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PROPRIETARY INFORMATION – WITHHOLD UNDER 10 CFR 2.390

10 CFR 50.90

August 25, 2010

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Peach Bottom Atomic Power Station, Unit 2
Renewed Facility Operating License No. DPR-44
NRC Docket No. 50-277

Subject: Response to Request for Additional Information Concerning the Safety Limit Minimum Critical Power Ratio Change License Amendment Request

References:

1) Letter from P. B. Cowan (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request - Safety Limit Minimum Critical Power Ratio Change," dated May 27, 2010

2) Letter from J. D. Hughey (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Unit 2 – Request for Additional Information Regarding License Amendment Request for Safety Limit Minimum Critical Power Ratio Change (TAC NO. ME3994)," dated July 1, 2010

3) Letter from P. B. Cowan (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information Concerning the Safety Limit Minimum Critical Power Ratio Change License Amendment Request," dated July 15, 2010

4) Letter from J. D. Hughey (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Unit 2 – Request for Additional Information Regarding License Amendment Request for Safety Limit Minimum Critical Power Ratio Change (TAC NO. ME3994)," dated August 18, 2010

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) requested a proposed change to modify Technical Specification (TS) 2.1.1 ("Reactor Core SLs"). Specifically, this change incorporates revised Safety Limit Minimum Critical Power Ratios (SLMCPRs) due to the cycle specific analysis performed by Global Nuclear Fuel for Peach Bottom Atomic Power Station (PBAPS), Unit 2, Cycle 19. References 2 and 3 pertain to additional information associated with the Reference 1 submittal.

**Attachment 1 transmitted herewith contains Proprietary Information.
When separated from Attachment 1, this document is decontrolled.**

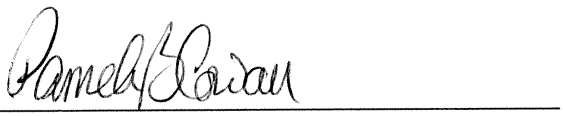
In the Reference 4 letter, the U.S. Nuclear Regulatory Commission staff requested additional information. Attached is our response to this request.

Attachment 1 (letter from J. M. Downs (Global Nuclear Fuel) to J. Tusar (Exelon Nuclear), dated August 20, 2010) contains information proprietary to Global Nuclear Fuel. Global Nuclear Fuel requests that the document be withheld from public disclosure in accordance with 10 CFR 2.390(a)(4). An affidavit supporting this request is also contained in Attachment 1. Attachment 2 contains a non-proprietary version of the Global Nuclear Fuel document.

Should you have any questions concerning this letter, please contact Tom Loomis at (610) 765-5510.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 25th of August 2010.

Respectfully,

DCH 

Pamela B. Cowan
Director, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments: 1) Response to Request for Additional Information - Proprietary Version of Global Nuclear Fuel Letter
2) Response to Request for Additional Information - Non-Proprietary Version of Global Nuclear Fuel Letter

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

ATTACHMENT 2

Response to Request for Additional Information

Non-Proprietary Version of Global Nuclear Fuel Letter

ENCLOSURE 2

JMD-EXN-HE0-10-056

Response to NRC Supplemental RAI's 10 through 13 for Peach Bottom Atomic Power Station Unit 2 Cycle 19 SLMCPR Submittal

Non-Proprietary Information

INFORMATION NOTICE

This is a non-proprietary version of JMD-EXN-HE0-10-056 Enclosure 1, which has the proprietary information removed. Portions of the document that have been removed are indicated by white space inside open and closed bracket as shown here [[ ]].

RAI-10: For the "Cycle 19 Core" table provided in response to RAI-01 in the July 15, 2010, supplement, identify those Cycle 18 fuel assemblies that are selected for thrice-burn in Cycle 19. Also describe the process for selecting those Cycle 18 fuel assemblies that will be thrice-burned in Cycle 19.

GNF RESPONSE: The Cycle 19 Core table provided in response to RAI-01 established that GE14 bundles indexed as B, C, D, E, F, and G in Figure 1 of Attachment 4 are to become thrice-burnt in Cycle 19. These 220 bundles are a subset of the 272 batch loaded as fresh assemblies in Cycle 17. The specific bundles chosen were selected based on criteria seeking to minimize bundle exposure and maximize reactivity.

Identical fresh nuclear fuel bundles will express a range of exposures and reactivities driven by their individual and unique reactor histories. Bundles of the same type are loaded throughout the reactor core as both fresh and, subsequently, once-burnt assemblies. The varying radial power profile of the core will provide a unique irradiation history for each fuel assembly. Bundles in the outer regions of the core are in lower power regions than interior bundles, and thus accumulate less exposure over the same residence time. Additionally, control blade experience is not uniform among similar bundle types and presents another mechanism for variable bundle exposure accumulation by temporarily suppressing bundle power relative to uncontrolled bundles.

The cumulative effects of position and reactor experience generate a range of bundle exposures to choose amongst. Generally, the least exposed, and therefore the highest reactivity bundles, are selected for the upcoming cycle.

RAI-11: Please describe the impact as well as the contribution of the input items listed in the response to RAI-02 in the July 15, 2010, supplement (such as cycle energy requirements, thermal limit margins, reactivity margins, discharge exposure limitations and other limits, desired control rod patterns, and channel distortion) on the final core loading pattern for Cycle 19.

In general, the reference core loading pattern is expected be a final core loading pattern unless a leaking fuel rod is present. SLMCPR will be determined based on the proposed final core loading pattern with the planned control rod control sequence. The hot bundles will be identified during this SLMCPR calculation process, which will be an important parameter applied to stability setpoint, and transient analysis for the Operating Limit (OL)MCPR. Therefore, the process used to generate a final core loading pattern plays an important role in the SLMCPR calculations.

GNF RESPONSE:

Russ Fawcett (GNF) provided a presentation to the NRC (Tony Attard and Tai Huang) at an audit on August 10, 2010 for a different docket. This presentation is on the basics of how GNF performs fuel cycle core design and it is provided here in Enclosure 3.

A licensing applicability check is performed on the final core loading pattern and is documented in our Design Record Files. The licensing of the reference loading pattern is applicable to the final loading pattern if the criteria specified in GESTAR II Section 3.4.2 are met. If any of the criteria in GESTAR II Section 3.4.2 are not met, a re-examination of the bases is performed as specified in GESTAR Section 3.4.3, which includes the Safety Limit MCPR. The licensing applicability review ensures that the Supplemental Reload Licensing Report remain valid for the final loading pattern.

RAI-12: Provide the information that documents the mechanisms that push the SLMCPR increase into the higher range of expectations as described in RAI-05 in the July 15, 2010, supplement.

GNF RESPONSE: As detailed in Section 2.1 of Attachment 4, MIP (MCPR Importance Parameter) measures the core bundle-by-bundle MCPR distribution and RIP (R-factor Importance Parameter) measures the bundle pin-by-pin power/R-factor distribution. Greater flatness in either parameter, [[ ]], yields more rods susceptible to boiling transition and thus a higher calculated SLMCPR. Table 3 of Attachment 4 presents the MIP and RIP parameters for Cycle 18 and Cycle 19. The key results are represented below.

Description	Cycle 18 Minimum Core Flow Limiting Case	Cycle 18 Rated Core Flow Limiting Case	Cycle 19 Minimum Core Flow Limiting Case	Cycle 19 Rated Core Flow Limiting Case
[[				
				]]

Table 6 of Attachment 4 provides the critical power uncertainties (standard deviations) of the GEXL MCPR correlation used for Cycle 18 and Cycle 19. As shown in the table, [[ ]]. The size of the requested SLMCPR increase is defined by the limiting SLMCPR case that occurred at EOC for Cycle 19. At this point in the cycle, the GNF2 fuel, being the most reactive, would dominate the SLMCPR calculation and [[ ]] of the GNF2 GEXL correlation would come to dominate the SLMCPR.

These previously noted mechanisms combined to push the SLMCPR increase into the higher range of expectations.

RAI-13: Identify the specific GNF-2 data points associated with the revised Figure 5 provided in the response to RAI-08 in the July 15, 2010, supplement.

GNF RESPONSE: The 10x10 GE14 and GNF2 data points from several cases are added to Figure 5. Also updated are the lattice configurations (e.g. 8x8, 9x9, 10x10) of each fuel product line.

The 10x10 (GE14, GNF2) points shown in Figure 5 reflect transition cores with a mix of 10x10 fuel products. Thus, there are not specific GNF2 data points in Figure 5. The table following Figure 5 provides the GE14 and GNF2 batch sizes, and the corresponding [[
]] for the 10x10 (GE14, GNF2) points in the figure. The table is in ascending order of the abscissa of Figure 5 for ease of correlation to the figure. Sums of batch sizes and [[ ]] may not add to 100% due to rounding and/or the presence of other fuel products in the core.

Figure 5

[[

]]

Table
Figure 5 - 10x10 (GE14, GNF2) Data Points

[[		Batch Fraction (%)		[[	
		GE14	**GNF2**		
		31.0	38.5		
		28.6	71.4		
		64.4	35.6		
		31.0	38.5		
		31.0	38.5		
		64.4	35.6		
		28.6	71.4		
		28.6	71.4		
		67.4	32.6		
		64.4	35.6		
		67.4	32.6		
	]]	67.4	32.6		]]