July 30, 1991

Docket No. 50-416

Mr. William T. Cottle
Vice President, Operations GGNS
Entergy Operations, Inc.
Post Office Box 756
Port Gibson, Mississippi 39150

Dear Mr. Cottle:

SUBJECT: ISSUANCE OF AMENDMENT NO. 79 TO FACILITY OPERATING LICENSE NO. NPF-29 - GRAND GULF NUCLEAR STATION, UNIT 1, REGARDING STANDBY LIQUID CONTROL SYSTEM TECHNICAL SPECIFICATIONS (TAC NO. 73599)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 79 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated June 19, 1989, as revised May 31 and December 7, 1990, and as supplemented February 7, March 4 and April 10, 1991.

The amendment changes TS 3/4.1.5 "Standby Liquid Control System" and associated Bases by specifying an acceptable range of sodium pentaborate solution temperature (75 - 130 °F), concentration (13.6 - 15.2 weight percent) and volume (4281 - 5088 gallons) for normal operation in lieu of the presently specified range of solution temperature (67 - 130 °F), concentration (13.6 - 28.5 weight percent), minimum volume (4530 gallons) and minimum weight (5800 pounds). An additional Action statement allows the solution concentration to be as high as 28.5 weight percent for 72 hours provided the solution temperature is above the saturation temperature as measured each 4 hours. An additional surveillance requirement is the daily determination of the operability of heat tracing on pump suction piping by determining that power is available to at least one of the two redundant circuits.

A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,
Original signed by
Lester L. Kintner, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III, IV, and V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 79 to NPF-29
2. Safety Evaluation

cc w/enclosures:
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

July 30, 1991

Docket No. 50-416

Mr. William T. Cottle
Vice President, Operations GGNS
Entergy Operations, Inc.
Post Office Box 756
Port Gibson, Mississippi 39150

Dear Mr. Cottle:

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The amendment changes TS 3/4.1.5 "Standby Liquid Control System" and associated Bases by specifying an acceptable range of sodium pentaborate solution temperature (75 - 130 °F), concentration (13.6 - 15.2 weight percent) and volume (4281 - 5088 gallons) for normal operation in lieu of the presently specified range of solution temperature (67 - 130 °F), concentration (13.6 - 28.5 weight percent), minimum volume (4530 gallons) and minimum weight (5800 pounds). An additional Action statement allows the solution concentration to be as high as 28.5 weight percent for 72 hours provided the solution temperature is above the saturation temperature as measured each 4 hours. An additional surveillance requirement is the daily determination of the operability of heat tracing on pump suction piping by determining that power is available to at least one of the two redundant circuits.

A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

L L Kintner

Lester L. Kintner, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III, IV, and V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 79 to NPF-29
2. Safety Evaluation

cc w/enclosures:
See next page

cc:

Mr. Fred W. Titus
Vice President, Engineering
Entergy Operations Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

Robert B. McGehee, Esquire
Wise, Carter, Child & Caraway
P. O. Box 651
Jackson, Mississippi 39205

Nicholas S. Reynolds, Esquire
Winston & Strawn
1400 L Street, N.W. - 12th Floor
Washington, D.C. 20005-3502

Mr. Jim T. LeGros
Manager of Quality Assurance
Entergy Operations, Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

Mr. Jack McMillan, Director
Division of Solid Waste Management
Mississippi Department of Natural Resources
P. O. Box 10385
Jackson, Mississippi 39209

Mr. Michael J. Meisner
Director, Nuclear Licensing
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, Mississippi 39150

Mr. C. B. Hogg, Project Manager
Bechtel Power Corporation
P. O. Box 2166
Houston, Texas 77252-2166

Mr. Johnny Mathis
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Route 2, Box 399
Port Gibson, Mississippi 39150

Mr. C. R. Hutchinson
GGNS General Manager
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, Mississippi 39150

The Honorable William J. Guste, Jr.
Attorney General
Department of Justice
State of Louisiana
P. O. Box 94005
Baton Rouge, Louisiana 70804-9005

Alton B. Cobb, M.D.
State Health Officer
State Board of Health
P. O. Box 1700
Jackson, Mississippi 39205

Office of the Governor
State of Mississippi
Jackson, Mississippi 39201

President,
Claiborne County Board of Supervisors
Port Gibson, Mississippi 39150

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta St., Suite 2900
Atlanta, Georgia 30323

Mike Morre, Attorney General
Frank Spencer, Asst. Attorney General
State of Mississippi
Post Office Box 22947
Jackson, Mississippi 39225

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

Mr. Donald C. Hintz, Executive Vice President & Chief Operating Officer
Entergy Operations, Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENTERGY OPERATIONS, INC.

SYSTEM ENERGY RESOURCES, INC.

SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

MISSISSIPPI POWER AND LIGHT COMPANY

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 79
License No. NPF-29

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Operations, Inc. (the licensee) dated June 19, 1989, as revised May 31 and December 7, 1990, and as supplemented February 7, March 4 and April 10, 1991, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. NPF-29 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 79 , are hereby incorporated into this license. Entergy Operations, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas R. Westerman for

Theodore R. Quay, Director
Project Directorate IV-1
Division of Reactor Projects III, IV, and V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 30, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 79

FACILITY OPERATING LICENSE NO. NPF-29

DOCKET NO. 50-416

Replace the following pages of the Appendix A Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

REMOVE PAGES	INSERT PAGES
3/4 1-18	3/4 1-18
3/4 1-19	3/4 1-19
3/4 1-20	3/4 1-20
-	3/4 1-21
B 3/4 1-4	B 3/4 1-4
B 3/4 1-4a	B 3/4 1-4a
-	B 3/4 1-4b

3/4.1.5 STANDBY LIQUID CONTROL SYSTEM

LIMITING CONDITION FOR OPERATION

3.1.5 Two standby liquid control system subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 5*.

ACTION:

a. In OPERATIONAL CONDITION 1 or 2:

1. With one system subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

2. With both standby liquid control system subsystems inoperable, except for the condition covered in ACTION a.3, restore at least one subsystem to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours.

3. With the sodium pentaborate concentration greater than 15.2 weight percent and the net tank volume greater than or equal to 4281 gallons and less than or equal to 5088 gallons, verify the sodium pentaborate solution temperature to be greater than or equal to the standby liquid control system solution minimum temperature limit of Figure 3.1.5-1 once per 4 hours and restore the sodium pentaborate solution to within the normal operation limits of Figures 3.1.5-1 and 3.1.5-2 within 72 hours. Otherwise, declare both standby liquid control system subsystems inoperable and be in at least HOT SHUTDOWN within the next 12 hours.

b. In OPERATIONAL CONDITION 5*:

1. With one system subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 30 days or insert all insertable control rods within the next hour.

2. With both standby liquid control system subsystems inoperable, insert all insertable control rods within one hour.

SURVEILLANCE REQUIREMENTS

4.1.5 Each standby liquid control system subsystem shall be demonstrated OPERABLE:

a. At least once per 24 hours by verifying that;

1. The temperature of the sodium pentaborate solution is greater than or equal to 75°F and less than or equal to 130°F.

2. The available volume of sodium pentaborate solution is within the limits of Figure 3.1.5-2.

*With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

SURVEILLANCE REQUIREMENTS (Continued)

3. The heat tracing is OPERABLE by determining that power is available to at least one division of heat tracing circuitry and the temperature of the pump suction piping is greater than or equal to 75°F and less than or equal to 130°F.

b. At least once per 31 days by;

1. Starting both pumps and recirculating demineralized water to the test tank.

2. Verifying the continuity of the explosive charge.

3. Determining that the concentration of boron in solution is within the limits of Figure 3.1.5-2 by chemical analysis.*

4. Verifying that each valve, manual, power operated or automatic, in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. Demonstrating that, when tested pursuant to Specification 4.0.5, the minimum flow requirement of 41.2 gpm at a pressure of greater than or equal to 1300 psig is met, without actuation of the pump relief valve.

d. At least once per 18 months during shutdown by;

1. Initiating one of the standby liquid control system subsystems, including an explosive valve, and verifying that a flow path from the pumps to the reactor pressure vessel is available by pumping demineralized water into the reactor vessel. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch which has been certified by having one of that batch successfully fired. Both system subsystems shall be tested in 36 months.

2. Demonstrating that the pump relief valve opens within 3% of the system design pressure and verifying that the relief valve does not actuate during recirculation to the test tank.

3. **Demonstrating that all heat traced piping between the storage tank and the reactor vessel is unblocked by pumping from the storage tank to the test tank and then draining and flushing the piping with demineralized water.

4. Demonstrating that the storage tank heater is OPERABLE by verifying the expected temperature rise for the sodium pentaborate solution in the storage tank after the heater is energized.

*This test shall also be performed anytime water or boron is added to the solution or when the solution temperature drops below 75°F.

**This test shall also be performed whenever the suction piping temperature is found to be below 75°F and may be performed by any series of sequential, overlapping or total flow path steps such that the entire flow path is included.

SURVEILLANCE REQUIREMENTS (Continued)

3. The heat tracing is OPERABLE by determining that power is available to at least one division of heat tracing circuitry and the temperature of the pump suction piping is greater than or equal to 75°F and less than or equal to 130°F.

b. At least once per 31 days by;

1. Starting both pumps and recirculating demineralized water to the test tank.

2. Verifying the continuity of the explosive charge.

3. Determining that the concentration of boron in solution is within the limits of Figure 3.1.5-2 by chemical analysis.*

4. Verifying that each valve, manual, power operated or automatic, in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. Demonstrating that, when tested pursuant to Specification 4.0.5, the minimum flow requirement of 41.2 gpm at a pressure of greater than or equal to 1300 psig is met, without actuation of the pump relief valve.

d. At least once per 18 months during shutdown by;

1. Initiating one of the standby liquid control system subsystems, including an explosive valve, and verifying that a flow path from the pumps to the reactor pressure vessel is available by pumping demineralized water into the reactor vessel. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch which has been certified by having one of that batch successfully fired. Both system subsystems shall be tested in 36 months.

2. Demonstrating that the pump relief valve opens within 3% of the system design pressure and verifying that the relief valve does not actuate during recirculation to the test tank.

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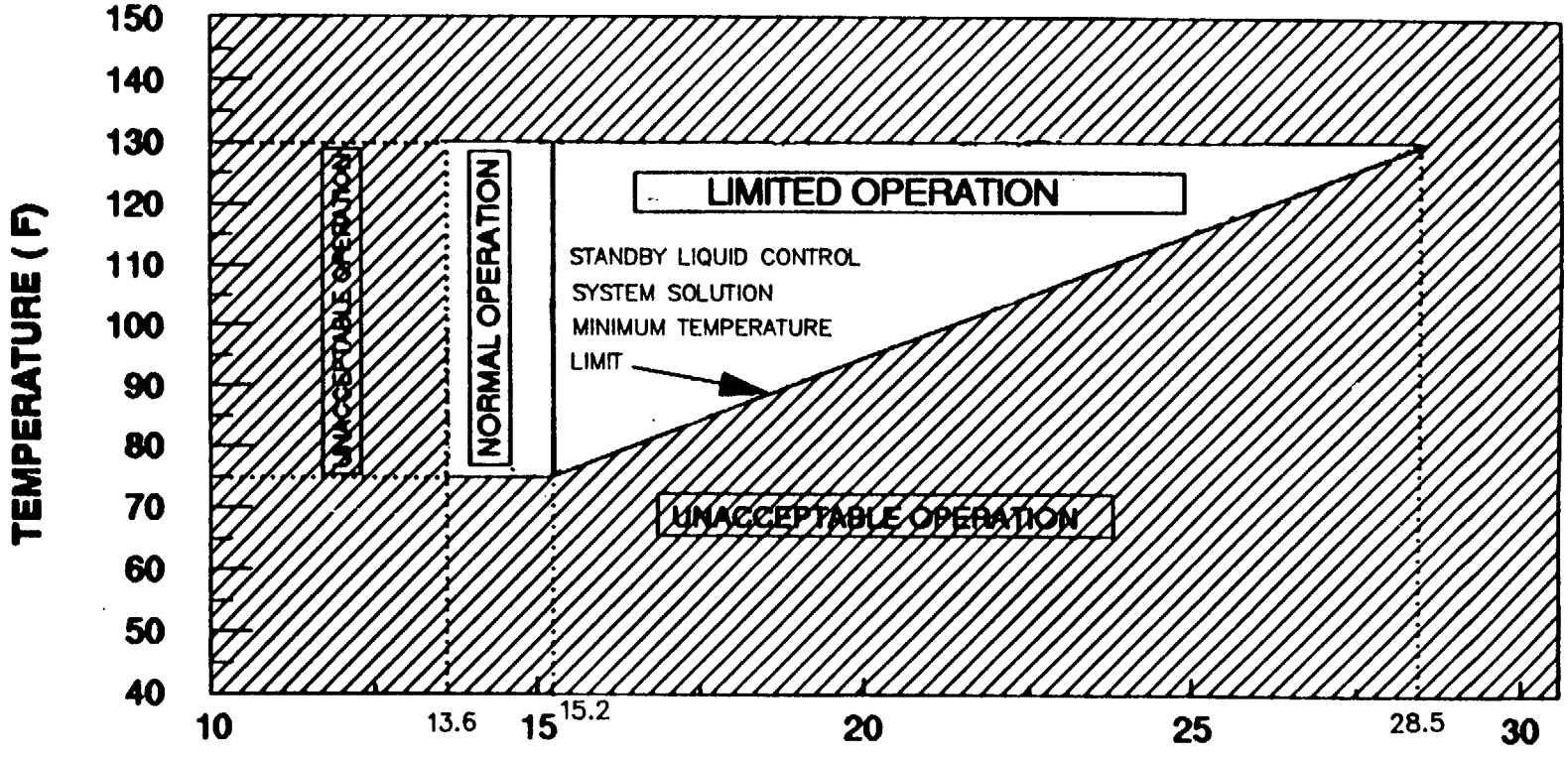

FIGURE 3.1.5-1

SODIUM PENTABORATE SOLUTION TEMPERATURE/CONCENTRATION REQUIREMENTS

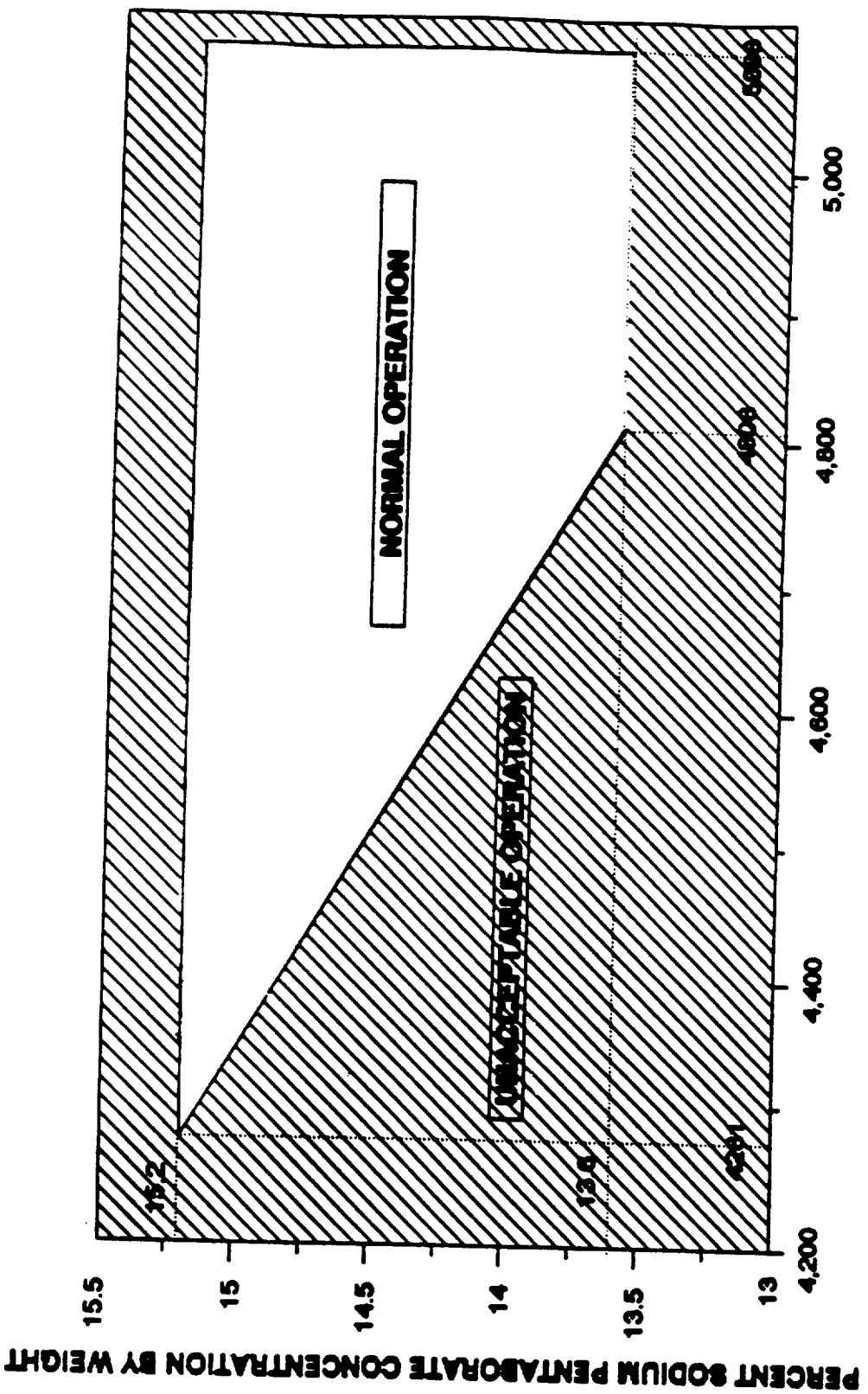

FIGURE 3.1.5-2

SODIUM PENTABORATE SOLUTION CONCENTRATION/AVAILABLE VOLUME REQUIREMENTS

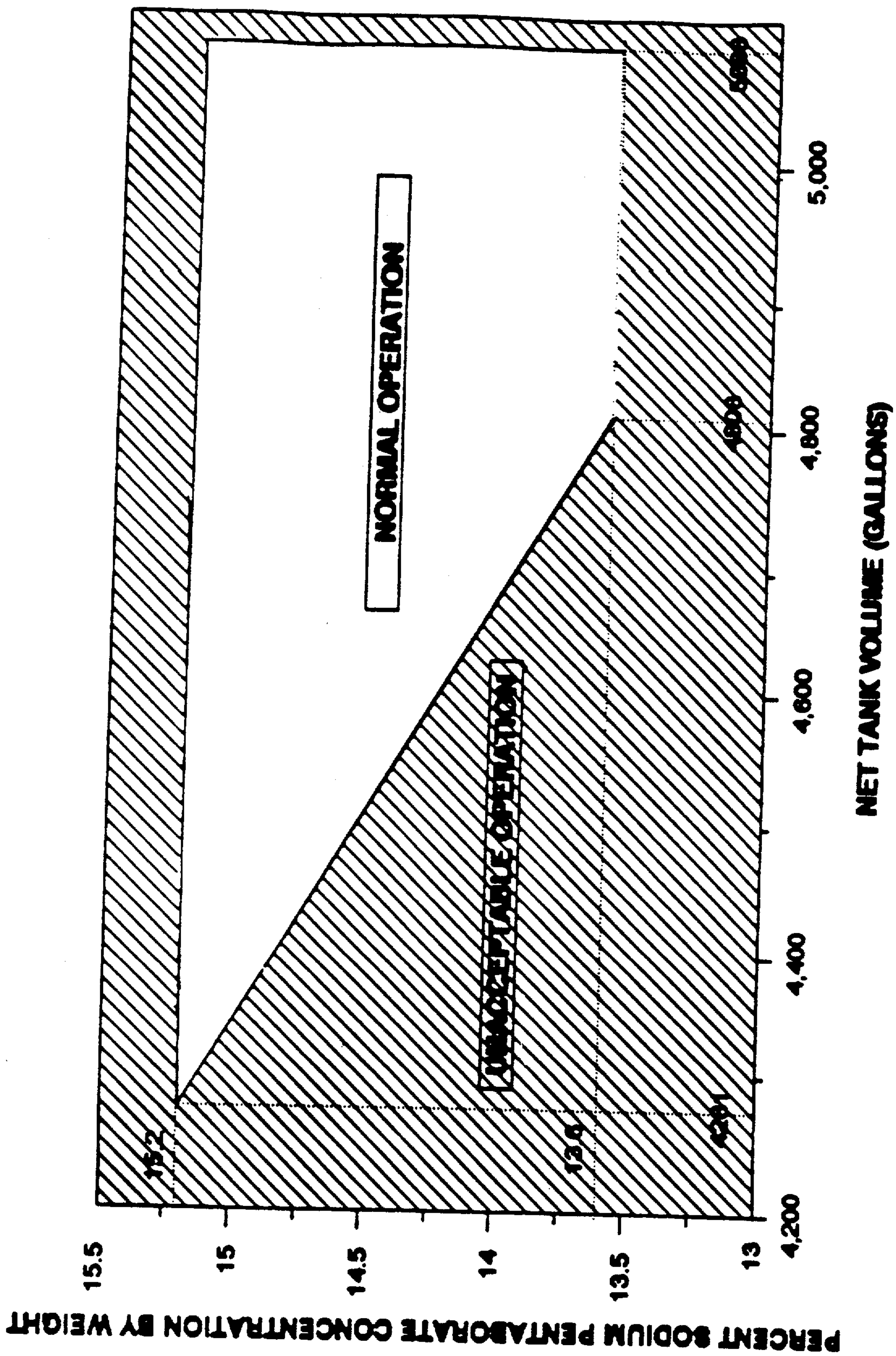

FIGURE 3.1.5-2

SODIUM PENTABORATE SOLUTION CONCENTRATION/AVAILABLE VOLUME REQUIREMENTS

CONTROL ROD PROGRAM CONTROLS (Continued)

The RPCS provides automatic supervision to assure that out-of-sequence rods will not be withdrawn or inserted. A rod is out of sequence if it does not meet the criteria of the Banked Position Withdrawal Sequence (Reference 1) as described in the FSAR. The RPCS function is allowed to be bypassed in the Rod Action Control System (RACS) if necessary, for example, to insert an inoperable control rod, return an out-of-sequence control rod to the proper in-sequence position or move an in-sequence control rod to another in-sequence position. The requirement that a second qualified individual verify such bypassing and positioning of control rods ensures that the bases for RPCS limitations are not exceeded. In addition, if THERMAL POWER is below the low power setpoint, additional restrictions are provided when bypassing control rods to ensure operation at all times within the basis of the control rod drop accident analysis.

The baseline analysis of the rod drop accident is presented in Section 15.4 of the FSAR and the techniques of the analysis are presented in Reference 1. Analyses applicable to the current cycle are addressed in the appropriate cycle-specific documentation.

The RPCS is also designed to automatically prevent fuel damage in the event of erroneous rod withdrawal from locations of high power density during higher power operation.

A dual channel system is provided that, above the low power setpoint, restricts the withdrawal distances of all non-peripheral control rods. This restriction is greatest at highest power levels.

3/4.1.5 STANDBY LIQUID CONTROL SYSTEM

The standby liquid control system provides a backup capability for bringing the reactor from full power to a cold, xenon-free shutdown, assuming that the withdrawn control rods remain fixed in the rated power pattern. To meet this objective it is necessary to inject a quantity of boron which produces a concentration of 660 ppm in the reactor core in approximately 90 to 120 minutes. To meet the 3% shutdown requirement, the minimum required solution concentration at the design volume of 4530 gallons is 14.4 weight percent. In order to establish this minimum concentration, it is necessary to have a minimum of 5803 pounds of sodium pentaborate. There is an additional allowance of 165 ppm in the reactor core to account for imperfect mixing and leakage. The time requirement was selected to override the reactivity insertion rate due to cooldown following the xenon poison peak and the required pumping rate is 41.2 gpm. The minimum storage volume is established to allow for the portion below the pump suction that cannot be inserted. The sodium pentaborate solution is required to be maintained above the minimum required concentration and below the maximum allowable concentration on Figure 3.1.5-2. The temperature requirement is necessary to ensure that the sodium pentaborate remains in solution. The

1. C.J. Paone, "Banked Position Withdrawal Sequence," GE Topical Report, NEDO-21231, January 1977.

STANDBY LIQUID CONTROL SYSTEM (Continued)

sodium pentaborate solution volumes specified in ACTION a.3 and Figure 3.1.5-2 are based on a 90°F nominal sodium pentaborate solution temperature.

With redundant pumps and explosive injection valves and with a highly reliable control rod scram system, operation of the reactor is permitted to continue for short periods of time with the system inoperable or for longer periods of time with one of the redundant components inoperable.

Relief valves are provided on the SLCS pump discharge piping to protect the SLCS pump and piping from overpressure conditions. Testing of the relief valve setpoint and verifying that the relief valve does not open during steady state operation of the SLCS pumps demonstrates OPERABILITY of the relief valve. The relief valves are ASME Class 2 valves and, as such, have a ± 3% tolerance in the opening pressure from the set pressure, per the ASME Code (Section III - Division 1 Subsection NC-7614.2(b), 1974 Edition).

Surveillance requirements are established on a frequency that assures a high reliability of the system. Once the solution is established, boron concentration will not vary unless more boron or water is added, thus a check on the temperature and volume once each 24 hours assures that the solution is available for use.

Temperature surveillance requirements are established on a frequency that assures a high probability that the solution temperature remains above the saturation temperature as illustrated by Figure 3.1.5-1. More frequent surveillance is required when operating in the "Limited Operation" region of Figure 3.1.5-1 because of decreased margin to saturation. Replacement of the explosive charges in the valves at regular intervals will assure that these valves will not fail because of deterioration of the charges.

Compliance with the NRC ATWS Rule 10CFR50.62 has been demonstrated by means of the equivalent control capacity concept using the plant specific minimum parameters. This concept requires that each boiling water reactor must have a standby liquid control system with a minimum flow capacity and boron content equivalent in control capacity to 86 gpm for 13% weight sodium pentaborate solution (natural boron enrichment) used for the 251-inch diameter reactor vessel studied in NEDE-24222, Reference 2. The described minimum system parameters (82.4 gpm, 13.6% weight with natural boron enrichment) provides an equivalent control capacity to the 10CFR 50.62 requirement. The techniques of the analysis are presented in a licensing topical report NEDE-31096-P, Reference 3.

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2. "Assessment of BWR Mitigation of ATWS, Volume II," NEDE-24222, December 1979.

3. L. B. Claasen et al., "Anticipated Transients Without Scram, Response to NRC ATWS Rule 10CFR50.62," G. E. Licensing Topical Report prepared for the BWR Owners' Group, NEDE-31096-P, December 1985.

STANDBY LIQUID CONTROL SYSTEM (Continued)

Only one subsystem is needed to fulfill the system design basis, and two subsystems are needed to fulfill ATWS rule requirements. An SLCS subsystem consists of the storage tank, one divisional pump, explosive type valve, and associated controls, and other valves, piping, instrumentation, and controls necessary to prepare and inject neutron absorbing solution into the reactor.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 79 TO FACILITY OPERATING LICENSE NO. NPF-29

ENTERGY OPERATIONS, INC., ET AL.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated June 19, 1989, as revised May 31 and December 7, 1990, and as supplemented February 7, March 4 and April 10, 1991, the licensee (System Energy Resources, Inc., before June 6, 1990, and Entergy Operations, Inc., on or after June 6, 1990), submitted a request for changes to the Grand Gulf Nuclear Station, Unit 1, Technical Specifications (TS). The requested changes would change TS 3/4.1.5 "Standby Liquid Control System" and associated Bases by specifying an acceptable range of sodium pentaborate solution temperature (75 - 130 °F), concentration (13.6 - 15.2 weight percent) and volume (4281 - 5088 gallons) for normal operation in lieu of the presently specified range of solution temperature (67 - 130 °F), concentration (13.6 - 28.5 weight percent), minimum volume (4530 gallons) and minimum weight (5800 pounds). An additional Action statement would allow the solution concentration to be as high as 28.5 weight percent for 72 hours provided the solution temperature is above the saturation temperature as measured each 4 hours. An additional surveillance requirement would be the daily determination of the operability of heat tracing on pump suction piping by determining that power is available to at least one of the two redundant circuits.

The proposed changes resulted from an assessment of the standby liquid control system (SLCS) by the licensee in August 1988, which concluded, in part, that the TS should be changed to reduce the potential for precipitation of sodium pentaborate in the solution. The maximum solution concentration of 28.5 percent permitted for normal operation in the present TS requires a temperature of 130 °F to prevent precipitation. However the SLCS tank heaters and heat tracing are designed to maintain the solution in the tank and suction piping between 85 and 95 °F and the discharge piping, which is not heat traced, is maintained at the containment temperature between 70 and 80 °F.

2.0 EVALUATION

2.1 Analyses for Proposed Technical Specifications

The function of the SLCS is to inject sodium pentabrate solution, a neutron poison, into the reactor coolant system to assure a safe shutdown condition during an anticipated transient without scram (ATWS) event. The ATWS rule as

specified in paragraph (c)(4) of 10 CFR 50.62 requires that each boiling water reactor must have a standby liquid control system with a minimum flow capacity and boron content equivalent in control capacity to 86 gallons per minute (gpm) of 13 weight percent sodium pentaborate solution. To be in compliance with the 10 CFR 50.62 requirements, the licensee established the lower bound on solution concentration (13.6 percent), based upon the two pump design flow rate of 82.4 gpm.

The current TS specifies the minimum weight of sodium pentaborate of 5800 pounds to be maintained in the SLCS and requires the concentration of boron in solution to be within the limits of Figure 3.1.5-1, which defines the required concentrations of the sodium pentaborate solution (ranging from 13.6 percent to 28.5 percent by weight) as a function of temperature (varying from 67 to 130 °F). The existing TS requires the tank heaters and the heat tracing subsystem or the SLCS suction piping to be operable in order to maintain the higher concentrations of sodium pentaborate solution above its saturation temperature. This requirement precludes solution precipitation and thus avoids the potential for flow blockage in the SLCS. In order to reduce the need to actuate the tank heaters and the heat tracing subsystem, the licensee proposed to operate the plant at lower sodium pentaborate concentrations ranging from 13.6 percent to 15.2 percent for normal operations and only allow higher concentrations for up to 72 hours, if necessary, during addition of borax or dilution of the sodium pentaborate solution. To maintain the required minimum weight of sodium pentaborate of 5800 pounds in the solution, the licensee proposed in Figure 3.1.5-2 to specify the required solution volumes (ranging from 4281 to 5088 gallons) as a function of the solution concentrations (13.6 percent to 15.2 percent). The upper bound on solution concentration (15.2 percent) is established to assure that its corresponding saturation temperature of 70 °F is below the minimum allowable temperature of 75 °F for the solution in the SLCS. Since the containment ambient temperature is normally above 75 °F, tank heaters and heat tracing on suction piping will not normally need to be actuated.

The licensee established the lower temperature limit of 75 °F to provide 5 °F margin to the saturation temperature for solution at the maximum allowable concentration (15.2 percent), and the upper temperature limit of 130 °F to meet the net pump suction head (NPSH) requirements for two-pump operation and provide about 20 °F margin to the 150 °F temperature rating of the SLCS piping.

The licensee established the required volumes of the solution in proposed Figure 3.1.5-2 to assure that the solution will contain a weight of sodium pentaborate of 5800 pounds. This weight was previously approved by the NRC in the existing TS as the quantity of nuclear poison needed for cold shutdown margin during an ATWS event. The upper bound on the required volumes is limited by the tank volume of 5088 gallons.

In the proposed TS, a maximum concentration of 28.5 percent of sodium pentaborate could be maintained in the SLCS tank for 72 hours. The temperature of the solution would have to be 130 °F which is 16 °F higher than its saturation temperature. However, during injection, when the solution passes through the 70 °F piping linking the SLCS tank and the reactor vessel, it loses heat and its temperature drops below the saturation temperature, causing precipitation of

sodium pentaborate. The calculation was made to demonstrate that excessive precipitation would not block the piping and retard or stop the flow of sodium pentaborate to the reactor vessel.

The licensee performed the calculations for steady state and transient conditions. Transient state occurs when the hot solution is introduced into the cold pipes. During this period most of the heat from the solution is transferred to the pipe walls and raises their temperature. Only a relatively small amount is transferred to the outside. During steady state condition, the pipe walls have already reached their equilibrium temperature and heat from the solution is transferred to the outside.

The licensee performed calculations using a computer code. The method was described in the submittal and a numerical example was given. The licensee found that during steady state, loss of heat from the solution was so low that its temperature dropped only a fraction of a degree Fahrenheit. However, during the transient condition the heat transfer from the solution to the pipe was significant and the temperature of the solution dropped below the saturation temperature for sodium pentaborate. The licensee calculated precipitation of 6.993 pounds of sodium pentaborate salt. This is a very small quantity, representing less than 0.1 percent of the total amount of sodium pentaborate in the tank. For the minimum specified volume at 28.5 percent the total amount of sodium pentaborate is much greater than the required 5800 pounds for cold shutdown margin. Therefore, control of the reactivity by SLCS injection would not be affected. Such a small precipitation would also be unlikely to cause blockage of the injection piping. In order to confirm that blockage would not likely occur, the licensee performed a laboratory experiment in which 28.5 percent solution of sodium pentaborate was cooled down from 130 °F to approximately 77 °F with continuous stirring. The resulting precipitation occurred in the form of suspended particles which dissolved when the solution was reheated. No plating of the precipitated sodium pentaborate was observed.

We have reviewed the licensee's analysis and performed an independent calculation. We found that both steady state and transient analyses performed by the licensee are conservative. Our calculations have indicated that in both these cases temperatures of the solution calculated by the licensee were slightly below those determined by us. The amount of sodium pentaborate precipitated was calculated to be 7.392 pounds, which is close to the licensee's value.

Based on its review of the proposed TS changes and its independent calculation of precipitation during injection of high-concentration sodium pentaborate solution, the staff concluded that the proposed TS assure the capability of the SLCS to inject the required amount of solution without excessive precipitation and are, therefore, acceptable.

2.2 Proposed Technical Specifications

(1) Required Volume of the Solution - Figure 3.1.5-2, TS 4.1.5.a.1 and 4.1.5.a.2 Figure 3.1.5-2 is added for the required volume of the solution in the SLCS tank as a function of concentration of the sodium pentaborate solution. The surveillance requirements of volume and temperature limits for TS 4.1.5.a.1 and 4.1.5.a.2 are changed to be consistent with the limits specified in Figure 3.1.5-2. The staff finds that the proposed changes are consistent with the licensee's analytical results and in compliance with the requirements of the ATWS rule as specified in 10 CFR 50.62 and, therefore, concludes the changes are acceptable.

(2) Heat Tracing Operability - TS 4.1.5.a.3

The surveillance requirement of TS 4.1.5.a.3 for heat tracing operability is revised to require the operator not only to confirm the SLCS pump suction pipe temperature to be not less than the saturated temperatures as required in the current TS, but also to verify the power to be available to at least one division of heat tracing circuitry. Since the added surveillance requirement reduces the probability of flow blockage due to sodium pentaborate precipitation, the staff concludes that the change is acceptable.

(3) Required Minimum Weight of Sodium Pentaborate - TS 4.1.5.b.3

The existing TS 4.1.5.b.3 requires the operator to maintain the minimum weight of sodium pentaborate of 5800 pounds to meet the cold shutdown margin requirement. In the revision, TS 4.1.5.b.3 deletes the minimum required weight of sodium pentaborate and requires the operator to maintain the concentration of boron in solution to be within the limits of Figure 3.1.5-2. Since the "normal operation" area of Figure 3.1.5-2 is established to maintain at least 5800 pounds of sodium pentaborate in solution, the change meets the same cold shutdown margin as in the existing TS. Therefore, the staff concludes that the change is acceptable.

(4) Reference of Design Minimum Weight of Sodium Pentaborate to Figure 3.1.5-2 - Bases 3/4.1.5

The revised Bases 3/4.1.5 reflects the TS changes by referring to Figure 3.1.5-2 for the required quantity of sodium pentaborate solution which contains the minimum weight of sodium pentaborate of 5800 pounds. The changes are consistent with the assumptions used in the analysis to support the TS changes and are, therefore, acceptable.

(5) Action Statement for Sodium Pentaborate Solution Concentration Greater than 15.2 percent - TS 3.1.5.a.3

The licensee proposed to normally operate the plant at lowered sodium pentaborate concentrations (ranging from 13.6 percent to 15.2 percent) in the SLCS tank. TS 3.1.5.a.3 is proposed as an additional Action statement

which would allow for temporary variations due to addition of Borax powder, non-uniform mixing and other unidentified causes. With the sodium pentaborate concentration greater than 15.2 percent, and solution volume within the limits of Figure 3.1.5-2, TS 3.1.5.a.3 requires the operator to (1) verify the sodium pentaborate solution temperature to be within the limits of Figure 3.1.5-1 every four hours, and (2) restore the sodium pentaborate solution to within the normal operating limits (13.6 percent to 15.2 percent) of Figure 3.1.5-1 and Figure 3.1.5-2 within 72 hours. The operator is required to bring the plant to the hot shutdown condition within the next 12 hours if the Action statements of TS 3.1.5.a.3 discussed above are not met. Since analyses demonstrated that there would not be excessive precipitation which could block the unheated discharge piping, if the solution at the maximum allowable concentration were injected, the staff concludes that the changes are acceptable (see Section 2.1 above).

2.3 SUMMARY

The staff has reviewed the proposed Technical Specification changes and the supporting analyses. The changes would result in a reduced potential for precipitation of the sodium pentaborate solution during normal plant operation by limiting concentrations to 15.2 weight percent. For a limited time of 72 hours, concentrations up to 28.5 percent if injected, would not result in sufficient precipitation to block the unheated discharge piping. Since the assumptions used in the analyses are reasonable and the calculated results demonstrate that the TS changes will meet the requirements of the ATWS rule for the SLCS as specified in 10 CFR 50.62, the staff concludes that the proposed TS changes are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Mississippi State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (56 FR 29273). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set

forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: S. Sun, SRXB/NRR
K. Parczewski, EMCB/NRR

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