



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 18, 2015

Vice President, Operations
Entergy Operations, Inc.
Grand Gulf Nuclear Station
P.O. Box 756
Port Gibson, MS 39150

**SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 – RE: UPDATED FLUENCE
METHODOLOGY LICENSE AMENDMENT REQUEST UNACCEPTABLE WITH
OPPORTUNITY TO SUPPLEMENT (TAC NO. MF5303)**

Dear Sir or Madam:

By letter dated November 21, 2014, Entergy Operations, Inc. (Entergy, the licensee), submitted a license amendment request for the Grand Gulf Nuclear Station, Unit No. 1 (GGNS). The proposed amendment would revise its licensing basis to adopt a single fluence method. The purpose of this letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's acceptance review of this amendment request. The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC staff to complete its detailed technical review. The acceptance review is also intended to identify whether the application has any readily apparent information insufficiencies in its characterization of the regulatory requirements or the licensing basis of the plant.

Consistent with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.90, "Application for amendment of license, construction permit, or early site permit," an amendment to the license (including the technical specifications) must fully describe the changes requested, and following as far as applicable, the form prescribed for original applications. Section 50.34 of 10 CFR, "Contents of applications: technical information," addresses the content of technical information required. This section stipulates that the submittal address the design and operating characteristics, unusual or novel design features, and principal safety considerations.

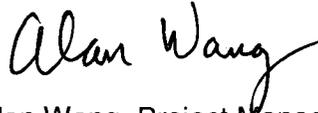
The NRC staff has reviewed your application and concluded that the information delineated in the enclosure to this letter is necessary to enable the NRC staff to make an independent assessment regarding the acceptability of the proposed amendment request in terms of regulatory requirements and the protection of public health and safety and the environment.

In order to make the application complete, the NRC staff requests that Entergy supplement the application to address the information requested in the enclosure by February 24, 2015. This will enable the NRC staff to complete its detailed technical review. If the information response to the NRC staff's request is not received by the above date, the application will not be accepted for review pursuant to 10 CFR 2.101, "Filing of application," and the NRC staff will cease its review activities associated with the application. If the application is subsequently accepted for review, you will be advised of any further information needed to support the NRC staff's detailed technical review by separate correspondence.

The information requested and associated time frame in this letter were discussed with Richard Scarbrough of your staff on February 5, 2015.

If you have any questions, please contact the GGNS, Project Manager, Alan B. Wang, at (301) 415-1445 or by e-mail at Alan.Wang@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "Alan Wang". The signature is written in a cursive style with a long, sweeping tail on the letter "g".

Alan Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosure:
Request for Information

cc w/encl: Distribution via Listserv



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REQUEST FOR INFORMATION

REGARDING FLUENCE METHODOLOGY LICENSE AMENDMENT REQUEST

ENTERGY OPERATIONS, INC.

GRAND GULF NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-416

By letter dated November 21, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14325A752), Entergy Operations, Inc., the licensee for Grand Gulf Nuclear Station, Unit 1 (GGNS) requested a license amendment that would revise its licensing basis to adopt a single fluence methodology.

The U.S. Nuclear Regulatory Commission (NRC) staff has performed an acceptance review of the proposed change in accordance with the Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-109, "Acceptance Review Process" (ADAMS Accession No. ML091810088). Per LIC-109, Appendix B, "Guide for Performing Acceptance Reviews," Section 3.1.2, "Technical Staff Criteria," the NRC staff finds the amendment does not meet the following criteria:

- Completeness of Scope
- Sufficiency of Information
- Regulatory Basis

The NRC staff has determined the following information is needed complete our acceptance review.

Methods Qualification Outside of the Beltline Region

By letter dated November 21, 2014, the statement below from Attachment 2, "Topical Report from MP Machinery and Testing, LLC (MPM)-614993, "Benchmarking of MPM Methods for Nuclear Plant Neutron Transport Calculations," is insufficient to qualify fluence calculations outside of the beltline region. It is stated explicitly that "there are no dosimetry data available at present from regions above and below the active core region to enable checking of 3D results in those regions of the plant." It is then implied that benchmarking the 3D method against the 2D synthesis method would be sufficient to qualify the 3D method for fluence calculations outside of the beltline region.

There are no dosimetry data available at present from regions above and below the active core region to enable checking of 3D results in those regions of the plant. Therefore, once TORT is benchmarked against the results of standard 2D synthesis, these 3D methods can be used routinely for flux calculations in the beltline, and outside of the beltline region.

Enclosure

To qualify the 3D fluence method for fluence calculations outside of the beltline region, some type of benchmarking of the 3D fluence method is necessary specific to the various regions-of-interest outside the beltline.

Furthermore, on Page 6 of Document GNRO-2014/00080, by letter dated November 21, 2014, Attachment 1, "Analysis of Proposed Single Fluence Methodology," Regulatory Position (RP) 1.4.3 of Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," states, in part, as follows:

For other applications [other than RT_{NDT} determination], the accuracy should be determined using the approach described in Regulatory Position 1.4, and an uncertainty allowance should be included in the fluence estimate as appropriate in the specific application.

Page 7 of Document GNRO-2014/00080, Attachment 1, includes the following response from licensee:

An extensive evaluation of all contributors to the uncertainty in the calculated fluence was made for the BWR plant calculations performed to date. This evaluation indicated that the uncertainty in calculated fluences in the reactor beltline region is below 20% as specified in the guide. In addition, the comparisons with measurements indicate agreement well within the 20% limit. The agreement of calculations with measurements to within $\pm 20\%$ uncertainty indicates that the MPM calculations can be applied for fluence determination with no bias. This meets the requirement of RP 1.4.3.

The NRC staff did not locate specific information evaluating the uncertainty of the proposed methods for locations outside the reactor vessel beltline. Information describing uncertainty allowances and application for fluence estimates outside of the reactor vessel beltline is required, or the NRC staff review of the method will be limited to the vessel beltline. Further application of the method would require additional justification.

Applicability of 2D Method Validation to 3D Method

Method qualification was done primarily for the 2D synthesis method; however, the 3D method is used for calculating fluence results. The licensee uses the 3D code results with aspects of the 2D synthesis bias and uncertainty analysis. Applying the validation of one method to another is inappropriate as there may be certain deficiencies that are masked in the method that is not formally qualified.

Seven 2D synthesis calculations were compared to corresponding measurements for the pool critical assembly calculational benchmark, 25 2D synthesis calculations were compared to corresponding measurements for the boiling-water reactor calculational benchmark, eight 2D synthesis calculations were compared to corresponding measurements as part of dosimetry benchmarking, and only one 3D calculation was compared to a corresponding measurement as part of dosimetry benchmarking. In summary, 40 calculations support the validation of the 2D synthesis method and 1 calculation supports the validation of the 3D method; however, the 3D method is relied upon to support all fluence projections as discussed in Section 7, "Summary

and Conclusions,” of Document GNRO-2014/00080, Attachment 3, “Single Fluence Method Applied to GGNS MPM-814779 Revision 1, ‘Neutron Transport Analysis for Grand Gulf Nuclear Station,’ November 2014” (nonpublic).

To qualify the 3D fluence method for fluence calculations inside the beltline region, a complete independent benchmarking of the 3D method is required.

Maximum Extended Load Line Limit Analysis Plus Operating Conditions

Document GNRO-2014/00080, Attachment 1, states, in part:

GGNS has calculated the fluence for every cycle up to the present. This gives the most accurate value of the present fluence. Extrapolations to future times are made using best estimate values of future fuel designs in a cycle 21 best estimate projection cycle. As changes in fuel core loadings are made, updated extrapolations will be made. Further, the flux values from the cycle 21 transport calculation were multiplied with a factor of 1.1 applied for projection to exposures after cycle 21. This 10% conservatism was applied by Entergy to ensure that fluence estimates remain conservative.

The NRC staff is presently concluding its review of Entergy’s request to implement the Maximum Extended Load Line Limit Analysis Plus (MELLLA+) operating domain. The NRC staff requires confirmation that the flux evaluation for Cycle 21 includes the water density and neutron spectral conditions reflective of a MELLLA+ core design.

The information requested and associated time frame in this letter were discussed with Richard Scarbrough of your staff on February 5, 2015.

If you have any questions, please contact the GGNS, Project Manager, Alan B. Wang, at (301) 415-1445 or by e-mail at Alan.Wang@nrc.gov.

Sincerely,

/RA/

Alan Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosure:
Request for Information

cc w/encl: Distribution via Listserv

DISTRIBUTION:

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OFFICE	NRR/DORL/LPL4-2/PM	NRR/DORL/LPL4/LA	NRR/DORL/LPL4-2/BC	NRR/DORL/LPL4/PM
NAME	AWang	PBlechman	MKhanna	AWang
DATE	2/10/15	2/10/15	2/12/15	2/18/15

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