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

November 4, 2014

MEMORANDUM TO: Meena K. Khanna, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Richard B. Ennis, Senior Project Manager RBEnnis
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3, DRAFT REQUEST FOR ADDITIONAL INFORMATION (TAC NOS. MF4523 AND MF4524)

The attached draft request for additional information (RAI) was transmitted on November 4, 2014, to Mr. Richard Gropp of Exelon Generation Company, LLC (Exelon, the licensee). This information was transmitted to facilitate an upcoming conference call in order to clarify the licensee's amendment request for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, dated July 25, 2014. The proposed amendment would change the definition in the Technical Specifications (TSs) for RECENTLY IRRADIATED FUEL. Specifically, the amendment would revise requirements pertaining to secondary containment hatches in order to facilitate activities performed during refueling outages.

The draft RAI was sent to Exelon to ensure that the questions are understandable, the regulatory basis for the questions is clear, and to determine if the information was previously docketed. This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket Nos. 50-277 and 50-278

Attachment: Draft RAI

DRAFT REQUEST FOR ADDITIONAL INFORMATION

REGARDING PROPOSED LICENSE AMENDMENT

REVISE TECHNICAL SPECIFICATION DEFINITION FOR RECENTLY IRRADIATED FUEL

EXELON GENERATION COMPANY, LLC

PEACH BOTTOM ATOMIC POWER STATION - UNITS 2 AND 3

DOCKET NOS. 50-277 AND 50-278

By letter dated July 25, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14211A017), Exelon Generation Company, LLC (Exelon, the licensee) submitted a license amendment request for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The proposed amendment would change the definition in the Technical Specifications (TSs) for RECENTLY IRRADIATED FUEL. Specifically, the amendment would revise requirements pertaining to secondary containment hatches in order to facilitate activities performed during refueling outages.

The Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and would like to discuss the following issues to clarify the submittal.

Containment and Ventilation Branch (SCVB)
Reviewer David Nold

SCVB-RAI-1

Subject
Secondary Containment Configuration

References
10 CFR Part 50, Appendix A, Criterion 16 "Containment Design"

NUREG-0800, Standard Review Plan (SRP 6.2.3), Revision 3, March 2007 "Secondary Containment Functional Design"

Question

The last paragraph on Page 3 of 16 from Attachment 1 of the license amendment request (LAR) reads in part:

> An administrative change is also proposed to address a discrepancy in the listing of the SC [secondary containment] hatches. Hatches H1 (Unit 2) and H2 (Unit 3) establish the SC pressure boundary for the Unit 2 and Unit 3 HPCI [high-pressure coolant injection] Rooms, respectively. These hatches are located in the ceiling of the HPCI Rooms. The ceiling of the HPCI Room is the floor for the Reactor

> Building Closed Cooling Water (RBCCW) Room that is located on the 116' elevation. The RBCCW Room is not part of the SC. Hatches H19 and H20 are in the ceiling of the RBCCW Rooms for Units 2 and 3, respectively. Hatches H19 and H20 open to the outside at grade-level (135' elevation), to the west-side of the Reactor Buildings (RBs). For HPCI maintenance that necessitates removing large components, hatches H1 and H19 (Unit 2) or hatches H2 and H20 (Unit 3) would need to be opened to remove these large components from the Unit 2 or Unit 3 HPCI Rooms. This existing discrepancy in the TS discussed above was inadvertently introduced in connection with an August 21, 2008, supplemental response (Reference 1) when the ground-level H19/H20 hatches were designated in lieu of hatches H1/H2. The ground-level hatches H19 and H20 establish the release paths to the environment for releases through hatches H1 and H2, respectively, during a Fuel Handling Accident (FHA). [emphasis added]

Reference 1 in the above excerpt refers to ADAMS Accession Number ML082340796.

From its review of Revision 24 of the Updated Final Safety Analysis Report (dated April 4, 2013), the NRC staff could not find where the boundaries of the secondary containments for PBAPS Units 2 and 3 are clearly defined either with words and/or with plant drawings. The staff inquires as to where (e.g., plant operating procedures, plant drawings, TS Bases etc.) the secondary containment boundaries for PBAPS Units 2 and 3 are clearly defined. The staff requests that the licensee provide the relevant parts of these documents in its docketed response.

SCVB-RAI-2

Subject
Secondary Containment Configuration

References
10 CFR Part 50, Appendix A, Criterion 16 "Containment Design"

NUREG-0800, SRP 6.2.3, Revision 3, March 2007 "Secondary Containment Functional Design"

Attachment 3 to the LAR, Calculation PM-1059, Revision 5, "EAB, LPZ, and CR Doses Due to Fuel Handling Accident (FHA)"

Question

Attachment 3 to the LAR, Calculation PM-1059, Revision 5, page 2 of 211, "Revision History," provides the following description of the changes in Revision 5 of the calculation:

> This major revision evaluates the post-FHA doses due to releases from the various Ground Hatches (GHs). This revision also credits the main control room emergency ventilation system for releases from GHs H1, H2, H17, H18, H19, H20, H21, H22, H33 and H34. [emphasis added]

Calculation PM-1059, Revision 5, page 5 of 211, states, in part, that:

> The post-FHA doses due to releases from the ground hatches (GHs) are additionally analyzed using the newly developed sets of χ/Q values (Ref. 9.2, Section 8.0) for the as-built location of the CR air intake. This revision removes conservatism from the modeled plant layout and resulting χ/Q values. This revision also credits the main control room (MCR or CR) ventilation filters for releases from ground hatches H1, H2 H17, H18, H19, H20, H21, H22, H33 and H34. [emphasis added]

Calculation PM-1059, Revision 5, page 6 of 211, states, in part, that:

> Hatches H1 (Unit 2) and H2 (Unit 3) establish the Secondary Containment (SC) pressure boundary for the Unit 2 and Unit 3 HPCI rooms, respectively. These hatches are located in the ceiling of the HPCI rooms. The ceiling of the HPCI room is the floor for the (RBCCW room that is located on the 116' elevation). The RBCCW room is not part of the SC boundary. Hatches H19 and H20 are in the ceiling of the RBCCW rooms for Units 2 and 3, respectively. Hatches H19 and H20 open to the outside at grade-level (135' elevation) to the west-side of the Reactor Buildings (RBs). For HPCI maintenance that necessitates removing large components, Hatches H1 and H19 (Unit 2) or hatches H2 and H20 (Unit 3) would need to be opened to remove these large components from the Unit 2 or Unit 3 HPCI rooms. The Unit 2 FHA release pathway through H19 is conservative for the evaluation of the FHA for the corresponding H1 hatch, and the Unit 3 FHA release pathway through H20 is conservative for the evaluation of the FHA for the corresponding H2 hatch. Therefore, the discussions in the following sections about the post-FHA releases through GHs H19 and H20 are directly applied to the releases from hatches H1 and H2, respectively. [emphasis added]

The NRC staff notes, from the above excerpts from Calculation PM-1059, that without a thorough read of the calculation, a reviewer might conclude that Unit 2 and Unit 3 HPCI ceiling hatches H1 and H2 are ground level hatches. The licensee should consider clarifying these conflicting excerpts during the next revision of Calculation PM-1059.

SCVB-RAI-3

Subject
Unit 2 and Unit 3 TS Table 3.3.6.2-1 "Secondary Containment Isolation Instrumentation"

References
10 CFR Part 50, Appendix A, Criterion 64, "Monitoring radioactivity releases"

10 CFR Part 50, Appendix A, Criterion 61, "Fuel storage and handling and radioactivity control"

NUREG-0800, SRP15.7.4, Revision 1, July 1981, "Radiological Consequences of Fuel Handling Accidents"

Question

NUREG-0800, SRP 15.7.4, Section I, "Areas of Review," reads in part:

> 3. The containment ventilation system is reviewed with respect to its function as a dose mitigating engineered safety feature (ESF) system for a fuel handling accident inside the containment, including the radiation detection system on the containment purge/vent lines for those plants that will vent or purge the containment during fuel handling operations. The closure times for the isolation valves in the lines are reviewed by the Containment Systems Branch (CSB).

NUREG-0800, SRP15.7.4, Section III, "Review Procedures," reads in part:

> 4. Fuel handling accident inside containment:... If the containment will be open during fuel handling operations, as with a containment purge exhaust system, the reviewer should verify that a prompt radiation detection and automatic containment isolation capability are provided and that the resulting doses are within the acceptance criteria ...

The NRC staff inquires as to whether the results of calculation PM-1059, Revision 5, cause a need to change the Allowable Values in TS Table 3.3.6.2-1 (i.e., ≤ 16.0 mR/hr) for Function 3, "Reactor Building Ventilation Exhaust Radiation - High," or for Function 4, "Refueling Floor Ventilation Exhaust Radiation - High," and ultimately whether isolation valve closure times will be impacted? The licensee's response should be framed with respect to the guidance of NUREG-0800, SRP15.7.4.

SCVB-RAI-4

Subject
Attachment 4 to the LAR, Calculation PM-1170, Revision 0, "PBAPS Atmospheric Dispersion Factors (χ/Qs) for post-FHA Ground Hatch Releases"

References
10 CFR Part 50, Appendix A, Criterion 19, "Control Room"

Regulatory Guide 1.194, Revision 0, June 2003, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants"

Question

Section 4.3, "Determination of CR Intake (Receptor) Characteristics," item 3, "Infiltration Pathways," on page 10 of 48 of Calculation PM-1170, Revision 0, (Attachment 4 to the LAR), states that:

> The typical infiltration pathways that need to be considered in establishing CR intake χ/Q values are listed in the RG 1.194 Section 3.3.3. The infiltration pathways listed in RG 1.194 Section 3.3.3 are reviewed for the assessment of CR

> χ/Q values in this analysis for the potential release points. The potential infiltration location(s) is not specifically identified in the latest PBAPS Tracer Gas Test Report (Ref. 9.8). The entire Control Room Emergency Ventilation System (CREVS) consists of the main control room, including the ductwork and associated air handling units (Ref. 9.8, Section 2.0). The ductwork including the fans and filtration units is located in the radwaste building (RWB) (Ref. 9.10). Therefore, the potential source of unfiltered inleakage is expected to originate across the operating fan supply duct connection upstream of the fan or filtration units in the RWB). The air intake for the CREVS is located in the RWB where the ductwork, fans, and filtration units are located. Therefore, the CR air intake χ/Q values are applied to the CR unfiltered inleakage.

Calculation PM-1059, Revision 5, Section 2.6, page 9 of 211, states, in part, that:

> The CR unfiltered inleakage of 500 cfm is used for the FHA cases that take credit for CREVS filtration. This inleakage is modeled after CREVS initiation. The periodic tests confirm that the maximum unfiltered inleakage is less than the modeled 500 cfm. As an example, the maximum unfiltered inleakage measured during the year 2011 PBAPS tracer gas test is 66 cfm without any measuring uncertainty (Ref. 9.23, Attached Final Report, Table 1). U.S. NRC Regulatory Guide 1.197, Section C.1.4 (Ref. 9.24), requires that for a CRE with a low inleakage, the measuring uncertainty may be an artifact of the calculations and not representative of the CRE's integrity and it becomes optional and can be neglected.

Section 3.3.3, "Infiltration Pathways," of Regulatory Guide 1.194 reads, in part, that:

> Infiltration of contaminated air to a control room can be minimized by proper design and maintenance of the control room envelope (CRE). However, infiltration is always a possibility and the location and significance of these leakage pathways may warrant determination of χ/Q values. An unfiltered inleakage path of 100 cfm can admit the same quantity of radioactive material as a pressurization air intake having a flow of 2000 cfm through a 95 percent efficient filter. The situation can be further compounded if the χ/Q for the unfiltered pathway is more limiting than that for the control room outside air intake.
>
> The infiltration paths actually applicable to a particular facility will be identified via inleakage testing or CRE inspections and surveillances. Refer to Table H-1, "Determination of Vulnerability Suspectability," of NEI 99-03, "Control Room Habitability Guidance" (Ref. 16), for further guidance on infiltration pathways.

Given that the potential infiltration locations are not specifically identified in the latest PBAPS Tracer Gas Test Report, what assurances can the licensee provide to the NRC staff: (a) that the assumption that maximum air in leakage (i.e., infiltration) into the Control Room Envelope (CRE) boundary occurs at "...the operating fan supply duct connection upstream of the fan or filtration units in the RWB"; and (b) that this is limiting with respect to control room dose rates? Are there other potential CRE breach areas (e.g., hatch covers, CRE penetrations, drain traps etc.) where

the combination of infiltration rates and χ/Q values would yield higher dose rates to the occupants of the CRE? Also, provide the staff with the assumptions used for the most recent tracer gas test. Of particular interest, what was the operating status during the tracer test of the Heating, Ventilation, and Air Conditioning System(s) that provide service to the perimeter compartments that surround the CRE?

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OFFICE	LPL1-2/PM
NAME	REnnis
DATE	11/4/14

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