Exelon Generation®

10 CFR 50.90

January 13, 2015

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 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: Response to Request for Additional Information
License Amendment Request to Revise Technical Specifications Definition for RECENTLY IRRADIATED FUEL

References:
1) Letter from James Barstow (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – License Amendment Request - Revise Technical Specifications Definition for RECENTLY IRRADIATED FUEL, dated July 25, 2014 (ML14211A019)

2) U.S. Nuclear Regulatory Commission Memorandum from R. B. Ennis to M. K. Khanna – Peach Bottom Atomic Power Station, Units 2 and 3, Draft Request for Additional Information (TAC Nos. MF4523 and MF4524), dated November 4, 2014 (ML14309A773)

By letter dated July 25, 2014 (Reference 1), Exelon Generation Company, LLC, (Exelon) submitted a License Amendment Request (LAR) for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, requesting changes to the Technical Specifications (TS) to revise the definition for RECENTLY IRRADIATED FUEL. Currently, the definitions in the PBAPS, Units 2 and 3, TS include limitations requiring that certain ground-level hatches remain closed during movement of any irradiated fuel in Secondary Containment. The proposed changes would modify the definitions for RECENTLY IRRADIATED FUEL to: 1) revise the specific restriction identifying the Secondary Containment hatches listed, and 2) address a discrepancy in the designation for identifying the Secondary Containment hatch numbers.

In the U.S. Nuclear Regulatory Commission (NRC) memorandum dated November 4, 2014 (Reference 2), the NRC indicated that it had reviewed the information submitted in the Reference 1 letter pertaining to the proposed license amendment and requested additional clarifying information to support its continued review. The Reference 2 memorandum identifies the draft NRC questions, which were further discussed during a December 4, 2014, teleconference between Exelon and NRC representatives.

Accordingly, Attachment 1 provides Exelon's response to the request for additional information contained in the Reference 2 memorandum. Attachment 2 contains drawings that help to further depict the Secondary Containment boundaries. Attachment 2 contains Security-Related Information (SUNSI) and Exelon requests that the information be withheld from public disclosure pursuant to 10 CFR 2.390.

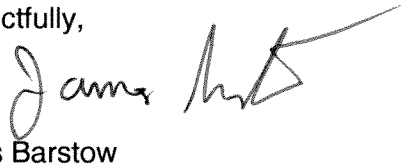
Exelon has reviewed the information supporting a finding of No Significant Hazards Consideration and the Environmental Consideration provided to the NRC in the Reference 1 letter. The additional information provided in this submittal does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration. In addition, the additional 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.

There are no regulatory commitments contained in this submittal.

If you have any questions or require additional information, please contact Mr. Richard Gropp at (610) 765-5557.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 13th day of January 2015.

Respectfully,



James Barstow
Director, Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachments:
1) Response to Request for Additional Information - License Amendment Request to Revise Technical Specifications Definition for RECENTLY IRRADIATED FUEL
2) Supporting Drawings Depicting Secondary Containment Boundaries

cc: NRC Region I, Regional Administrator
NRC Project Manager, NRR - Peach Bottom
NRC Senior Resident Inspector - Peach Bottom
S. T. Gray, State of Maryland w/ Attachment 1 only
R. R. Janati, Bureau of Radiation Protection,
Commonwealth of Pennsylvania w/ Attachment 1 only

ATTACHMENT 1

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3

NRC Docket Nos. 50-277 and 50-278

Renewed Facility Operating License Nos.
DPR-44 and DPR-56

Response to Request for Additional Information
License Amendment Request to
Revise Definition of RECENTLY IRRADIATED FUEL

Response to Request for Additional Information
License Amendment Request to Revise Technical Specifications
Definition of RECENLTY IRRADIATED FUEL

Background

By letter dated July 25, 2014 (Reference 1), Exelon Generation Company, LLC, (Exelon) submitted a License Amendment Request (LAR) for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, requesting changes to the Technical Specifications (TS) to revise the definition for RECENTLY IRRADIATED FUEL. Currently, the definitions in the PBAPS, Units 2 and 3, TS include limitations requiring that certain ground-level hatches remain closed during movement of any irradiated fuel in Secondary Containment. The proposed changes would modify the definitions for RECENTLY IRRADIATED FUEL to: 1) revise the specific restriction identifying the Secondary Containment hatches listed, and 2) address a discrepancy in the designation for identifying the Secondary Containment hatch numbers.

In the U.S. Nuclear Regulatory Commission (NRC) memorandum dated November 4, 2014 (Reference 2), the NRC indicated that it had reviewed the information submitted in the Reference 1 letter pertaining to the proposed license amendment and requested additional clarifying information to support its continued review. The Reference 2 memorandum identifies the draft NRC questions, which were further discussed during a December 4, 2014, teleconference between Exelon and NRC representatives. The draft questions from the Reference 2 memorandum are identified below followed by Exelon's response.

NRC Question 1 – (SCVB-RAI-1)

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. <u>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.</u> 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.

Response

In addition to the description of Secondary Containment in Updated Final Safety Analysis Report (UFSAR) Section 5.3, *"Secondary Containment System,"* and TS Bases Section 3.6.4.1, *"Secondary Containment,"* the Secondary Containment boundaries are further defined in plant drawings and procedures. Pertinent plant drawings (i.e., A-484, Sheet 1; A-485, Sheet 1; A-486, Sheet 1; A-487, Sheet 1; A-488, Sheet 1; and A-489, Sheet 1) are provided in Attachment 2 of this submittal. These drawings depict the following:

- Barrier Plans, Elev. 91'-6" (A-484, Sheet 1)
- Barrier Plans, Elev. 116'-0" (A-485, Sheet 1)
- Barrier Plans, Elev. 135'-0" (A-486, Sheet 1)
- Barrier Plans, Elev. 165'-0" (A-487, Sheet 1)
- Barrier Plans, Elev. 195'-0" (A-488, Sheet 1)
- Barrier Plans, Elev. 234'-0" (A-489, Sheet 1)

Additionally, Procedure CC-PB-201, *"Hazard Barrier Control Program,"* provides administrative requirements, responsibilities, and controls for breaching a hazard barrier or blocking a High Energy Line Break (HELB) vent path, including Secondary Containment barriers. This program has historically and correctly delineated hatches H1 and H2 as the Secondary Containment hatch boundary.

NRC Question 2 – (SCVB-RAI-2)

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.

Response

PBAPS uses a calculation database to track administrative type changes that are needed for future calculation revisions. This issue has been added to the PBAPS calculation database for inclusion in the next appropriate PM-1059 calculation revision.

NRC Question 3 – (SCVB-RAI-3)

NUREG-0800, SRP15.7.4, 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.

Response

The purpose of PM-1059, Revision 5, *"EAB, LPZ, and CR Doses Due to Fuel Handling Accident (FHA),"* is to perform a bounding dose analysis for periods of time when Secondary Containment will not be required by the TS and the associated ground-level release exterior hatches will be opened. During these conditions, the TS Table 3.3.6.2-1, Function 3 - *"Reactor Building Ventilation Exhaust Radiation - High"* and the Function 4, - *"Refueling Floor Ventilation Exhaust Radiation - High"* instruments would not be required to be operable (table excerpt below). Therefore, there would not be an impact on the TS instrument allowable value as a result of this license amendment request.

Table 3.3.6.2-1 (page 1 of 1)
Secondary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level—Low (Level 3)	1,2,3, (a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≥ 1.0 inches
2. Drywell Pressure—High	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 2.0 psig
3. Reactor Building Ventilation Exhaust Radiation—High	1,2,3, (a),(b)	2	SR 3.3.6.2.1 SR 3.3.6.2.3 SR 3.3.6.2.5	≤ 16.0 mR/hr
4. Refueling Floor Ventilation Exhaust Radiation—High	1,2,3, (a),(b)	2	SR 3.3.6.2.1 SR 3.3.6.2.3 SR 3.3.6.2.5	≤ 16.0 mR/hr

(a) During operations with a potential for draining the reactor vessel.
(b) During movement of RECENTLY IRRADIATED FUEL assemblies in secondary containment.

There are no changes to the TS being requested associated with postulated movements of RECENTLY IRRADIATED FUEL (which would require all the exterior hatches to be closed). However, if moving RECENTLY IRRADIATED FUEL, the maximum Fuel Handling Accident (FHA) radiological release would activate the TS Table 3.3.6.2-1, Function 4, radiation monitoring instruments and ensure Secondary Containment isolation valves are closed prior to the release reaching the isolation valves (per UFSAR, Section 7.12.5.5.2, *"Reactor Building Ventilation Exhaust Radiation Monitoring and Refueling Floor Ventilation Exhaust Radiation Monitoring"*). The 16 mr/hr TS allowable value is conservatively less than that which would result from the refueling accident.

NRC Question 4 – (SCVB-RAI-4)

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?

Response

During a design basis event, the Main Control Room Emergency Ventilation (MCREV) system does not involve any recirculation mode and solely consists of makeup airflow provided by one of the two MCREV emergency fans / filtration units. The PBAPS MCREV only utilizes a pressurization mode of operation, which results in a positive pressure in the Control Room Envelope (CRE). TS 5.5.13, *"Control Room Envelope Habitability Program,"* Item d, requires measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one subsystem of the MCREV system, operating at a flow rate required by TS 5.5.7, *"Ventilation Filter Testing Program"* (VFTP). The differential pressures between the CRE and adjacent areas were verified to be positive in the last tracer gas testing performed on the CRE and is also tested on a 24-month frequency in accordance with TS 5.5.13.d. During the most recent tracer gas test, the ventilation systems that provide service to the perimeter compartments that surround the CRE were in service, which is considered to be conservative for the purposes of performing the test.

The pressurization mode design of the PBAPS MCREV system minimizes the possibility of air in-leakage into the CRE and results in only limited sources of air in-leakage into the CRE. These potential air in-leakage sources include the emergency fans / filtration units, which are located just outside of the CRE, and the PBAPS, Units 2 and 3, Battery and Switchgear Room supply ductwork that traverses through the CRE (see Attachment 2, Drawing A-487). Because the PBAPS, Units 2 and 3, Battery and Switchgear Room supply ductwork could potentially provide an air in-leakage source into the CRE, vulnerable locations on this ductwork have been sealed. Additionally, periodic inspections are performed to ensure that this potential air in-leakage

pathway is not significant. Any potential CRE air in-leakage is expected to be small and at the joints / seals involving the emergency fans / filtration units. The atmosphere surrounding the MCREV emergency fans / filtration units is supplied by the Radwaste Building supply fans. The intake for the Radwaste supply fans are from the same fresh air plenum as the MCREV emergency fans / filtration units. Therefore, there would not be any different assumed χ/Q values and the assumed 500 cfm bypass (which is considered conservative with respect to the most recent tracer gas test) appropriately uses the correct χ/Q value.

References

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