



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-8064

February 22, 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. 50-416/00-01

Dear Mr. Eaton:

This refers to the inspection conducted on January 24 to 27, 2000, at the Grand Gulf Nuclear Station facility. The purpose of the inspection was to follow up on two previous inspection findings involving instrument setpoints and motor-operated valve design assumptions.

During the inspection, we were able to resolve the concerns related to these two items and did not identify any additional issues.

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

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

Sincerely,

Dr. Dale A. Powers, Chief
Engineering and Maintenance Branch
Division of Reactor Safety

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

Enclosure:
NRC Inspection Report No.
50-416/00-01

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

IE01

Entergy Operations, Inc.

-2-

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

Entergy Operations, Inc.

-3-

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

Entergy Operations, Inc.

-4-

E-Mail report to D. Lange (DJL)
E-Mail report to NRR Event Tracking System (IPAS)
E-Mail report to Document Control Desk (DOCDESK)

E-Mail notification of report issuance to the GG SRI and Site Secretary (JLD, MJS).

E-Mail notification of issuance of all documents to Nancy Holbrook (NBH).

bcc to DCD (IE01)

bcc distrib. by RIV:

Regional Administrator

DRP Director

DRS Director

Branch Chief (DRP/A)

Project Engineer (DRP/A)

Resident Inspector

RIV File

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-416
License No.: NPF-29
Report No.: 50-416/00-01
Licensee: Entergy Operations, Inc.
Facility: Grand Gulf Nuclear Station
Location: Waterloo Road
Port Gibson, Mississippi
Dates: January 24 to 27, 2000
Inspectors: M. Runyan, Senior Reactor Inspector
Engineering and Maintenance Branch
C. Paulk, Senior Reactor Inspector
Engineering and Maintenance Branch
Approved By: Dr. Dale A. Powers, Chief
Engineering and Maintenance Branch
Division of Reactor Safety

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Grand Gulf Nuclear Station
NRC Inspection Report No. 50-416/00-01

Engineering

- Selected safety-related instrument setpoints were reviewed and found to be adequately justified by calculations or other appropriate documentation (Section E8.1). This closes Unresolved Item 50-416/9902-03.

Report Details

Summary of Plant Status

The plant was taken offline on the first day of the inspection for problems associated with an insulator on one of the main power transformers. While repairs were being made, the reactor was maintained at approximately 10 percent thermal power. With repairs complete, the main generator was reconnected to the grid and the reactor was returned to full power on the final day of the inspection.

III. Engineering

E8 Engineering-Miscellaneous Issues (92903)

E8.1 (Closed) Unresolved Item 50-416/9902-03: instrumentation setpoint program weaknesses.

This item identified that the licensee lacked instrument setpoint calculations for many of its safety-related instrument setpoints, particularly those associated with the emergency diesel generators. Based on review of a sample calculation, the item also questioned the quality of setpoint calculations.

The inspectors reviewed a list of all safety-related instruments, 622 total. The list included a calculation number if a calculation existed for the particular instrument or else an internal correspondence (GIN) or telephone conversation record (GTC) that justified why a calculation was not needed. The list distinguished between technical specification (TS) instruments and non-TS instruments. The following statistics were derived from this list:

TABLE 1

Instrument Classification	Total Number	Number with calculations	Number without calculations
TS Instruments	263	263	0
Non-TS Instruments	359	185	174

An instrument was considered to be a TS instrument if its allowable value was specified in the TS, even if its setpoint value was located in the Technical Requirements Manual. The inspectors noted that all TS instruments were supported by setpoint calculations. According to licensee personnel, two new calculations had been prepared for the few TS instruments that had not been supported by calculations when this unresolved item was identified.

The inspectors selected 10 setpoint calculations, 5 GINs, and 1 GTC for review, as listed in Tables 2, 3, and 4 below:

TABLE 2

Calculation Number	TS	Instrument	Component Number
JC-Q1D17-K609-1	Yes	Containment and Drywell Vent Exhaust Primary Containment Isolation System Radiation Monitor	1D17K609A
JC-Q1D17-K610-1	Yes	Main Steam Line Primary Containment Isolation System Log Radiation Monitor	1D17K610A
JC-Q1E12-90023	Yes	Low Pressure Coolant Injection Pump Start Time Delay	1E12K70A
JC-Q1E12-N658-1	No	Residual Heat Removal A Interface Valve Pressure 12F041A to E12F042A Switch	1E12N658A
JC-Q1E21-N651-2	No	Low Pressure Core Spray Pump Discharge Flow Switch	1E21N651
JC-Q1E22-N654-1	Yes	Condensate Storage Tank Level Low Switch	1E22N654C
JC-Q1P45-N200-1	No	Valve (F253) Air Supply Pressure Low Switch	1G46N050
JC-Q1P81-N036A-1	No	High Pressure Core Spray Engine A Jacket Water Low Start Pressure Switch	1P81N036A
JC-Q1R21-90024-1, JC-Q1R21-90025-1	Yes	Division I/II Loss of Voltage and Degraded Voltage	1H22P331

TABLE 3

GIN Number	TS	Instrument	Component Number
91/06857	No	High Pressure Core Spray Engine A Starting Air Low Pressure Switch	1P81N112A
91/06858	No	Division I Diesel Generator Engine Crankcase Pressure Switch	1P75N160A
92/00969	No	Division I Diesel Generator Lube Oil Pump Low Pressure Switch	1P75N075A
92/02496	No	High Pressure Core Spray Diesel Start Sequence Inhibit Time Delay Relay	1P81K001
92/05742	No	Diesel Generator A Day Tank Low Level Switch	1P75N602A

TABLE 4

GTC Number	TS	Instrument	Component Number
94/00388	No	Main Steam Isolation Valve Leakage Control System Outboard Steam Line Pressure Switch	1E32N655

The inspectors determined that each of the selected instrument setpoints was adequately justified by the associated documentation and that uncertainties were appropriately applied. The quality of the calculations and associated documentation was good, with one exception discussed in the next paragraph.

The inspectors identified a concern related to Calculation JC-Q1E22-N654-1, which established the setpoint for the condensate storage tank level low switch. This calculation contained two non-conservative assumptions for a loss-of-coolant accident.

First, the assumed outflow through the high pressure core spray pump was selected as the design minimum full flow value rather than the maximum attainable (runout) value. Second, the contribution of flow from the condensate storage tank and suppression pool during the time that both of these sources supply the high pressure core spray and reactor core isolation cooling pumps (while one set of valves are opening and the other set are closing to transfer suction sources) was arbitrarily assumed to be equally divided. This assumption was overly simplistic and failed to account for all possible hydrodynamic conditions, such as various containment pressure conditions that may exist, following the accident. During discussions with licensee engineers, the inspectors were able to determine that a safety issue did not exist, in that the system design would preclude cavitation or intake of air into the pumps. The inspectors considered this calculation to represent an isolated instance of imprecise engineering.

The inspectors reviewed Design Change 98/0636-00, "Change Control Room Air Conditioning Units A and B Trouble Annunciators Time Delay from 5 to 20 Seconds," Revision 0, in which setpoints were revised. The processes used to revise the setpoints were consistent with the applicable procedures.

The inspectors' review of the licensee's setpoint program adequately resolved the concerns related to this unresolved item, in that the selected safety-related instrument setpoints were adequately justified by calculations or other appropriate documentation.

E8.2 (Closed) Inspection Followup Item 50-416/9603-01: review long-term justification for methodology and assumed valve factors.

This item identified the lack of a rigorous justification for the assumed 0.5 valve factor assigned to the Powell 600/900 pound class motor-operated gate valve group. The issue was later reviewed and documented in NRC Inspection Report 50-416/99-02. In that report, the concern was focused on five motor-operated valves that possessed less than 20 percent margin when using the assumed group valve factor. Four of these valves were subsequently modified to improve their margins. However, only two of the valves (Q1B21F016 and Q1B21F019) were raised to margins in excess of 20 percent. Valve Q1E51F059, which was the one valve of the five to have not been modified, was expected to be modified on-line during the current operating cycle.

Licensee engineers planned to explore options to improve the margins of the other two marginal valves (Q1G33F028 and Q1G33F039). These valves had been recently modified but remained marginal because of a motor design parameter that was changed by the valve vendor during the same time period. The engineers speculated that torque switch setting changes alone may be sufficient to achieve an approximate 20 percent margin for both valves. A licensee representative informed the inspectors that these switch setting changes would be made during Refueling Outage 11 in Spring 2001. Both of these valves were designated by the plant's probabilistic risk assessment as being of low risk and the existing design and testing information did not suggest an operability problem. The inspectors considered the licensee's completed and planned actions sufficient for the inspectors to close this item.

V. Management Meetings

XI Exit Meeting Summary

The inspectors presented the inspection results in an exit meeting to members of licensee management on January 27, 2000. The licensee's management acknowledged the findings presented. The inspectors asked whether any materials examined during the inspection should be considered proprietary. The licensee's management stated that one proprietary document, NEDC-31336P-A, "GE Nuclear Instrument Setpoint Methodology," September 1995, was reviewed by the inspectors. No information from this document, or from any other proprietary source, was discussed in this inspection report.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee:

A. Barfield, Manager, Design Engineering
F. Brown, Senior Engineer
T. Bryant, Senior Engineer
S. Burris, Engineering Supervisor
K. Christian, Supervisor, Code Programs
R. Fuller, Senior Engineer
C. Holifield, Senior Engineer
M. Humphries, Supervisor, Electrical and Instrumentation and Control
R. Jackson, Senior Licensing Specialist
C. Lambert, Director, Engineering
A. Malone, Senior Staff Engineer
L. Patterson, Technical Assistant
M. Renfroe, Manager, Engineering Programs and Support
J. Roberts, Director, Nuclear Safety Assurance
J. Robertson, Quality Assurance Manager
G. Smith, Senior Staff Engineer
J. Turner, Motor-Operated Valve Engineer
J. Venable, General Manager
W. White, Engineering Supervisor

NRC Personnel:

P. Alter, Resident Inspector
J. Dixon-Herrity, Senior Resident Inspector

INSPECTION PROCEDURES USED

92903 Followup - Engineering

ITEMS CLOSED

Closed

50-416/9902-03	URI	Instrument Setpoint Program Weaknesses
50-416/9603-01	IFI	Review Long-Term Justification for Methodology and Assumed Valve Factors

DOCUMENTS REVIEWED

Standards:

GGNS-JS-09, "Methodology for the Generation of Instrument Loop Uncertainty and Setpoint Calculations," Revision 1

Miscellaneous:

ABD-1, "Analytical Bases Documentation Reload Analysis Inputs," Revision 0

NEDC-31336P-A, "GE Nuclear Instrument Setpoint Methodology," September 1995

Grand Gulf Nuclear Station Plant Technical Guidelines, Section 4.0, "EPG/SAG Introduction," Amendment 11

Upper Tier Documents:

Design Engineering Administrative Manual, IC-G-001-02, "I&C Uncertainties and Setpoint Calculation Program," August 23, 1999

Design Engineering Administrative Manual, ES-P001-01, "Design Inputs," October 14, 1997

Calculations:

JC-Q1D17-K609-1, "Instrument Loop Uncertainty and Setpoint Determination for System 1D17 Loop K604, K617, K618, K621 Isolation on High Radiation," Revision 0

JC-Q1D17-K610-1, "Instrument Loop Uncertainty and Setpoint Determination for Loop 1D17-K610 Group 10 Isolation on HIGH-HIGH MSL Tunnel Radiation Level (TR 3.3.6.1)," Revision 0

JC-Q1E12-90023, "Instrument Loop Uncertainty and Setpoint Determination for Instrument Loop 1E12-K70 LPCI Pump Start Time Delay," Revision 0

JC-Q1E12-N658-1, "RHR Injection Valve Pressure Permissive for Test (TR 3.4.6.2)," Revision 1

JC-Q1E21-N651-2, "Instrument Loop Uncertainty and Setpoint Determination for Instrument Loop 1E12-K70 LPCI Pump Start Time Delay," Revision 0

JC-Q1E22-N654-1, "Instrument Loop Uncertainty and Setpoint Determination for Loops 1E22-N654 and 1E51-N635 HPCS and RCIC Pump Suction Transfer on Low CST Level (TS 3.3.5.1)," Revision 1

JC-Q1P45-N200-1, "Instrument Loop Uncertainty and Setpoint Evaluation for Isolation Valve Closure on Low Instrument Air Pressure," Revision 1

JC-Q1P81-N036A-1, "HPCS Diesel Generator Starting Air Interlocks 1P81N036A/B, 1P81N107A/B, and 1P81N108A/B Setpoint Calculation," Revision 0

JC-Q1R21-90024-1, "Division I and II Degraded Voltage Setpoint Validation (T/S 3.3.8.1),"
Revision 0

JC-Q1R21-90025-1, "Division I and II Loss of Voltage Setpoint Validation (T/S 3.3.8.1),"
Revision 1

Internal Correspondence:

91/06857, "System P81 Safety-Related Instrument Setpoint Calculation," December 10, 1991

91/06858, "System P75 Engine Mounted Safety-Related Instrument Setpoint Calculation,"
December 10, 1991

92/00969, "System P75 - Auxiliary Lube Oil Pumps and Auxiliary Jacket Water Pumps Control
Setpoint Calculation," February 21, 1992

92/02496, "System P81 Safety-Related Instrument Setpoint Calculation 1P81-K001," May 19,
1992

92/05742, "System P75 and P81 Safety-Related Instrument Setpoint Calculations,"
December 21, 1992

Telephone Conversation Record:

94/00388, "MSIV Leakage Control System Setpoints," October 12, 1994

Procedures:

334, "Responses to Engineering Requests," Revision 2

305, "Engineering Calculations," Revision 16

01-S-17-5, "Engineering Request," Revision 7

01-S-07-1, "Control of Work on Plant Equipment and Facilities," Revision 33

Engineering Requests:

98/0636-00, "Change Control Room Air Conditioning Units A and B Trouble Annunciators Time
Delay from 5 to 20 Seconds," Revision 0

97/0287-00, "Marginal Gate MOVs," Revision 0

99/0081-00, "PRA Risk Ranking of Valves," Revision 0