Entergy

Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

Michael A. Krupa
Director, Extended Power Uprate
Grand Gulf Nuclear Station
Tel. (601) 437-6684

Attachment 1 contains Proprietary Information.

GNRO-2011/00075

September 2, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Supplemental Information
Extended Power Uprate
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCES: 1. License Amendment Request, Extended Power Uprate, dated September 8, 2010 (GNRO-2010/00056, Accession Number ML102660403)

Dear Sir or Madam:

Per teleconference on August 16, 2011 with the Nuclear Regulatory Commission (NRC), additional information was requested regarding certain aspects of the Grand Gulf Nuclear Station, Unit 1 (GGNS) Extended Power Uprate (EPU) License Amendment Request (LAR) (Reference 1). Attachment 1 provides supplemental information regarding considerations in the small break loss-of-coolant accident spectrum.

GE-Hitachi Nuclear Energy Americas, LLC (GEH) considers portions of the information provided in Attachment 1 to be proprietary and therefore exempt from public disclosure pursuant to 10 CFR 2.390. An affidavit for withholding information, executed by GEH, is provided in Attachment 3. The proprietary information was provided to Entergy in a GEH transmittal that is referenced in the affidavit. Therefore, on behalf of GEH, Entergy requests to withhold Attachment 1 from public disclosure in accordance with 10 CFR 2.390(b)(1). A non-proprietary version of the RAI responses is provided in Attachment 2.

No change is needed to the no significant hazards consideration included in the initial LAR (Reference 2) as a result of the additional information provided. There are no new commitments included in this letter.

If you have any questions or require additional information, please contact Jerry Burford at 601-368-5755.

When Attachment 1 is removed, the entire letter is non-proprietary.

Attachment 1 contains Proprietary Information.

I declare under penalty of perjury that the foregoing is true and correct. Executed on September 2, 2011.

Sincerely,

MAK/FGB/dm

Attachments:

1. Supplemental Information – Proprietary
2. Supplemental Information – Non-Proprietary
3. GEH Affidavit for Withholding Information from Public Disclosure

cc: Mr. Elmo E. Collins, Jr.
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
612 East Lamar Blvd., Suite 400
Arlington, TX 76011-4005

U. S. Nuclear Regulatory Commission
ATTN: Mr. A. B. Wang, NRR/DORL (w/2)
ATTN: ADDRESSEE ONLY
ATTN: Courier Delivery Only
Mail Stop OWFN/8 B1
11555 Rockville Pike
Rockville, MD 20852-2378

State Health Officer
Mississippi Department of Health
P. O. Box 1700
Jackson, MS 39215-1700

NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

When Attachment 1 is removed, the entire letter is non-proprietary.

Attachment 2

GNRO-2011/00075

Grand Gulf Nuclear Station Extended Power Uprate

Supplemental Information
Non-Proprietary

This is a non-proprietary version of Attachment 1 from which the proprietary information has been removed. The proprietary portions that have been removed are indicated by double square brackets as shown here: [[ ]].

Non-Proprietary

Grand Gulf Nuclear Station Extended Power Uprate
Supplemental Information

By letter dated September 8, 2010, Entergy Operations, Inc. (Entergy) submitted a license amendment request (LAR) for an Extended Power Uprate (EPU) for Grand Gulf Nuclear Station, Unit 1 (GGNS). By teleconference on August 16, 2011, the Nuclear Performance and Code Review Branch requested additional information regarding considerations in the small break loss-of-coolant accident spectrum. Entergy's response is provided below.

RESPONSE

GE- Hitachi (GEH) does not analyze a specific break in the bottom head drain line as part of its Emergency Core Cooling System - Loss of Coolant Accident (ECCS-LOCA) analysis; however, such a break is included in the methodology as applied. [[

]]

From a review of the reactor water cleanup (RWCU) piping and instrument diagrams (P&IDs), it is seen that the drain line for boiling water reactor's (BWR) is connected to either one or both recirculation loops via the RWCU piping, depending on the plant's RWCU system design. There is an isolation valve in the drain line before it joins with the RWCU piping coming off the recirculation loop(s). There is also a bypass line (with valve) around the isolation valve (parallel flow paths). The only time that the bottom head drain line would be treated as a standalone break would be the case where both the isolation valve and the bypass valve were closed. The RWCU system P&IDs typically show the isolation valve closed and the bypass valve open, however, it is acknowledged that plants typically operate with the isolation valve open to maximize the RWCU flow through the bottom head (overall RWCU flow, mitigate potential thermal stratification in the bottom head, aid to keep the drain line clear, etc.) Given that the plants do not operate with the drain line fully isolated, it is not reasonable that a standalone bottom head drain line break analysis be required. Similarly, given that the plants operate with the RWCU system lined up to both the bottom head drain and the recirculation loop(s), establishing a clear flow path from the vessel to a recirculation line break, the bottom head drain flow path would need to be included in such an analysis.

The LOCA response for a standalone bottom head drain line break is like any other small liquid line break. Using the standard 10 CFR 50.46 ECCS performance analysis assumptions (single break, single failure, limiting of offsite or onsite power, no operator action, etc.), the limiting condition would be failure of the high pressure ECCS (high pressure core injection or high pressure core spray). With no high pressure makeup, the falling reactor pressure vessel (RPV) water level would generate an automatic depressurization system (ADS) initiation signal. The ADS would open the requisite number of relief valves to depressurize the vessel. Once the

Non-Proprietary

vessel has been depressurized, the low pressure ECCS would then inject to rapidly restore core cooling. The peak cladding temperature (PCT) is governed primarily by the time it takes the vessel to depressurize through the relief valves as well as the inventory loss due to the depressurization. The inventory loss through the break between the time of the low RPV level ADS initiation and low pressure ECCS injection has only a minor, secondary impact on the PCT. It would indicate a minor change to assumed liquid level in the lower portion of the core, but the limiting power shape assumptions, with power concentrated in the uncovered upper portions of the core, would be the predominant factor in determining PCT. This condition at the higher hot spot elevation would not appreciably change, depending principally on the heat up rate at that location and length of time heat up would continue until low pressure inventory could be delivered to quench the temperature excursion.

The bottom head drain flow path is modeled in the GGNS SAFER analysis. [[

]]

[[

]]

The break spectrum is extended past the point where the worst total small break area has been established (highest PCT in the small break region of the spectrum) and far enough to show that the PCT is steadily decreasing as the total break area is further reduced. At GGNS, this peak SBLOCA PCT occurred at a break area of 0.08 ft^2. [[

]] Sensitivity evaluations performed [[ ]] showed that reducing the flow area from the recirculation line leads to a reduction in PCT. Thus, it can be inferred that the PCT for the drain line break area alone would be less than the small end of the analyzed break spectrum and definitely lower than the worst case small break PCT. It should also be noted that the worst-case break for GGNS is the large break LOCA. With a PCT of 1675°F, the worst-case Small Break LOCA PCT is more than 300°F less than this limiting result.

The foregoing represents generic procedure with respect to the SAFER/GESTR methodology for BWR plants for ECCS-LOCA analyses performed since as early as 1998.

Attachment 3

GNRO-2011/00075

Grand Gulf Nuclear Station Extended Power Uprate

GEH Affidavit for Withholding Information from Public Disclosure

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Edward D. Schrull, PE state as follows:

(1) I am the Vice President, Regulatory Affairs, Services Licensing, GE-Hitachi Nuclear Energy Americas LLC (GEH), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in Enclosure 1 of GEH letter, GEH-GGNS-AEP-480, L. King (GEH) to M. Smith (Entergy Operation, Inc.), "Follow-up NRC Question on Bottom Head Drain Break," dated August 29, 2011. The GEH proprietary information in Enclosure 1, which is entitled "Follow-up NRC Question on Bottom Head Drain Break, GEH Proprietary Information - Class III (Confidential)" is identified by a dotted underline inside double square brackets. [[This sentence is an example.{3}]] In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GEH relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for trade secrets (Exemption 4). The material for which exemption from disclosure is here sought also qualifies under the narrower definition of trade secret, within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975 F2d 871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F2d 1280 (DC Cir. 1983).

(4) The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. Some examples of categories of information that fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without license from GEH constitutes a competitive economic advantage over other companies;

b. Information that, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information that reveals aspects of past, present, or future GEH customer-funded development plans and programs, resulting in potential products to GEH;

d. Information that discloses trade secret and/or potentially patentable subject matter for which it may be desirable to obtain patent protection.

(5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GEH, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GEH, not been disclosed publicly, and not been made available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary and/or confidentiality agreements that provide for maintaining the information in confidence. The initial designation of this information as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in the following paragraphs (6) and (7).

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, who is the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or who is the person most likely to be subject to the terms under which it was licensed to GEH. Access to such documents within GEH is limited to a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary and/or confidentiality agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains results of an analysis performed by GEH to support the Grand Gulf Nuclear Station Extended Power Uprate (EPU) license application. This analysis is part of the GEH EPU methodology. Development of the EPU methodology and the supporting analysis techniques and information, and their application to the design, modification, and processes were achieved at a significant cost to GEH.

The development of the evaluation processes along with the interpretation and application of the analytical results is derived from the extensive experience databases that constitute major GEH asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH. The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial. GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GEH would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 29th day of August 2011.

Edward D. Schrull, PE
Vice President, Regulatory Affairs
Services Licensing
GE-Hitachi Nuclear Energy Americas LLC
3901 Castle Hayne Rd.
Wilmington, NC 28401
Edward.Schrull@ge.com