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Vice President
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June 22, 1990

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Modification of Regulatory Guide 1.97 Compliance Schedule for Neutron Monitoring; Proposed Amendment to the Operating License Condition 2.C(36)
PCOL-90/01, Revision 2
AECM-90/0118

By letter dated May 31, 1990, Entergy Operations submitted Revision 1 to the proposed change to Grand Gulf Nuclear Station (GGNS) Operating License Condition 2.C(36). The proposed change requested an extension to the implementation date for neutron flux monitoring until the fifth GGNS refueling outage.

Based on discussion with the NRC Staff, Entergy Operations is by this letter submitting Revision 2 of the proposed change to the operating license. This proposed amendment to the operating license modifies the previous no significant hazards consideration to more closely address the deferral of the initially proposed GGNS excore design approach.

In accordance with the provisions of 10CFR50.4 the original of the requested amendment is attached and the appropriate copies will be distributed. The attached OLCR-NL-90-01 provides the technical justification and discussion to support the requested amendment. This request for amendment has been reviewed and accepted by the GGNS Plant Safety Review Committee. The Safety Review Committee has reviewed and approved the original amendment. Based on the guidelines present in 10CFR50.92, Entergy Operations has concluded that this proposed amendment involves no significant hazards.

If you have further questions, please advise.

Yours truly,

WTC:mtc
Attachment

cc: (See Next Page)

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BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

LICENSE NO. NPF-29

DOCKET NO. 50-416

IN THE MATTER OF

MISSISSIPPI POWER & LIGHT COMPANY
and
SYSTEM ENERGY RESOURCES, INC.
and
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION
and
ENTERGY OPERATIONS, INC.

AFFIRMATION

I, W. T. Cottle, being duly sworn, state that I am Vice President - Operations Grand Gulf of Entergy Operations, Inc.; that on behalf of Entergy Operations, Inc., System Energy Resources, Inc., and South Mississippi Electric Power Association I am authorized by Entergy Operations, Inc. to sign and file with the Nuclear Regulatory Commission, this application for amendment of the Operating License of the Grand Gulf Nuclear Station; that I signed this application as Vice President - Operations Grand Gulf of Entergy Operations, Inc.; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge, information and belief.

W. T. Cottle

STATE OF MISSISSIPPI
COUNTY OF CLAIBORNE

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 22 day of June, 1990.

(SEAL)

Notary Public

My commission expires:

My Commission Expires July 3, 1992

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OLCR - NL-90-01 Extension of Post-Accident Neutron Flux Monitoring Upgrade Implementation Schedule

I. SUBJECT

Facility Operating License No. NPF-29; Operating License Condition 2.C(36) - Emergency Response Facilities; Attachment 1, Item (c)(4).

II. DISCUSSION

The proposed change extends the implementation date for installing or upgrading the neutron flux monitoring system until prior to startup following the fifth refueling outage. The current license condition specifies that the Regulatory Guide (RG) 1.97 requirements for the neutron flux monitoring system be implemented prior to startup following the fourth refueling outage (Refer to Attachment 1 to NPF-29).

A. Recent Background on Actions Affecting Implementation of a RG 1.97 Neutron Monitoring System

As committed in AECM-89/0013 dated February 6, 1989 (Reference 3), Entergy Operations has been in the process of developing an excore neutron monitoring system to comply with GGNS Operating License Condition 2.C(36) by the fourth GGNS refueling outage (RFO4). In the February 6, 1989 submittal, Entergy Operations noted that a reduction in low end range of 10E-6% power would be necessary based on the GGNS design approach to install detectors on the external portion of the shield wall. On July 21, 1989 (Reference 4) the NRC approved the request to pursue an excore system, but requested that Entergy Operations consider other locations where the RG 1.97 power range can be met. The status of our actions to implement this system was discussed in the December 5, 1989 neutron monitoring system quarterly status report (Reference 5). In the status report, Entergy Operations provided additional details regarding the unsuitability of other excore detector locations for compliance to the RG 1.97 10E-6% power low end range. The report also noted that Entergy Operations' current plans were to issue the contract for an excore neutron monitoring system in mid February 1990.

Concurrent with the above actions, Entergy Operations worked closely with the BWR Owners Group (BWROG) in development of the BWROG Topical Report; NEDO-31558 (Reference 1), which provided alternate requirements on neutron monitoring for RG 1.97. This topical report was submitted by the BWR Owners Group to the NRC for review on April 1, 1988. In support of the existing GGNS neutron monitoring system design, Entergy Operations submitted a GGNS plant specific design evaluation on compliance to NEDO-31558 on April 28, 1988 (Reference 2). As a result of the NRC's ongoing review of NEDO-31558, Entergy Operations also submitted on December 20, 1989 (Reference 6) a request for an operating license amendment extending system implementation until the fifth GGNS refueling outage (RFO5). The request was based on the need to allow adequate time for Entergy Operations evaluation of the NRC resolution of this issue prior to issuance of a February 1990 neutron monitoring system purchase order.

After lengthy evaluation, the NRC issued their Safety Evaluation Report (SER) on NEDO 31558 (Reference 7) on January 29, 1990. In this SER the NRC concluded that a Category 1 designation and a low end range of 10E-6% power were appropriate as specified in RG 1.97. Therefore, the alternate requirements of NEDO 31558 were found to be unacceptable. Subsequently, on February 2, 1990 the NRC rejected Entergy Operations' request for the GGNS Operating License amendment of December 20, 1989 extending the implementation schedule until RF05 (Reference 8). The extension request was rejected based on SERI's ability to issue an excore NMS system purchase order by mid-February 1990.

On February 7, 1989 Entergy Operations and certain members of the BWROG RG 1.97 Neutron Monitoring Subcommittee met with the NRC Staff to discuss conclusions reached by the NRC in their SER for BWROG NEDO-31558. As a result of the BWROG/NRC meeting the NRC provided certain clarifications to the SER and the process for each licensee on implementation actions. Based on Entergy Operations' understanding of this meeting, the NRC clarified that:

1) There are technical issues that remain unresolved. These include the lack of event definition for which to base 10CFR50.49 environmental qualification and for meeting the RG 1.97 specified low end range of 10E-6% power.

2) The NRC does not intend to impose additional requirements that result in the need to qualify beyond the DBA environment (i.e., no fuel melting).

3) The NRC will not prescribe the event to which neutron monitoring equipment must be environmentally qualified.

4) The NRC is aware of the potential difficulty in meeting the low end range of 10E-6% power for excore sensors. This was considered an issue for possible relaxation depending upon plant specific technical bases and equipment availability.

5) The NRC requested the BWROG to consider a generic response regarding development of proposed design criteria for complying with RG 1.97 and the Staff's SER.

In summary, the NRC Staff recognized that even though the NRC has reached a final position on RG 1.97 neutron monitoring, several design and implementation issues still existed which licensees should address. As a result, the BWROG RG 1.97 Neutron Monitoring Subcommittee has been tasked to develop appropriate design criteria. This action is discussed in BWROG letter to NRC dated 02/21/90 (Reference 9).

In a separate discussion with the GGNS Project Manager on February 7, 1990, Entergy Operations was requested to continue implementation of the RG 1.97 excore design for the fourth GGNS refueling outage (scheduled to begin October 1990). The GGNS excore system design approach should also consider detector locations through or inside of the GGNS shield wall to further meet the 10E-6% low end power range.

B. Current Actions Underway by BWROG and Entergy Operations for Addressing the RG 1.97 NMS Issue

Since the original submittal of the proposed amendment to the GGNS Operating License to defer the RG 1.97 neutron monitoring system until the fifth GGNS refueling outage (AECM-90/0038 dated February 16, 1990), several actions have been underway to address this issue by the BWROG and by Entergy Operations. These actions are summarized below:

1) Current BWROG Actions

On March 18, 1990 the general BWROG committee authorized the RG 1.97 Neutron Monitoring Subcommittee to proceed with development of the design criteria (specification) which will be applicable to both incore and excore neutron monitoring designs.

On April 10, 1990 members of the BWROG management met with the NRC to discuss the technical basis for the SER on NEDO-31558. At this meeting the NRC reaffirmed their position provided in the SER for meeting the RG 1.97 guidelines.

On April 18, 1990 the BWROG Subcommittee met with representatives of General Electric on the design for the incore Wide Range Neutron Monitoring System and with Gamma-Metrics for the excore detector design. At this meeting system design information was presented and discussed regarding approaches to complying with RG 1.97. These discussions involved key design issues such as meeting separation criteria and addressing environmental qualification, power source design, and core flux profiles. The Subcommittee will compile known issues and establish a design specification which will address the extent of compliance with RG 1.97.

On May 21, 1990, the NRC staff issued a response to the BWROG letter of February 21, 1990 clarifying the NRC position on certain BWROG identified design issues (Reference 10). In this letter the NRC reaffirmed the BWROG action to continue development of a design document for generic BWR application. The BWROG subcommittee will factor the NRC Staff clarification into the BWROG design specification.

2) Current Entergy Operations Actions

As a result of the recent NRC position reaffirming BWR neutron monitoring system designs to meet a range goal down to 10E-6% power, Entergy Operations has begun evaluating alternate excore design approaches which will comply with this sensitivity range.

Entergy Operations is currently working with Gamma-Metrics on an excore detector design which is expected to obtain a neutron monitoring sensitivity to 10E-6% power or better under hot vessel conditions. This design will use a smaller detector (approximately 24 inches long by 2.5 inches in diameter) placed horizontally or at a slight diagonal into the bio-shield wall. This installation approach will require boring or cutting a 2.75 inch hole in the bio-shield wall up to the inner steel liner. Based on the expected increased sensitivity only one detector per channel (2 channels) will be required.

Entergy Operations is in the process of developing a system design specification which will accomplish this design approach. This GGNS specification will be evaluated against the design specification being developed by the BWROG when finalized. As discussed in Section III, Entergy Operations will notify the NRC of the design approach which is expected to more fully comply with RG 1.97 or request exception to RG 1.97 based on specific design constraints and cost benefit results.

III. ENTERGY OPERATIONS ACTIONS TO FURTHER ADDRESS RG 1.97 NEUTRON MONITORING REQUIREMENTS

Entergy Operations will perform or participate in the following actions to further address RG 1.97 requirements for implementation of a post accident neutron monitoring system for the fifth GGNS refueling outage. The proposed schedule is based on anticipated BWROG schedules and subsequent Entergy Operations actions. Entergy Operations will notify the NRC of any changes to this schedule in subsequent GGNS Neutron Monitoring Quarterly Status Reports.

	Action	Schedule
1)	BWROG RG 1.97 NMS Subcommittee to develop draft design specification for RG 1.97 incore and excore neutron monitoring systems.	July 1990
2)	BWROG to finalize and issue BWR RG 1.97 NMS design specification for BWROG member usage.	Sept 1990
3)	Entergy Operations to review and apply BWROG design criteria to current GGNS excore NMS design approach.	Nov 1990
4)	Entergy Operations to notify NRC of a design approach which is expected to comply with RG 1.97 or request exception to RG 1.97 based on GGNS specific design constraints and cost benefit results.	Dec 1990

IV. JUSTIFICATION

A. Proposed Development of RG 1.97 Neutron Monitoring Design Criteria (Specification) Based on NRC Safety Evaluation Report to NEDO-31558

As discussed in Section II of this amendment request, several design issues were raised in the February 7, 1990 NRC/BWROG meeting regarding the NRC conclusions provided in the SER on NEDO-31558. During this meeting the NRC proposed that the BWR Owners Group establish design criteria for complying with the NRC's SER. Such a criteria document (specification) is currently under development by the BWROG RG 1.97 Neutron Monitoring Subcommittee.

Entergy Operations has been an active member of the RG 1.97 BWROG Subcommittee for review of neutron monitoring design requirements. As a BWR licensee and committee member, Entergy Operations believes that further development of the BWR design criteria (specification) is appropriate prior to implementing this system on BWRs. While Entergy Operations committed to install an excore neutron monitoring system at the fourth refueling outage for meeting RG 1.97, this action is considered necessary in order (1) to establish appropriate GGNS design considerations for RG 1.97 on post accident neutron monitoring, and (2) to avoid imprudent financial expenditures and resource commitments by Entergy Operations if current GGNS design considerations are modified.

B. Evaluation of Alternate GGNS Excore Detector Location(s) for Meeting the RG 1.97 Low End Range

As discussed in the December 5, 1989 Neutron Monitoring System Quarterly Status Report (Reference 5), Entergy Operations has actively pursued the installation of an excore neutron monitoring system to satisfy Operating License Condition 2.C(36), Attachment 1. This included preparing the initial excore neutron monitoring system design criteria, environmental design criteria, penetration design specifications and overall system purchase specification. The GGNS design approach was similar to that installed by Pennsylvania Power and Light for RG 1.97 on Susquehanna Steam Electric Station.

Detector sensitivity and monitoring range was expected to be comparable to that obtained by Susquehanna (10E-4% to 10E-5% power under hot vessel conditions). Given the conclusions reached by NEDO-31558 to only require a 1% low end range, this design approach was considered fully justified based on the existing GGNS design limitations.

In discussion with the GGNS NRC Project Manager for GGNS on February 7, 1990, Entergy Operations was requested to further evaluate alternate locations for meeting the RG 1.97 low end range of 10E-6% power on GGNS. As noted in the December 5, 1989 quarterly status report any detector locations different from those currently proposed would result in more involved and complicated design and installation hardships. Under the relatively near term implementation schedule for the excore system at RF04 (commencing October 1990), a new design approach is impractical based on the need to have issued an excore system purchase specification (external to shield wall design) in February 1990.

V. SIGNIFICANT HAZARDS CONSIDERATIONS

The proposed amendment would modify GGNS Operating License Condition 2.C(36) Attachment 1 to extend the implementation date of the RG 1.97 required neutron monitoring system for an additional outage (i.e., the fifth refueling outage). The system previously being considered for GGNS would have met all known design considerations of RG 1.97 except the low end range of 10E-6% power. The GGNS currently proposed system is expected to result in a low end range sensitivity of approximately 10E-4% power. This extension is requested based on 1) the GGNS application of design criteria document ¢specification! under development by the BWR Owners Group for addressing the NRC's SER on NEDO-31558, and 2) the additional excore system detector placement evaluation on GGNS for meeting the low end range requirements of RG 1.97.

In accordance with the requirements of 10CFR50.92, the following discussion is provided in support of the determination that no significant hazards are created or increased by the changes proposed in this amendment request.

1. No significant increase in the probability or the consequences of an accident previously evaluated results from this proposed change because:

   Deferral of the proposed GGNS post accident neutron monitoring system during the fifth fuel cycle does not involve a significant increase in the probability of an accident previously evaluated since the proposed system modification would not affect reactor operation and is not an initiator for any previously evaluated accidents. The post accident neutron flux monitoring system provides post-accident indication of reactor power and does not provide any signals to actuate engineered safety features or to trip the reactor. Furthermore, reactor trip signals from the present neutron flux monitoring system to the reactor protection system will not be changed as a result of the installation of the proposed GGNS post accident neutron monitoring system.

   The deferral of the currently proposed post accident neutron monitoring during GGNS Cycle 5 does not cause the consequences of an accident previously analyzed to significantly increase since:

   a. The existing SRM/IRM system is expected to function during the initial phase of an accident (including a LOCA) to indicate subcritical reactor power. Long term post-LOCA monitoring is available through the APRM channels where operator action is required at the APRM downscale alarm. In addition, other measures and indications can provide the operator with reactor power information as discussed below:

      i. The present control rod position indication system provides the reactor operator with information that all rods are inserted.

ii. Qualified instrumentation such as reactor pressure, suppression pool temperature and safety relief valve (SRV) actuation provide the reactor operator with post-accident information for assessment of reactor power.

b. The currently proposed GGNS post accident neutron monitoring system is expected to be within two decades of meeting the RG 1.97 low end range of 10E-6% power. The intent of the post accident neutron monitoring system (as discussed in the January 29, 1990 NRC Safety Evaluation Report on NEDO-31558) is to provide warning of possible events for returning the reactor to a critical state. Under anticipated design basis events once all rods have been inserted, return to a critical state would not be expected.

Under hypothetical events where certain rods would drift out or where fuel would undergo some physical changes, the GGNS proposed system would provide 6 decades (10E-4% to 100% power) of power status information to the operator during the fifth fuel cycle. However, deferring installation of the proposed system one cycle to allow for additional design criteria review and further system detector location evaluation may provide a post accident monitoring system that would have a greater reliability and operating range (8 decades) for detecting reapproach to criticality.

c. Under a potential event as considered in the NRC SER on NEDO-31558, the GGNS symptom based Emergency Procedures (EPs) provide appropriate conservative actions during Cycle 5 if reactor power cannot be directly measured in a post-accident condition. The EPs contain action steps which mitigate the symptomatic effects of design basis events (such as LOCA) and beyond design basis events (such as ATWS) along with potential degraded core events.

Therefore, the consequences of an accident previously evaluated will not be significantly increased by the absence of a post accident neutron flux monitoring system during the fifth fuel cycle.

2. This proposed change will not create the possibility of a new or different kind of accident than any previously evaluated because:

The neutron monitoring system previously proposed by Entergy Operations on GGNS for meeting RG 1.97 will provide supplemental post accident monitoring capability by providing additional operator information in order to perform further potential mitigative actions during an accident. Its installation will not preclude or prevent any accident. As such, delaying the installation of the RG 1.97 post accident neutron monitoring system will not create the possibility of a new or different kind of accident. During the extension period, the existing SRM/IRM neutron monitoring system will remain unchanged from the configuration that was previously evaluated in the FSAR.

3. This proposed change does not involve a significant reduction in the margin of safety because:

The current GGNS margin of safety is established by the existing SRM/IRM neutron monitoring system and the shutdown margin of the control rod system. The post accident neutron monitoring system required by RG 1.97 provides additional information to the operator for responding to undefined post accident reactivity anomalies. The proposed GGNS excore neutron monitoring system originally proposed for installation during the fourth refueling outage would provide neutron monitoring diversity and qualified instrumentation to approximately 10E-4% power. Deferral of this system for one additional fuel cycle to allow for further review of system design criteria and alternate detector locations for improving low end range sensitivity to 10E-6% power will reduce the post accident neutron monitoring margin of safety during Cycle 5 operations. However, the margin of safety for a post accident monitoring system having potentially 8 decades of operating range for the remainder of the GGNS plant operating life (as compared to one having only 6 decades) would provide an overall long term net improvement in post accident neutron monitoring capability. Therefore, the deferral of the NMS for one fuel cycle when viewed over the complete operating life of the plant would result in a net increase in the margin of safety.

In addition, the design, function, and operation of the existing GGNS IRM/SRM neutron monitoring system will remain the same as that described in the UFSAR. No additional reactor protection trip functions will be performed by the RG 1.97 post accident neutron monitoring system instrumentation. EP actions are conservative with respect to the use of the NMS for verification that the reactor is shutdown. If assuming an accident scenario where the post accident flux monitoring system is not available during GGNS Cycle 5, operator actions are specified which will lead to safe reactor shutdown.

Therefore, the margin of safety is not significantly reduced by the deferral of the RG 1.97 post accident neutron flux monitoring system until the fifth refueling outage.

VI. REFERENCES

1) GE NEDO 31558 Dated April 1, 1988; "BWR Owners Group Tropical Report Position on NRC RG 1.97 Rev. 3 Requirements for Post-Accident Neutron Monitoring System"

2) AECM-88/0083 dated April 28, 1988; GGNS Plant Specific Design Evaluation for NEDO 3.558

3) AECM-89/0013 February 6, 1989; RG 1.97 Neutron Monitoring System; Request for Commitment Modification

4) NRC letter dated July 21, 1989 (MAEC-89/0228) regarding Post Accident Neutron Flux Monitoring

5) AECM-89/0204 dated December 5, 1989 regarding the Quarterly Status Report for RG 1.97 Neutron Monitoring System.

6) AECM-89/0223 dated December 20, 1989; Modification RG 1.97 Compliance Schedule for Neutron Monitoring; Proposed Amendment to OL Condition 2.C(36)

7) NRC letter dated January 29, 1990; issuing the NRC Safety Evaluation Report on BWROG NEDO 31558

8) NRC letter dated February 2, 1990; regarding denial of Entergy Operations O.L. amendment request of December 20, 1989.

9) BWR Owners Group Letter (BWROG-9025/MFN-008-90) dated February 21, 1990 entitled "Position on NRC Reg. Guide 1.97 Rev. 3 Requirements for Post-Accident Neutron Monitoring System."

10) NRC letter dated May 21, 1990 to the BWROG entitled, "Position on the Reg. Guide 1.97, Rev. 3 Requirements for Post Accident Neutron Monitoring System".