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

July 17, 2015

Mr. Bryan C. Hanson
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 - ISSUANCE OF AMENDMENTS RE: REVISE TECHNICAL SPECIFICATION DEFINITION FOR RECENTLY IRRADIATED FUEL (TAC NOS. MF4523 AND MF4524)

Dear Mr. Hanson:

The Commission has issued the enclosed Amendment Nos. 298 and 301 to Renewed Facility Operating License Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station, Units 2 and 3. These amendments consist of changes to the Technical Specifications (TSs) and Facility Operating Licenses in response to your application dated July 25, 2014, as supplemented by letters dated January 13, 2015, and May 26, 2015.

The amendments change the definition in the TSs for RECENTLY IRRADIATED FUEL. Specifically, the amendments revise requirements pertaining to secondary containment hatches in order to facilitate activities performed during refueling outages.

A copy of the safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's Biweekly *Federal Register* Notice.

Sincerely,

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

Docket Nos. 50-277 and 50-278

Enclosures:
1. Amendment No. 298 to Renewed DPR-44
2. Amendment No. 301 to Renewed DPR-56
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv

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

EXELON GENERATION COMPANY, LLC

PSEG NUCLEAR LLC

DOCKET NO. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 298
Renewed License No. DPR-44

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Exelon Generation Company, LLC (Exelon Generation Company), and PSEG Nuclear LLC (the licensees), dated July 25, 2014, as supplemented by letters dated January 13, 2015, and May 26, 2015, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Renewed Facility Operating License No. DPR-44 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 298, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Douglas A. Broaddus, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications
and Facility Operating License

Date of Issuance: July 17, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 298

RENEWED FACILITY OPERATING LICENSE NO. DPR-44

DOCKET NO. 50-277

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove	Insert
3	3

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove	Insert
1.1-5	1.1-5

(5) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear material as may be produced by operation of the facility, and such Class B and Class C low-level radioactive waste as may be produced by the operation of Limerick Generating Station, Units 1 and 2.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 of Part 50, and Section 70.32 of Part 70; all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the Peach Bottom Atomic Power Station, Unit 2, at steady state reactor core power levels not in excess of 3951 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 298, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

(3) Physical Protection

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822), and the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans[1], submitted by letter dated May 17, 2006, is entitled: "Peach Bottom Atomic Power Station Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Storage Installation Security Program, Revision 3." The set contains Safeguards Information protected under 10 CFR 73.21.

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The Exelon Generation Company CSP was approved by License Amendment No. 281.

(4) Fire Protection

The Exelon Generation Company shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report for the facility, and as approved in the NRC Safety Evaluation Report (SER) dated May 23, 1979, and Supplements dated August 14, September 15, October 10 and November 24, 1980, and in the NRC SERs dated September 16, 1993, and August 24, 1994, subject to the following provision:

[1] The Training and Qualification Plan and Safeguards Contingency Plan are Appendices to the Security Plan.

1.1 Definitions

PHYSICS TESTS (continued)	b. Authorized under the provisions of 10 CFR 50.59; or c. Otherwise approved by the Nuclear Regulatory Commission.
PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)	The PTLR is the unit-specific document that provides the reactor vessel pressure and temperature limits, including heatup and cooldown rates, for the current reactor vessel fluence period. These pressure and temperature limits shall be determined for each fluence period in accordance with Specification 5.6.7.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3951 MWt.
REACTOR PROTECTION SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from the opening of the sensor contact up to and including the opening of the trip actuator contacts.
RECENTLY IRRADIATED FUEL	RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 24 hours.
SHUTDOWN MARGIN (SDM)	SDM shall be the amount of reactivity by which the reactor is subcritical or would be subcritical throughout the operating cycle assuming that: a. The reactor is xenon free; b. The moderator temperature is $\geq$ 68°F, corresponding to the most reactive state; and c. All control rods are fully inserted except for the single control rod of highest reactivity worth, which is assumed to be fully withdrawn. With control rods not capable of being fully inserted, the reactivity worth of these control rods must be accounted for in the determination of SDM.

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

EXELON GENERATION COMPANY, LLC

PSEG NUCLEAR LLC

DOCKET NO. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 301
Renewed License No. DPR-56

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Exelon Generation Company, LLC (Exelon Generation Company), and PSEG Nuclear LLC (the licensees), dated July 25, 2014, as supplemented by letters dated January 13, 2015, and May 26, 2015, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Renewed Facility Operating License No. DPR-56 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 301, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Douglas A. Broaddus, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications
and Facility Operating License

Date of Issuance: July 17, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 301

RENEWED FACILITY OPERATING LICENSE NO. DPR-56

DOCKET NO. 50-278

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove	Insert
3	3

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove	Insert
1.1-5	1.1-5

(5) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear material as may be produced by operation of the facility, and such Class B and Class C low-level radioactive waste as may be produced by the operation of Limerick Generating Station, Units 1 and 2.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 of Part 50, and Section 70.32 of Part 70; all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the Peach Bottom Atomic Power Station, Unit No. 3, at steady state reactor core power levels not in excess of 3951 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 301, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

(3) Physical Protection

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822), and the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans[1], submitted by letter dated May 17, 2006, is entitled: "Peach Bottom Atomic Power Station Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Storage Installation Security Program, Revision 3." The set contains Safeguards Information protected under 10 CFR 73.21.

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The Exelon Generation Company CSP was approved by License Amendment No. 283.

[1]The Training and Qualification Plan and Safeguards Contingency Plan and Appendices to the Security Plan.

1.1 Definitions

PHYSICS TESTS (continued)	b. Authorized under the provisions of 10 CFR 50.59; or c. Otherwise approved by the Nuclear Regulatory Commission.
PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)	The PTLR is the unit-specific document that provides the reactor vessel pressure and temperature limits, including heatup and cooldown rates, for the current reactor vessel fluence period. These pressure and temperature limits shall be determined for each fluence period in accordance with Specification 5.6.7.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3951 MWt.
REACTOR PROTECTION SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from the opening of the sensor contact up to and including the opening of the trip actuator contacts.
RECENTLY IRRADIATED FUEL	RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 312 hours. This 312-hour time period may be reduced to 24 hours if secondary containment hatches H2, H21, H22 and H34 are closed.
SHUTDOWN MARGIN (SDM)	SDM shall be the amount of reactivity by which the reactor is subcritical or would be subcritical throughout the operating cycle assuming that: a. The reactor is xenon free; b. The moderator temperature is $\geq$ 68°F, corresponding to the most reactive state; and c. All control rods are fully inserted except for the single control rod of highest reactivity worth, which is assumed to be fully withdrawn. With control rods not capable of being fully inserted, the reactivity worth of these control rods must be accounted for in the determination of SDM.

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 298 AND 301

TO RENEWED FACILITY OPERATING LICENSE NOS. DPR-44 AND DPR-56

EXELON GENERATION COMPANY, LLC

PSEG NUCLEAR LLC

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-277 AND 50-278

1.0 INTRODUCTION

By application dated July 25, 2014, as supplemented by letters dated January 13, 2015, and May 26, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML14211A017, ML15014A175, and ML15153A252, respectively), Exelon Generation Company, LLC (Exelon, the licensee), requested changes to the Technical Specifications (TSs) for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The proposed amendment would revise the definition for RECENTLY IRRADIATED FUEL in TS 1.1.

Currently, the PBAPS, Units 2 and 3, TS definitions for RECENTLY IRRADIATED FUEL include limitations requiring that certain ground-level hatches remain closed during movement of any irradiated fuel in secondary containment (SC). The proposed changes would modify the definitions to (1) revise the specific restriction identifying the SC hatches listed, and (2) address a discrepancy in the designation for identifying the SC hatch numbers. The licensee indicated that the proposed changes would allow for the performance of more efficient refueling outages.

The supplements dated January 13, 2015, and May 26, 2015, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on September 30, 2014 (79 FR 58816).

2.0 REGULATORY EVALUATION

2.1 System Description

The containment system is a "multibarrier" system with (a) a primary barrier consisting of the primary containment with its pressure suppression system, and (b) a secondary barrier consisting of the reactor building with a system to limit the ground-level release of airborne radioactive material from the SC.

The reactor building, in conjunction with the reactor building heating and ventilating system and the standby gas treatment system (SGTS), constitutes the SC. The reactor building encloses the primary containment, the refueling and reactor servicing areas, new and spent fuel storage facilities, equipment necessary for safe plant shutdown, and other reactor auxiliary systems. The SC serves as the containment during reactor refueling and maintenance operations when the primary containment is open; and the SC serves as an additional barrier when the primary containment is functional.

The structural design features of the reactor building include the design for earthquakes, tornados, flooding, and missiles. The reactor building is founded on a rock formation. The interior and exterior walls of the reactor building are cast-in-place concrete from the foundation to the refueling floor. The superstructure above the refueling floor is metal siding and decking on a structural steel framework. The thicknesses of the concrete walls are governed by their structural or shielding requirements. The insulated metal siding above the refueling floor is installed with sealed joints. The reactor building has personnel and equipment entrances. The entrances are provided with airtight doors forming an airlock system to maintain the leak-tightness of the building. The personnel access doors are provided with electrical door supervision. The penetrations for piping, ventilation ducts, electrical cables, and instrument leads are sealed. The ventilation ducts are provided with valves for automatic closure when reactor building isolation is required.

The SC is designed to seismic Class I criteria and it limits the ground-level release of airborne radioactive materials. The SC provides for the controlled, filtered, elevated release of the building atmosphere under accident conditions. The safety objective of the reactor building SC, in conjunction with other engineered safeguards, is to limit the ground-level release of airborne radioactive materials and to provide means for controlled elevated release of the building atmosphere so that off-site doses from the postulated design-basis accidents (DBAs) are below the values of Title 10 of the Code of *Federal Regulations* (10 CFR), Section 50.67, "Accident source term."

The SGTS is part of the SC and has the capability of maintaining a negative pressure within the reactor building, with respect to the outside atmosphere, to limit ground-level release of radioactive material. The reactor building atmosphere, normally discharged through the building ventilation exhaust, can be processed through the SGTS for filtration before being discharged to the stack when a high radiation condition occurs. The SGTS is common to both Units 2 and 3 and is located in a shielded room in the radwaste building between the Unit 2 and Unit 3 reactor buildings. The SGTS is designed to support containment atmospheric dilution by providing a filtered flow path for purging primary containment post-loss-of-coolant accident (LOCA). The system filters the exhaust air to remove radioactive particulates and halogens. The safety

objective of the SGTS is to limit the ground-level release from the reactor building, and to release primary and secondary containment air at an elevated release point via the main stack. The SGTS limits the release of radioactive materials by maintaining a negative pressure in the reactor building under normal atmospheric conditions.

The environmental effects of postulated DBAs are minimized by the reactor building heating and ventilating and SGTS. Because a fuel handling accident can potentially occur any time when fuel assemblies are being manipulated, either over the reactor core or in the spent fuel pool, this accident is considered in all operating states. Considerations include mechanical fuel damage caused by impact and a subsequent release of fission products. Secondary containment isolation and the SGTS are automatically initiated by the reactor building ventilation radiation monitoring system. Upon a reactor building isolation signal, the reactor building ventilation isolation valves isolate the reactor building atmosphere in 1.5 to 10 seconds. This rapid closure time prevents escape of potentially contaminated air. At the same time, the SGTS is automatically started to maintain a negative pressure in the reactor building. Potentially contaminated air from the reactor then passes through the SGTS for filtration prior to elevated release from the stack.

The spent fuel storage pools are located in the reactor buildings. Ventilation air from the spent fuel pool area is not normally filtered prior to exhaust to the atmosphere. Provisions are made for level detection to ensure the fuel in the spent fuel storage is covered with sufficient water for radiation shielding. Leakage detection instrumentation is also provided to ensure an adequate fuel pool water level is maintained. The design of the spent fuel pool structure is such as to prevent inadvertent draining of the pool. The radiation levels are monitored in the refueling floor exhaust duct. Both low and high radiation signals are alarmed in the control room and a high-high radiation signal isolates the duct and initiates the SGTS.

2.2 Proposed TS Changes

2.2.1 PBAPS, Unit 2

The definition for RECENTLY IRRADIATED FUEL in TS 1.1 for PBAPS, Unit 2 currently reads as follows:

> RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 24 hours. When using this definition to suspend the Applicability of LCOs [limiting conditions for operation], secondary containment ground-level hatches H15, H16, H17, H18, H19, and H33 shall be closed during the movement of any irradiated fuel in Secondary Containment.

The licensee requested that the definition be revised to read as follows:

> RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 24 hours.

2.2.2 PBAPS, Unit 3

The definition for RECENTLY IRRADIATED FUEL in TS 1.1 for PBAPS, Unit 3 currently reads as follows:

> RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 24 hours. When using this definition to suspend the Applicability of LCOs, secondary containment ground-level hatches H20, H21, H22, H23, H24, and H34 shall be closed during the movement of any irradiated fuel in Secondary Containment.

The licensee requested that the definition be revised to read as follows:

> RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 312 hours. This 312-hour time period may be reduced to 24 hours if secondary containment hatches H2, H21, H22 and H34 are closed.

2.3 Regulatory Requirements and Guidance

The regulatory requirements and guidance which the NRC staff considered in its review of this license amendment request (LAR) included the following:

- 10 CFR 50.67, "Accident source term," which sets limits for the radiological consequences of a postulated DBA using an alternative source term (AST). The NRC approved a full scope implementation of an AST methodology for PBAPS, Units 2 and 3, by License Amendment Nos. 269 and 273 on September 5, 2008 (ADAMS Accession No. ML082320406).

- Regulatory Guide (RG) 1.52, "Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants," Revision 4, dated September 2012 (ADAMS Accession No. ML12159A013), which, in part, provides guidance regarding the design of engineered safety feature (ESF) atmosphere cleanup systems.

- RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dated July 2000 (ADAMS Accession No. ML003716792), which provides guidance to licensees of operating power reactors on acceptable applications of ASTs.

- RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessment at Nuclear Power Plants," dated June 2003 (ADAMS Accession No. ML031530505), which provides guidance on determining atmospheric relative concentration values (χ/Q) in support of design-basis control room radiological habitability assessments at nuclear power plants.

- NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports" (hereinafter referred to as SRP), Section 6.2.3, "Secondary Containment Functional Design," Revision 3, dated March 2007 (ADAMS Accession No. ML063600406), which, in part, provides guidance to the NRC staff in performing reviews regarding the secondary

containment's ability to collect and process radioactive material that may leak from primary containment.

- SRP Section 6.4, "Control Room Habitability System," Revision 3, dated March 2007 (ADAMS Accession No. ML070550069), which, in part, provides guidance to the NRC staff in performing reviews regarding ensuring that plant operators are adequately protected against the effects of accidental release of radioactive gases.

- SRP Section 15.0.1, "Radiological Consequence Analyses Using Alternative Source Terms," Revision 0, dated July 2000 (ADAMS Accession No. ML003734190), which, in part, provides guidance to NRC staff in performing reviews associated with the requirements in 10 CFR 50.67.

- SRP Section 15.7.4, "Radiological Consequences of Fuel Handling Accidents," Revision 1, dated July 1981 (ADAMS Accession No. ML052350313), which, in part, provides guidance to NRC staff in performing reviews regarding the radiological consequences of a design-basis fuel handling accident (FHA).

- Generic Letter 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal," dated June 3, 1999 (ADAMS Legacy Library Accession No. 9906030055), which requested licensees to provide information intended, in part, to ensure that charcoal filters used in ESF ventilation systems performed in a manner consistent with the licensing basis for the facility.

3.0 TECHNICAL EVALUATION

3.1 Radiological Consequences Review

3.1.1 Background

The NRC staff based its radiological consequences review on the current design basis established by License Amendment No. 269 (Unit 2) and No. 273 (Unit 3), dated September 5, 2008. These amendments approved a full scope implementation of an AST methodology pursuant to 10 CFR 50.67, using the guidance described in RG 1.183.

The licensee's application dated July 25, 2014, stated that of the four DBA radiological accidents contained in the PBAPS licensing basis for AST, the only accident that is affected by the opening of the subject hatches is the FHA. The regulatory requirements from which the NRC staff based its acceptance are the reference values in 10 CFR 50.67 and the accident-specific acceptance criteria in Regulatory Position 4.4 of RG 1.183. Dose acceptance criteria for the FHA are a total effective dose equivalent (TEDE) of 6.3 roentgen equivalent man (rem) at the exclusion area boundary (EAB) for the maximum 2-hour period, 6.3 rem at the outer boundary of the low-population zone (LPZ), and 5 rem in the control room for the duration of the accident.

As discussed in the LAR, the licensee is proposing a change to the Units 2 and 3 TS definitions for RECENTLY IRRADIATED FUEL to allow for the performance of more efficient outages. The current PBAPS TS definitions require SC ground-level hatches, specifically, those above the residual heat removal (RHR) rooms, to be in place during movement of recently irradiated fuel

assemblies. The NRC staff approved an extended power uprate (EPU) amendment for PBAPS, Units 2 and 3, on August 25, 2014 (ADAMS Accession No. ML14133A046). Unit 2 has already implemented the EPU. Unit 3 is scheduled to implement the EPU during the fall 2015 refueling outage. As a result of EPU modifications that will be installed in Unit 3 in the fall 2015 outage, changes to the definition of recently irradiated fuel are needed, specifically for installation of the PBAPS, Unit 3 RHR cross-tie modification in the RHR rooms. The installation will be facilitated by removal of the RHR room hatches, which are currently listed in the definition of recently irradiated fuel in the PBAPS TSs for Units 2 and 3. Without an NRC-approved change to the PBAPS TSs, movement of irradiated fuel is not permitted without the RHR room hatches being in place.

The licensee also stated opening of the west-side hatches currently listed in the TS definitions for recently irradiated fuel would facilitate access through these hatches to efficiently perform maintenance, along with modification and replacement of equipment and components located in the high pressure coolant injection (HPCI) room, torus room, and RHR rooms, without impacting the refueling outage.

The LAR also proposed an administrative change to address a discrepancy in the listing of the SC hatches. This existing discrepancy in the TSs was inadvertently introduced in connection with an August 21, 2008, supplemental response for the AST amendment (ADAMS Accession No. ML082340796) when the ground-level H19/H20 hatches were designated in lieu of hatches H1/H2. Hatches H1 (Unit 2) and H2 (Unit 3) establish the 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 rooms is the floor for the reactor building closed cooling water (RBCCW) rooms that are located on the 116-foot elevation. The RBCCW rooms are not part of the SC. Hatches H19 (Unit 2) and H20 (Unit 3) are in the ceiling of the RBCCW rooms for Units 2 and 3, respectively. Hatches H19 and H20 open to the environment at grade-level (135-foot elevation) to the west-side of the reactor buildings. Hence, the area between hatches H1 and H19 for Unit 2, and between hatches H2 and H20 for Unit 3, is not part of the SC. Therefore, hatches H1 and H2 should have been chosen as the boundary to be identified in the TS definitions of recently irradiated fuel, and H19 and H20 should have been indicated as the release locations for corresponding releases from hatches H1 and H2.

For HPCI maintenance that necessitates removing large components, hatches H1/H19 (Unit 2) or hatches H2/H20 (Unit 3) would need to be opened to remove these large components from the Unit 2 or Unit 3 HPCI rooms. As discussed above, the ground-level hatches H19 (Unit 2) and H20 (Unit 3) establish the release paths to the environment through hatches H1 (Unit 2) and H2 (Unit 3), respectively, during an FHA DBA. The licensee revised the AST FHA DBAs for both Unit 2 and Unit 3 to reflect these new release pathways to the environment. In doing so, it was also necessary for the licensee to develop a new set of atmospheric dispersion factors for the main control room (MCR) air intake from a postulated release through these ground-hatches. The licensee performed the computations of the revised FHA using the NRC dose consequence computer code RADTRAD, Version 3.03.

3.1.2 Atmospheric Dispersion Estimates

The licensee produced new atmospheric dispersion factors (χ/Q values) for use in evaluating the radiological consequences of an FHA, through the opening of select hatches and through other potential release paths, in support of the LAR, as discussed below.

Meteorological Data

The licensee used five years of consecutive onsite hourly meteorological data collected during the calendar years of 1984 through 1988 to generate new MCR χ/Q values. In the supplement dated May 26, 2015, the licensee provided meteorological data in the form of hourly meteorological input data files for ARCON96 atmospheric dispersion computer code (NUREG/CR-6331, "Atmospheric Relative Concentrations in Building Wakes"). The NRC staff reviewed the files for the purpose of confirmatory analysis of the licensee's χ/Q values. The onsite meteorological data were used to model atmospheric dispersion for sets of possible ground-level release pathways to the MCR intake:

- Unit 2 RHR Ground Hatch H18
- Unit 2 RBCCW Ground Hatch H19
- Unit 3 RBCCW Ground Hatch H20
- Unit 3 RHR Ground Hatch H21
- Unit 3 RHR Ground Hatch H23
- Unit 2 and Unit 3 roof scuttles
- Unit 2 and Unit 3 personnel access doors
- Unit 2 and Unit 3 railway bay doors

Output from ARCON96 yielded new MCR χ/Q values for all releases discharged into the environment during a postulated FHA through each of these pathways.

The licensee provided ARCON96 meteorological input data from meteorological tower 1A and two measurement levels of tower 2. Tower 1A takes measurements at the 10 meter and 28 meter level, and tower 2 takes measurements at the 10 meter, 23 meter, and 98 meter levels. Data from tower 1A were evaluated to be more conservative because tower 1A is located in the river valley where stable conditions are expected to occur more frequently. In addition to this, ΔT measurements (the change in temperature between two measurement heights) are taken using an interval of 17 meters, between 27 and 10 meters. This is expected to result in conservative analysis because of the smaller measurement interval (as compared to the RG 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," Revision 1, dated March 2007 (ADAMS Accession No. ML070350028) recommended 50 meter measurement interval). This interval of 17 meters, as opposed to the recommended 50 meters, would typically yield a higher occurrence of stable and unstable conditions. Wind speed and wind direction data used in the atmospheric dispersion analyses from the onsite meteorological tower 1A were measured at heights of 34 feet (10 meters) and 92 feet (28 meters) above tower grade.

The set of meteorological data used in the current LAR atmospheric dispersion analyses from tower 1A was previously reviewed by NRC staff and discussed in the safety evaluation (SE) for

PBAPS, Units 2 and 3, License Amendment Nos. 269 and 273. As stated in the SE for Amendments Nos. 269 and 273, the NRC staff performed a quality review of the ARCON96 hourly meteorological database using the methodology described in NUREG-0917, "Nuclear Regulatory Commission Staff Computer Programs for Use with Meteorological Data." As expected, the staff found that stable and neutral atmospheric conditions were generally reported to occur more frequently at night and more unstable and neutral conditions during the day. The staff also noted a very high incidence of stable measurements on tower 1A due to the reasons mentioned in the previous paragraph.

In the SE for Amendments Nos. 269 and 273, the NRC staff noted that wind speed, wind direction, and stability class frequency distributions for each measurement channel were reasonably similar from year to year. However, the staff discovered an unusually high occurrence of low wind speeds (less than 0.5 miles per hour) recorded for tower 1A during 1984, as compared to 1985 through 1988, and revealed that wind speed measurements during that same year on all towers were recorded to the nearest mile per hour and wind direction measurements were recorded to the nearest 5° interval. The staff performed a random set of ARCON96 calculations using only the 1985 through 1988 meteorological data and compared these results to the licensee's calculations using the complete 1984 through 1988 meteorological dataset. The staff found no significant differences between the two sets of generated χ/Q values.

The NRC staff reviewed the available information relative to the onsite meteorological measurements program and the ARCON96 meteorological data input files provided by the licensee. On the basis of the review and the acceptability of the meteorological data, the staff finds that the data provided an acceptable basis for making atmospheric dispersion estimates from postulated release points during an FHA.

MCR Atmospheric Dispersion Factors

The licensee established new MCR χ/Q values for ground-level releases from PBAPS Units 2 and 3 based on postulated accidental releases of material to the atmosphere using guidance provided in RG 1.194. These new atmospheric dispersion estimates were calculated using the ARCON96 onsite atmospheric dispersion computer code. Regulatory Guide 1.194 states that ARCON96 is an acceptable methodology for assessing MCR χ/Q values for use in DBA radiological analyses. The NRC staff concludes that there are no unusual siting, building arrangements, release characterization, meteorological regimes, or terrain conditions that prevent the use of this model and also evaluated the licensee's source-receptor configuration and direction. The staff determined there are no unusual conditions that would not support the LAR.

Atmospheric dispersion factors resulting from postulated post-FHA release points (11 sources total) were determined using tower 1A data only, as these data were measured in the river valley adjacent to the PBAPS. Wind speed, wind direction, and atmospheric stability class measured at the 10 meter and the 28 meter heights were used as input for the calculations. All sources were modeled as ground-level releases. When generating ground-level release χ/Q values for the MCR intake analysis, the licensee used a minimum wind speed parameter of 0.2 and a surface roughness length of 0.1, as opposed to using the ARCON96 program defaults of 0.5 and 0.2, respectively. The NRC staff performed the analysis using the program defaults, in

addition to the licensee's parameters, and determined there to be no significant difference in values.

The licensee used the "taut string" methodology, described in RG 1.194 as "the shortest horizontal distance between the release point and the intake," for releases through the units' roof scuttles, personnel access doors, and railway bay doors. However, the "taut string" methodology was not utilized for releases from ground hatches because the release path must travel through the radwaste building structure before reaching the MCR intake. For ground-level hatches, the licensee took the shortest straight-line horizontal distance between the release point and the MCR intake within the intervening building, consistent with RG 1.194.

In summary, the NRC staff qualitatively reviewed the inputs for the ARCON96 computer model runs for the MCR χ/Q value calculations and found them consistent with site configuration and NRC staff practice. Additionally, the NRC staff performed confirmatory analysis and reviewed the licensee's χ/Q values (listed in Table 1 below) and determined that they are acceptable for use in MCR dose assessment associated with this LAR.

EAB and LPZ Atmospheric Dispersion Factors

The licensee used previously generated EAB and LPZ χ/Q values at distances of 823 meters (0.511 miles) and 7300 meters (4.54 miles), respectively, extracted directly from the PBAPS UFSAR, Section 2.3.7.3.3 table, "EAB and LPZ χ/Q Modeling Results." The χ/Q values in this section of the UFSAR were calculated for the EAB and LPZ based on possible release points from the reactor building stacks, the turbine building, personnel access doors, railway bay doors, roof scuttles, and ground-level hatches for both Units 2 and 3. The licensee continues to use approved χ/Q values that are currently part of the licensing basis for the plant (in the case of ground-level hatch releases and releases through roof scuttles, personnel access doors, and railway bay doors). The NRC staff finds the EAB and LPZ atmospheric dispersion factors acceptable for dose estimates in support of this LAR.

Table 1: ARCON96 MCR Intake χ/Qs (seconds per meters^3)

Release Point	0-2 hour	2-8 hour	8-24 hour	1-4 day	4-30 day
Ground Hatch H18	1.48E-03	6.87E-04	2.45E-04	2.10E-04	1.65E-04
Ground Hatch H19	1.75E-03	9.51E-04	3.05E-04	2.82E-04	2.44E-04
Ground Hatch H20	5.59E-03	4.61E-03	1.63E-03	1.55E-03	1.34E-03
Ground Hatch H21	6.20E-03	5.35E-03	2.14E-03	1.84E-03	1.61E-03
Ground Hatch H23	1.58E-03	1.42E-03	6.25E-04	4.41E-04	3.86E-04
Unit 2 Roof Scuttle	1.90E-03	1.33E-03	5.96E-04	4.18E-04	3.27E-04
Unit 3 Roof Scuttle	1.30E-03	6.10E-04	3.18E-04	2.19E-04	1.54E-04

Release Point	0-2 hour	2-8 hour	8-24 hour	1-4 day	4-30 day
Unit 2 Personnel Access Doors	7.54E-04	5.09E-04	2.16E-04	1.46E-04	1.06E-04
Unit 3 Personnel Access Doors	1.04E-03	6.39E-04	2.72E-04	1.87E-04	1.64E-04
Unit 2 Railway Bay Doors	4.54E-04	3.48E-04	1.53E-04	1.06E-04	7.95E-05
Unit 3 Railway Bay Doors	4.36E-04	2.38E-04	1.07E-04	7.62E-05	5.59E-05

3.1.3 Fuel Handling Accident Radiological Consequences

The licensee performed a survey of the various conditions that could exist when the drywell is open. The survey revealed that the greatest potential for a release of radioactive material occurs when the drywell head and reactor vessel head have been removed. The licensee determined that the only accident that could result in the release of significant quantities of fission products to the SC during this mode of operation is one resulting from the accidental dropping of a fuel bundle onto the top of the reactor core. When an FHA is postulated to occur in the spent fuel pool (SFP), it is assumed that the dropped bundle will rest on the tops of the bail handles of the fuel in the storage racks. As discussed in the SE for the PBAPS AST license amendments, the NRC staff found that the licensee's conclusion that the consequences of an FHA over the reactor core bounds those for an FHA over the SFP to be acceptable. This DBA assumes an inoperable SC integrity and that the postulated release pathways to the environment are through the various hatches listed in the PBAPS, Units 2 and 3 TS definitions describing the term for recently irradiated fuel.

The fission product inventory that constitutes the source term for the revised FHA utilizing the AST methodology is the gap activity in the fuel rods assumed to be damaged as a result of the fuel drop in the reactor core. A maximum of 172 fuel rods are assumed to fail as a result of the assembly drop. Volatile constituents of the core fission product inventory migrate from the fuel pellets to the gap between the pellets and the fuel rod cladding during normal power operations. The fission product inventory in the fuel rod gap of the damaged fuel rods is assumed to be instantaneously released to the surrounding water as a result of the accident consistent with RG 1.183, Appendix B, Regulatory Position 1.3.

Table 3 in Section 3.2 of RG 1.183 lists fractions of the core inventory assumed to be in the gap for the various radionuclides for non-LOCA events. As discussed in Section 4.1 of Attachment 3 to the LAR, the licensee used the values in Table 3 as part of it analysis. Note 11 for Table 3 in RG 1.183 states, in part, that the release fractions listed in the table have been determined to be acceptable for use with currently approved light water reactor fuel with a peak burnup up to 62,000 megawatt days per metric ton of uranium (MWD/MTU), provided that the maximum linear heat generation rate (LHGR) does not exceed 6.3 kilowatts per foot (kw/ft) peak rod average power for burnups exceeding 54,000 MWD/MTU. Section 2.4 of Attachment 3 to the LAR states that the PBAPS fuel management program has determined that there will be no fuel assemblies being exposed to a maximum LHGR that exceeds 6.3 kw/ft at fuel burnups between 54 and 62 GWD/MTU. As such, the release fractions used by the licensee are consistent with the guidance in RG 1.183.

Fission products released from the damaged fuel are scrubbed from the gases by passage through the overlaying water in the reactor cavity or SFP, depending on their physical and chemical form. Following the guidance in RG 1.183, Regulatory Position 3.5 and Appendix B, Section 1.3, the licensee assumed that the chemical form of radioiodine released from the fuel to the SFP consists of 95 percent cesium iodide (CsI), 4.85 percent elemental iodine, and 0.15 percent organic iodide. The CsI released from the fuel is assumed to completely dissociate in the pool water, and because of the low pH of the pool water, the iodine as part of the CsI re-evolves as elemental iodine. This results in a final iodine distribution of 99.85 percent elemental iodine and 0.15 percent organic iodine. The licensee assumed that the release to the pool water and the chemical redistribution of the iodine species occurs instantaneously. In accordance with RG 1.183, Appendix B, Regulatory Position 2, the licensee credited an overall iodine decontamination factor (DF) of 200 for a water cover depth of 23 feet. Consistent with RG 1.183, the licensee credited an infinite DF for the remaining particulate forms of the radionuclides contained in the gap activity. In accordance with RG 1.183, the licensee did not credit decontamination from water scrubbing for the noble gas constituents of the gap activity.

The licensee assumes the release to the environment is an unfiltered release through the various hatches and does not model a reduction in the amount of radioactive material available for release by any filter systems. The radioactive material that escapes from the reactor cavity is assumed to be released to the environment over a 2-hour time period. Consistent with RG 1.183, Appendix B, Section 4.1, the radioactive material that escapes to the environment is released over a 2-hour time period, ensuring that at least 99.9 percent of the gaseous activity will be released.

Activity released to the environment is transported by atmospheric dispersion to the MCR heating, ventilation, and air conditioning (HVAC) intake and to the offsite EAB and LPZ dose receptors. As previously discussed, the licensee developed a new set of atmospheric dispersion factors for the MCR air intake from the various ground-hatch release pathways. The EAB and LPZ atmospheric dispersion factors previously approved by License Amendment Nos. 269 and 273 were used in this analysis. Consistent with RG 1.183, Regulatory Position 4.1.7, no correction is made for depletion of the effluent plume by deposition on the ground.

The MCR habitability for normal operation of the PBAPS HVAC system supplies outside air that is drawn through a filter by a fresh air supply fan and is discharged to the inlet of the air conditioning supply fan suction. The air is then discharged to duct work leading to the MCR and adjacent offices. The licensee, in its analysis of MCR doses, considered both crediting and not crediting the initiation of the main control room emergency ventilation (MCREV) for certain release pathways. For those release pathways crediting the initiation of the MCREV, an unfiltered inleakage of 500 cubic feet per minute (cfm) is used. For those release pathways that do not take credit for MCREV filtration, an MCR unfiltered inleakage of 1,600 cfm is used. The NRC staff finds the MCR flow rate assumptions to be consistent with the licensing basis described in License Amendment Nos. 269 and 273. TS 3.3.7.1 for Unit 2 and Unit 3 requires the MCREV to be operational during movement of irradiated fuel assemblies in secondary containment. As such, the licensee modeled the MCREV to be operational for releases through ground hatches H17, H18, H33, and H1/H19 for Unit 2, and H21, H22, H34 and H2/H20 for Unit 3. Table 2 below specifies the ground-hatch release pathways and associated dose for which the licensee credited the initiation of the MCREV.

The licensee's FHA results of the radiological consequences (see Table 2) from a release to the environment through hatches H15, H16, H17, H18, H1/H19, and H33 for Unit 2; and H2/H20, H21, H23, H24, and H34 for Unit 3 are within allowable acceptance criteria, after the given fuel decay times. As such, these hatches can remain open during the movement of irradiated fuel after the given fuel decay times. The NRC staff found that the licensee's evaluations of modeling the fuel decay time are consistent with RG 1.183, Regulatory Position 3.1. Regulatory Position 3.1 states that for events postulated to occur while the facility is shutdown, radioactive decay from the time of shutdown may be modeled.

For PBAPS, Unit 2, the licensee's revised FHA demonstrates that the resulting radiological dose consequences from the various release pathways, including the ground-level hatches, are within regulatory requirement reference values in 10 CFR 50.67 and the accident-specific acceptance criteria in Regulatory Position 4.4 of RG 1.183, after a fuel decay time of 24 hours.

For PBAPS, Unit 3, the licensee's revised FHA demonstrates that the resulting radiological dose consequences from the various release pathways, including the ground-level hatches, are within regulatory requirements reference values in 10 CFR 50.67, and the accident-specific acceptance criteria in Regulatory Position 4.4 of RG 1.183 with varying fuel decay times between 24 to 312 hours. The licensee explained that the varying fuel decay times reflects the severity of the new set of atmospheric dispersion factors now being located in unfavorable wind sectors. The licensee's results demonstrate hatch H2 can be opened after a fuel decay time of 288 hours, and that hatches H21, H22, and H34 can be opened after a fuel decay time of 312 hours, to allow MCR doses to be maintained below the FHA accident-specific acceptance criteria. Hatches H23 and H24 can be opened during irradiated fuel movement after a minimum fuel decay time of 24 hours. The NRC staff found that the licensee's evaluation of the radiological consequences of the revised FHA with varying fuel decay times for certain hatch releases is consistent with RG 1.183, Regulatory Position 3.1.

Table 2: Licensee Revised FHA Results for the EAB, LPZ, and MCR

FHA Release Point	Fuel Decay Time (Hours)	FHA Dose		
		EAB (rem TEDE)	LPZ (rem TEDE)	MCR (rem TEDE)
H17, H18, and 33 (Note 1)	24	2.99	0.453	3.17
H1/H19 (Note 1)	24	2.99	0.453	3.75
H2/H20 (Note 1)	288	0.804	0.122	4.52
H21, H22, and H34 (Note 1)	312	0.735	0.111	4.59
H23, H24, H15, and H16 (Note 2)	24	2.99	0.453	3.58
Acceptance Criteria (rem TEDE)		6.3	6.3	5.0

Note 1: MCREV initiation is credited with CR unfiltered inleakage of 500 cfm.
Note 2: MCREV initiation is not credited with CR in normal mode of operation.

3.1.4 Radiological Consequences Conclusion

The NRC staff evaluated PBAPS's proposed changes to the current licensing basis FHA. The NRC staff performed a review and confirmatory analysis of the radiological consequence of the revised FHA using RG 1.183 AST methodology and a newly developed set of MCR atmospheric dispersion factors. The NRC staff found that the modeling assumptions for the revised FHA analysis described above are consistent with the guidance on modeling assumptions described in RG 1.183 to evaluate the radiological consequences of a FHA. Based upon the results of the FHA analysis, the NRC staff finds that the licensee demonstrated that with the requested changes, the dose consequences remain within the regulatory guidance provided by RG 1.183 and the limits in 10 CFR 50.67.

3.2 Evaluation of TS Changes

3.2.1 Unit 2, TS 1.1 Change

As shown in SE Section 2.2.1, the current PBAPS, Unit 2, TS 1.1 definition for RECENTLY IRRADIATED FUEL includes a fuel decay time requirement of 24 hours and a requirement that hatches H15, H16, H17, H18, H19, and H33 be closed during movement of any irradiated fuel in SC. The licensee requested that the PBAPS, Unit 2, TS 1.1 definition for RECENTLY IRRADIATED FUEL be revised to remove the requirement that the hatches be closed. The revised PBAPS, Unit 2, TS 1.1 definition would read as follows:

> RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 24 hours.

As discussed in SE Section 3.1.3, the revised FHA analysis for PBAPS, Unit 2 shows that EAB, LPZ, and MCR doses are within acceptable limits after a 24-hour fuel decay time, with hatches H1, H15, H16, H17, H18, H19, and H33, remaining opening during movement of recently irradiated fuel in SC. Therefore, the NRC staff finds that the proposed change to the PBAPS, Unit 2 definition is consistent with the revised FHA analysis.

3.2.2 Unit 3, TS 1.1 Change

As shown in SE Section 2.2.2, the current PBAPS, Unit 3, TS 1.1 definition for RECENTLY IRRADIATED FUEL includes a 24-hour fuel decay time requirement and a requirement that hatches H20, H21, H22, H23, H24, and H34 be closed during movement of any irradiated fuel in SC. The licensee requested that the PBAPS, Unit 3, TS 1.1 definition for RECENTLY IRRADIATED FUEL be revised to read as follows:

> RECENTLY IRRADIATED FUEL is fuel that has occupied part of a critical reactor core within the previous 312 hours. This 312-hour time period may be reduced to 24 hours if secondary containment hatches H2, H21, H22 and H34 are closed.

As discussed in SE Section 3.1.3, the revised FHA analysis for PBAPS, Unit 3 shows that EAB, LPZ, and MCR doses are within acceptable limits with varying fuel decay times between 24 to 312 hours. The licensee's results demonstrate hatch H2 can be opened after a fuel decay time of 288 hours, and that hatches H21, H22, and H34 can be opened after a fuel decay time of

312 hours. Hatches H23 and H24 can be opened during irradiated fuel movement after a minimum fuel decay time of 24 hours. The NRC staff finds that the proposed change to the PBAPS, Unit 3 definition is consistent with the revised FHA analysis.

3.3 Secondary Containment Issues Review

As part of the review of this LAR, the NRC staff requested that the licensee provide additional information to confirm several miscellaneous issues regarding the SC. The licensee provided a response to the staff's request in its letter dated January 13, 2015. The following is a brief summary of this portion of the review.

3.3.1 SC Boundary

The NRC staff noted that during its review of the PBAPS Updated Final Safety Analysis Report, the staff could not find where the boundaries of the SCs for PBAPS, Units 2 and 3, were clearly defined, either with words and/or with plant drawings. The staff requested that the licensee provide documentation of the plant drawings and plant procedures that establish control of the PBAPS SC. In its letter dated January 13, 2015, the licensee provided plant drawings showing the SC boundaries. The licensee also discussed a plant procedure that provides administrative requirements, responsibilities, and controls with respect to SC. The information provided by the licensee provided sufficient information to demonstrate the location of the SC boundaries, as well as control of the SC boundaries.

3.3.2 Identification of Hatches H1 and H2

The NRC staff cited several excerpts from Calculation PM-1059, Revision 5 (Attachment 3 to the application dated July 25, 2015) that seemed to indicate that hatch H1 (Unit 2) and hatch H2 (Unit 3) were ground-level hatches. These hatches are actually in the ceiling of the respective HPCI rooms. In its letter dated January 13, 2015, the licensee stated that PBAPS uses a calculation database to track administrative type changes needed for future calculation revisions and that this issue has been added to the database for inclusion in the next appropriate PM-1059 calculation revision. The license's response adequately resolved the staff's concern.

3.3.3 Potential Impact on other TSs due to Revised FHA Analysis

Based on SRP 15.7.4, Sections I.3 and III.4, the NRC staff asked the licensee if the proposed changes to the FHA analysis in calculation PM-1059, Revision 5, had any impact on the "Allowable Value" in TS Table 3.3.6.2-1 (i.e., 16.0 millirems per hour) 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 would be impacted. In its letter dated January 13, 2015, the licensee indicated that the purpose of calculation PM-1059, Revision 5, was to perform a bounding dose analysis for periods of time when SC will not be required by the TSs and the associated ground-level release exterior hatches will be opened. During these conditions, the TS Table 3.3.6.2-1, Function 3 and Function 4 instruments would not be required to be operable. Therefore, there would not be an impact on the TS instrument allowable value as a result of this LAR. The licensee's response adequately resolved the staff's concern.

3.3.4 MCR Unfiltered Inleakage

Section 3.3.3, "Infiltration Pathways," of RG 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 Susceptibility," of NEI 99-03, "Control Room Habitability Guidance" (Ref. 16), for further guidance on infiltration pathways.

Based on NRC staff review of Exelon's calculations PM-1059, Revision 5, and PM-1170, Revision 0 (Attachments 3 and 4 to the application dated July 25, 2014, respectively), and the guidance from RG 1.194 cited above, the staff asked the licensee to further justify the CRE dose rates, since the potential infiltration locations are not specifically identified in the latest PBAPS Tracer Gas Test Report.

In its letter dated January 13, 2015, the licensee discussed, in detail, the operation of the MCREV system. The MCREV operates during a design-basis event, such as an FHA. The licensee indicated, in part, that:

1) The MCREV only utilizes a pressurization of operation, which results in a positive pressure in the CRE.

2) The differential pressures between the CRE and the adjacent areas were verified to be positive during the last tracer gas testing performed on the CRE.

3) The pressurization mode design of the MCREV minimizes the possibility of inleakage into the CRE and results in only limited sources of air inleakage.

4) Vulnerable sources for inleakage, such as ductwork that traverses through the CRE, have been sealed. Also, periodic inspections are performed to ensure that this potential air inleakage pathway is not significant.

The licensee's response adequately resolved the staff's concern.

3.3.5 Review of TSs Applicable to Recently Irradiated Fuel

The NRC staff reviewed the PBAPS TSs for which the limiting conditions for operation (LCO) applicability applies to plant operation during movement of recently irradiated fuel. The TSs reviewed are as follows:

1) TS 3.3.6.2, "Secondary Containment Isolation Instrumentation"
2) TS 3.6.4.1, "Secondary Containment"
3) TS 3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)"
4) TS 3.6.4.3," Standby Gas Treatment (SGT) System"

The staff's review determined that the above TSs currently contain appropriate operability requirements or actions during movement of recently irradiated fuel. The staff did not identify any unintended impacts to the above TSs due to the proposed LAR.

3.4 Technical Evaluation Conclusion

Based on the discussion in SE Sections 3.1 through 3.3, the NRC staff concludes that the proposed license amendments for PBAPS, Units 2 and 3, are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (79 FR 58816). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: July 17, 2015

July 17, 2015

Mr. Bryan C. Hanson
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 - ISSUANCE OF AMENDMENTS RE: REVISE TECHNICAL SPECIFICATION DEFINITION FOR RECENTLY IRRADIATED FUEL (TAC NOS. MF4523 AND MF4524)

Dear Mr. Hanson:

The Commission has issued the enclosed Amendment Nos. 298 and 301 to Renewed Facility Operating License Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station, Units 2 and 3. These amendments consist of changes to the Technical Specifications (TSs) and Facility Operating Licenses in response to your application dated July 25, 2014, as supplemented by letters dated January 13, 2015, and May 26, 2015.

The amendments change the definition in the TSs for RECENTLY IRRADIATED FUEL. Specifically, the amendments revise requirements pertaining to secondary containment hatches in order to facilitate activities performed during refueling outages.

A copy of the safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's Biweekly *Federal Register* Notice.

Sincerely,
/RA/

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

Docket Nos. 50-277 and 50-278

Enclosures:
1. Amendment No. 298 to Renewed DPR-44
2. Amendment No. 301 to Renewed DPR-56
3. Safety Evaluation

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OFFICE	NRO/TL*	STSB/BC	OGC	LPL1-2/BC	LPL1-2/PM
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