



~~PROPRIETARY INFORMATION – WITHHOLD UNDER 10 CFR 2.390~~

10 CFR 50.90
10 CFR 2.390

February 6, 2015

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Peach Bottom Atomic Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278

Subject: MELLLA+ License Amendment Request – Supplement 2
Response to Request for Additional Information

Reference: Exelon letter to the NRC, "License Amendment Request – Maximum
Extended Load Line Limit Analysis Plus," dated September 4, 2014
(ADAMS Accession No. ML14247A503)

In accordance with 10 CFR 50.90, Exelon Generation Company, LLC (EGC) requested amendments to Facility Operating License Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3, respectively (Reference 1). Specifically, the proposed changes would revise the Renewed Operating Licenses to allow operation in the expanded Maximum Extended Load Line Limit Analysis Plus (MELLLA+) operating domain and the use of the Detect and Suppress – Confirmation Density (DSS-CD) stability solution.

The attachments to this letter provide responses to Requests for Additional Information (RAIs) from the PRA and Human Performance Branch (APHB), the Radiation Protection and Consequence Branch (ARCB) and the Containment and Ventilation Branch (SCVB) review of the referenced LAR. Portions of the information provided in Attachment 3 are considered to be proprietary and, therefore, exempt from public disclosure pursuant to 10 CFR 2.390. Attachment 4 provides a non-proprietary version. Attachment 5 contains an affidavit for withholding information executed by GE Hitachi Nuclear Energy Americas LLC (GEH). On behalf of GEH, EGC requests Attachment 3 be withheld from public disclosure in accordance with 10 CFR 2.390(b)(1).

EGC has reviewed the information supporting a finding of no significant hazards consideration and the environmental consideration provided to the U. S. Nuclear Regulatory Commission in the referenced LAR. The supplemental information provided in this submittal does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration. Further, the additional

**Attachment 3 contains Proprietary Information.
When separated from Attachment 3, this document is decontrolled.**

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information provided in this submittal does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), EGC is notifying the Commonwealth of Pennsylvania and the State of Maryland of this application by transmitting a copy of this letter along with the attachments to the designated State Officials.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this letter, please contact Mr. David Neff at (610) 765-5631.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 6th day of February 2015.

Respectfully,



Kevin F. Borton
Manager, Licensing – Power Uprate
Exelon Generation Company, LLC

Attachments:

1. Responses to PRA and Human Performance Branch Requests for Additional Information
2. Response to Radiation Protection and Consequence Branch Request for Additional Information
3. Responses to Containment and Ventilation Branch Requests for Additional Information (Proprietary)
4. Responses to Containment and Ventilation Branch Requests for Additional Information (Non-proprietary)
5. Affidavit in Support of Request to Withhold Information

cc: USNRC Region I, Regional Administrator	w/attachments
USNRC Senior Resident Inspector, PBAPS	w/attachments
USNRC Project Manager, PBAPS	w/attachments
R. R. Janati, Commonwealth of Pennsylvania	w/o proprietary attachment
S. T. Gray, State of Maryland	w/o proprietary attachment

Attachment 1

**MELLLA+ LAR Supplement 2
Peach Bottom Atomic Power Station Units 2 and 3
NRC Docket Nos. 50-277 and 50-278**

**Responses to PRA and Human Performance Branch
Requests for Additional Information**

**Response to PRA and Human Performance Branch (APHB)
Request for Additional Information**

By letter dated September 4, 2014, Exelon Generation Company, LLC (EGC) submitted a license amendment request for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The proposed amendment would allow operation in the Maximum Extended Load Line Limit Analysis Plus (MELLLA+) operating domain and the use of the Detect and Suppress – Confirmation Density stability solution.

In an email dated December 17, 2014, from the NRC (Rick Ennis) to Exelon (David Neff), the NRC provided requests for additional information seeking clarification of certain issues related to the LAR. This attachment provides responses to those RAIs.

APHB-RAI-1

Are there any operator actions that are added, removed or otherwise changed other than those described in Sections 9.3 and 9.3.3 of the PBAPS MELLLA+ Safety Analysis Report (M+SAR)? Please describe any changes to manual actions and identify any applicable time limits for successful completion.

RESPONSE

Yes. Section 2.4.4 of the M+SAR provides a basis for a new operator action to exit the MELLLA+ operating domain with a feedwater temperature reduction greater than 10°F below the feedwater design temperature. There is no time limit associated with this in the MELLLA+ analysis and it is not a time critical action in accordance with the PBAPS Operator Response Time Program

Similarly, Section 1.2.4 of the M+SAR provides a basis for a new operator action to exit the MELLLA+ operating domain when operating in single loop operation (SLO). This is an immediate action and it is not considered a time critical action in accordance with the PBAPS Operator Response Time Program.

The actions stated in Section 9.3.1.1 of the M+SAR are current operator actions that are incorporated in procedures and training at PBAPS. The actions for boron injection and initiation of Residual Heat Removal (RHR) suppression pool cooling (SPC) are identified as Time Critical Actions (TCAs) in accordance with the PBAPS Operator Response Time Program.

The operator actions described in Section 9.3.3 of the M+SAR to manually reduce reactor water level is an existing operator action. For MELLLA+ implementation, this action is designated as a TCA in accordance with the PBAPS Operator Response Time Program.

APHB-RAI-2

Has an operating experience review been done, including plant-specific condition reports, Licensee Event Reports, INPO reports, and other relevant sources?

RESPONSE

Yes. Available operating experience related to MELLLA+ is rather limited, since the NRC has only recently (March 28, 2014) issued its first authorization to operate in the MELLLA+ domain to the Monticello Nuclear Generating Plant (MNGP). EGC has been in contact directly with the MNGP staff to discuss any implementation experience.

EGC performed searches for related MELLLA+ operating experience at the World Association of Nuclear Operators (WANO) website and at the Institute of Nuclear Power Operations (INPO) website. No specific information related to MELLLA+ was found on either website.

In addition, EGC is aware that the Nine Mile Point Unit 2 (NMP2) and Grand Gulf Nuclear Station (GGNS) are also in the process of seeking the necessary regulatory approval to operate in the MELLLA+ region. EGC has been in contact with these plants to discuss various technical and operational questions that have arisen during the development and review of their regulatory applications.

APHB-RAI-3

Do any of the changes described necessitate changes to the plant Functional Requirements Analysis or Function Allocation? Do any of the changes replace automatic functions with manual actions or vice versa?

RESPONSE

PBAPS does not use the specific processes described in the request to define design basis operational requirements.

The process governing changes and the addition of operator requirements is part of the EGC configuration change control process at PBAPS. This process provides the necessary direction and guidance to evaluate configuration changes to the facility, including impact assessments that identify procedures and training material that require revisions for the planned configuration change.

Implementation of MELLLA+ at PBAPS does not replace any existing automatic functions with manual actions or vice versa. However, a new automatic function, Automated Backup Stability Protection (ABSP), is being added by the Power Range Neutron Monitoring (PRNM) system modification (Detect and Suppress Solution – Confirmation Density (DSS-CD)).

APHB-RAI-4

What has been or will be done to assure that anticipated transient without scram (ATWS) response actions can be done within the time limits of the relevant analyses? Are changes necessary to the task analysis to ensure that tasks can be completed as described?

RESPONSE

The review and development of the ATWS response actions and corresponding procedures, training and validations are ongoing. ATWS response actions which are identified as time critical are controlled in accordance with the EGC Operator Response Time Program which establishes the process, controls, and methodologies to validate and document operator TCAs. The PBAPS Operator Response Time Program documents the site-specific actions and required times for operator responses to tasks that are credited by the design and licensing basis to be accomplished within a specified time. The Operations Director, or designee, is responsible for the Operator Response Time Program, including ensuring staffing is sufficient to ensure TCAs can be performed in the required times; coordinating the selection of the validation team members, and periodically validating TCAs can be met.

Operations Training is responsible for developing and maintaining simulator scenario and walkthrough scenario validation materials, providing resources to support initial and periodic validations of TCAs. Operator Response Time Program actions that have been selected for training are incorporated into the applicable initial and continuing training programs for Equipment Operators and Licensed Operators as per the Operator Training Programs.

Based on the impact reviews conducted per EGC's configuration change control process, new and changed tasks will be identified and analyzed per EGC's Nuclear Training Program and approved by the applicable line organizations. PBAPS employs a procedure-based task list for Operations Department duties. If new procedures are required, a new task will be established. Skills and knowledge required to perform new and changed tasks will be identified and form the basis for knowledge and performance objective development.

APHB-RAI-5

What are the performance shaping factors that can affect the performance of ATWS response operator actions? What are the likely errors? Is there sufficient time available for recovery actions after errors?

RESPONSE

Performance Shaping Factors are not used to evaluate operator actions at PBAPS. PBAPS utilizes an Emergency Operating Procedure (EOP) validation process and the EGC Operations Training Program to evaluate human performance of operator tasks.

Likely operator errors during an ATWS response include misinterpretation of indications and implementing the procedure steps improperly. PBAPS features to mitigate such errors include oversight, procedural direction, and indication of plant status.

EGC's configuration change control processes will ensure that the required operator actions can be carried out with sufficient margin to allow for operator error. The processes for procedure change and operator training will provide an opportunity to assure that margin is available to time critical action requirements.

APHB-RAI-6

Please describe any increase or decrease in operator work load that will occur with the proposed license amendment.

RESPONSE

The normal operation operator workload is not increased by the changes to operator responses described in the PBAPS MELLLA+ LAR. At MELLLA+ conditions, fewer rod pattern adjustments will be required to maintain 100% EPU power. This will be a decrease in operator work load.

APHB-RAI-7

Please describe any changes to staffing or qualification needed to support the proposed license amendment.

RESPONSE

No changes to qualification and staffing are needed to support the MELLLA+ license amendment.

APHB-RAI-8

Several sections of the M+SAR mention that there are limited effects on controls and instrument setpoints as a result of MELLLA+ operation. What changes to human-system interfaces are necessary to support these changes (i.e., changes to ranges, labels on displays, etc.)? Are changes necessary to any interfaces to support the use of the Detect and Suppress Solution - Confirmation Density (DSS-CD) stability solution?

RESPONSE

In order to support the implementation of MELLLA+, an upgrade to the existing PRNM system at PBAPS is required. This modification changes the human-system interfaces as described here.

- The Main Control Room PRNM 2/4 Logic Module front panel has the additional Confirmation Density Algorithm (CDA) trip indication and has updated trip nomenclature.
- The APRM interface is modified to provide controls for Operators to enable Automatic Backup Stability Protection (ABSP).
- The Operator Display Assembly is updated to include the CDA graph screens in the same manner as other PRNM graphs.
- There will be a new alarm for the CDA. It will use a currently spare alarm points in the 2/4 logic module.

- The Exit Region Alarm is incorporated as part of Control Room OPRM Trip Enabled Alarm.
- The existing OPRM pre-trip alarms for the Growth Rate Based Algorithm (GRA) and the Amplitude Based Algorithm (ABA) are being eliminated. These pre-trip alarms are replaced by the CDA/PBA pre-trip alarm.

APHB-RAI-9

Please describe any changes to operating procedures (or alarm procedures) needed to support the proposed license amendment.

RESPONSE

Changes to procedures will be developed in accordance with the EGC configuration change control process, including impact reviews by operations and training personnel. Training and implementation requirements, including any effects on the simulator, are identified and tracked.

Section 10.9 of the M+SAR describes potential changes to the EOPs and AOPs that will be evaluated during the modification process. EOPs include variables and limit curves, which define conditions where operator actions are indicated. The EOPs remain symptom-based. The EOPs will be reviewed for any effect and revised as necessary prior to implementation of MELLLA+ operating domain expansion. Any changes identified to the EOPs will be included in the operator training to be conducted prior to implementation of MELLLA+. These actions meet the requirements of Limitation and Condition 12.23.4 of the NRC Safety Evaluation Report for the GEH Licensing Topical Report NEDC-33006P-A, Revision 3, Maximum Extended Load Line Limit Analysis Plus (M+LTR).

Abnormal Operating Procedures (AOPs) include event based operator actions. Minor AOP revisions are expected as a result of MELLLA+ operating domain expansion. The AOPs will be reviewed for any effect and revised as necessary prior to implementation of MELLLA+ operating domain expansion. Any changes identified to the AOPs will be included in the operator training to be conducted prior to implementation of MELLLA+.

APHB-RAI-10

If the Emergency Operating Procedures are affected, describe any changes that were required of the Control Room task analysis that was done as part of your Detailed Control Room Design Review. If no update to the task analysis was necessary, describe how task requirements were developed.

RESPONSE

Section 10.9 of the M+SAR describes potential changes to the EOPs and AOPs that will be evaluated during the modification process. The PBAPS Detailed Control Room Design Review is a historical document and is not updated for design changes. Changes to operator tasks are documented per the EGC Operator Training Program and Nuclear Training Program.

The EGC configuration change control process provides the necessary direction and guidance to evaluate configuration changes to the facility and track them to completion; this includes the identification of procedure and training revision requirements. Required changes to EOPs will be identified through this process.

The EGC Systematic Approach to Training Process encompasses training analysis, training material design and development, training implementation, and training effectiveness evaluation. This systematic training process is part of an overall set of integrated processes for the operation and support of EGC's nuclear plants. The EGC Nuclear Training Program provides specific direction and guidance on the performance of job and task analysis. Based on the impact reviews conducted as part of the configuration control change process, new and changed tasks will be identified and analyzed per the EGC Training Program requirements, and will be approved by the applicable line organizations. PBAPS employs a procedure-based task list for Operations Department duties. If new procedures are required a new task will be established. Skills and knowledge required to perform new and changed tasks will be identified and form the basis for knowledge and performance objective development.

APHB-RAI-11

What validation activities have been done to ensure that operators can complete all of the necessary tasks within the allowable time frames? Has any validation occurred to ensure that the changes to the human-system interface (power/core flow maps, alarms, instrument setpoints) and procedures are sufficient for task completion?

RESPONSE

Validation activities for operator actions have not yet been performed because procedures for ATWS have not yet been revised. Procedures and training will be revised in accordance with the EGC configuration change control process, and operators will be trained prior to implementation of MELLLA+ operating domain expansion. In addition, the ATWS response procedures of other EGC BWR plants were benchmarked. This benchmarking provided assurance that time critical actions can be accomplished.

The results of the MELLLA+ human factors review determined that changes to plant procedures will not alter the current mitigation strategies. Changes associated with setpoints will not introduce a level of complexity that would lead to misunderstanding the parameters.

The response to APHB-RAI-4 describes the validation of tasks with time critical actions.

APHB-RAI-12

How will operator performance be monitored after implementation to ensure that operator actions remain possible within acceptable time frames?

RESPONSE

The Operations Director, or designee, is responsible for the Operator Response Time Program, including periodically validating TCAs can be met. Operations Training is responsible for developing and maintaining simulator scenario and walkthrough scenario validation materials and providing resources to support initial and periodic validations of TCAs. Operator Response Time Program actions that have been selected for training are incorporated into the applicable initial and continuing training programs for Equipment Operators and Licensed Operators.

In addition, a Senior Management Observation program provides guidance to Senior Line Managers to conduct observations of control room crew performance. Observations are performed in the plant and in the simulator during training and/or evaluation scenarios.

Attachment 2

**MELLLA+ LAR Supplement 2
Peach Bottom Atomic Power Station Units 2 and 3
NRC Docket Nos. 50-277 and 50-278**

**Response to Radiation Protection and Consequence Branch
Request for Additional Information**

**Response to Radiation Protection and Consequence Branch (ARCB)
Request for Additional Information**

By letter dated September 4, 2014, Exelon Generation Company, LLC (EGC) submitted a license amendment request for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The proposed amendment would allow operation in the Maximum Extended Load Line Limit Analysis Plus (MELLLA+) operating domain and the use of the Detect and Suppress – Confirmation Density stability solution.

In an email dated December 17, 2014, from the NRC (Rick Ennis) to Exelon (David Neff), the NRC provided requests for additional information seeking clarification of certain issues related to the LAR. This attachment provides responses to those RAIs.

ARCB-RAI-1

In June 2009, the NRC staff approved the use of GE Hitachi Nuclear Energy (GEH) Licensing Topical Report (LTR) NEDO-33006P-A, "Maximum Extended Load Line Limit Analysis Plus," (M+ LTR) (ADAMS Accession No. ML091800530) as a basis for MELLLA+ operating domain expansion license amendment requests, subject to limitations specified in the M+ LTR and in the associated NRC safety evaluation (NRC M+ LTR SE) (ADAMS Accession No. ML081130008). The licensee's amendment request refers to the M+ LTR as a basis for the PBAPS MELLLA+ submittal. The M+ LTR indicates that the liquid Radwaste Tank failure (which typically has an impact at other boiling water reactors (BWRs) as a result of the change to MELLLA+) is a plant-specific evaluation and was not evaluated generically in the M+ LTR.

Section 9.2.1.6 of the M+SAR, "Liquid Radwaste Tank Failure," states that "[t]he liquid radwaste tank failure is not applicable to PBAPS."

Please justify why there is no plant-specific evaluation provided in the PBAPS license amendment request.

RESPONSE

Section 9.2.2.3 of the M+SAR complements Section 9.2.1.6 by stating that the Liquid Radwaste Tank Failure is not applicable to PBAPS because it is not an evaluated accident per the PBAPS UFSAR.

In addition, Section 9.2 of the M+ LTR states that the effect MELLLA+ has on the liquid radwaste tank failure depends on the change in moisture carryover in the steam, which is dependent on the design characteristics of the steam separators and dryers and the design minimum core flow rate. Section 3.3.3 of the M+SAR states that the PBAPS-specific evaluation concluded that the performance of the steam dryer and separator remains acceptable because moisture carryover values under MELLLA+ conditions are bounded by the pre-MELLLA+ conditions.

Attachment 4

**MELLLA+ LAR Supplement 2
Peach Bottom Atomic Power Station Units 2 and 3
NRC Docket Nos. 50-277 and 50-278**

**Responses to Containment and Ventilation Branch
Requests for Additional Information (Non-proprietary)**

**Response to Containment and Ventilation Branch (SCVB)
Request for Additional Information**

By letter dated September 4, 2014, Exelon Generation Company, LLC (EGC) submitted a license amendment request for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The proposed amendment would allow operation in the Maximum Extended Load Line Limit Analysis Plus (MELLLA+) operating domain and the use of the Detect and Suppress – Confirmation Density stability solution.

In an email dated December 17, 2014, from the NRC (Rick Ennis) to Exelon (David Neff), the NRC provided requests for additional information seeking clarification of certain issues related to the LAR. This attachment provides responses to those RAIs.

SCVB-RAI-1

Based on the considerations in NUREG-0800, Standard Review Plan (SRP), Section 6.2.1.1.C, "Pressure-Suppression Type BWR Containments, Revision 7 (ADAMS Accession No. ML063600403), the NRC staff requests the following information:

- a. A list of analysis cases for PBAPS, Units 2 and 3, in terms of break size, location, equipment out-of-service, assumed single failure, and initial containment temperature and pressure, that have been used to calculate the primary containment response due to a postulated LOCA as initiated from 102% power/83% flow (MELLLA+ statepoint J). It is expected that the analysis cases should include recirculation coolant line breaks and main steam line breaks. Please also include the calculated primary containment pressure and temperature results in the list.
- b. For the determination of limiting primary containment temperature and pressure responses, please justify the completeness of the break spectrum as listed in question a. If the MELLLA+ statepoint J does not generate the limiting primary containment temperature and pressure responses, please include the analysis cases and results from the other statepoints to show the limiting case.

RESPONSE

- a. Analysis of the short-term containment response to a double ended guillotine break (DEGB) recirculation suction line break (RSLB) loss-of-coolant accident (LOCA) was performed at conditions encompassing the maximum extended load line limit analysis plus (MELLLA+) operating domain. Analysis of the long-term design basis accident (DBA)-LOCA containment response and analysis of steam breaks for drywell temperature response were not performed for MELLLA+ conditions since the results of the analysis for these other events that are presented for the current licensing basis (extended power uprate (EPU)) in Reference 1-1 are bounding for all state conditions including MELLLA+. This is discussed in more detail in the response to SCVB-RAI-1(b) that provides the requested justification for the scope of the MELLLA+ analysis.

The limiting event for determination of peak drywell pressure (and also for evaluation of the containment LOCA hydrodynamic loads) is the DEGB RSLB LOCA. The RSLB is limiting relative to the main steam line break (MSLB) for Mark I plants. There are no equipment out-of-service (EOOS) options associated with the MELLLA+ RSLB LOCA containment analysis. Single loop operation (SLO), final feedwater temperature reduction (FFWTR) and operation with a feedwater temperature reduction of more than 10°F are not permitted within the MELLLA+ domain per Reference 1-2. Analyses of the short-term containment response to this event were performed at two statepoints in the MELLLA+ operating domain, including the 102.0% power, 83.0% core flow condition and the 80.8% power, 55% core flow condition that correspond to Points J and K in Figure 1-1 of the Peach Bottom Atomic Power Station (PBAPS) MELLLA+ Safety Analysis Report (SAR) (Reference 1-2), respectively. The results determined that Point J (102% power, 83.0% core flow) is the more limiting point of MELLLA+ domain.

The initial drywell temperature conditions and results for the analyses performed for MELLLA+ for the limiting statepoint (102% power, 83.0% core flow), with a comparison to the limiting EPU analysis results, were provided in Table 4-1 of Reference 1-2 and are repeated below in Table 1-1. As shown in Table 1-1 below, the predicted results for MELLLA+ are bounded by the results for the current licensing basis (EPU).

Table 1-1 Comparison of MELLLA+ Short Term Containment Response to EPU

	Power (%)	Flow (%)	Feedwater Temperature ⁽¹⁾	Peak Drywell Pressure (psig)	Maximum Drywell Temperature (°F)	Initial Drywell Temperature (°F) / pressure (psig)
EPU	102.0	100.0	Reduced	50.4	298	70°F / 2.5 psig (Design)
MELLLA+	102.0	83.0	Normal	49.9	297	70°F / 2.5 psig (Design)
EPU	102.0	100.0	Reduced	48.7	296	125°F / 2.0 psig (Bounding)
MELLLA+	102.0	83.0	Normal	47.5	295	125°F / 2.0 psig (Bounding)

Note:

1. Operating with final feedwater temperature reduction is not allowed in the MELLLA+ operating domain.
- b. A change in break subcooling associated with MELLLA+ operation which can potentially affect the short-term containment response for the DBA-LOCA event is

the DEGB RSLB. This is because a change in subcooling can affect the critical liquid break flow rate and therefore potentially affect the initial break flow that controls the DEGB RSLB drywell pressure and temperature response during the period when peak drywell pressures occur.

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]] The long-term containment analyses have been performed for the EPU current licensing basis and the results reported in Section 2.6.1.1.1 of Reference 1-1. The results presented in Section 2.6.1.1.1 of Reference 1-1 are also bounding for the MELLLA+ domain.

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The results obtained for the spectrum of steam break analyses that were presented in Reference 1-1, including Figure 2.6-10 for EPU, are also bounding for the MELLLA+ domain.

References:

- 1-1 GE Hitachi Nuclear Energy, "Safety Analysis Report for Exelon Peach Bottom Atomic Power Station Units 2 and 3 Constant Pressure Power Uprate," NEDC-33566P, Revision 0, September 2012.
- 1-2 GE Hitachi Nuclear Energy, "Safety Analysis Report for Peach Bottom Atomic Power Station Units 2 & 3 Maximum Extended Load Line Limit Analysis Plus," NEDC-33720P, Revision 0, September 2014.

SCVB-RAI-2

The test pressure used in the current primary containment leakage rate testing program (TS 5.5.12) is 49.1 pounds per square inch gauge (psig). That pressure is conservatively set to be slightly higher than the calculated containment pressure for the design basis LOCA. However, Table 4-1 of the M+SAR indicates that the calculated peak drywell pressure can be 50.4 psig. That value is significantly higher than the TS value of 49.1 psig. Explain why the TS test pressure of 49.1 psig is not being revised.

RESPONSE

The basis for selection of the current test pressure of 49.1 psig for primary containment leakage testing (Pa) is described below. This description was originally provided in response to SCVB-RAI-5 for the EPU submitted with Supplement 7 of the EPU license

amendment request (LAR) dated July 31, 2013 (Reference 2-1). The discussion in Section 2.6.1 of the EPU LAR safety evaluation report (Reference 2-2) indicated Nuclear Regulatory Commission (NRC) acceptance of the Reference 2-1 response and the basis for selection of Pa. The basis for selection of Pa, as originally provided for EPU in Reference 2-1, is considered applicable for MELLLA+ as discussed below.

The description for selection of Pa given below has been augmented from the Reference 2-1 request for additional information (RAI) response with the addition of predicted drywell pressure values obtained from the MELLLA+ containment analysis.

As an introduction to this RAI response, Exelon is clarifying the purpose for performing the PBAPS EPU containment analysis at both the Design Case and Bounding Case initial conditions of drywell temperature and pressure. The use of the Design Case initial drywell temperature and pressure was to provide the most conservative hypothesized initial conditions in order to demonstrate that a design basis loss-of-coolant accident (DBLOCA) initiated at the PBAPS EPU power level would not challenge the PBAPS containment design pressure of 56 psig. The use of the Bounding Case initial drywell temperature and pressure was to provide conservative initial conditions in order to determine a conservative containment pressure response due to a DBLOCA at the PBAPS EPU power level. The containment pressure response determined from the DBLOCA using the Bounding Case initial conditions was then used to determine a conservative value of Pa for 10 CFR Part 50 Appendix J leak rate testing.

The peak containment pressure results for the Bounding Case analysis (48.7 psig (EPU), 47.5 psig (MELLLA+)) are below the current Pa value of 49.1 psig stated in PBAPS Technical Specification (TS) 5.5.12, and Exelon did not request a modification to this 49.1 psig value for the PBAPS EPU LAR and is not requesting such a change for the PBAPS MELLLA+ LAR.

Peak drywell pressures reported in Table 4-1 of the MELLLA+ SAR are from the containment short term DBA LOCA analysis. [[

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As stated in the previous EPU RAI response, the results from two initial drywell conditions (Design Case and Bounding Case) are reported. The following current PBAPS licensing basis parameters are used:

- Initial Drywell Pressure: [[

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- Initial Drywell Temperature: [[

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- Initial Drywell Humidity: Assumed value is 20% relative humidity. [[

]] This value is unchanged from the PBAPS current licensing basis analysis of record. This value is the minimum value for the plant normal operation.

The use of the Design Case initial drywell temperature, pressure and relative humidity was to provide the most conservative hypothesized initial conditions in order to demonstrate that a DBA LOCA initiated at the PBAPS EPU power level would not challenge the PBAPS containment design pressure of 56 psig. The Design Case initial temperature of 70°F is well below the lowest drywell initial temperature that can be achieved with PBAPS operating at power and was therefore very conservative for demonstrating the maximum PBAPS containment pressure response at EPU conditions. The initial drywell temperature, pressure and relative humidity for the Bounding Case were developed with a conservative historical statistical basis, which also achieved a conservative prediction of the containment pressure response due to a DBA LOCA at the PBAPS EPU power level.

The containment pressure response determined from the DBA LOCA using conservative initial conditions was then used to determine a conservative value of Pa for 10 CFR Part 50 Appendix J leak rate testing. The Bounding Case initial temperature of 125°F represents the lower statistical bound (2-sigma uncertainty) of the 5-year historical normal drywell operating temperature during power operation of the PBAPS units. The 2 psig value is the maximum normal operating drywell pressure that could occur at PBAPS since the immediate operator action is to manually scram the reactor should the drywell pressure actually reach 2 psig during normal operations.

Per 10 CFR Part 50 Appendix J, Pa is defined as the calculated peak containment internal pressure as related to the DBA. The current and proposed Pa value shown in PBAPS TS 5.5.12 (49.1 psig) bounds the containment peak pressure of 47.5 psig for the limiting MELLLA+ condition, as determined from a DBA LOCA containment analysis using conservative bounding input assumptions.

References:

- 2-1 Exelon Letter to NRC Document Control Desk, "Extended Power Uprate License Amendment Request – Supplement 7 Response to Request for Additional Information – Extended Power Uprate," July 31, 2013.
- 2-2 NRC Letter to Exelon, "Peach Bottom Atomic Power Station, Units 2 and 3 – Issuance of Amendments Re: Extended Power Uprate (TAC Nos. ME9631 and ME9632)," August 25, 2014.

SCVB-RAI-3

Figure 2.6-10 of the PBAPS Power Uprate Safety Analysis Report (PUSAR) (Reference 18 of the M+SAR) indicates that the calculated drywell temperatures due to long-term small break LOCAs can exceed the drywell design temperature of 281°F under extended power uprate conditions. The figure shows that the drywell temperature could be above 310°F for a duration as long as 900 seconds.

- a. Please provide a figure that is similar to Figure 2.6-10 of the PUSAR to present the calculated drywell temperatures for long-term small break LOCAs initiated from 102% power/83% flow (MELLLA+ statepoint J) or any other limiting statepoint with respect to the drywell temperature response under MELLLA+ conditions.
- b. Consistent with the requirements in draft General Design Criteria (GDC) 10 and 49, the drywell shell should be designed with sufficient margin to accommodate the temperature from any LOCA. Please provide justification that the drywell shell will not exceed its design temperature of 281°F under LOCA conditions following implementation of the proposed MELLLA+. As part of the justification, provide the drywell shell thickness and associated thermal conductivity for all material composition (e.g., stainless steel, paint, air gap, etc.) as well as the outside boundary condition (e.g., insulated or fixed temperature, etc.) for the most limiting thermal loading point. This justification should also be performed consistently with any assumption used to model heat transfer out of the drywell shell.
- c. Discuss any impact of the proposed MELLLA+ on the evaluation currently contained in PBAPS Updated Final Safety Analysis Report (UFSAR) Section C.2.5.3 "Temperature Loads."

RESPONSE

a. [[

]] Therefore, the DW temperatures based on analyses of a spectrum of steam line breaks performed for the current licensing basis EPU condition (102% power / 100% core flow) are bounding for MELLLA+ conditions. Figure 2.6-10 of the PBAPS PUSAR (Reference 3-1) is applicable to MELLLA+.

- b. The limiting condition for DW shell temperature is established by steam breaks since steam breaks produce the maximum DW atmosphere temperatures. As identified in the response to SCVB-RAI-3(a), the predicted DW atmosphere temperature profiles obtained from the steam line break analyses for EPU and reported in Reference 3-1 are also the bounding profiles for MELLLA+. Therefore, the maximum predicted DW shell temperature of 281°F that was obtained from the EPU steam line break analysis is also bounding for MELLLA+.

Note that there is a time-lag between the DW atmosphere temperature response and the DW shell temperature response that is controlled by the heat transfer from the DW atmosphere to the DW shell and by the heat absorption capacity of the metal DW shell. [[

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The following discussion provides a description of the conservative heat sink modeling used for analyses of the EPU steam line break that determined the peak DW shell temperature of 281°F reported in Reference 3-1:

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- c. The current EPU thermal loading assessment for the DW shell and equipment in the DW remains unchanged for MELLLA+. The current licensing basis regarding the temperature loads can be found in Section 2.3.1, for equipment in the DW, and Section 2.6.1, for the DW shell (References 3-1 and 3-2).

References:

- 3-1 GE Hitachi Nuclear Energy, "Safety Analysis Report for Exelon Peach Bottom Atomic Power Station Units 2 and 3 Constant Pressure Power Uprate," NEDC-33566P, Revision 0, September 2012.
- 3-2 NRC Letter to Exelon, "Peach Bottom Atomic Power Station, Units 2 and 3 – Issuance of Amendments Re: Extended Power Update (TAC Nos. ME9631 and ME9632)," August 25, 2014.

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SCVB-RAI-4: Containment Analysis Data

To support an NRC staff confirmatory analysis in the review of the proposed amendment, please provide containment analysis data similar to Tables 2 to 4 as shown on pages A-190 to A-194 of Appendix A, "GEH Responses to NRC RAIs," of NEDC-33006P-A, Revision 3, for both ATWS and representative large and small break (recirculation line and main steam line) LOCA analyses. Alternatively, the computer code output files of the associated analyses for the first few time steps are acceptable to respond to this question in lieu of the tabulated data.

RESPONSE

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Tables 4-1 and 4-2 provide the requested information similar to that included in Appendix A of Reference 4-1. The requested data applicable to and available from the ATWS containment analysis is provided in Table 4-1.

The requested output data applicable to and available from the MELLLA+ DBA-LOCA RSLB containment analysis are provided in Table 4-2. Note that heat sinks are not utilized for this analysis.

In support of the NRC review, EGC is providing a proprietary data file to the NRC. The data file is considered to be proprietary in its entirety; a non-proprietary version of this file is not provided consistent with guidance in NRC Information Notice 2009-07, "Withholding of Proprietary Information from Public Disclosure." The file includes: [[

]]

References:

- 4-1 GE Nuclear Energy, "General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus," NEDC-33006P-A, Revision 3, June 2009.
- 4-2 GE Hitachi Nuclear Energy, "Safety Analysis Report for Peach Bottom Atomic Power Station Units 2 & 3 Maximum Extended Load Line Limit Analysis Plus," NEDC-33720P, Revision 0, September 2014.

Table 4-1 ATWS Analysis Containment Data

Item	Requested Data	ATWS Analysis Value
II		

Item	Requested Data	ATWS Analysis Value
		11

Attachment 5

**MELLLA+ LAR Supplement 2
Peach Bottom Atomic Power Station Units 2 and 3
NRC Docket Nos. 50-277 and 50-278**

Affidavit in Support of Request to Withhold Information

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **Lisa K. Schichlein**, state as follows:

- (1) I am a Senior Project Manager, NPP/Services Licensing, Regulatory Affairs, 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 Enclosures 1 and 3 of GEH letter, GEH-PBAPS-MP-130, “GEH Responses to PBAPS MELLLA+ RAIs SCVB-RAI-1 through SCVB-RAI-4,” dated January 28, 2015. The GEH proprietary information in Enclosure 1, which is entitled “Responses to SCVB RAIs in Support of PBAPS MELLLA+ LAR,” is identified by a dotted underline inside double square brackets. [[This sentence is an example.^{3}]] Figures and large objects are identified with double square brackets before and after the object. The content of Enclosure 3 is proprietary in its entirety. The GEH proprietary information in Enclosure 3, which is entitled “SCVB-RAI-4 Output Data,” is identified as “GEH Proprietary Information – Class II (Internal){3}.” In each case, the superscript notation ^{3} or the 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 U.S.C. Sec. 552(b)(4), and the *Trade Secrets Act*, 18 U.S.C. 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 F.2d 871 (D.C. Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F.2d 1280 (D.C. 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;

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- d. Information that discloses trade secret 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 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.
 - (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 or confidentiality agreements.
 - (8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed results and conclusions regarding supporting evaluations of the safety-significant changes necessary to demonstrate the regulatory acceptability of the Maximum Extended Load Line Limit Analysis Plus analysis for a GEH Boiling Water Reactor ("BWR"). The analysis utilized analytical models and methods, including computer codes, which GEH has developed, obtained NRC approval of, and applied to perform evaluations of Maximum Extended Load Line Limit Analysis Plus for a GEH BWR.

The development of the evaluation processes along with the interpretation and application of the analytical results is derived from the extensive experience and information databases that constitute a 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

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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 is true and correct.

Executed on this 28th day of January 2015.



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