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10 CFR 50.90

September 26, 2003

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

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

Subject: License Amendment Request
Change to the Fire Protection Program Concerning Carbon Dioxide Fire Suppression Systems Actuation

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (Exelon), hereby requests amendment to Facility Operating License (FOL) Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, respectively. Exelon is submitting this request to obtain NRC approval to implement a change to the PBAPS Fire Protection Program (FPP), which is common to both Unit 2 and Unit 3. Specifically, the change to the FPP involves converting the existing carbon dioxide ($CO_2$) fire suppression systems, located in the Cable Spreading Room and each of the four Emergency Diesel Generator Rooms, from automatic to manual actuation systems. Exelon has determined that there are personnel safety and plant safety risks associated with the automatic actuation capability of these $CO_2$ fire suppression systems. Manual actuation of these systems will continue to satisfy the fire protection objectives regarding the capability to achieve and maintain safe shutdown in the event of a fire.

Exelon has concluded that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c).

Exelon requests approval of the proposed change by September, 2004, with implementation following completion of fire suppression system modifications, as appropriate.

This letter contains two (2) regulatory commitments. One involves upgrading existing one-hour rated fire barriers in the Cable Spreading Room to three-hour rated barriers. The purpose of the fire barrier upgrade is to eliminate the Appendix R, Section III.G.2.c requirement for automatic suppression in the fire area. The installation of three-hour rated fire barriers meets the requirements of Appendix R, Section III.G.2.a. The other commitment involves inclusion of the existing fire barriers around each emergency diesel generator day tank room into the fire barrier surveillance program.

The proposed change has been reviewed by the Plant Operations Review Committee, and approved by the Nuclear Safety Review Board.

A006

If you have any questions or require additional information, please contact Glenn Stewart at 610-765-5529.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

Executed on 09-26-03

M. P. Gallagher
Director, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Evaluation of the Proposed Changes

| | | |
|---|---|---|
| cc: | H. J. Miller, Administrator, Region I, USNRC | w/ attachment |
| | C. W. Smith, USNRC Senior Resident Inspector, PBAPS | " |
| | G. F. Wunder, Senior Project Manager, USNRC | " |
| | R. R. Janati - Commonwealth of Pennsylvania | " |

# Attachment

## Evaluation of Proposed Changes

### 1.0 DESCRIPTION

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (Exelon), hereby requests amendment to Facility Operating License (FOL) Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, respectively. Exelon is submitting this request to obtain NRC approval to implement a change to the PBAPS Fire Protection Program (FPP), which is common to both Unit 2 and Unit 3. Specifically, the change to the FPP involves converting the existing Carbon Dioxide ($CO_2$) Fire Suppression Systems, located in the Cable Spreading Room (CSR) and each of the four Emergency Diesel Generator (EDG) Rooms, from automatic to manual actuation systems. Exelon has determined that there are personnel safety and plant safety risks associated with the automatic actuation capability of these $CO_2$ fire suppression systems. Manual actuation of these systems will continue to satisfy the fire protection objectives regarding the capability to achieve and maintain safe shutdown in the event of a fire.

### 2.0 PROPOSED CHANGE

Section 2.C.(4) of the PBAPS, Unit 2 and Unit 3, FOLs regarding fire protection states:

> "The licensee 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 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:
>
> The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire."

The proposed activity involves changing the $CO_2$ fire suppression systems in specific plant areas from automatic actuation to manual actuation. The proposed change involves a change in the level of fire protection that could potentially be viewed as a decrease in the effectiveness of the FPP. Therefore, Exelon is submitting the proposed change for prior NRC review and approval in accordance with License Condition 2.C.(4). Exelon has evaluated the proposed FPP change and determined that an adequate level of fire safety is maintained based on the fire protection features described within this submittal.

## 3.0 BACKGROUND

PBAPS provided $CO_2$ fire suppression capability in the following plant rooms as part of original plant construction:

Cable Spreading Room (common room for both Units)
E-1 Emergency Diesel Generator Room
E-2 Emergency Diesel Generator Room
E-3 Emergency Diesel Generator Room
E-4 Emergency Diesel Generator Room

These systems were originally described to the NRC in the PBAPS Fire Protection Program Report (FPPR), dated March 1977. Each system was designed to provide total flooding capability using a low pressure $CO_2$ delivery system. The CSR was originally a manually actuated system. The $CO_2$ systems in the EDG rooms were originally automatic. The CSR was modified to an automatically actuated system as part of the post-Browns Ferry fire protection guidelines contained in Branch Technical Position (BTP) APCSB 9.1-5, Appendix A, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." Specifically, in a Safety Evaluation Report (SER) dated May 23, 1979, the NRC requested that PBAPS evaluate changing the manual CSR $CO_2$ system to automatic. In a February 21, 1980 letter, PBAPS committed to make the CSR $CO_2$ system automatic as captured in SER Supplement 1, dated August 14, 1980.

The current PBAPS FPP provides a description of the $CO_2$ systems in Section 2.8. In addition, each of the individual fire hazards analysis sections for each fire area, i.e., Section 5.3.19 (CSR), Section 5.3.34 (E-4 EDG), Section 5.3.35 (E-3 EDG), Section 5.3.36 (E-2 EDG) and Section 5.3.37 (E-1 EDG), provide a description of the systems.

In June 2002, the E-2 EDG $CO_2$ system inadvertently discharged $CO_2$ into the E-2 EDG room while the EDG was running and two personnel were in the room. The cause of the inadvertent actuation was an unused light bulb that dropped onto a printed circuit card resulting in the short circuit. The EDG automatically tripped in accordance with the $CO_2$ discharge logic. The two employees were able to leave the area without injury. Prior to this event, PBAPS was considering options to the automatic $CO_2$ systems based on the industry experience documented in NRC Information Notice 99-05, "Inadvertent Discharge of Carbon Dioxide Fire Protection System and Gas Migration." Following this event the personnel safety implications of automatic $CO_2$ systems became clear. Each of the $CO_2$ systems was blocked at the main isolation valve and the systems were declared inoperable per the respective Technical Requirements Manual (TRM) section. Compensatory measures were implemented per the TRM.

Based on this event, a decision was made to pursue a design change to make each of these $CO_2$ systems manually actuated. Advance approval from the NRC is requested to change these $CO_2$ systems from automatic to manual.

## 4.0 TECHNICAL ANALYSIS

The analysis that supports the change of the $CO_2$ system in each area will be described on an individual basis.

### 4.1 Emergency Diesel Generator Rooms

Fire Hazards Analysis: At PBAPS, the EDG rooms are located in a building separate from adjacent plant structures by approximately 30 feet. Each of the EDG rooms is a separate fire area with separation being provided by concrete walls with three-hour rated fire doors and penetration seals. The roof structure is also concrete. Each room contains a single EDG. Figure 1 provides a layout drawing of the EDG building. The specific fire areas associated with the EDG rooms are as follows:

E-1 EDG – Fire Area 46, FPP Section 5.3.37
E-2 EDG – Fire Area 45, FPP Section 5.3.36
E-3 EDG – Fire Area 44, FPP Section 5.3.35
E-4 EDG – Fire Area 43, FPP Section 5.3.34

The combustibles in the room consist primarily of lubricating oil and fuel oil. A fire in the EDG room is postulated to be a Class B fire involving either lube or fuel oil. The fuel oil day tank is located in a room within each EDG room that is separated from the remainder of the EDG room by a three-hour rated fire barrier. The barriers between each fuel oil day tank room and the corresponding EDG room will be added to the fire barrier surveillance program. The main fuel oil supply is located in underground tanks located outside of the EDG building and do not represent a fire exposure hazard. There are dikes located around the doors that separate each EDG room to prevent oil from flowing between the rooms.

Each of the EDG rooms is subjected to the administrative control program that addresses transient combustible materials and ignition sources (hot work activities). In addition, plant equipment operators perform daily tours of the EDG rooms. They ensure that any dripping oil is wiped-up and that there are no fire hazards in the area. Security also performs daily tours of the EDG rooms.

Each EDG room has 16 heat detectors installed at the ceiling. These detectors currently initiate the automatic $CO_2$ system. The 16 detectors are located in eight locations in groups of two adjacent heat detectors. Both heat detectors from the same location must actuate to initiate the current CO2 system. The heat detectors annunciate an alarm in the control room, specifically identifying the affected EDG room. The alarm response cards instruct the control room operator to dispatch the fire brigade immediately upon receipt of an EDG fire detection alarm.

Fire hydrants are located on both the east and west sides of the building. Both fire hydrants have adjacent hose houses that contain foam-making capability either with a foam cart or with foam buckets and eductors. The hose houses also contain hose carts to facilitate stretching hose from the hydrants to the affected EDG room. Fire extinguishers are available in each EDG room.

The Pre-Fire Strategy Plan for the EDG building has been revised to provide step-by-step instructions for manually actuating the $CO_2$ system in each EDG room. The actions necessary to manually discharge the $CO_2$ system into a specific EDG room can be accomplished without entry into the affected EDG room. The actions necessary to manually discharge the EDG $CO_2$ systems have been covered in fire brigade drills and in fire brigade classroom training.

The most credible scenario in which a fire in an EDG room could occur is during operation of the EDG. Operation of the EDG provides a heat/ignition source (the operating EDG), fuel (either lube or fuel oil) being pumped to the running EDG, as well as forced ventilation. When an EDG is running, an equipment operator is either in the room or dispatched to monitor the EDG. The equipment operator at the EDG can provide early notification of a fire to the main control room, shutdown the diesel, and initiate the $CO_2$ system manually.

In the event a fire occurs in an EDG room, it is assumed that the fire-affected EDG is unavailable. Power and control wiring between the EDG and it's Unit 2 and Unit 3 4kV switchgear are routed within the room and terminate at various panels associated with the EDG. Failure of these cables can affect the associated divisionalized Unit 2 and Unit 3 4kV switchgear; however, as demonstrated by the Appendix R safe shutdown analysis, these failures do not prevent achieving safe shutdown using the unaffected redundant equipment. The other 3 division EDGs and 4kV switchgear will remain available since the fire in a single EDG room will not affect key support systems for the remaining EDGs. A fire in an EDG room does not directly affect off-site power. Therefore, off-site power sources will be available. In addition, the Station Blackout (SBO) source will be available in the event of an EDG fire.

A fire is not postulated to occur in conjunction with an accident condition or severe natural phenomena. At PBAPS, the EDG takes combustion air from the room; therefore, the $CO_2$ system has been designed to shutdown the EDG upon $CO_2$ system actuation. The original design considered that an EDG could be damaged by the $CO_2$ starving the EDG of air. If the EDG was shutdown in advance, then the EDG could be restarted once the $CO_2$ had been vented from the room. An accidental discharge of $CO_2$ could result in the shutdown of an EDG while still needed to operate. In fact, the current $CO_2$ system logic locks out the automatic $CO_2$ discharge logic during a LOCA signal. A change to manual actuation would eliminate the potential of an accidental discharge that could adversely impact the EDG response to an accident.

Peach Bottom recently completed a Fire PRA that included the risk contribution of each EDG room both from a Unit 2 and a Unit 3 perspective. Overall, the EDG rooms contributed very little to the overall risk. Specifically, for Unit 2, the risk contribution was 0.3% to 0.4 % with the highest individual risk number of any room 1.38E-07. For Unit 3, the risk contribution was 0.3% to 0.6% with the highest individual risk number of any room 3.90E-07. It is important to note that these risk numbers were achieved without any credit being given for the detection or suppression system (automatic or manual) in any EDG room. Therefore, the risk numbers are not dependent on an automatic $CO_2$ system in an EDG room.

<u>Proposed Manual $CO_2$ System Design</u>

Heat detectors in each EDG room would provide an alarm to the main control room in the event of a fire. The existing piping and discharge nozzles would remain. A control panel will keep the pneumatically actuated relay to shutdown the EDG and the fans. This will occur at the start of

the discharge. To discharge the system in the event of a fire, the fire brigade or operator would manually actuate the $CO_2$ system for that EDG room. Detailed instructions for actuating the $CO_2$ system are provided in the pre-fire plan.

### 4.2 Cable Spreading Room

Fire Hazards Analysis: At PBAPS, the CSR is common for both Units 2 and 3. The CSR is located on elevation 150' in the Turbine Building, directly below the main control room and above the 4kV Switchgear rooms. The plant computer room is located in the center of the CSR. The CSR is part of the Main Control Room fire area (Fire Area 25, FPP Section 5.3.19) that includes the main control room (fire zone 25-108), the CSR (fire zone 25-78H), the computer room (fire zone 25-129), and the fan room (fire zone 25-108A). Walls and floor/ceiling assemblies to fire areas adjacent to the CSR have three-hour fire ratings. The floor/ceiling assembly between the main control room and the CSR is a smoke and hot gas boundary. It is not considered a fire rated barrier since both rooms are part of the same fire area. The walls between the computer room and the CSR are fire rated but are not credited for Appendix R since they are part of the same fire area. Figure 2 provides a layout of the CSR.

The CSR contains two runs of one-hour fire rated Thermo-Lag raceway encapsulation barriers. One section is located on the Unit 2 side and the other is on the Unit 3 side (refer to Figure 2). Three-hour rated fire barriers will be installed in conjunction with changing the $CO_2$ system to a manually actuated system.

The primary combustible material in the CSR is cable insulation from cable routed in trays within the room. However, the exposed cable insulation is fire resistant (IEEE 383 rated or equivalent). The cables located in the cable trays are low voltage instrument and control cables. A small number of cables carrying 480 volts are located in conduit. Thermo-lag is the secondary combustible in the room. There are minimal quantities of transient combustibles located in the room. Typically, transient combustibles are in the form of a temporary computer set-up outside of an instrument cabinet to take readings.

The CSR is subjected to the administrative control program that addresses transient combustible materials and ignition sources (hot work activities). In addition, plant equipment operators perform daily tours of the CSR and one aspect of the tour is to ensure that there are no fire hazards in the area. Security also performs daily tours of the CSR.

A fire in the CSR that is capable of igniting and sustaining a fire in the fire resistive cable insulation is difficult to postulate. The electrical cabinets in the room are low voltage (120 VAC or 125 VDC). The cabinets are generally sealed at the top, although some cabinets have side ventilation openings. There are no flammable/combustible liquids or gasses used or stored in the CSR. Work in the CSR is limited to activities associated with the equipment in the room.

The CSR has 25 smoke detectors located in the room. The number of detectors was increased from 4 to 25 as part of an earlier fire protection modification. The detectors are arranged in two zones to provide a cross-zoned configuration that was used for automatically actuating the $CO_2$ system (i.e., a detector from each zone is required to initiate discharge). Either detection zone initiates an alarm in the main control room as well as an alarm within the CSR. The second detector initiates the $CO_2$ discharge sequence, which includes shutdown of ventilation fans, closure of ventilation dampers and the start of the discharge delay timer. The CSR fire

detection panel is located directly outside the entry doors and uses a mimic display to graphically show the location of alarming detectors. Upon the receipt of an alarm an operator is immediately dispatched to the CSR per plant procedures. If there is any indication of a fire the operator will provide an immediate report to the control room and then attempt to extinguish the fire with a fire extinguisher provided in the room.

Fire hose stations are located directly outside of each of the entry doors into the CSR. Fire extinguishers are located within the CSR. Special nozzles are being obtained and will be mounted adjacent to the hose station located outside of each of the CSR doors. These nozzles are mounted on 10' long poles that will permit the fire brigade to apply water to the overhead stacked cable trays. The CSR has a room height of 14'; therefore, these 10' poles will allow the brigade to access all cable trays in the room.

The Pre-Fire Strategy Plan for CSR has been revised to provide step-by-step instructions for manually actuating the $CO_2$ system. The actions necessary to manually discharge the CO2 system into the CSR can be accomplished without entry into the CSR. The actions necessary to manually discharge the CSR $CO_2$ systems have been covered in fire brigade drills and in fire brigade classroom training.

In the event of a fire in the CSR, shutdown can be achieved and maintained using the alternate shutdown method as described in the FPP. The encapsulated cables in the CSR contain control cables for the safety relief valves and their long-term nitrogen supply. These valves are controlled from the ADS alternative control stations located in the switchgear rooms. Operation of these valves is not required to achieve hot shutdown, but is required to achieve cold shutdown from the alternative control stations.

Procedure SE-2, "CARDOX Injection Into the Cable Spreading Room," initiates a dual unit manual shutdown in the event of a $CO_2$ discharge in the CSR. This procedure has been in place for a number of years and is based on an analysis performed on the postulated effects of a $CO_2$ discharge on the equipment in the CSR. This analysis was based in part on the results of the incident and subsequent testing that was performed at TMI following a $CO_2$ discharge event at that plant. Industry experience has also shown that $CO_2$ from a discharge in the CSR may potentially migrate into the main control room or other plant areas.

The credible fire scenario for the CSR is a slow growth electrical fire. The existing detection system is a cross-zoned smoke detection system. The first detection alarm provides notification to the main control room. The second detection alarm initiates the fan shutdown and damper closure, and discharges the $CO_2$ into the room. In the event of a fire in the CSR, an operator will be dispatched to the room upon receipt of the first alarm in the main control room. However, with the $CO_2$ system in the automatic mode, the operator cannot enter the CSR without personal protective equipment, including self-contained breathing apparatus, and must wait for the remainder of the fire brigade to arrive before entering the room (2-in, 2-out rule). The concern is that the second detection alarm would initiate the $CO_2$ discharge and create a personnel safety hazard in the room.

Industry experience has shown that accidental $CO_2$ discharges are far greater than discharges for actual fires. Elimination of the potential for inadvertent discharges will decrease the risk during non-fire scenarios. The control room complex, which includes the CSR, was not included

in the recent Fire PRA revision, since NUREG-1150 addresses this area. However, a recent review of the CSR fire PRA scenarios (Reference 7.25) determined that, given the room features described above that minimize the actual fire hazard in the CSR and the actions taken to improve the manual fire fighting capability, including specific drills and training as well as smoke detection, there is virtually no difference between the fire risk outcome with an automatic or manual CO2 system in the room.

Proposed $CO_2$ System Design for the Cable Spreading Room

There are two aspects to the proposed configuration to the CSR associated with making the $CO_2$ suppression system manual. The first aspect will be upgrading the existing one-hour rated fire barriers to three-hour rated fire barriers. The purpose of the fire barrier upgrade is to eliminate the Appendix R, Section III.G.2.c, requirement for automatic suppression. The installation of three-hour rated fire barriers meets the requirements of Appendix R, Section III.G.2.a.

The second aspect is the physical change of the $CO_2$ suppression system from an automatic to manually actuated system. Currently, the plan is to maintain the existing cross-zoned smoke detection system. The first detection alarm would provide notification to the main control room. The second detection alarm will initiate the fan shutdown and damper closure (as well as sending another alarm to the main control room). In the event of a fire in the CSR, the smoke detection in the room will detect the fire while it is still in an incipient stage and provide an alarm to the control room, at which time an operator will be dispatched to investigate the alarm. The CSR is located in a central plant location, just below the main control room which will ensure a rapid response by an operator. The CSR fire detection panel will provide a graphic indication of the fire location, and can be used by the operator to determine the fire location. With the $CO_2$ system in a manual mode, the operator dispatched to the CSR upon the receipt of the alarm can enter the room immediately. In addition, the operator can identify and report the exact fire location, and use a portable fire extinguisher (there are several located within the CSR) to extinguish the fire. In the event the operator determines the fire is beyond the capability of a fire extinguisher, the $CO_2$ system can be initiated manually by the operator from just outside of the CSR.

The proposed strategy is expected to reduce the time to suppression for the majority of small, slow-growth fires that are postulated for the CSR.

## 5.0 REGULATORY ANALYSIS

### 5.1 No Significant Hazards Consideration

Exelon Generation Company, LLC has evaluated whether or not a significant hazards consideration is involved with the proposed activity by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. **Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response: No. The proposed activity involves changing the actuation of the carbon dioxide ($CO_2$) fire suppression systems from automatic to manual. With the exception

of the Emergency Diesel Generator (EDG) $CO_2$ system itself, the proposed activity does not result in any physical changes to safety-related structures, systems, or components (SSCs), or the manner in which safety-related SSCs are operated, maintained, modified, tested, or inspected. The EDG $CO_2$ system is safety related due to a potential common mode effect on all four EDGs in the event of a seismic event. Eliminating the automatic actuation function of the EDG $CO_2$ system will thereby eliminate a potential common mode effect on the EDGs. The proposed activity does not degrade the performance or increase the challenges of any safety-related SSCs assumed to function in the accident analysis. As a result, the proposed activity does not introduce any new accident initiators. In addition, fires are not an accident that is previously evaluated. Regardless, the proposed activity does not change the probability of a fire occurring since fire ignition frequency is independent of the method of fire suppression in the room. The consequences of the proposed activity are bounded by the fire safe shutdown analysis, which assumes fire damage throughout the affected fire area. The fire safe shutdown analysis for each of the areas addressed by the proposed activity demonstrates that safe shutdown can be accomplished assuming that no fire suppression is available. In addition, the removal of the automatic discharge capability of the $CO_2$ system in each of the EDG rooms significantly reduces the potential for an inadvertent discharge to shutdown the EDG if needed for non-fire accident conditions. Similarly, removal of the automatic discharge feature in the CSR significantly reduces the potential for an inadvertent discharge that would require (by procedure) immediate shutdown of both units, and the potential migration of $CO_2$ into the main control room or other areas. In the future, $CO_2$ discharge will only occur as a deliberate action to the most extreme fires, as one element of an overall graded approach to fire fighting in the affected areas.

Therefore, changing the actuation of the $CO_2$ fire suppression systems from automatic to manual does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

Response: No. The proposed activity involves changing the actuation of the $CO_2$ fire suppression systems from automatic to manual. With the exception of the Emergency Diesel Generator (EDG) $CO_2$ system itself, the proposed activity does not result in any physical changes to safety-related structures, systems, or components (SSCs), or the manner in which safety-related SSCs are operated, maintained, modified, tested, or inspected. The proposed activity does not degrade the performance or increase the challenges of any safety-related SSCs assumed to function in the accident analysis. As a result, the proposed activity does not introduce nor increase the number of failure mechanisms of a new or different type than those previously evaluated. The fire safe shutdown analysis assumes fire damage throughout the area consistent with a complete lack of fire suppression capability. The elimination of the potential for inadvertent actuation accomplished by changing the $CO_2$ systems from automatic to manual prevents the $CO_2$ systems from creating a challenge to existing accidents.

Therefore, changing the actuation of the $CO_2$ fire suppression system from automatic to manual does not create the possibility of a new or different kind of accident from any accident previously evaluated.

**3. Does the proposed change involve a significant reduction in a margin of safety?**

Response: No. The proposed activity involves changing the actuation of the $CO_2$ fire suppression systems from automatic to manual. With the exception of the Emergency Diesel Generator (EDG) $CO_2$ system itself, the proposed activity does not result in any physical changes to safety-related structures, systems, or components (SSCs), or the manner in which safety-related SSCs are operated, maintained, modified, tested, or inspected. The proposed activity does not degrade the performance or increase the challenges of any safety-related SSCs assumed to function in the accident analysis. The proposed activity does not impact plant safety since the conclusions of the fire safe shutdown analysis remain unchanged.

Therefore, changing the actuation of the $CO_2$ fire suppression system from automatic to manual does not involve a significant reduction in a margin of safety.

Based on the above, Exelon Generation Company, LLC concludes that the proposed changes to the Peach Bottom Atomic Power Station Fire Protection Program present no significant hazards considerations under the standards set forth in 10 CFR 50.92(c) and accordingly, a finding of "no significant hazards consideration" is justified.

**5.2 <u>Applicable Regulatory Requirements/Criteria</u>**

This section will address the change of the $CO_2$ systems from automatic to manual actuation in terms of regulatory requirements and commitments. The regulatory analysis will be divided into sections based on the $CO_2$ system being addressed. PBAPS is committed to compliance with the guidance in Appendix A to BTP APCSB 9.5-1 and to specific portions of 10 CFR 50, Appendix R. Specific compliance to these documents is described in a series of Fire Protection Safety Evaluation Reports and approved exemption requests and is summarized in the FPP. An overview of the PBAPS fire protection licensing bases will be provided first.

General Design Criterion (GDC) 3, "Fire protection," of Appendix A to 10 CFR Part 50 requires, in part, that fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. PBAPS fire detection and fighting systems are designed to meet the requirements of GDC 3.

Following the Browns Ferry fire in 1975, the NRC issued BTP APCSB 9.5-1, "Fire Protection for Nuclear Power Plants." Subsequently, the Staff issued BTP APCSB 9.5-1, Appendix A, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." NRC letters dated May 11, 1976, and September 27, 1976, requested that PBAPS provide a comparison to the BTP. PBAPS submitted a compliance review of Appendix A to BTP APCSB 9.5-1 to the NRC in March 1977 referred to as the Fire Protection Program Report (FPPR). The NRC issued a Fire Protection Safety Evaluation

Report (FPSER) in May of 1979, followed by a series of Supplemental FPSERs. There was considerable correspondence between PBAPS and the NRC during this period. Specific documents will be referenced where they are applicable to the $CO_2$ system in the individual sections below.

10CFR 50, Appendix R, Fire Protection Programs for Nuclear Power Facilities Operating Prior to January 1, 1979, was formally issued in 1981. Appendix R specified that Sections III.G, (L), J and O applied to all plants operating prior to 1979. However, where a licensee had open items remaining from prior BTP related FPSERs, applicable portions of Appendix R could be applied. Also, there were several exemption requests submitted by PBAPS regarding Appendix R requirements. In cases where the NRC approved these exemption requests, Safety Evaluation Reports were provided. Where specific PBAPS or NRC documents are applicable to the $CO_2$ systems they will be referenced in the individual sections below.

**Emergency Diesel Generator Rooms**

Each of the four EDG rooms was provided with an automatic $CO_2$ system as part of original plant construction. The automatic $CO_2$ systems in each of the EDG rooms were described to the NRC in the PBAPS Fire Protection Program Report dated March 1977. This submittal was made in response to the post-Browns Ferry fire protection guidelines contained in BTP APCSB 9.5-1. Appendix A to BTP APCSB 9.5-1 addresses fire protection in EDG rooms in Section F.9, "Diesel Generator Areas." One requirement is separation from other plant areas and from each other by three-hour rated barriers. The second requirement is for automatic fire suppression and detection along with drainage and smoke venting capability. The third requirement addresses separation of day tanks from the EDGs. As noted in the fire hazards analysis the EDG rooms are in a separate building and each EDG is separated from the adjacent EDG by three hour rated fire barriers. Automatic detection is provided in each EDG room and curbs have been installed around each door to prevent oil from passing under doors and between rooms. Smoke venting can be achieved by opening the large exterior watertight door. The day tanks are separated from the EDGs by a three-hour rated fire barrier. Therefore, compliance with Appendix A for plants operating as of July 1, 1976, as applied to PBAPS will continue to be met with the exception of automatic fire suppression.

The May 1979 FPSER notes that three-hour rated barriers separate each EDG, and the day tanks are separated within each EDG room by a three-hour rated fire barrier. The FPSER also addresses the consequences of an unsuppressed fire in an EDG room as the loss of one division of safety related equipment if both normal and backup offsite power was unavailable. This remains true now. An EDG would be lost in the event that a fire in an EDG room was unsuppressed. It should be noted that in the event of a fire in an EDG room with an automatic $CO_2$ system, the EDG would be still be unavailable for two reasons. First, an automatic $CO_2$ initiation will trip the EDG (and HVAC fan shutdown) either automatically by design, or by air starvation. Second, it is likely that the fire would involve the EDG itself (either fuel oil or lube oil) and force a shutdown. Therefore, the immediate consequences to the plant, i.e., the loss of the affected EDG, would be the same for either automatic $CO_2$ initiation or for no suppression.

10 CFR 50, Appendix R does not have any specific fire protection requirements for EDG rooms. Since redundant shutdown capability is available outside of each EDG room, the critical requirement is three-hour separation between the EDGs and redundant equipment. Not only are the EDGs separated by three-hour rated barriers from one another, but they are also separated from the other off-site power sources. Therefore, the requirements of 10 CFR 50, Appendix R are met without automatic $CO_2$ suppression in the EDG rooms.

**Cable Spreading Room**

Appendix A to BTP APCSB 9.5-1 addresses fire protection in the CSR in Section F.3, "Cable Spreading Rooms." This section states that a water based automatic fire suppression system should be installed in the CSR. The CSR was provided with a manual $CO_2$ fire suppression system as part of original plant construction. The manual $CO_2$ system in the CSR was described to the NRC in the PBAPS Fire Protection Program Report dated March 1977. The May 1979 FPSER addresses the CSR in Section 5.3. The potential for damaging safety-related equipment for both units and the need to shutdown the plant outside the main control room was described in the, "Consequences if no fire suppression was available," section of the FPSER. In addition, this section noted that PBAPS had committed to install additional smoke detectors and requested that PBAPS evaluate the practicality and need of changing the manual $CO_2$ system to automatic. At that time PBAPS increased the number of smoke detectors from four to 25 and provided a graphic annunciation panel to identify which detectors are in alarm. The $CO_2$ system was also modified to an automatically initiated system using a cross-zoned detection approach. Subsequent FPSERs accepted the additional detectors and the change to the $CO_2$ system to automatic.

The consequences of a fire in the CSR with manual $CO_2$ fire suppression will not change. The increase in the number of smoke detectors from 4 to 25 ensures prompt detection of a fire in the CSR. The type of combustibles located in the CSR is consistent with a slow growth fire. The manual $CO_2$ system will permit rapid manual action using hand held fire extinguishers by the fire brigade. The manual $CO_2$ system provides a back-up in the unlikely event of a significant fire in the CSR. The fire safe shutdown analysis demonstrates that the plant can safely shut down in the event of a fire in the CSR.

Appendix R to 10 CFR 50 does not specifically address the fire protection requirements for CSRs. However, Appendix R provides specific fire area separation requirements in Section III.G. Appendix R compliance for Section III.G is currently achieved in two methods within the CSR. The first method of Appendix R compliance is by alternative shutdown capability. Since virtually all of the cables routed to the main control room are routed through the CSR, the CSR is part of the main control room fire area and as such requires alternate shutdown capability per Appendix R section III.G.3. For the fire area that contains both the main control room and the CSR, alternate shutdown is provided using an alternate shutdown panel in a separate fire area along with other manual actions using procedural guidance to achieve and maintain hot and then cold shutdown. Section III.G.3 requires fire detection and "fixed" fire suppression in the area under consideration for Alternate Shutdown.

Manually actuated fire suppression systems have been determined to be acceptable to meet the requirement for "fixed" fire suppression systems. Therefore, a manually actuated $CO_2$ system will meet the requirements of a fixed fire suppression system and the existing smoke detection system will meet the detection requirements of Appendix R, Section III.G.3.

The second method of compliance is by protection of several raceways located in the CSR. The cables in the raceway need to be operable in the event of a fire in the CSR. Currently, these raceways are provided with a one-hour rated fire barrier encapsulation to meet Appendix R, Section III.G.2.c (one-hour fire barrier with automatic fire suppression and fire detection). A three-hour rated fire barrier will be installed in conjunction with making the $CO_2$ system manually initiated. A three-hour rated fire barrier will comply with Appendix R, Section III.G.2.a, which does not require automatic suppression capability.

In a series of letters to the NRC dated, March 29, 1985, June 6, 1985 and March 7, 1986, PBAPS transmitted structural steel evaluations, described modifications and requested exemptions from Appendix R, Section III.G.2, regarding structural steel that were an integral part of a fire barrier separating fire areas. The floor/ceiling assembly between the main control room and the CSR was identified in these letters as a barrier that is supported by structural steel. In a letter dated December 31, 1986, the NRC accepted the analytical approach to determine which structural steel required protection. This letter noted that the CSR ceiling was not a barrier required by Appendix R, Section III.G.2 since the CSR and the main control room are part of the same fire area. Therefore, there is no impact to this exemption by changing the $CO_2$ system from automatic to manual.

**Conclusion**

In conclusion, based on the considerations discussed above,

1) There is reasonable assurance that the health and safety of the public will not be endangered by making the EDG and CSR $CO_2$ suppression systems manual. The plant will maintain the ability to achieve and maintain safe shutdown in each of these areas with a manually actuated $CO_2$ fire suppression system.
2) The change of the $CO_2$ suppression systems from automatic actuation to manual actuation will continue to comply with the requirements of 10CFR50, Appendix R.
3) Approval of this change by the NRC will not be inimical to the common defense and security or to the health and safety of the public.

## 6.0 ENVIRONMENTAL CONSIDERATIONS

Exelon Generation Company, LLC, has determined that the proposed amendment would 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. However, the proposed amendment does not involve: (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

## 7.0 REFERENCES

7.1 Peach Bottom Atomic Power Station Facility Operating License Nos. DPR-44 and DPR-56.

7.2 Peach Bottom Atomic Power Station Fire Protection Program Report, dated March 1977.

7.3 Fire Protection Safety Evaluation Report for Peach Bottom Atomic Power Station, Units 2 and 3, dated May, 23, 1979.

7.4 Fire Protection Safety Evaluation Report for Peach Bottom Atomic Power Station, Units 2 and 3, Supplement 1, dated August 14, 1980.

7.5 Fire Protection Safety Evaluation Report for Peach Bottom Atomic Power Station, Units 2 and 3, Supplement 2, dated September 15, 1980.

7.6 Fire Protection Safety Evaluation Report for Peach Bottom Atomic Power Station, Units 2 and 3, Supplement 3, dated October 24, 1980.

7.7 Fire Protection Safety Evaluation Report for Peach Bottom Atomic Power Station, Units 2 and 3, Supplement 4, dated November 24, 1980.

7.8 Peach Bottom Atomic Power Station letter to the NRC dated February 21, 1980.

7.9 Peach Bottom Atomic Power Station, Fire Protection Program (part of the Updated Final Safety Analysis Report), Revision 14, dated April 2003.

7.10 NRC Information Notice 99-05, "Inadvertent Discharge of Carbon Dioxide Fire Protection System and Gas Migration," dated March 8, 1999.

7.11 Appendix A to Branch Technical Position APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976," dated August 23, 1976.

7.12 Peach Bottom Atomic Power Station Technical Requirements Manual, Section 3.14, Fire Protection.

7.13 Appendix R to 10 CFR Part 50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

7.14 Safety Evaluation Report for Alternate Safe Shutdown Capability for Peach Bottom Atomic Power Station, Units 2 and 3, dated January 26, 1984.

7.15 Revision to Safety Evaluation Report for Alternate Safe Shutdown Capability for Peach Bottom Atomic Power Station, Units 2 and 3, dated May 4, 1984.

7.16 Specification NE-00296, "Specification for Post-Fire Safe Shutdown Program Requirements at Peach Bottom Atomic Power Station."

7.17 Exemption Request approval Safety Evaluation Report, NRC letter dated December 31, 1986.

7.18 Letter to the NRC, dated March 29, 1985, Peach Bottom Atomic Power Station, Units 2 and 3, Structural Steel Survivability Analysis.

7.19 Peach Bottom Atomic Power Station Letter to the NRC, dated June 6, 1985.

7.20 Peach Bottom Atomic Power Station Letter to the NRC, dated March 7, 1986.

7.21 NUREG CR-3656, "Evaluation of Suppression Methods for Electrical Cable Fires, October 1986.

7.22 Safety Evaluation of the Peach Bottom Atomic Power Station, Units 2 and 3, Fire Protection Program, dated September 16, 1993.

7.23 NRC letter to Peach Bottom Atomic Power Station, dated May 11, 1976.

7.24 NRC letter to Peach Bottom Atomic Power Station, dated September 27, 1976.

7.25 Risk Assessment of the Unit 3 Alternate Shutdown Panel Condition, dated July 2003, (P0467030057-2247)

Figures removed under 10 CFR 2.390