report CR-GGN-1999-0172 to establish new limits which would not require securing any safety system loads. The new limits submitted for approval were based on 7 days of continuous diesel generator operation at rated capacity using the alternate calculation method in ANSI N195-1976. The inspectors determined that the new limits and required storage tank levels were correctly calculated in accordance with the industry standard.

c. Conclusions

The engineering reportability evaluation and calculations completed to support a proposed Technical Specification change were thorough and in accordance with accepted industry standards.

E2 Engineering Support of Facilities and Equipment

E2.1 Standby Service Water (SSW) Cooling Tower Fan Contaminated Oil

a. Inspection Scope (37551)

On January 28, 2000, SSW cooling tower Fan A was removed from service because of the presence of water in the gearbox oil sight glass. The inspectors reviewed the operability and reportability determination performed by the engineering department in support of efforts to return the cooling tower fan to service.

b. Observations and Findings

The licensee determined that the water intrusion in the gearbox oil for SSW cooling tower Fan A occurred during postmaintenance cleaning and preservation of cooling tower components during Refueling Outage 10 (November 1999). The nonconformance was documented in Condition Report CR-GGN-2000-128. The engineering department resolved all open issues regarding acceptable water concentration in gearbox oil for long-term operation of the cooling tower fan and established an acceptable level for oil replacement. Engineering operability and reportability determinations were based on more than 21 days of continuous fan operation while providing shutdown cooling during the refueling outage.

c. Conclusions

The engineering operability and reportability determinations for SSW cooling tower Fan A following water contamination of gearbox oil were complete and thorough.

E4 Engineering Staff Knowledge and Performance

E4.1 Main Transformer B Thermography Results in Downpower

a. Inspection Scope (37551)

The inspectors reviewed the licensee's response to indications of high temperature at a bolted connection on main Transformer B that was found during thermography.

b. Observations and Findings

Engineering personnel identified that the bolted connection at the base of the bushing on main Transformer B was greater than 50°C hotter than similar connections on the other two main transformers. Once the concern was brought to the attention of management, the licensee lowered power to approximately 17 percent and took the unit off line to allow work on the main transformer. The utility's transmission group acceptance criteria for thermography of this type of bolted connection was that component failure was almost certain if the differential was between 40 and 70°C and failure was imminent if the differential was greater than 70°C. Upon disassembly of the connection, the utility maintenance personnel found that the connection had not been greased. The connection was greased and similar connections on the other two transformers were greased to ensure a good connection. The licensee then returned the unit to 100 percent power. Engineering personnel monitored the temperature of the connections on the main transformers during the power ascension.

Engineers observed an increasing temperature differential as power increased. The licensee determined that the unit should be taken off line again and the problem addressed after the temperature differential between Transformer B and Transformers A and C reached approximately 84.7°C. The utility found that the plate in the bolted connection had indentations near the bolt holes that prevented the connection from maintaining good conductivity at those points. The licensee machined the plates and installed inserts to ensure a good connection.

The licensee initiated Condition Report CR-GGN-2000-0099 to identify the root cause of the problem. One of the corrective actions assigned was to determine why the issue was not immediately brought to the attention of management. The licensee found that engineering personnel became aware of the problem on January 19, 2000, and discussed it within engineering but did not bring the concern to management's attention until January 21, 2000. The corrective actions for this problem included conducting a human performance evaluation and initiating action to identify acceptance criteria for thermography conducted by the engineering department, where possible.

c. Conclusions

The licensee took thorough and prompt corrective actions to address an equipment deficiency on the main transformer, although a delay in reporting the problem to licensee management was identified.

E8 Miscellaneous Engineering Issues (92700)

E8.1 (Closed) Licensee Event Report 50-416/99-006: Main steam lines exceeded leakage limits. The inspectors reviewed the interim licensee event report, the significant event review team root cause analysis report, and the equipment history available in the corrective action program. During main steam line Local Leak Rate Testing (LLRT) that took place during Refuel Outage 10, the licensee found that the as-found leakage through both the inboard and outboard main steam isolation valves (MSIVs) in main steam Lines A and C exceeded the acceptance limit. Technical Specification 3.6.1.3.8 specified a total leakage limit of 100 scfh for the four main steam lines (equivalent to 47,200 sccm). The acceptance leakage limit for individual MSIVs was 11,800 sccm. The as-found leakage rate through Valve B21F022A (inboard MSIV on main steam Line A) was 208,602 sccm and the leakage was unquantifiable for Valves B21F028A, B21F022C, and B21F028C. In addition, one of two valves failed on main steam Lines B (15,300 sccm) and D (unquantifiable). The licensee identified the root causes as inadequate original design and ineffective corrective actions. The design allowed rotation of the main poppet during operation, resulting in wear on the guide ribs and the body and failure of the spring holder pin over time. The result was that, as the wear became worse, the valve main and pilot poppets became less stable during valve closure, resulting in poor seating characteristics or in the inability for the valve to seat properly. Upon disassembly, the licensee found that all eight MSIVs exhibited the same wear characteristics, indicating that all eight valves were degraded.

The MSIVs had a history of failing to meet LLRT requirements. Valve B21F022C failed in 1987. The licensee found that the spring holder pin had sheared and rebuilt the valve using a vendor recommended modification to weld the end of the pin. Valve B21F028D failed in 1992. The licensee repaired it using the same modification. Valve B21F028C failed in 1993 and the licensee repaired it using the same modification.
Valves B21F022C and -F028D failed again in 1996 (the licensee did not recognize the latter failure in the work package; the package just stated that the stem was changed out). The licensee again replaced the parts and used the same modification. No further corrective actions were taken. Valve B21F028D failed again in 1998. The licensee replaced the parts, used the same modification, and opened an engineering response to look into MSIV LLRT failures. However, the latter action was put on hold and no further corrective actions were taken.

The problem with excessive MSIV LLRT failures in industry was documented in Information Notice 82-23, “Main Steam Isolation Valve Leakage.” The different failure mechanisms found by the licensee were discussed in NUREG-1169, “Resolution of Generic Issue C-8. An Evaluation of Boiling Water Reactor Main Steam Isolation Valve Leakage and the Effectiveness of Leakage Treatment Methods,” Appendix B, which documented industry's history of problems with MSIVs.

As of Refueling Outage 10, the root cause for design deficiencies with the MSIVs, which caused the valves to degrade to the point that they would not meet the design leakage requirements, was not identified and corrected to prevent recurrence. There were several opportunities to identify and correct the design deficiencies: (1) Information Notice 82-23 and NUREG-1169 both identified industry leakage testing failure concerns; (2) the second failure of Valve B21F022C during Refueling Outage 8 after the modification was installed during Refueling Outage 2, and (3) the second failure of Valve B21F028D during Refueling Outage 9 after the modification was installed during Refueling Outages 5 and 8. As of Refueling Outage 10, the licensee had not taken effective corrective actions to prevent recurrence and had not planned to take any action beyond repairing the valves each time a failure occurred.

The failure to take corrective action to preclude repetition of the failure of the MSIVs to meet the leakage requirements was a violation of 10 CFR Part 50, Appendix B, Criterion XVI. That criterion requires that measures be taken to assure that the cause for significant conditions adverse to quality be determined and corrective action taken to preclude repetition. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy (50-416//0002-01). This violation is in the licensee's corrective action program as Condition Report CR-GGN-1999-1653.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls (71750)

During tours of the controlled access areas, the inspectors observed radiological postings and worker adherence to radiation protection procedures. Personnel followed radiation protection procedures, locked high radiation area doors were locked, and radiation and contamination areas were properly posted.

S1 Conduct of Security and Safeguards Activities

The inspectors observed the practices of security personnel and the condition of security equipment. Protected and vital area barriers were in good condition. The isolation zones were free of obstructions, and the protected area illumination levels were good. The inspectors concluded that the daily security activities were conducted in a professional manner.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on February 22, 2000. The licensee acknowledged the findings presented.

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

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Bottemiller, Manager, Plant Licensing
R. Carroll, Superintendent, Operations
B. Edwards, Manager, Maintenance and Modifications
C. Ellsaesser, Manager, Corrective Action and Assessment
C. Lambert, Director, Design Engineering
J. Venable, General Manager, Plant Operations

INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observations
62707	Maintenance Observation
71707	Plant Operations
71750	Plant Support Activities
92700	Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities
93001	OSHA Interface Activities

ITEMS OPENED AND CLOSED

Opened

50-416/0002-01	NCV	Failure to take corrective actions to prevent recurrence of main steam isolation valve local leak rate test failures (Section E8.1)

Closed

50-416/99-006	LER	Main steam lines exceeded leakage limits (Section E8.1)
50-416/0002-01	NCV	Failure to take corrective actions to prevent recurrence of main steam isolation valve local leak rate test failures (Section E8.1)