



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

APR 8 1986

Docket no. 50-416

LICENSEE: Mississippi Power & Light Company (MP&L)
FACILITY: Grand Gulf Nuclear Station, Unit 1
SUBJECT: SUMMARY OF APRIL 1, 1986 MEETING REGARDING INTERLOCKS FOR
ECCS PRESSURE ISOLATION VALVES

The purpose of the meeting was to discuss resolution of an issue regarding interlocks for ECCS injection valves which also function as pressure isolation valves. Enclosure 1 is a list of attendees. Enclosure 2 is a handout prepared by the licensee. Enclosure 3 is a November 22, 1985 staff letter which defines the issue.

Prior to the meeting, the licensee had proposed Technical Specification changes (by letter dated August 12, 1985) to implement a design change to add interlocks to the ECCS injection valves to prevent over pressurization of the low pressure coolant injection systems by the higher pressure reactor coolant system due to inadvertent opening of the valves. The licensee had proposed to include interlocks for the automatic opening of the valves by a LOCA signal, but not to include interlocks for manual controls on the remote shutdown panel. Further the licensee had proposed to use a set point for the interlocks that was 110% of the reactor piping system design pressure, as defined in the ASME Code. The staff had determined that the proposed design criteria, as supplemented by letters dated September 25, October 5 and October 22, 1985, were unacceptable and provided its position and alternative acceptable criteria by letter dated November 22, 1985 (Enclosure 3).

During the meeting, the licensee summarized its remote shutdown panel (RSP) design criteria, using the information presented in Enclosure 2 as an outline. The licensee stated that the SRP is not designed with the same philosophy concerning interlocks as is the control room control circuits (e.g., a pressure permissive is not required for the corresponding RSP control circuit). The RSP rooms contain only RSP equipment and each electrical division is in a separate room. Access to the rooms is administratively controlled by locked doors. Circuits in the panels are normally energized. There are only a few interlocks on valve controls on the remote shutdown panel and these are valve-to-valve interlocks and not pressure activated interlocks as associated with various control room circuits. Other features are outlined in Pages 3-6 of Enclosure 2.

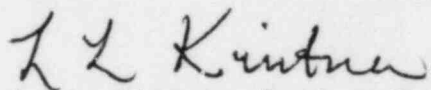
The licensee's position is that because of the security provided for these RSP rooms and infrequent use and access and because of training of operators who are authorized to use the panels, inadvertent operation of these ECCS valves from the RSP is unlikely and pressure permissive interlocks should not be required. Regarding the set points for interlocks on control room circuits, the licensee's position is that the 1974 ASME Code for which Grand Gulf is designed allows transients to raise the system pressure to 110% of design pressure (sizing and setting

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relief valves for overpressurization transients). The 1977 ASME Code which first addressed setpoints for interlocks and specifies use of design pressure for the set point is not a requirement for the Grand Gulf plant because the construction permit was issued in 1974. The licensee has estimated that lowering the interlock setpoint 50 psi to the design pressure of the low pressure system would increase the calculated peak cladding temperature following a LOCA by 6°F (to 2157°F) and that this would unnecessarily reduce the margin to the limiting 2200°F thus reducing the margin available for operational enhancements. The licensee's position is summarized on Page 2 of Enclosure 2. The calculation of the interlock setpoints is shown on Page 7 of Enclosure 2.

At the conclusion of the meeting, the licensee proposed alternative positions which are similar to the alternative positions indicated in staff's November 22, 1985 letter (Enclosure 3). The licensee proposed the use of key lock switches at the remote shut down panel (not the motor control center) because of the poor access of the motor control center if operation of the ECCS valves was needed for shut down. The licensee indicated that they were confident the low design pressure ECCS systems could withstand 110% of design pressure for the transients resulting from a LOCA or inadvertent manual opening of the valves during plant heatup or cooldown. However, the licensee did not believe the major analytical effort necessary to increase the ASME Code design pressure rating by 50 psi was needed. The staff said it would consider the information presented in the meeting and inform the licensee of its conclusion by telephone.

By telephone on April 3, 1986, the staff informed the licensee that the alternatives proposed in the April 1, 1986 meeting appeared to be acceptable. The staff indicated that the key locked control switches should be separate from the present spring-return-to-auto control switches and that relevant information regarding design of the switches and administrative controls should be provided in the supplemental letter. The staff also said that a statement should be provided to the effect that pressures equivalent to the upper analytical limit of the setpoint will satisfy ASME Code stress allowable values for the piping, valves and other components of the ECCS systems.



L. L. Kintner, Project Manager
BWR Project Directorate No. 4
Division of BWR Licensing

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NRC - MP&L Meeting - April 1, 1986

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Charles C. Graves
Wayne Hodges
Jim Lombardo
Horace Shaw
W. Butler*
B. Siegel*
M. Srinivasan*
Bob Stevens

MP&L

Sam H. Hobbs
Wayne Russell
Thomas Barnett
Mike Withrow
Joe Hendry
J.C. Catlin, Jr.

Illinois Power Company

P. J. Telthorst

*Part time

LOW PRESSURE ECCS PRESSURE PERMISSIVE
INTERLOCK MEETING AGENDA

MP&L/NRC

BETHESDA, MARYLAND

APRIL 1, 1986

I. OVERVIEW OF ISSUES

- ° REQUIREMENT OF LICENSE CONDITION 2.C.(18)
- ° NO INTERLOCKS ON RSP
- ° LPCI/LPCS SETPOINT ABOVE 500 PSIG
- ° GGNS COMMITMENTS/NRC SAFETY EVALUATIONS
- ° CURRENT INDUSTRY PRACTICES

II. REMOTE SHUTDOWN PANEL

III. LPCI/LPCS SETPOINT ABOVE 500 PSIG

IV. MP&L'S POSITION

III. MP&L'S POSITION

- DESIGN CHANGE GOES BEYOND THE DESIGN BASIS OF GG
 - 1) INSTALLATION OF INTERLOCKS TO THE VALVE CONTROL CIRCUITS IN THE REMOTE SHUTDOWN PANEL

- TECH SPEC CHANGE DOES COMPLY WITH SRP 7.4

- TECH SPEC SETPOINT DOES COMPLY WITH GGNS SSER2, SECTION 6.3.4

- MP&L HAS AND ALWAYS WILL UTILIZE ACCEPTABLE INDUSTRY PRACTICES PURSUANT TO ASME CODE

- PCT INCREASE OF 6°F NOT NECESSARY

II. GGNS REMOTE SHUTDOWN PANEL (RSP)

- DESIGN BASIS
- CONFIGURATION
- RSP OPERATION

GGNS RSP DESIGN BASIS

- RSP REQUIRED BY 10CFR50, APPENDIX A, GDC 19
- RSP UTILIZED FOR SHUTDOWN WITH CONTROL ROOM UNINHABITABLE
- DESIGN BASIS ACCIDENTS ASSUMED NOT TO OCCUR CONCURRENT WITH CONTROL ROOM EVACUATION
- AUTOMATIC CONTROLS CONTINUE TO FUNCTION AFTER EVACUATION
- RSP CONTROLS OPERATE IN PARALLEL WITH CONTROL ROOM CONTROLS
- RSP CONTROLS DESIGNED TO BE COMPATIBLE WITH CONTROL ROOM CIRCUITS
- RSP CONTROLS DESIGNED FOR MANUAL SHUTDOWN

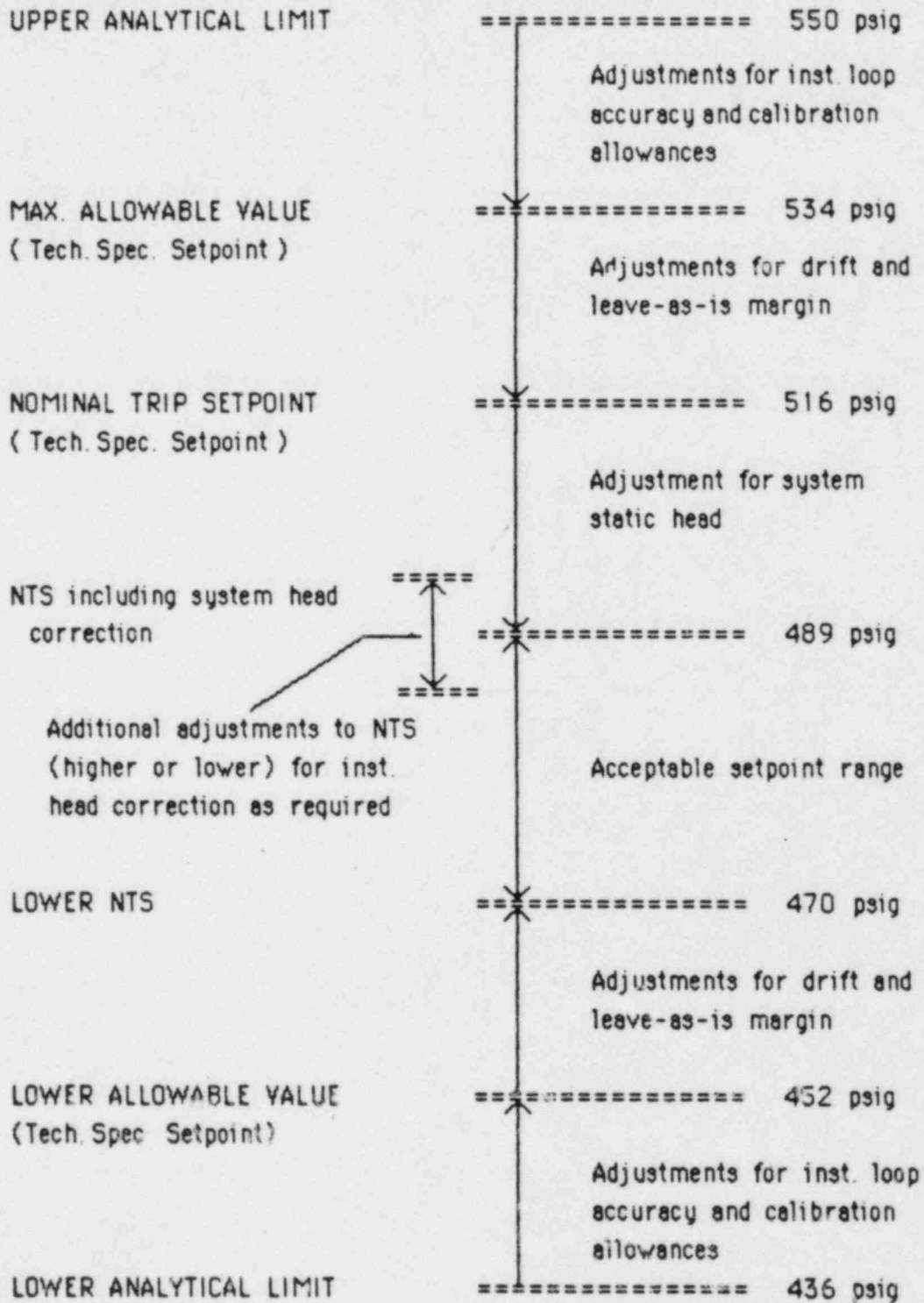
GGNS RSP CONFIGURATION

- TWO BASIC TYPES OF CONTROL CIRCUITS
- NORMALLY ENERGIZED RSP ARRANGEMENT/ADVANTAGES
- RSP LOCATIONS/DETAILS

GGNS RSP OPERATION

- ACCESS CONTROLS
- PROCEDURES

PRESSURE INTERLOCK SETPOINTS FOR LOW PRESSURE ECCS AUTOMATIC INITIATION



L. Kentner



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

November 22, 1985

Docket No.: 50-416

Mr. Jackson B. Richard
Senior Vice President
Mississippi Power and Light Company
P.O. Box 23054
Jackson, Mississippi 39205

Dear Mr. Richard:

Subject: Grand Gulf Unit 1 - Low Pressure Emergency Core Cooling
System (ECCS) Pressure Permissive Interlocks

By letter dated August 12, 1985, Mississippi Power and Light Company requested an amendment to the Grand Gulf Nuclear Station, Unit 1 operating license in order to implement a design change which would add pressure permissive interlocks to the control circuits for low pressure ECCS injection valves. This change is required by License Condition 2.C.(18) to be implemented prior to startup following the first refueling. Technical Specification changes proposed to implement this design change were proposed in Item 13 of the Attachment to the August 12, 1985, letter.

During its review of the proposed Technical Specification changes, the NRC staff requested additional information regarding the pressure interlocks. The licensee provided some of the requested information, including a revised ECCS performance analysis (by letter dated October 22, 1985), a description of the logic incorporated in the pressure permissive interlocks and a piping and instrument diagram (by letter dated October 5, 1985), and a proposed surveillance requirement on ECCS valve opening time (by letter dated September 25, 1985). However, the licensee declined to provide additional information regarding: (1) the addition of interlocks to the valve control circuits in the remote shutdown panel or alternate means to minimize the potential for inadvertent overpressurization of the low design pressure systems, and (2) changing the interlock pressure setpoints to values below the ECCS piping design pressure.

The purpose of this letter is to request additional information and to provide the NRC staff's safety evaluation and position regarding interlocks for ECCS valve controls on remote shutdown panels and the pressure setpoint for interlocks on low design pressure ECCS piping. The staff's safety evaluation and positions, including acceptable alternatives to interlocks on the remote shutdown panel, is enclosed. The staff concludes that the proposed Technical Specification change in Item 13 of the licensee's August 12, 1985, letter, as supplemented by letters dated September 25, October 5, and October 22, 1985, is unacceptable because it does not meet the NRC staff position regarding pressure

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November 22, 1985

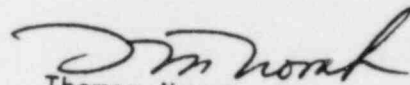
Mr. Jackson B. Richard

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permissive interlocks for the remote shutdown panel control circuits (Standard Review Plan Section 7.4.III), and because the proposed setpoints for pressure interlocks do not meet the staff position requiring interlock setpoints to be below the ECCS piping design pressure (Grand Gulf Nuclear Station Safety Evaluation Supplement 2, Section 6.3.4, NUREG-0831).

You are requested to revise Item 13 of the August 12, 1985, submittal to respond to the enclosed staff positions. Based on its preliminary review, the NRC staff issued a notice in the Federal Register of its intent to amend the operating license in the manner proposed in the August 12, 1985, submittal. The staff will reissue the notice in this matter due to the need for substantive changes resulting from its safety evaluation. In order to include the response to this letter in the new notice, you should submit your response within 30 days of receipt of this letter. Your response should include an analysis of significant hazards conditions for any revised proposal pursuant to Section 50.91 (a) of 10 CFR 50. In the absence of an acceptable response to this letter, the staff intends to deny the request for license amendment in Item 13 of the August 12, 1985, letter.

Sincerely,



Thomas Novak, Assistant Director
for Licensing
Division of Licensing

Enclosure:
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Grand Gulf Nuclear Station

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SAFETY EVALUATION

GRAND GULF UNIT 1

LOW PRESSURE ECCS SYSTEM PRESSURE PERMISSIVE INTERLOCKS

Facility Operating License NPF-29, Condition 2.C.(18) requires the licensee to implement isolation protection against overpressurization of the low pressure emergency core cooling systems (RHR/LPCI and LPCS) through the implementation of reactor vessel pressure permissive interlocks. The licensee has proposed Technical Specification (T.S.) changes to support the required design change. The Instrumentation and Control Systems Branch (ICSB) focused its review on the revisions to T.S. Tables 3.3.3-1 and 4.3.3.1-1. The Reactor Systems Branch with the assistance of the Mechanical Engineering Branch focused its attention on systems and piping design aspects of the proposed changes.

Instrumentation and Control Systems Aspects

The licensee proposes to include the new high/low pressure permissive interlocks for the low pressure ECCS injection valves in T.S. Table 3.3.3-1 (ECCS Actuation Instrumentation). The Technical Specifications will require a minimum of three channels operable for all operating conditions with Action 31 (declare ADS trip system or ECCS inoperable) applicable for Operating Conditions 1, 2, and 3 and Action 35 (trip inoperable channel after one hour or declare associated systems inoperable) applicable for Operating Conditions 4 and 5. Upon request, the licensee provided information (Letter dated October 5, 1985) to clarify what constitutes a channel for the pressure

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permissive interlocks. The licensee states that the minimum requirement of 3 operating channels per trip function is applicable to the "one-out-of-two twice" logic utilized in the design change and is adequate to assure operability of the required low pressure injection function considering the diversity of injection systems and logic channels available (four per trip function).

The licensee also proposes to add the surveillance requirements for the new interlock channels to T.S. Table 4.3.3.1-1 (ECCS Actuation Instrumentation Surveillance Requirements). The surveillance frequencies will be once per 12 hours for channel check, once per month for channel functional test, and once per refueling cycle for channel calibration for all operating conditions.

Based on the above information, the staff finds the channel operability requirements proposed for revised T.S. Table 3.3.3-1 to be acceptable. We also find the channel surveillance frequencies proposed in T.S. Table 4.3.3.1-1 to be acceptable.

After implementation of the proposed design, the high/low pressure permissive interlocks for the low pressure ECCS injection valves will be active for both automatic and manual control room operation. The licensee has proposed not to include such an interlock for the remote shutdown panel (RSP) control circuits for the ECCS injection valves. Based on the current information provided by the licensee, the staff finds the requested interlock omission to be unacceptable.

It is the staff's position that pressure permissive interlocks should be installed as part of the RSP control circuits consistent with the corresponding control room control circuits. This position is based on the Standard Review Plan (SRP Section 7.4) interpretation of GDC 19 which requires that the remote shutdown station equipment be designed to the same standards as the corresponding equipment in the main control room. Also, Section 6.3.4 of the Grand Gulf, Unit 1 SER Supplement No. 2 requires that interlocks be present at all times for both manual and automatic actuation unless the reactor vessel pressure is lower than the design pressure of the ECCS involved. Thus, without special control over the operation of these valves, inadvertent operation must be assumed from the RSP which could result in overpressurization of the low pressure ECCS.

The following is an acceptable alternative (method of special control) to the implementation of pressure permissive interlocks for the RSP control circuits associated with the low pressure ECCS injection valves:

- (1) The provision of spring-return-to-normal control switches on the RSPs which would alleviate the concern related to the change-of-state of equipment upon transfer of control to the RSP and

- (2) (A) Continue to implement special Technical Specification 4.4.3.2.2.b for LPCS and LPCI outboard check valves to ensure integrity since the licensee takes credit for these valves as part of the omission justification, or

- (B) Implementation of a keylocked control switch separate from the RSP controls (preferably at MCC) which would block operation of the valve via the RSP control. This should include administrative controls to ensure that RSP control of the valve is actually blocked when the valve is closed. Also, valve position indication should not be negated in the control room or at the RSP by the implementation of this special control scheme.

Systems and Piping Design

The licensee has proposed Technical Specification (TS) changes regarding the low pressure ECCS injection system, in response to an NRC position regarding the prevention of an intersystem LOCA which was expressed in Supplement No. 2 to the Grand Gulf Nuclear Station (GGNS) Safety Evaluation Report (NUREG-0831) and which became License Condition 2.C.(18).. These TS changes would implement design changes adding pressure interlocks to the injection valves on the low pressure ECCS systems, require respective trip setpoints, and require periodic surveillance of associated ECCS actuation instrumentation.

Two of the proposed changes are administrative in nature. For instance, in connection with the installment of pressure interlocks, an additional trip function has been added to the ECCS low pressure systems. The minimum number of operable channels, applicable operational conditions, and action to be

taken are supplied for the new trip function (see Tables 1 and 2). Instrumentation surveillance intervals are also designated for this function (see Table 3). These proposals are acceptable to us, as discussed above.

In the original submittal, MP&L proposed to delete ECCS response times for low pressure systems. Subsequently, in a letter dated September 25, 1985, MP&L proposed to use " ≤ 29 seconds" as response times for both LPCI and LPCS injection valves. This is acceptable to us because this response time is within the value used in analyses of loss of coolant accidents.

One issue that has not been resolved is the interlock setpoint for the high pressure to low pressure interface valve. The setpoint 534 psig, is above the design pressure of the low pressure system, 500 psig. The ASME Code, dated 1977, which was the first Code edition to address such interlocks, required the interlocks to prevent the pressure from exceeding the design pressure of the low pressure side. Section 6.3.4 of GGNS SSER's (June 1982), states that the valves in question should be "interlocked to prevent opening unless the reactor vessel pressure is lower than the design pressure of the ECCSs involved." From discussions with the licensee, we understand that maintaining the setpoint below the design pressure will result in increased peak cladding temperature for the postulated loss of ^{coolant} accident from 2151°F to 2157°F, which is still less than the limiting value of 2200°F required by 10 CFR 50.46. The staff concludes that exceeding the Code allowable design pressure for the interlocks is unacceptable because the Code position can be

met without reducing the acceptable margin of safety for peak cladding temperature. If meeting the Code requirement results in a hardship, the hardship should be described and justification should be provided for our consideration. Include in the justification the results of an analysis to show that pressure in the ECCS piping equal to the upper analytical limit of the interlock setpoint will satisfy the ASME Code stress allowable values for the piping, valves and other components of the affected portions of the ECCS.