



ENTERGY

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July 6, 1992

W. T. Cottle
Vice President
Operations
Grand Gulf Nuclear Station

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

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Response to Generic Letter 92-01, Revision 1

GNRO-92/00083

Gentlemen:

As required under the Provisions of 10 CFR 50.54(f), Entergy Operations, Inc. is providing its response to Generic Letter (GL) 92-01, Revision 1, Reactor Vessel Structural Integrity dated March 6, 1992. This GL was issued by the NRC to obtain information needed to assess licensee compliance with requirements and commitments regarding reactor vessel integrity. Specifically, GL 92-01 requested information from licensees to permit NRC verification that licensees are complying with the requirements set forth in Appendices G and H to 10 CFR Part 50, and commitments made in response to GL 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and its Impact on Plant Operations".

Entergy Operations has concluded that the design and operation of the Grand Gulf Nuclear Station is in compliance with the requirements of Appendices G and H to 10 CFR Part 50 as well as commitments made in our response to GL 88-11.

Justification for this conclusion is delineated in the attachment to this letter as our response to the information requested by GL 92-01. We plan no further action in response to GL 92-01.

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If you require additional information, please advise.

Yours truly,

WTC/CEB

WTC/CEB/ams

attachment: GGNS Response to Generic Letter 92-01, Revision 1

cc: Mr. D. C. Hintz (w/a)
Mr. J. L. Mathis (w/a)
Mr. R. B. McGehee (w/a)
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U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555

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
ENERGY OPERATIONS, INC.

AFFIRMATION

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

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 6th day of July, 1992.

(SEAL)

Elizabeth L. Lang

Notary Public

My commission expires:

December 28, 1995

Grand Gulf Nuclear Station Response
to Generic Letter 92-01, Revision 1

Background

The NRC issued Generic Letter 88-11 "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and its Impact on Plant Operations" dated July 12, 1988. This GL requested licensees to use the methodology described in Regulatory Guide 1.99, Revision 2 "Radiation Embrittlement of Reactor Vessel Materials" to predict the effect of neutron radiation on reactor vessel materials as required by Paragraph V.A. of 10 CFR Part 50 Appendix G. The responses for Grand Gulf Nuclear Station (GGNS) were provided to the NRC by letters dated January 9, 1989 (Reference 1), February 28, 1989 (Reference 2), and October 13, 1989 (Reference 2).

The NRC transmitted its Safety Evaluation accepting GGNS's response to GL 88-11 by letter dated February 21, 1990 (Reference 4). By letters dated April 26, 1990 and November 30, 1990 respectively, GGNS submitted a proposed Operating License Amendment requesting a change to the Reactor Pressure Vessel (RPV) Pressure-Temperature Curves and surveillance requirements to utilize the methodology of Regulatory Guide 1.99, Revision 2, and revised neutron fluence values for the reactor vessel wall. The NRC Safety Evaluation approving this License Amendment was transmitted to GGNS by letter dated March 25, 1991.

As a result of concerns raised during NRC review of reactor vessel integrity for the Yankee Nuclear Power Station, the NRC issued GL 92-01 to assess licensees compliance with the requirements of 10 CFR 50.60 and 10 CFR 50.61 and fulfillment of commitments made in response to GL 88-11. The following provides a point-by-point response to the information requested by GL 92-01 for GGNS.

Item (1) of GL 92-01, Revision 1:

Licensees not having a surveillance program meeting ASTM E185-73, -79, or -82 and who do not have an integrated surveillance program approved by the NRC, are requested to describe actions taken or to be taken to ensure compliance with Appendix H to 10 CFR Part 50. Addresses who plan to revise the surveillance program to meet Appendix H to 10 CFR Part 50 are requested to indicate when the revised program will be submitted to the NRC for review. If the surveillance program is not to be revised to meet Appendix H to 10 CFR Part 50, addresses are requested indicate when they plan to request an exemption from Appendix H to 10 CFR Part 50 under 10 CFR 50.60(b).

GGNS's Response to Item (1):

Based on calculations performed in accordance with Regulatory Guide 1.99, Rev. 1, the GGNS SAR stated that the GGNS reactor vessel materials surveillance program was in compliance with the requirements of 10CFR50, Appendix H and ASTM E185-73 except that the reactor vessel surveillance capsules did not contain the limiting base material. NRC WUREG-0831 SER Section 5.3.1.2 documents NRC acceptance of this deviation. As a result of new requirements mandated by NRC Generic Letter 88-11 and contained in Regulatory Guide 1.99, Rev. 2, GGNS recalculated the predicted shifts in reference temperature for all beltline materials. This resulted in revised

GGNS's Response to Item (1) (Continue):

reference temperatures such that two base material heat/lot numbers have the same limiting adjusted reference temperature. The results of this recalculation were submitted to the NRC by References 1, 2 and 3 and approved by the NRC in Reference 4. As documented in GGNS SAR section 5.3.2.1, one of these two base materials is included in the reactor vessel surveillance capsule. Therefore, GGNS is in compliance with the requirements of ASTM E185-73 for preparation and withdrawal of test specimens. Currently, GGNS has not removed or tested any surveillance specimens. As documented in GGNS SAR Section 5.3.1.6.1, fracture toughness testing of irradiated capsule specimens will be performed in accordance with ASTM E185-82. The GGNS reactor vessel materials surveillance program is in compliance with the requirements of 10CFR50, Appendix H. This generic letter item is not applicable to GGNS and no further action is required.

Item (2a) of GL 92-01, Revision 1:

Licensees of plants for which the Charpy upper shelf energy is predicted to be less than 50 foot-pounds at the end of their licenses using the guidance in paragraphs C.1.2 or C.2.2 in Regulatory Guide 1.99, Revision 2, are requested to provide to the NRC the Charpy upper shelf energy predicted for December 16, 1991, and for the end of their current license for the limiting beltline weld and the plate or forging and are requested to describe the actions taken pursuant to paragraphs IV.A.1 or V. C of Appendix G to 10 CFR Part 50.

GGNS's Response to Item 2a:

As a result of new requirements mandated by NRC Generic Letter 88-11 and contained in Regulatory Guide 1.99, Rev. 2, GGNS recalculated the predicted end of life upper shelf energies for all beltline materials. As documented in SAR Section 5.3.2.1.4, the end of life upper shelf energy is not below 50 ft-lbs for any beltline region materials. This was confirmed by the NRC in Reference 4. This generic letter item is not applicable to GGNS and no further action is required.

Item 2(b) of GL 92-01, Revision 1:

Licensees whose reactor vessels were constructed to an ASME Code earlier than the Summer 1972 Addenda of the 1971 Edition are requested to describe the consideration given to the following material properties in their evaluations performed pursuant to 10 CFR 50.61 and Paragraph III.A of 10 CFR Part 50, Appendix G:

- (1) the results from all Charpy and drop weight tests for all unirradiated beltline materials, the unirradiated reference temperature for each beltline material, and the method of determining the unirradiated reference temperature from the Charpy and drop weight test;
- (2) the heat treatment received by all beltline and surveillance materials;

Item 2(b) of GL 92-01, Revision 1 (Continued):

- (3) the heat number for each beltline plate or forging and the heat number of wire and flux lot number used to fabricate each beltline weld;
- (4) the heat number for each surveillance plate or forging and the heat number of wire and flux lot number used to fabricate the surveillance weld;
- (5) the chemical composition, in particular the weight in percent of copper, nickel, phosphorous, and sulfur for each beltline and surveillance material; and
- (6) the heat number of the wire used for determining the weld metal chemical composition if different than Item (3) above.

GGNS's Generic Use to Item (2b):

As documented in Sections 5.2.6.3, 5.3.2.1.5 and 5.3.3.1.1.1 of the GGNS SAR, the GGNS RPV was constructed in accordance with the requirements of ASME Section III, Class 1, 1971 Edition with the Winter 1972 addends. This generic letter item is not applicable to GGNS and no further action is required.

Item (3) of GL 92-01, Revision 1:

Licensees are requested to provide the following information regarding commitments made in response to GL 88-11:

- a. How the embrittlement effects of operation at an irradiation temperature (cold leg or recirculation suction temperature) below 525°F were considered. In particular, licensees are requested to describe consideration given to determining the effect of lower irradiation temperature on the reference temperature and on the Charpy upper shelf energy.
- b. How their surveillance results on the predicted amount of embrittlement were considered.
- c. If a measured increase in reference temperature exceeds the mean-plus two standard deviations predicted by Regulatory Guide 1.99, Revision 2, or if a measured decrease in Charpy upper shelf energy exceeds the value predicted using the guidance in paragraph C.1.2 in Regulatory Guide 1.99, Revision 2, the licensee is requested to report the information and describe the effect of the surveillance results on the adjusted reference temperature and Charpy upper shelf energy for each beltline material as predicted for December 16, 1991, and for the end of its current license.

GGNS's Response to Item (3a):

Embrittlement effects resulting from operation below 525°F were not considered when applying Regulatory Guide 1.99, Rev. 2 in response to Generic Letter 88-11. The recirculation suction piping fluid is taken

GGNS's Response to Item (3a) (Continued):

directly from the beltline region of the vessel and is representative of the beltline temperature. During steady state power operation, the recirculation duct temperature is maintained above 525°F. GGNS does not operate with the beltline temperature constantly below 525°F. During plant startups and some transient conditions (operation with feedwater heaters out of service; including turbine trip with 100% steam bypass and partial feedwater heater bypass), the beltline temperature may be less than 525°F with the core critical but the effects of the neutron fluence accumulated at reduced temperatures are not expected to be significant for the following reasons:

- The neutron fluence accumulated at temperatures less than 525°F is estimated to be less than 1% of the total predicted operating fluence (2.11×10^{18} n/cm²).
- Reduced temperature during startups is associated with low power (and fluence) levels.
- The temperature is expected to remain at or above 515°F during most of these transients.
- The estimated cumulative fluence for operation at less than 525°F is approximately 7.5×10^{15} n/cm².

Any vessel embrittlement that could occur as the result of exposure at reduced temperature will influence the outcome of the surveillance tests. Since the effects of the neutron fluence accumulated at reduced temperatures are not expected to be significant, this generic letter item is not applicable to GGNS and no further action is required.

GGNS's Response to Item (3b):

Currently, GGNS has not removed any irradiated surveillance impact test specimens for testing. Surveillance specimen impact test results were not considered in application of Regulatory Guide 1.99, Rev. 2 in response to Generic Letter 88-11. This generic letter item is not applicable to GGNS and no further action is required.

GGNS's Response to Item (3c):

Currently, GGNS has not removed any irradiated surveillance impact test specimens for testing. Surveillance specimen impact test were not considered in application Regulatory Guide 1.99, Rev. 2 in response to Generic Letter 88-11. This item is not applicable to GGNS and no further action is required.

References:

- 1) AECM-89/0002, dated January 9, 1989, transmitting GGNS's response to Generic Letter 88-11.
- 2) AECM-89/0047, dated February 28, 1989, additional information for GGNS regarding Generic Letter 88-11.
- 3) AECM-89/0189, dated October 13, 1989, Response to NRC request for additional information regarding GGNS's response to Generic Letter 88-11.
- 4) Letter USNRC to W. T. Cottle, dated February 21, 1991, transmitting the NRC Safety Evaluation accepting the GGNS Pressure-Temperature Limits Relating to Generic Letter 88-11.