

February 16, 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 Reg. Guide 1.97
Compliance Schedule for Neutron
Monitoring; Proposed Amendment to
the Operating License Condition
2.C(36)
PCOL-90/01
AECM-90/0038

System Energy Resources, Inc. (SERI) is submitting by this letter a proposed change to Attachment 1 to Grand Gulf Nuclear Station (GGNS) Operating License Condition 2.C(36). The proposed change requests an extension to the implementation date for neutron flux monitoring until the fifth GGNS refueling outage. This request is based on 1) the additional time required for the BWROG to evaluate and develop a design criteria document to address the results of the NRC Safety Evaluation Report (SER) of January 29, 1990 for BWR Owners Group (BWROG) NEDO 31558 and 2) the additional time required for SERI to evaluate and apply the results of the BWROG design criteria to the GGNS design approach.

CURRENT ISSUES INVOLVING IMPLEMENTATION OF RG 1.97 NEUTRON MONITORING SYSTEM

On February 7, 1990 SERI and certain members of the BWR Owners Group Subcommittee on RG 1.97 Neutron Monitoring met with the NRC staff to discuss conclusions reached by the Staff in their Safety Evaluation Report on NEDO 31558 dated January 29, 1990. During this meeting, issues were raised regarding the appropriate design criteria for meeting the NRC's SER conclusions. As a result of this meeting, the BWROG is currently considering the development of a design criteria document which will address the NRC issues. This effort will involve additional review of the January 29, 1990 SER by the BWROG RG 1.97 Neutron Monitoring Subcommittee, and consideration of potential events for which to establish design criteria. Details of this program will be provided to the NRC through the BWROG in the near future. SERI has previously been an active member of this subcommittee and intends to continue our involvement and support as required to resolve this design issue.

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In addition, a subsequent meeting was held on February 7, 1990 regarding the GGNS plant specific schedule for complying with RG 1.97. At this meeting the NRC requested SERI to perform a further detailed evaluation of alternate locations for installation of an excore system beyond that currently being designed for GGNS. SERI considers that this evaluation will be appropriate based on the results of the BWROG detailed evaluation of the SER and the proposed design criteria development. Upon completion of appropriate design criteria for GGNS, SERI will further evaluate the current GGNS excore detector design approach including consideration of alternate detector locations as determined necessary to comply with the RG 1.97 low end range requirements.

SERI PERSPECTIVE ON RG 1.97 NEUTRON MONITORING FOR GGNS

SERI recognizes that the subject of neutron monitoring instrumentation to RG 1.97 requirements has been an unresolved BWR industry for a significant amount of time and that the NRC staff is strongly emphasizing the need for resolution and implementation of any required plant modifications. SERI supports this goal. SERI, however, is obligated to pursue a resolution path that represents the minimum degree of uncertainty as to its eventual needs in meeting established design criteria, safety concerns and operational enhancements. SERI has in parallel paths supported the development of a design that would meet the intent of RG 1.97 and at the same time ascertain the exact nature of the post accident safety function of the system by working closely with the BWROG.

The recently issued NRC SER and NRC/BWROG meeting of February 7 further established design direction, but it was mutually recognized that certain issues still remain to be more thoroughly researched and defined. On net, SERI believes the uncertainty in requirements and what represents an acceptable design remains sufficiently high to warrant additional time to accomplish these tasks.

There are generally two design approaches that have been developed to meet the RG 1.97 post accident neutron monitoring requirements namely, incore and excore. The conceptual design of the incore approach can be considered complete with a degree of design work having been completed by the vendor. However, in SERI's previous evaluation there remained a significant amount of work necessary to resolve final design and actual field implementation issues. We believe the excore approach can meet the intent of RG 1.97; however, the minimum range requirement along with other potential design criteria issues introduce uncertainties even into this approach.

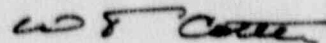
Two extensions have been granted to GGNS to pursue this matter and achieve resolution. It is only with thorough consideration of all issues that additional extension is requested. SERI believes that it has acted aggressively and in good faith to actively participate with the BWROG, to pursue the study and design of plant specific changes at GGNS, and to keep the NRC informed of our progress. In conclusion, we believe SERI has been a strong proponent for resolution of this matter. At this point, SERI believes that an additional operational cycle is warranted to arrive at a design that provides the best approach to meet the RG 1.97 requirements.

OPERATING LICENSE AMENDMENT REQUEST

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 and the Safety Review Committee.

Based on the guidelines present in 10CFR50.92, SERI has concluded that this proposed amendment involves no significant hazards.

Yours truly,



WTC:be

Enclosure: Affirmation per 10CFR50.30

Attachment: OLCR-NL-90-01

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

AFFIRMATION

I, W. T. Cottle, being duly sworn, state that I am Vice President, Nuclear Operations of System Energy Resources, Inc.; that on behalf of System Energy Resources, Inc., and South Mississippi Electric Power Association I am authorized by System Energy Resources, 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, Nuclear Operations of System Energy Resources, 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

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 16 day of Feb, 1990.

(SEAL)

Patricia H. Houghton
Notary Public

My commission expires:
My Commission Expires July 1, 1993

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).

As committed in AECM-89/0013 dated February 6, 1989 (Reference 3), SERI 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, SERI 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 SERI 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, SERI 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 SERI's current plans were to issue the contract for an excore neutron monitoring system in mid February 1990.

Concurrent with the above actions, SERI 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, SERI 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, SERI 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 SERI 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 SERI's 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 SERI 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 and to also discuss the GGNS specific operating license implementation schedule and actions. As a result of the BWROG portion of the meeting dealing with the SER, the NRC provided certain clarifications to the SER and the process for each licensee on implementation actions. Based on SERI's 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 10 CFR 50.49 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 exist which licensees must address. As a result, the BWROG is considering a funding request to establish design criteria as appropriate.

During the GGNS specific portion of the February 7 meeting, SERI 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 was to also consider detector locations through or inside of the GGNS shield wall to further meet the 10E-6% low end power range.

SERI has moved in good faith to install a neutron monitoring system which was believed to satisfy the intent of RG 1.97. However, concerns regarding the BWR design criteria have been raised by the issuance of the NRC SER on the NEDO 31558 Topical Report. Given the design uncertainties discussed in the February 7 NRC/BWROG meeting and the request for SERI to

consider other design locations for excore detector placement, SERI does not believe it is in the best interest of GGNS or the BWR industry to require near term system implementation until further BWR and GGNS design considerations are concluded.

Therefore, SERI requests that the GGNS Operating License Condition 2.C(36), Attachment 1 be amended to require implementation of a RG 1.97 neutron monitoring system prior to startup following the fifth refueling outage.

III. JUSTIFICATION

A. Proposed Development of RG 1.97 Neutron Monitoring Design Criteria 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 is currently being proposed by the BWROG RG 1.97 Neutron Monitoring Subcommittee for full committee approval. The specifics of the BWROG document development and timing will be provided to the NRC in the near future.

SERI 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, SERI believes that further development of the BWR design criteria document is appropriate prior to implementing this system on BWRs. While SERI 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 criteria for RG 1.97 on post accident neutron monitoring, and (2) to avoid imprudent financial expenditures and resource commitments by SERI if current GGNS design criteria is modified.

B. Performance of Detailed Evaluation of Alternate GGNS Excore Detector Locations for Meeting the RG 1.97 Low End Range

As discussed in the recent Neutron Monitoring System Quarterly Status Report dated December 5, 1989 (Reference 5), SERI 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 is similar to that installed by Pennsylvania Power and Light for RG 1.97 on Susquehanna Steam Electric Station. Detector sensitivity and monitoring range is also 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 NRC Project Manager for GGNS on February 7, 1990, SERI was requested to further evaluate in detail 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), an additional detailed evaluation to consider other potential design changes is impractical based on the need to issue an excore system purchase specification (external to shield wall design) in February 1990 and the ongoing BWROG efforts to establish post accident neutron monitoring design criteria.

Upon establishing firmer design criteria through the BWROG for GGNS, additional design consideration may result which could modify our current design approach. Given the need to perform a detailed excore detector location design evaluation for meeting the low end range of RG 1.97, SERI requests that this evaluation be conducted prior to establishing a final GGNS excore system design and procurement and consider the results of the BWROG design criteria.

IV. 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). This extension is requested based on 1) the GGNS application of a design criteria document being considered 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:
 - a. The absence of a 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 absence of the proposed system modification would not affect reactor operation. 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 a post accident neutron monitoring system.

- b. The consequences of an accident previously analyzed have been evaluated for significant increase as a result of the proposed delay in installation of the post accident neutron flux monitoring system. If the new system were installed during the fourth refueling outage, it would provide some post accident monitoring improvements over the presently installed system. However, the presently installed 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.
- c. Under a potential event as considered by the NRC in their SER on NEDO 31558 dated January 29, 1990, the GGNS symptom based Emergency Procedures (EPs) would provide appropriate conservative actions if reactor power can not be directly measured in a post-accident situation. 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 required by RG 1.97 will provide additional 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 present neutron monitoring system will remain unchanged from the configuration that was previously evaluated in the FSAR. The current GGNS neutron monitoring system has been evaluated under the events described in NEDO-31558 and would be considered acceptable for operation under design basis considerations (See Reference 2). Therefore, delaying installation of the RG 1.97 post accident neutron monitoring system

- will not create the possibility of a new or different kind of accident from any previously evaluated.
- 3. This proposed change does not involve a significant reduction in the margin of safety because:

Design, function, and operation of the existing GGNS neutron monitoring system will remain the same. Also no additional reactor protection trip functions will be performed by the RG 1.97 post accident monitoring system instrumentation. EP actions are conservative with respect to the use of the NMS for verification that the reactor is shutdown. If not available during an accident scenario, operator actions are specified which will lead to safe reactor shutdown. Because these actions lead to a safe plant condition (reactor shutdown), the margin of safety is not significantly reduced.

V. 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 O.L. 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 SERI O.L. amendment request of December 20, 1989.