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10CFR50.90

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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

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

Subject: License Amendment Request
Main Steam Tunnel Temperature – High

Pursuant to 10CFR50.90, Exelon Generation Company, LLC (Exelon) hereby requests the following amendment to the Technical Specifications (TS), Appendix A, of the Peach Bottom Atomic Power Station (PBAPS), Unit 2, Facility Operating License. This License Amendment Request (LAR) proposes to revise TS Table 3.3.6.1-1, Primary Containment Isolation Instrumentation, to increase the TS Allowable Value (AV) related to the setpoint for the Main Steam Tunnel Temperature – High system isolation function for those instruments located within the Reactor Building. A new Function 1.f has been added to represent the Reactor Building Main Steam Tunnel Temperature – High. Existing function 1.e has been renamed to clarify that it represents only the Turbine Building Main Steam Tunnel Temperature – High.

During operation with high ambient temperatures, the temperatures of the Reactor Building Main Steam Tunnel result in reduced operating margin on Unit 2. Should the non-safety related Reactor Building ventilation system be out of service during these conditions, the resulting Reactor Building steam tunnel temperature could exceed the isolation setpoint. The reduced operating margin during these conditions did result in a Group I Main Steam isolation in July 2003 when no actual steam leaks were present. The proposed change improves the operating margin, improves the station's risk profile, and reduces challenges to the plant by avoiding unnecessary main steam line isolations that are not a result of a main steam line leak.

A change is not being requested for Unit 3 at this time because there is sufficient operating margin due to different sensor locations.

The proposed changes have been reviewed by the Plant Operations Review Committee and approved by the Nuclear Safety Review Board. Additionally, there are no commitments contained within this letter.

This information is being submitted under unsworn declaration.

A001

Exelon requests approval of the proposed amendment by May 14, 2004, based on Peach Bottom's desire to facilitate the necessary modifications to the plant prior to the high temperatures expected in Summer 2004. Once approved, this amendment shall be implemented within 30 days of issuance.

We are notifying the State of Pennsylvania of this application for changes to the TS and Operating License by transmitting a copy of this letter and its attachments to the designated state official.

If you have any questions or require additional information, please contact Doug Walker at (610) 765-5726.

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

Respectfully,

Executed on 02-12-2004 Michael P. Gallagher

Michael P. Gallagher
Director, Licensing and Regulatory Affairs

Attachment 1: Description of Proposed Changes, Technical Analysis, and No Significant Hazards Consideration
Attachment 2: Marked-up TS and Bases Pages
Attachment 3: Camera-ready TS pages

cc: H. J. Miller, Administrator, Region I, USNRC
C. W. Smith, USNRC Senior Resident Inspector, Peach Bottom
G. Wunder, Senior Project Manager, USNRC (via FedEx)
R. R. Janati - Commonwealth of Pennsylvania

ATTACHMENT 1

PEACH BOTTOM ATOMIC POWER STATION
UNIT 2

Docket No. 50-277

License No. DPR-44

License Amendment Request (LAR)
"Main Steam Tunnel Temperature – High"

Description of Proposed Changes, Technical Analysis, and
No Significant Hazards Consideration

ATTACHMENT 1 CONTENTS

1.0 DESCRIPTION

This letter is a request to amend Facility Operating License DPR-44 for Peach Bottom Atomic Power Station (PBAPS), Unit 2.

Exelon Generation Company, LLC (Exelon) is proposing that the Peach Bottom Unit 2 Facility Operating License be amended to revise TS Table 3.3.6.1-1 and associated bases to increase the TS Allowable Value (AV) related to the setpoint for the Main Steam Tunnel Temperature – High system isolation function for those sensors located inside the Reactor Building.

The Main Steam Tunnel temperature function is performed by four sets of four temperature elements. One set is located in the Main Steam Tunnel ventilation duct in the Reactor Building and the other three sets are located along the main steam lines in the Turbine Building. A new Function 1.f has been added to represent the Reactor Building Main Steam Tunnel Temperature – High. Existing function 1.e has been renamed to clarify that it represents only the Turbine Building Main Steam Tunnel Temperature – High.

During operation with high ambient temperatures, the temperatures of the Reactor Building Main Steam Tunnel result in reduced operating margin on Unit 2. Should the non-safety related Reactor Building ventilation system be out of service during these conditions, the resulting Reactor Building steam tunnel temperature could exceed the isolation setpoint. The reduced operating margin during these conditions did result in a Group I Main Steam isolation in July 2003 when no actual steam leaks were present. The proposed change improves the operating margin, improves the station's risk profile, and reduces challenges to the plant by avoiding unnecessary main steam line isolations that are not a result of a main steam line leak.

The proposed change in the Main Steam Tunnel Temperature - High Allowable Value results in a timely Primary Containment Group 1 Main Steam Isolation in the event of a steam leak. Analyses performed in support of the proposed change indicate that a design basis steam leak in the Reactor Building area will be isolated with an Allowable Value of 230.0 degrees F.

A change is not being requested for Unit 3 at this time because there is sufficient operating margin due to different sensor locations.

2.0 PROPOSED CHANGE

Exelon proposes to revise TS Table 3.3.6.1-1, Primary Containment Isolation Instrumentation, and associated bases to:

- Increase the TS Allowable Value (AV) related to the setpoint for the Main Steam Tunnel Temperature – High isolation function for those instruments located within the Reactor Building. The Allowable Value is being increased from 200.0 degrees F to 230.0 degrees F.
- Rename the existing function 1.e to clarify that it represents only the Turbine Building Main Steam Tunnel Temperature – High.
- Add a new Function 1.f to represent the Reactor Building Main Steam Tunnel Temperature – High.

3.0 BACKGROUND

The Main Steam Tunnel Temperature - High Function is provided to detect leaks in a main steam line and provides diversity to main steam line high flow instrumentation. Main Steam Tunnel Temperature signals are initiated from resistance temperature detectors (RTDs).

Four channels of Reactor Building Main Steam Tunnel Temperature – High and twelve channels of Turbine Building Main Steam Tunnel Temperature-High Function are available and are required to be operable to ensure that no single instrument failure can preclude the isolation function. Only the Allowable Value associated with the four Reactor Building Main Steam Tunnel Temperature channels located within the Reactor Building is requested to be changed per this LAR. As described in the TS Bases section 3.3.6.1 and in UFSAR section 7.3, the Allowable Value is chosen to detect a leak equivalent to between 1% and 10% rated steam flow. The Function isolates Primary Containment Group 1 isolation valves which include Main Steam Isolation Valves (MSIVs), Main Steam Line (MSL) drain valves, MSL sample line valves and recirculation loop sample line valves. Furthermore, in accordance with UFSAR section 4.10, Main Control Room alarms with lower setpoints exist to alert operators to the presence of smaller leaks in the Main Steam Tunnel.

The temperature elements are located so that they are sensitive to air temperatures only and not radiated heat from hot piping or equipment. These monitors have temperature setpoints, which are predicated on a temperature rise equivalent to reactor coolant leakage. The temperature trip setpoints are a function of sensor location and plant specific ventillation system design.

The Unit 3 Reactor Building temperature sensors are in a different location than Unit 2 sensors. The location of the Unit 3 sensors provides adequate operating margin to loss of the non-safety related Reactor Building ventilation system and adequate sensitivity for detection and isolation over the required range of leaks and breaks.

On Unit 2, the location of sensors provides adequate sensitivity for detection and isolation over the required range of leaks and breaks; however, it does not provide adequate operating margin to loss of the non-safety related Reactor Building ventilation system.

On July 22, 2003, Peach Bottom Unit 2 experienced a generator lock-out which resulted in a reactor scram and a Group II/III isolation. The Group II/III isolation tripped the Reactor Building ventillation system. The Reactor Building ventilation trip resulted in an increase in the Reactor Building Main Steam Tunnel temperature above the Group I isolation setpoint and subsequent isolation of the MSIVs. The isolation occurred approximately 13 minutes after the reactor scram.

Safety systems are challenged when there is an unnecessary Group I isolation transient subsequent to a scram. A Group I isolation results in a loss of the Main Condenser as a heat sink and loss of the Feedwater system for reactor level control. This requires the use of Safety Relief Valve's (SRV) and High Pressure Coolant Injection (HPCI) for reactor pressure control, suppression pool cooling for heat removal, and Reactor Core Isolation Cooling and HPCI for reactor level control. This LAR is intended to avoid unnecessary Group 1 isolations.

4.0 TECHNICAL ANALYSIS

To support the proposed setpoint change, a new analysis of reactor building temperature response to a Main Steam Line leak was performed. This analysis used the computer code GOTHIC. A detailed analytical model of the Reactor Building Main Steam Tunnel and surrounding rooms in the reactor building was created. GOTHIC is an advanced computer program used to perform transient thermal analysis of multiphase systems in complex geometries. Numerical Applications, Inc. (NAI) developed GOTHIC for the Electric Power Research Institute (EPRI). The GOTHIC program has been previously approved for use by the NRC for nuclear power plants such as Joseph M. Farley, Waterford 3, River Bend, Perry, and the Clinton Power Station for applications such as containment, high energy line break, and HVAC analyses.

The GOTHIC code was used to address the effects of local temperature increases in the reactor building by subdividing volumes of the area into different nodes. This analysis incorporates realistic features such as multiple volumes to accurately track steam flow from the leak, heat sinks such as the building's floor and ceiling, and HVAC effects. The calculation uses conservative ambient conditions and heat loads. Additionally, the model was benchmarked against actual summer and winter loss of ventilation events.

Based on the results of the new analysis, it was concluded that the UFSAR Table 7.3.1 analytical limit for high temperature in the main steam line tunnel in the reactor building can be raised from 220 degrees F to 240 degrees F. The analytical limit results in detection of leaks greater than 1% in less than one minute. The detection of the main steam line leak within one minute has been analyzed and the resulting mass-energy is bounded by the main steam line break and the radiological consequences are well within 10 CFR 100 dose limits as discussed in section 4.2.

The NRC approved GE instrument setpoint methodology (Reference 7.1), which is equivalent to ISA 67.04 method 2, was used to determine that the allowable value (i.e., the value listed in the Technical Specifications) can be raised from 200 degrees F to 230 degrees F. The actual trip setpoint will be 225 $\pm$ 2 degrees F.

The GOTHIC Analysis showed for a loss of Reactor Building ventilation event, the maximum obtained temperature will be less than 220 degrees F for more than 7 hours. Hence, this new setpoint meets the design basis described in UFSAR Section 7.3.4.7.3 that states "the main steam line space high temperature trip is set far enough above the temperature expected during operations at rated power to avoid spurious isolation, yet low enough to provide early indication of a steam line break".

4.1 Operating Experience

On July 22, 2003, a main steam line isolation occurred at Peach Bottom Unit 2 due to main steam line tunnel high temperature approximately 13 minutes after a generator lockout / turbine trip scram. The resulting loss of normal condenser, feedwater, and condensate systems complicated the response to the scram. If the proposed amendment had been in place for this event, the setpoint would not have been exceeded. The operators would have determined that the high temperature was the result of a loss of ventilation and that no steam leak was present. This would have avoided complicating the transient and avoided the additional risk associated with the loss of the normal heat sink.

4.2 Radiological Consequences

The projected radiological dose consequences for the Main Steam Line break must not exceed the limits established in 10 CFR 100. The current licensing bases correspond to the projected offsite dose consequences of the mass released from the bounding full main steam line break outside containment. This release results in projected whole body and thyroid doses well below the 10 CFR 100 limits at the exclusion area and low population zone boundaries as shown in UFSAR table 14.9.8. The dose assessments for this release are extremely conservative in that they each assume that the full release inventory is available for immediate inhalation. Even so, the resulting dose is only a fraction of the 10 CFR 100 limits. Since isolation for this break occurs from the main steam line high flow signal, raising the setpoint for the high temperature isolation trip signal does not affect the radiological consequences for this break.

The main steam line tunnel high temperature instruments are designed to detect a leak in the range of 1 to 10 percent steam line flow. For a 10 percent leak, raising the analytical limit to 240 degrees F results in the temperature reaching the new analytic limit in about 34 seconds. The estimated release for the proposed new setpoint for a 10 percent leak is less than 10% of the analyzed release of the main steam line break release accident. Therefore, the radiological effects associated with the postulated small steam leak remain bounded by the existing accident analysis.

In addition, steam releases in the reactor building can be detected by alternate means such as plant radiation monitors, rising temperature indication and alarms on the area ambient temperature monitors, operator rounds, contaminated piping inspections, and steam cycle efficiency decrease. These redundant means of detection provide an opportunity for actions prior to automatic isolation. The proposed setpoint change does not alter these other means of detection.

4.3 Equipment Qualification

The proposed allowable value change has been evaluated to determine if equipment qualification would be impacted. The environmental qualification accident scenario is based on a large main steam line break. Since a large break is isolated quickly based on high steam line flow, the new allowable value for the temperature instrumentation does not produce a more challenging equipment qualification environment. It is therefore concluded that the qualified service life and structural integrity of the structures, systems, and components in the Reactor Building are not affected nor adversely impacted by the proposed setpoint change.

4.4 Probabilistic Risk Assessment (PRA)

During operation with high ambient temperatures, the temperatures of the Main Steam Tunnel result in reduced operating margin. Loss of Reactor Building ventilation has caused the temperature to exceed the Group 1 isolation setpoint following a plant trip, resulting in more complicated recovery from the plant trip. Loss of ventilation has caused the temperature to come close to the setpoint on other occasions. If a loss of Reactor Building ventilation is resolved prior to causing a main steam line isolation, restoration of ventilation requires removing the temperature instrumentation from service to prevent tripping the plant and isolating the normal heat sink. The proposed change improves the operating margin, improves the station's risk profile, reduces the unavailability time of the temperature instrumentation, and reduces challenges to the plant by avoiding unnecessary main steam line isolations that are not a result of a main steam line leak. Thus, the proposed change decreases the probability of plant transients, while continuing to provide protection to the public health and safety in the event of actual steam leaks from the main steam lines.

The Peach Bottom plant PRA does not explicitly model the action of the Main Steam Tunnel high temperature function to isolate the main steam lines. The impact of this function is implicitly included in the scram initiator values within the PRA. The Peach Bottom PRA uses scram initiator frequencies that are based upon a Bayesian updating combination of plant-specific and industry scram data. To quantify the risk significance of the Main Steam Tunnel high temperature isolation function, a bounding analysis was performed. Eliminating the unwarranted plant transients will reduce core damage frequency and large, early release frequency (LERF).

4.5 Discussion of Operator Action

A discussion of abnormal leakage outside containment is provided in section 4.10 of the Peach Bottom UFSAR. Detection of abnormal leakage external to the primary containment (e.g., process line break outside containment) is provided by diverse features. These include detection by low reactor water level, high process line flow, high ambient temperature in the piping or equipment area, and high Reactor Building sump level. These monitors provide alarm and indication in the main control room so the operators can take appropriate manual action. Selected process parameters initiate the isolation logic to cause closure of appropriate system isolation valves on indication of excess leakage. In addition to these indications of abnormal leakage, areas outside the containment are monitored by the radiation monitoring system. The radiation monitoring system provides alarms on detection of high radiation levels. The operator will continue to have all of these diverse features available following incorporation of this license amendment.

Per UFSAR section 4.10, a distinction is made between gross leakage (where 10CFR100 applies and automatic action is required) and abnormal leakage (where 10CFR20 applies and manual action is acceptable). Since this license amendment request makes no changes in detection of abnormal leakage, the protection provided by manual actions to comply with 10CFR20 is unaffected.

If a loss of Reactor Building ventilation occurs, restoration of ventilation requires removing the temperature instrumentation from service to prevent tripping the plant and isolating the normal heat sink. This proposed change will significantly reduce the operator challenges associated with removing the temperature instrumentation from service during a transient.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration (NSHC)

Exelon proposes to revise TS Table 3.3.6.1-1, Primary Containment Isolation Instrumentation, and associated bases to:

- Increase the TS Allowable Value (AV) related to the setpoint for the Main Steam Tunnel Temperature – High isolation function for those instruments located within the Reactor Building. The Allowable Value is being increased from 200.0 degrees F to 230.0 degrees F.
- Rename the existing function 1.e to clarify that it represents only the Turbine Building Main Steam Tunnel Temperature – High.
- Add a new Function 1.f to represent the Reactor Building Main Steam Tunnel Temperature – High.

Exelon has evaluated whether or not a significant hazards consideration is involved with the proposed amendment 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 leak detection instrumentation associated with the proposed amendment is designed to detect Main Steam Line leakage in the range of one to ten percent of rated steam flow. This design basis remains unchanged. This ensures that the criteria for acceptance as established in the original licensing bases remains valid. The previous analysis for establishing the allowable value for Main Steam Line Tunnel High temperature in the Reactor Building can be improved using industry standard, state of the art computer modeling techniques. The new analysis using the GOTHIC computer code is appropriate because it accurately accounts for the building heat structures, HVAC effects, and outside air temperatures. The proposed change increases the operating margin, which reduces the potential for unnecessary plant transients. Raising the setpoint causes a greater time to detect the leak, but remains bounded by existing analysis for the design basis break of the main steam line documented in Table 14.9.8 of the Peach Bottom UFSAR. There are no impacts on equipment qualification. Changes to the instrumentation used to detect a steam line leak do not affect the probability of occurrence of the leak. Hence, it is concluded that raising the allowable value for Reactor Building Main Steam Tunnel high temperature does not significantly increase 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 amendment does not impact the physical design or location of the associated leak detection instrumentation. The leak detection instrumentation associated with the proposed amendment will continue to detect main steam line leakage in the range of one to ten percent of rated steam flow. The instruments will still initiate the automatic isolation of the appropriate containment isolation valves to mitigate steam leakage as credited in the original licensing bases. This proposed amendment is associated only with the results of a main steam line leak in the Reactor Building portion of the Main Steam Tunnel and has no impact on the initiation of this leak. Therefore, the proposed amendment 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.

Steam leaks in the affected area of the Reactor Building will be detected on a timely basis so that the Group 1 Primary Containment Isolation Valves are promptly closed. The analysis performed for the proposed amendment demonstrates that the appropriate instruments will promptly initiate automatic system isolation upon sensing a temperature in excess of the new setpoint. Therefore, the proposed amendment ensures that the criteria for acceptance as established in the original licensing bases remain valid. Further, the proposed amendment eliminates a potential cause for unnecessary plant shutdowns created by conditions other than a main steam line leak. Equipment qualification and structural integrity of systems, structures, and components located within the Reactor Building are not affected by the proposed amendment. Therefore, the proposed amendment does not involve a significant reduction in the margin of safety.

Based on the above, Exelon concludes that the proposed amendment presents no significant hazards under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements / Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met.

Exelon has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the Technical Specifications, and do not affect conformance with any General Design Criteria differently than described in the UFSAR.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to TS Table 3.3.6.1-1, function 1.e, Turbine Building Main Steam Tunnel Temperature – High, as well as the addition of a new function 1.f, Reactor Building Main Steam Tunnel Temperature-High. 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 NEDC-31336P-A, "General Electric Instrument Setpoint Methodology," September, 1996

8.0 PRECEDENCE

8.1 Nine Mile 2, Amendment 77, approved September 17, 1996. The amendment revised the Isolation Actuation Instrumentation to establish a range of allowable values and trip setpoints for high temperatures in the Main Steam Line Tunnel Lead Enclosure. The change is intended to prevent unnecessary challenges to the plant and its safety systems due to environmental conditions.

8.2 LaSalle 1/2, Amendments 111 and 96, approved April 4, 1996. The amendment revised the setpoints for the automatic primary containment isolation on Main Steam Line Tunnel Differential Temperature-High and deleted the automatic primary containment isolation on Main Steam Line Tunnel Temperature-High.

8.3 Susquehanna 1/2, Amendments 119 and 87, Approved May 21, 1992. The amendment increased the isolation setpoint for the Leak Detection Temperature Function in the Turbine Building Main Steam Tunnel.

8.4 Nine Mile Point 2, Amendment 15, Approved May 15, 1990. The Amendment revised the Isolation Actuation instrumentation system to increase the Trip Setpoints and Allowable Values for High Absolute and Differential Temperature isolation instrumentation systems in the Main Steam Tunnel.

8.5 River Bend, Amendment 25, Approved June 29, 1988. The amendment increased the Area Temperature Limit for the Main Steam Tunnel.

8.6 Perry, Amendment 7, Approved June 10, 1987. The amendment revised the steam tunnel and Turbine Building Main Steam Line High Temperature Trip setpoints and Allowable Values.

ATTACHMENT 2

PEACH BOTTOM ATOMIC POWER STATION
UNIT 2

Docket No. 50-277

License No. DPR-44

License Amendment Request (LAR)
"Peach Bottom Main Steam Tunnel Temperature - High"

Marked-Up Technical Specifications Pages

UNIT 2

TS page 3.3-52

Marked-up Technical Specifications Bases Pages

UNIT 2

B 3.3-142
B 3.3-143
B 3.3-149
B 3.3-161
B 3.3-166

Table 3.3.6.1-1 (page 1 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Main Steam Line Isolation					
a. Reactor Vessel Water Level — Low Low Low (Level 1)	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ -160.0 inches
b. Main Steam Line Pressure — Low	1	2	E	SR 3.3.6.1.3 SR 3.3.6.1.7	≥ 850.0 psig
c. Main Steam Line Flow — High	1,2,3	2 per MSL	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 123.3 psid
d. Main Steam Line — High Radiation	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.3 SR 3.3.6.1.6 SR 3.3.6.1.7	≤ 15 X Full Power Background
e. (Turbine Building) Main Steam Tunnel Temperature — High	1,2,3	8 6	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 200.0°F
f. Reactor Building Main Steam Tunnel Temperature — High	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 230.0°F
2. Primary Containment Isolation					
a. Reactor Vessel Water Level — Low (Level 3)	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ 1.0 inches
b. Drywell Pressure — High	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 2.0 psig
c. Main Stack Monitor Radiation — High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.7	≤ 2 X 10^{-2} µCi/cc
d. Reactor Building Ventilation Exhaust Radiation — High	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.3 SR 3.3.6.1.7	≤ 16.0 mR/hr
e. Refueling Floor Ventilation Exhaust Radiation — High	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.3 SR 3.3.6.1.7	≤ 16.0 mR/hr

(continued)

BASES

BACKGROUND (continued)

1. Main Steam Line Isolation

Most MSL Isolation Functions receive inputs from four channels. The outputs from these channels are combined in a one-out-of-two taken twice logic to initiate isolation of the Group I isolation valves (MSIVs and MSL drains, MSL sample lines, and recirculation loop sample line valves). To initiate a Group I isolation, both trip systems must be tripped.

Turbine Building

The exceptions to this arrangement are the Main Steam Line Flow—High Function and Main Steam Tunnel Temperature—High Functions. The Main Steam Line Flow—High Function uses 16 flow channels, four for each steam line. One channel from each steam line inputs to one of the four trip strings. Two trip strings make up each trip system and both trip systems must trip to cause an MSL isolation. Each trip string has four inputs (one per MSL), any one of which will trip the trip string. The trip systems are arranged in a one-out-of-two taken twice logic. This is effectively a one-out-of-eight taken twice logic arrangement to initiate a Group I isolation. ~~The Main Steam Tunnel Temperature—High Function receives input from 16 channels. The logic is arranged similar to the Main Steam Line Flow—High Function except that high temperature on any channel is not related to a specific MSL.~~

INSERT 1

2. Primary Containment Isolation

Most Primary Containment Isolation Functions receive inputs from four channels. The outputs from these channels are arranged in a one-out-of-two taken twice logic. Isolation of inboard and outboard primary containment isolation valves occurs when both trip systems are in trip.

The exception to this arrangement is the Main Stack Monitor Radiation—High Function. This Function has two channels, whose outputs are arranged in two trip systems which use a one-out-of-one logic. Each trip system isolates one valve per associated penetration. The Main Stack Monitor Radiation—High Function will isolate vent and purge valves greater than two inches in diameter during containment purging (Ref. 2).

The valves isolated by each of the Primary Containment Isolation Functions are listed in Reference 1.

(continued)

BASES

BACKGROUND (continued)

3., 4. High Pressure Coolant Injection System Isolation and Reactor Core Isolation Cooling System Isolation

The Steam Line Flow—High Functions that isolate HPCI and RCIC receive input from two channels, with each channel comprising one trip system using a one-out-of-one logic. Each of the two trip systems in each isolation group (HPCI and RCIC) is connected to the two valves on each associated penetration. Each HPCI and RCIC Steam Line Flow—High channel has a time delay relay to prevent isolation due to flow transients during startup.

The HPCI and RCIC Isolation Functions for Drywell Pressure—High and Steam Supply Line Pressure—Low receive inputs from four channels. The outputs from these channels are combined in a one-out-of-two taken twice logic to initiate isolation of the associated valves.

The HPCI and RCIC Compartment and Steam Line Area Temperature—High Functions receive input from 16 channels. The logic is similar to the Main Steam Tunnel Temperature—High Function.

, four channels at each of four different locations. The channels are arranged in a one-out-of-two taken twice logic for each location.

The HPCI and RCIC Steam Line Flow—High Functions, Steam Supply Line Pressure—Low Functions, and Compartment and Steam Line Area Temperature—High Functions isolate the associated steam supply and turbine exhaust valves and pump suction valves. The HPCI and RCIC Drywell Pressure—High Functions isolate the HPCI and RCIC test return line valves. The HPCI and RCIC Drywell Pressure—High Functions, in conjunction with the Steam Supply Line Pressure—Low Functions, isolate the HPCI and RCIC turbine exhaust vacuum relief valves.

5. Reactor Water Cleanup System Isolation

The Reactor Vessel Water Level—Low (Level 3) Isolation Function receives input from four reactor vessel water level channels. The outputs from the reactor vessel water level channels are connected into a one-out-of-two taken twice logic which isolates both the inboard and outboard isolation valves. The RWCU Flow—High Function receives input from two channels, with each channel in one trip system using a one-out-of-one logic, with one channel tripping the inboard valve and one channel tripping the outboard valves. The SLC

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.d. Main Steam Line—High Radiation (continued)

The Main Steam Line—High Radiation signals are initiated from four gamma sensitive instruments. Four channels are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is chosen to ensure that offsite dose limits are not exceeded.

This Function isolates MSIVs, MSL drains, MSL sample lines and recirculation loop sample line valves.

1.e. Turbine Building Main Steam Tunnel Temperature—High

The Turbine Building Main Steam Tunnel Temperature Function is provided to detect a break in a main steam line and provides diversity to the high flow instrumentation.

Turbine Building Main Steam Tunnel Temperature signals are initiated from resistance temperature detectors (RTDs) located along the main steam line between the ~~drywell wall~~ Reactor Building and the turbine. ~~Sixteen~~ Twelve channels of Turbine Building Main Steam Tunnel Temperature—High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is chosen to detect a leak equivalent to between 1% and 10% rated steam flow.

This Function isolates MSIVs, MSL drains, MSL sample lines and recirculation loop sample line valves.

INSERT 2

Primary Containment Isolation

2.a. Reactor Vessel Water Level—Low (Level 3)

Low RPV water level indicates that the capability to cool the fuel may be threatened. The valves whose penetrations communicate with the primary containment are isolated to limit the release of fission products. The isolation of the primary containment on Level 3 supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded.

(continued)

BASES

ACTIONS (continued)

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in redundant isolation capability being lost for the associated penetration flow path(s). For those MSL, Primary Containment, HPCI, RCIC, RWCU, SDC, and Feedwater Recirculation Isolation Functions, where actuation of both trip systems is needed to isolate a penetration, the Functions are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip (or the associated trip system in trip), such that both trip systems will generate a trip signal from the given Function on a valid signal. For those Primary Containment, HPCI, RCIC, RWCU, and SDC isolation functions, where actuation of one trip system is needed to isolate a penetration, the Functions are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip, such that one trip system will generate a trip signal from the given function on a valid signal. This ensures that at least one of the PCIVs in the associated penetration flow path can receive an isolation signal from the given Function. For all Functions except 1.c, 1.e, 2.c, 3.a, 3.b, 3.e, 4.a, 4.b, 4.e, 5.a, 5.b, and 6.a, this would require both trip systems to have one channel OPERABLE or in trip. For Function 1.c, this would require both trip systems to have one channel, associated with each MSL, OPERABLE or in trip. For Functions 1.e, 3.e and 4.e, each Function consists of channels that monitor several locations within a given area (e.g., different locations within the main steam tunnel area). Therefore, this would require both trip systems to have one channel per location OPERABLE or in trip. For Functions 2.c, 3.a, 3.b, 4.a, 4.b, 5.a, and 6.a, this would require one trip system to have one channel OPERABLE or in trip.

Turbine Building

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.1.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology. For Function 1.e, 1.f, 3.e, and 4.e channels, verification that trip settings are less than or equal to the specified Allowable Value during the CHANNEL FUNCTIONAL TEST is not required since the installed indication instrumentation does not provide accurate indication of the trip setting. This is considered acceptable since the magnitude of drift assumed in the setpoint calculation is based on a 24 month calibration interval.

The 92 day Frequency of SR 3.3.6.1.2 is based on the reliability analysis described in Reference 7.

SR 3.3.6.1.3, SR 3.3.6.1.4, SR 3.3.6.1.5, and SR 3.3.6.1.6

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations, consistent with the assumptions of the current setpoint methodology. SR 3.3.6.1.6, however, is only a calibration of the radiation detectors using a standard radiation source.

As noted for SR 3.3.6.1.3, the main steam line radiation detectors (Function 1.d) are excluded from CHANNEL CALIBRATION due to ALARA reasons (when the plant is operating, the radiation detectors are generally in a high radiation area; the steam tunnel). This exclusion is acceptable because the radiation detectors are passive devices, with minimal drift. The radiation detectors are calibrated in accordance with SR 3.3.6.1.6 on a 24 month Frequency.

(continued)

INSERT 1

The Turbine Building Main Steam Tunnel Temperature-High Function receives inputs from twelve channels, four channels at each of the three different locations along the steam line. High temperature on any channel is not related to a specific MSL. The channels are arranged in a one-out-of-two taken twice logic for each location.

INSERT 2

1.f. Reactor Building Main Steam Tunnel Temperature-High

The Reactor Building Main Steam Tunnel Temperature Function is provided to detect a break in a main steam line and provides diversity to the high flow instrumentation.

Reactor Building Main Steam Tunnel Temperature signals are initiated from resistance temperature detectors (RTDs) located in the Main Steam Line Tunnel ventilation exhaust duct. Four channels of Reactor Building Main Steam Tunnel Temperature—High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is chosen to detect a leak equivalent to between 1% and 10% rated steam flow.

This Function isolates MSIVs, MSL drains, MSL sample lines and recirculation loop sample line valves.

ATTACHMENT 3

PEACH BOTTOM ATOMIC POWER STATION
UNIT 2

Docket No. 50-277

License No. DPR-44

License Amendment Request (LAR)
"Peach Bottom Main Steam Tunnel Temperature - High"

Camera-Ready Technical Specification Pages

UNIT 2

TS page 3.3-52

Camera-Ready Technical Specifications Bases Pages

UNIT 2

B 3.3-142
B 3.3-143
B 3.3-149
B 3.3-149a
B 3.3-161
B 3.3-166

Table 3.3.6.1-1 (page 1 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Main Steam Line Isolation					
a. Reactor Vessel Water Level – Low Low Low (Level 1)	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ -160.0 inches
b. Main Steam Line Pressure – Low	1	2	E	SR 3.3.6.1.3 SR 3.3.6.1.7	≥ 850.0 psig
c. Main Steam Line Flow – High	1,2,3	2 per MSL	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 123.3 psid
d. Main Steam Line – High Radiation	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.3 SR 3.3.6.1.6 SR 3.3.6.1.7	≤ 15 X Full Power Background
e. Turbine Building Main Steam Tunnel Temperature – High	1,2,3	6	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 200.0°F
f. Reactor Building Main Steam Tunnel Temperature-High	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 230.0°F
2. Primary Containment Isolation					
a. Reactor Vessel Water Level – Low (Level 3)	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ 1.0 inches
b. Drywell Pressure – High	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 2.0 psig
c. Main Stack Monitor Radiation – High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.7	≤ 2 X 10^{-2} µCi/cc
d. Reactor Building Ventilation Exhaust Radiation – High	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.3 SR 3.3.6.1.7	≤ 16.0 mR/hr
e. Refueling Floor Ventilation Exhaust Radiation – High	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.3 SR 3.3.6.1.7	≤ 16.0 mR/hr

(continued)

BASES

BACKGROUND (continued)

1. Main Steam Line Isolation

Most MSL Isolation Functions receive inputs from four channels. The outputs from these channels are combined in a one-out-of-two taken twice logic to initiate isolation of the Group I isolation valves (MSIVs and MSL drains, MSL sample lines, and recirculation loop sample line valves). To initiate a Group I isolation, both trip systems must be tripped.

The exceptions to this arrangement are the Main Steam Line Flow—High Function and Turbine Building Main Steam Tunnel Temperature—High Functions. The Main Steam Line Flow—High Function uses 16 flow channels, four for each steam line. One channel from each steam line inputs to one of the four trip strings. Two trip strings make up each trip system and both trip systems must trip to cause an MSL isolation. Each trip string has four inputs (one per MSL), any one of which will trip the trip string. The trip systems are arranged in a one-out-of-two taken twice logic. This is effectively a one-out-of-eight taken twice logic arrangement to initiate a Group I isolation. The Turbine Building Main Steam Tunnel Temperature-High Function receives inputs from twelve channels, four channels at each of the three different locations along the steam line. High temperature on any channel is not related to a specific MSL. The channels are arranged in a one-out-of-two taken twice logic for each location.

2. Primary Containment Isolation

Most Primary Containment Isolation Functions receive inputs from four channels. The outputs from these channels are arranged in a one-out-of-two taken twice logic. Isolation of inboard and outboard primary containment isolation valves occurs when both trip systems are in trip.

The exception to this arrangement is the Main Stack Monitor Radiation—High Function. This Function has two channels, whose outputs are arranged in two trip systems which use a one-out-of-one logic. Each trip system isolates one valve per associated penetration. The Main Stack Monitor Radiation—High Function will isolate vent and purge valves greater than two inches in diameter during containment purging (Ref. 2).

The valves isolated by each of the Primary Containment Isolation Functions are listed in Reference 1.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.d. Main Steam Line—High Radiation (continued)

The Main Steam Line—High Radiation signals are initiated from four gamma sensitive instruments. Four channels are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is chosen to ensure that offsite dose limits are not exceeded.

This Function isolates MSIVs, MSL drains, MSL sample lines and recirculation loop sample line valves.

1.e Turbine Building Main Steam Tunnel Temperature-High

The Turbine Building Main Steam Tunnel Temperature Function is provided to detect a break in a main steam line and provides diversity to the high flow instrumentation.

Turbine Building Main Steam Tunnel Temperature signals are initiated from resistance temperature detectors (RTDs) located along the main steam line between the Reactor Building and the turbine. Twelve channels of Turbine Building Main Steam Tunnel Temperature-High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is chosen to detect a leak equivalent to between 1% and 10% rated steam flow.

This Function isolates MSIVs, MSL drains, MSL sample lines and recirculation loop sample line valves.

1.f. Reactor Building Main Steam Tunnel Temperature-High

The Reactor Building Main Steam Tunnel Temperature Function is provided to detect a break in a main steam line and provides diversity to the high flow instrumentation.

Reactor Building Main Steam Tunnel Temperature signals are initiated from resistance temperature detectors (RTDs) located in the Main Steam Line Tunnel ventilation exhaust duct. Four channels of Reactor Building Main Steam Tunnel Temperature—High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.f Reactor Building Main Steam Tunnel Temperature-High (continued)

The Allowable Value is chosen to detect a leak equivalent to between 1% and 10% rated steam flow.

This Function isolates MSIVs, MSL drains, MSL sample lines and recirculation loop sample line valves.

Primary Containment Isolation

2.a. Reactor Vessel Water Level—Low (Level 3)

Low RPV water level indicates that the capability to cool the fuel may be threatened. The valves whose penetrations communicate with the primary containment are isolated to limit the release of fission products. The isolation of the primary containment on Level 3 supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded.

(continued)

BASES

BACKGROUND (continued)

3., 4. High Pressure Coolant Injection System Isolation and Reactor Core Isolation Cooling System Isolation

The Steam Line Flow—High Functions that isolate HPCI and RCIC receive input from two channels, with each channel comprising one trip system using a one-out-of-one logic. Each of the two trip systems in each isolation group (HPCI and RCIC) is connected to the two valves on each associated penetration. Each HPCI and RCIC Steam Line Flow—High channel has a time delay relay to prevent isolation due to flow transients during startup.

The HPCI and RCIC Isolation Functions for Drywell Pressure—High and Steam Supply Line Pressure—Low receive inputs from four channels. The outputs from these channels are combined in a one-out-of-two taken twice logic to initiate isolation of the associated valves.

The HPCI and RCIC Compartment and Steam Line Area Temperature—High Functions receive input from 16 channels, four channels at each of four different locations. The channels are arranged in a one-out-of-two taken twice logic for each location.

The HPCI and RCIC Steam Line Flow—High Functions, Steam Supply Line Pressure—Low Functions, and Compartment and Steam Line Area Temperature—High Functions isolate the associated steam supply and turbine exhaust valves and pump suction valves. The HPCI and RCIC Drywell Pressure—High Functions isolate the HPCI and RCIC test return line valves. The HPCI and RCIC Drywell Pressure—High Functions, in conjunction with the Steam Supply Line Pressure—Low Functions, isolate the HPCI and RCIC turbine exhaust vacuum relief valves.

5. Reactor Water Cleanup System Isolation

The Reactor Vessel Water Level—Low (Level 3) Isolation Function receives input from four reactor vessel water level channels. The outputs from the reactor vessel water level channels are connected into a one-out-of-two taken twice logic which isolates both the inboard and outboard isolation valves. The RWCU Flow—High Function receives input from two channels, with each channel in one trip system using a one-out-of-one logic, with one channel tripping the inboard valve and one channel tripping the outboard valves. The SLC

(continued)

BASES

ACTIONS (continued)

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in redundant isolation capability being lost for the associated penetration flow path(s). For those MSL, Primary Containment, HPCI, RCIC, RWCU, SDC, and Feedwater Recirculation Isolation Functions, where actuation of both trip systems is needed to isolate a penetration, the Functions are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip (or the associated trip system in trip), such that both trip systems will generate a trip signal from the given Function on a valid signal. For those Primary Containment, HPCI, RCIC, RWCU, and SDC isolation functions, where actuation of one trip system is needed to isolate a penetration, the Functions are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip, such that one trip system will generate a trip signal from the given function on a valid signal. This ensures that at least one of the PCIVs in the associated penetration flow path can receive an isolation signal from the given Function. For all Functions except 1.c, 1.e, 2.c, 3.a, 3.b, 3.e, 4.a, 4.b, 4.e, 5.a, 5.b, and 6.a, this would require both trip systems to have one channel OPERABLE or in trip. For Function 1.c, this would require both trip systems to have one channel, associated with each MSL, OPERABLE or in trip. For Functions 1.e, 3.e and 4.e, each Function consists of channels that monitor several locations within a given area (e.g., different locations within the Turbine Building main steam tunnel area). Therefore, this would require both trip systems to have one channel per location OPERABLE or in trip. For Functions 2.c, 3.a, 3.b, 4.a, 4.b, 5.a, and 6.a, this would require one trip system to have one channel OPERABLE or in trip.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.1.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology. For Function 1.e, 1.f, 3.e, and 4.e channels, verification that trip settings are less than or equal to the specified Allowable Value during the CHANNEL FUNCTIONAL TEST is not required since the installed indication instrumentation does not provide accurate indication of the trip setting. This is considered acceptable since the magnitude of drift assumed in the setpoint calculation is based on a 24 month calibration interval.

The 92 day Frequency of SR 3.3.6.1.2 is based on the reliability analysis described in Reference 7.

SR 3.3.6.1.3, SR 3.3.6.1.4, SR 3.3.6.1.5, and SR 3.3.6.1.6

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations, consistent with the assumptions of the current setpoint methodology. SR 3.3.6.1.6, however, is only a calibration of the radiation detectors using a standard radiation source.

As noted for SR 3.3.6.1.3, the main steam line radiation detectors (Function 1.d) are excluded from CHANNEL CALIBRATION due to ALARA reasons (when the plant is operating, the radiation detectors are generally in a high radiation area; the steam tunnel). This exclusion is acceptable because the radiation detectors are passive devices, with minimal drift. The radiation detectors are calibrated in accordance with SR 3.3.6.1.6 on a 24 month Frequency.

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