October 6, 2005

Mr. Britt T. McKinney
Sr. Vice President and
Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: ONE-TIME 48-HOUR ALLOWABLE OUTAGE TIME FOR SECONDARY CONTAINMENT AND STANDBY GAS TREATMENT SYSTEM TECHNICAL SPECIFICATIONS 3.6.4.1 AND 3.6.4.3 FOR SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 (TAC NOS. MC4423 AND MC4424)

Dear Mr. McKinney:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 226 to Facility Operating License No. NPF-14 and Amendment No. 203 to Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Units 1 and 2 (SSES 1 and 2). These amendments are in response to your application dated September 8, 2004, as supplemented by your letters on July 8 and September 28, 2005.

The amendments revise the SSES 1 and 2 Technical Specifications 3.6.4.1, “Secondary Containment,” and 3.6.4.3, “Standby Gas Treatment System (SGTS),” to extend, on a one-time basis, the allowable completion time for required actions for secondary containment inoperable and two SGTS subsystems inoperable, in mode 1, 2, or 3 from 4 to 48 hours.

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

Sincerely,

/RA/

Richard V. Guzman, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures:
1. Amendment No. 226 to License No. NPF-14
2. Amendment No. 203 to License No. NPF-22
3. Safety Evaluation

cc w/encls: See next page

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cc w/encls: See next page

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PUBLIC	PDI-1 R/F	RLaufer
RGuzman	M'OBrien	OGC
ACRS	GHill (2)	TBoyce
JHayes	MKotzalas	DLPM DPR

Acting Branch Chief, Branch 4, RI

* SE provided by memo. No substantive changes made.

Accession No.: ML052710408 Package No.: TSs:

OFFICE	PDI-1/PM	PDI-2/LA	SPSB-C/SC	OGC	PDI-1/SC
NAME	RGuzman	MO'Brien	MKotzalas*	SHamrick	RLaufer
DATE	10/05/05	10/06/05	9/27/05 SE DTD	10/5/05	10/06/05

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Susquehanna Steam Electric Station, Unit Nos. 1 and 2

cc:

Robert A. Saccone
Vice President - Nuclear Operations
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603-0467

Aloysius J. Wrape, III
General Manager - Performance
Improvement and Oversight
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Terry L. Harpster
General Manager - Plant Support
PPL Susquehanna, LLC
769 Salem Blvd., NUCSA4
Berwick, PA 18603-0467

Richard D. Pagodin
General Manager - Nuclear Engineering
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603-0467

Rocco R. Sgarro
Manager - Nuclear Regulatory Affairs
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Walter E. Morrissey
Supervising Engineer
Nuclear Regulatory Affairs
PPL Susquehanna, LLC
769 Salem Blvd., NUCSA4
Berwick, PA 18603-0467

Michael H. Crowthers
Supervising Engineer
Nuclear Regulatory Affairs
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Steven M. Cook
Manager - Quality Assurance
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB2
Berwick, PA 18603-0467

Luis A. Ramos
Community Relations Manager,
Susquehanna
PPL Susquehanna, LLC
634 Salem Blvd., SSO
Berwick, PA 18603-0467

Bryan A. Snapp, Esq
Assoc. General Counsel
PPL Services Corporation
Two North Ninth Street, GENTW3
Allentown, PA 18101-1179

Supervisor - Document Control Services
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Richard W. Osborne
Allegheny Electric Cooperative, Inc.
212 Locust Street
P.O. Box 1266
Harrisburg, PA 17108-1266

Director, Bureau of Radiation Protection
Pennsylvania Department of
Environmental Protection
Rachel Carson State Office Building
P.O. Box 8469
Harrisburg, PA 17105-8469

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 35, NUCSA4
Berwick, PA 18603-0035

Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

cc:

Board of Supervisors
Salem Township
P.O. Box 405
Berwick, PA 18603-0035

Dr. Judith Johnsrud
National Energy Committee
Sierra Club
443 Orlando Avenue
State College, PA 16803

PPL SUSQUEHANNA, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-387

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 226
License No. NPF-14

1. The Nuclear Regulatory Commission (the Commission or the NRC) having found that:

   A. The application for the amendment filed by PPL Susquehanna, LLC, dated September 8, 2004, as supplemented by letters dated July 8 and September 28, 2005, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

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

   C. There is reasonable assurance: (I) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

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

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

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-14 is hereby amended to read as follows:

   (2) Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 226 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PPL Susquehanna, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance, shall be implemented within 30 days, and shall expire on December 31, 2005.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard J. Laufer, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: October 6, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 226

FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
TS/3.6-35	TS/3.6-35
TS/3.6-36	TS/3.6-36
TS/3.6-37	TS/3.6-37
TS/3.6-43	TS/3.6-43
TS/3.6-44	TS/3.6-44

PPL SUSQUEHANNA, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 203
License No. NPF-22

1. The Nuclear Regulatory Commission (the Commission or the NRC) having found that:

   A. The application for the amendment filed by PPL Susquehanna, LLC, dated September 8, 2004, as supplemented by letters dated July 8 and September 28, 2005, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

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

   C. There is reasonable assurance: (I) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

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

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

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-22 is hereby amended to read as follows:

   (2) Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 203 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PPL Susquehanna, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance, shall be implemented within 30 days, and shall expire on December 31, 2005.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard J. Laufer, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: October 6, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 203

FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
TS/3.6-35	TS/3.6-35
TS/3.6-36	TS/3.6-36
TS/3.6-37	TS/3.6-37
TS/3.6-43	TS/3.6-43
TS/3.6-44	TS/3.6-44

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 226 TO FACILITY OPERATING LICENSE NO. NPF-14

AND AMENDMENT NO. 203 TO FACILITY OPERATING LICENSE NO. NPF-22

PPL SUSQUEHANNA, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 388

1.0 INTRODUCTION

By application dated September 8, 2004 (Agencywide Documents Access and Management System (ADAMS), Accession No. ML042600070), as supplemented in letters dated July 8 (ML052010115) and September 28, 2005, PPL Susquehanna, LLC (PPL, the licensee), requested changes to the Technical Specifications (TSs) for Susquehanna Steam Electric Station, Units 1 and 2 (SSES 1 and 2).

The proposed changes would revise the SSES 1 and 2 TSs 3.6.4.1, “Secondary Containment,” and 3.6.4.3, “Standby Gas Treatment System [SGTS],” to extend on a one-time basis, the allowable completion time for required actions for secondary containment inoperable and two SGTS subsystems inoperable, in mode 1, 2, or 3, from 4 to 48 hours.

2.0 REGULATORY EVALUATION

The Nuclear Regulatory Commission (NRC) finds that PPL, in its September 8, 2004, July 8 and September 28, 2005, submittals identified the applicable regulatory requirements. The regulatory requirements and guidance which the NRC staff considered in its review of the application are as follows:

1. Title 10 of the *Code of Federal Regulations* (10 CFR) establishes the fundamental regulatory requirements with respect to the reactivity control systems. Specifically, General Design Criterion (GDC) 16, “Containment design,” in Appendix A of 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," states that reactor containment and associated systems shall be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require.

2. GDC 50, “Containment design basis,” states, in part, that the reactor containment structure, including access openings, penetrations, and the containment heat removal system shall be designed so that the containment structure and its internal compartments can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any loss-of-coolant accident.

3. Section 50.36, “Technical specifications,” provides the regulatory requirements for the content required in a licensee’s TSs. Section 50.36 states, in part, that the TSs will include surveillance requirements (SRs) to assure that the quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation (LCO) will be met.

3.0 TECHNICAL EVALUATION

3.1 PPL’s Proposed Changes

Damper motor HDMO7545B is at the end of its qualification life. The lifetime was previously extended via re-analysis. PPL has determined that replacement is required. Although damper motor HDMO7545A does not require replacement at this time, PPL concluded that it was prudent to replace it concurrently with the replacement of HDMO7545B. Following replacement, both dampers will be qualified to the end of current plant life. This one-time change would be effective from the date of issuance until December 31, 2005.

In order to effect this one-time change, TS 3.6.4.1, “Secondary Containment,” would be revised by modifying the completion time for Required Action A. The modification would include a new completion time, which reads "48 hours for a one-time outage for replacement of the reactor building recirculating fan damper motors, to be completed by December 31, 2005." This new completion time will be connected with a logical connector "OR."

TS 3.6.4.3, “Standby Gas Treatment System,” would also be revised to modify the completion time for Required Action D. The modification would include a new completion time, which reads "48 hours for a one-time outage for replacement of the reactor building recirculating fan damper motors, to be completed by December 31, 2005." This new completion time will also be connected with a logical connector "OR."

Upon approval of the proposed change, PPL would revise TS Bases 3.6.4.1 and 3.6.4.3 under the TSs bases control program, by inserting the following:

> A temporary (one-time) completion time is connected to the completion time requirements above (4 hours) with an "OR" connector. The temporary completion time is 48 hours and applies to the replacement of the reactor building recirculating fan damper motors. The temporary completion time of 48 hours may only be used once, and expires on December 31, 2005.

3.2 Background

3.2.1 Secondary Containment

During normal operation, the secondary containment is required to be kept at a minimum negative pressure of 0.25 inches of water gauge with respect to outside. This is to assure that all leakage will be into the secondary containment. During normal operation, this is accomplished by nonsafety-related heating, ventilation, and air conditioning (HVAC) systems. When a secondary containment isolation signal is received, the safety-related reactor building (RB) recirculating and the SGTS fans start and the normal operating, nonsafety-related HVAC systems are tripped. The isolated secondary containment zones align to the RB recirculation plenum by the opening of isolation dampers. The SGTS is connected to, and draws air from, the RB recirculation plenum. The SGTS is used to maintain the affected zone(s) of the secondary containment at a negative pressure. The removal of air from the recirculation plenum maintains the secondary containment at a negative pressure of 0.25 inches of water gauge with respect to outside.

The secondary containment is divided into three isolated ventilation zones. Zones I and II surround respective Units 1 and 2 primary containment below the floor at elevation 779 feet and 1 inch and also include stairwells and elevator machine rooms and shafts above elevation 779 feet and 1 inch. Zone III includes Units 1 and 2 secondary containment above the floor at elevation 779 feet and 1 inch, including the refueling floor, but excludes the HVAC fan and equipment rooms.

The following control fission products within the secondary containment in the event of a design basis accident:

a) A secondary containment that completely surrounds each of the two primary containments

b) The SGTS

c) A recirculation system

3.2.2 Standby Gas Treatment System (SGTS)

The SGTS is designed to accomplish the following safety-related objectives:

a) Exhaust sufficient filtered air from the reactor building to maintain a minimum negative pressure of 0.25 inches of water in the affected volumes following secondary containment isolation for the following design basis events:

    (1) Irradiated fuel-handling accident in the refueling floor area, and

    (2) Loss-of-coolant accident (LOCA)

b) Filter the exhausted air from the reactor building to remove radioactive particulate and radioactive and nonradioactive forms of iodine in order to limit the offsite dose to the guidelines of Part 100 of Title 10 of the *Code of Federal Regulations*

(10 CFR Part 100) and the control room operator doses to General Design Criteria (GDC) 19.

Nonsafety-related objectives for design of the SGTS include:

a) Filter and exhaust air from the primary containment for purging and ventilating

b) Filter and exhaust discharge from the high-pressure coolant injection barometric condenser

c) Filter and exhaust from the primary containment pressure relief line

d) Filter and exhaust nitrogen from the primary containment for nitrogen purging

A common recirculation system is provided for Units 1 and 2 to perform the following safety-related functions:

a) Mix the atmosphere in the reactor building to obtain a lesser and more uniform concentration of radioactivity following a design-basis accident (DBA) LOCA or a refueling accident

b) Prevent the spread of radioactivity by the HVAC between Zone III and Zones I or II during and after an irradiated fuel-handling accident

c) Provide mixing of the atmosphere within the reactor building. This may involve mixing the atmosphere of all three zones; of Zone I or Zone II and the refueling area (Zone III); or of Zone III alone, particularly in case of the fuel-handling accident in b), above.

3.3 Configuration Impacts of Proposed Action

During this work evolution, the access hatch to the reactor building recirculation plenum will be removed for the duration of the work activity. Removal of the access hatch allows the recirculation plenum air space to interact with the surrounding environment (Unit I railroad bay). For this evolution, the Unit 1 railroad bay will be aligned to secondary containment (Zone III). Therefore, opening the reactor building recirculation plenum hatch does not allow secondary containment to directly communicate with the environment, and, therefore, does not represent a leakage pathway out of secondary containment.

To provide for worker safety, the power to the SGTS fans and recirculation fans will be isolated during the work evolution, necessitating entry into the two limiting conditions for operation (LCOs). Therefore, should a secondary containment isolation signal occur, these fans will not perform their intended functions until power is restored and the recirculation plenum hatch is reinstalled.

PPL indicated that the justification for the use of a 48-hour secondary containment and the SGTS subsystems extended completion time was based upon:

1) A radiological evaluation of the impact on DBA-LOCA doses including doses offsite, control room habitability, and exposures for personnel access,

2) The risk-mitigating requirements (i.e., equipment required to be maintained operable) which will exist during the replacement of the reactor building recirculation fan damper motors, and

3) The SSES 1 and 2 risk management process which will assess the risk impacts of planned and emergent work during the replacement.

3.4 Compensatory Actions/Restrictions

In its September 8, 2004, submittal, PPL indicated that the following mitigating measures will be taken prior to and/or during the work to increase the ability to identify and take appropriate actions before a problem arises:

a) Performance of engineering inspections of containment. These will include, prior to the work:

   (1) Testing for leak tightness of the secondary containment structure per TS SRs 3.6.4.1.4 and 3.6.4.1.5

   (2) Testing for secondary containment bypass leakage paths

b) Prohibition of movement of irradiated fuel within secondary containment during the extended LCO period

c) Prohibition of high-risk activities within the confines of the plant that may result in a loss of offsite power during the replacement

d) Prohibition of high-risk grid activities that may result in a loss of offsite power during the replacement

e) No granting of any work requests for the duration of the damper motor replacement by transmission and distribution operations if such a request would jeopardize the reliability of offsite power

f) Performance of surveillance testing of diesel generator 'E' (fifth nontechnical specification) before damper motor replacement to assure its availability

g) Requirement for reactor building HVAC availability during damper motor replacement

In a letter dated September 28, 2005, PPL clarified their position regarding the performance of engineering inspections of containment noted above. The testing which was performed during the May 2005 outage was considered sufficient for the above commitment and was not considered as necessary to be re-performed in October 2005. The PPL letter also indicated that no maintenance would be performed on secondary containment penetrations and that

maintenance on secondary containment would be managed and controlled to assure that the integrity measured in May 2005 remained.

In addition to the above actions, PPL indicated in their September 8, 2004, submittal that, per normal operating procedures, the control room will monitor weather conditions for imminent external events such as external flood or forest fire threats prior to and during the replacement of the motors. Additionally, geomagnetic activity from solar storms will be monitored via forecasts provided to the Pennsylvania, New Jersey, and Maryland interconnection, prior to and during the replacement. PPL indicated that work will be modified if conditions warrant.

The provisions which will be made to restore a functional train of the SGTS during replacement of the recirculating fan damper motors were presented in the September 8, 2004, submittal. That submittal also indicated that preparations would be made for blade seal replacement; however, PPL did not anticipate that this would be necessary. PPL indicated that arrangements would be made for a dedicated secondary containment and the SGTS restoration team during this replacement action.

3.5 Radiological Evaluation

3.5.1 PPL's Evaluation

Two radiological dose analyses were performed by PPL to evaluate this one-time TS change. The first analysis determined the consequences to the control room operators and to offsite individuals. The second analysis involved the doses to plant personnel resulting from the restoration actions required in the event of a DBA-LOCA during the reactor building recirculation fan damper motor work.

<u>DBA-LOCA Doses - Offsite and Control Room Habitability Analysis</u>

PPL performed an evaluation of the impact on the final safety analysis report, Chapter 15, DBA-LOCA dose analysis, assuming a period of time without secondary containment and the SGTS with eventual restoration of secondary containment and the SGTS. This evaluation assumed the worst-case time scenario. This worst-case scenario assumes restoration of secondary containment and the SGTS within 200 minutes following the LOCA.

For this amendment request, PPL calculated the dose consequences to offsite individuals and to the control room operators using the same assumptions as those presented in the updated final safety analysis report (UFSAR) for the DBA-LOCA except for the period during which the SGTS and secondary containment was being restored. During the restoration period, the PPL analysis assumed reactor building leakage rates consistent with DBA-LOCA conditions. During the restoration period, the reactor building will be isolated and no ventilation systems will be operating. Therefore, the only driving force for a release to the environment would be airborne leakage to the reactor building. Airborne leakage would occur as a result of drywell and suppression pool free air volume leakage (1 percent per day) and engineered safety feature (ESF) recirculation system leakage (20 gallons per minute (gpm)). Therefore, for the time period to restore the SGTS, PPL assumed the activity release rate to the environment from the reactor building was at a volumetric leakage rate equivalent to the leakages from the drywell and suppression pool free air volume and from ESF system leakage. Table 4.1-1 presents the

assumptions used by PPL from the beginning of the LOCA until the period after the LOCA when the SGTS is established and operating in the reactor building.

Since there are no drywell or suppression pool leakage paths directly into reactor building Zone III for the 200-minute time period to restore the SGTS, PPL assumed one zone mixing (Zone I or Zone II mixing). The activity release rate to the environment from the reactor building during the restoration period was assumed to be at a volumetric leakage rate equivalent to the rate of drywell and suppression pool free air volume and ESF system leakage into the reactor building. PPL indicated that this leakage rate is equivalent to 10 standard cubic feet per minute (SCFM).

After the SGTS is restored, PPL assumed that the reactor building mixing model and leakage rates were the same as for the UFSAR DBA-LOCA Chapter 15.6.5 analysis. The activity release rate to the environment from the reactor building for the UFSAR DBA-LOCA model is based on ventilation systems operating and the design reactor building leakage rate of 200 percent per day for a 50 percent building mixing efficiency. During a postulated DBA-LOCA, drywell and suppression pool free air volume leakage into the reactor building will occur in reactor building ventilation Zones I for a Unit 1 event or in Zone II for a Unit 2 event. Because there are no leakage paths directly into reactor building Zone III, activity transport into Zone III under DBA-LOCA conditions can only occur if the reactor building recirculation system is running. For the UFSAR DBA-LOCA, the reactor building ventilation systems would not be operating for the first 10 seconds post-accident. However, in the UFSAR DBA-LOCA activity release model, PPL simplified the analysis by assuming reactor building mixing in all three ventilation zones for this 10-second time period. In their submittal, PPL indicated that the assumption of two-zone versus three-zone mixing has no impact on the reactor building activity release rate to the environment since the reactor building leakage rate is specified as 1 percent per day. Even though ventilation systems are not operating, PPL assumed the design reactor building leakage rate to the environment for the first 10 seconds in order to simplify the activity release model. PPL concluded that since this only involved a 10-second release duration, these assumptions had no significant impact on DBA-LOCA doses.

PPL performed a parametric study to evaluate the impact that reactor building leakage would have on DBA-LOCA doses for restoration of the SGTS. All other assumptions used for this analysis were assumed to be the same as used in the UFSAR DBA-LOCA, Section 15.6.5. PPL determined that reactor building leakage rates would have to be significantly higher than expected under DBA-LOCA conditions with the SGTS not operating for 10 CFR Part 100 offsite dose limits or 10 CFR Part 50, Appendix B, Criterion 19, control room dose limits to be exceeded. For this to occur, the reactor building leakage rate during restoration of the SGTS would need to be 424 SCFM (82 percent per day). This compares to the expected reactor building leakage rate without ventilation systems operating of 10 SCFM (1.935 percent per day).

For this one-time amendment request, PPL calculated the exclusion area boundary (EAB), the low-population zone (LPZ), and control room operator doses to be 44.4, 25.5, and 11 rem thyroid, respectively. PPL calculated the whole-body doses at these locations to be 0.68 rem, 0.31 rem, and 0.71 rem.

Table 4.1-1, Sequence of Events - DBA-LOCA
SGTS Restoration Time = 200 Minutes for Recirculation Fan Damper Work

Time From DBA-LOCA	Description
0	DBA-LOCA occurs
3 min	End of reactor coolant system blowdown and suppression pool scrubbing
200 min	- SGTS restored - SGTS exhaust fans start - Reactor building recirculation fan starts
203 min	Reactor building drawdown to negative pressure complete
Note: For restoration of the SGTS, no credit for a delay in the SGTS fans or the reactor building recirculation fans reaching full flow is conservatively assumed.	

DBA-LOCA Doses - Personnel Exposures Analysis

The second analysis performed by PPL involved the determination of the doses to plant personnel who would be taking the restoration actions in the event that a DBA-LOCA occurred during the reactor building recirculation fan damper motor work. PPL's analysis addressed personnel doses in each of the areas for work tasks necessary to restore the SGTS and the dose resulting from ingress/egress of the areas where the work would occur. PPL evaluated personnel radiation exposures for restoration of the SGTS for DBA-LOCA component/piping contained sources. Personnel requirements and restoration times were given in Section 4.2.3 of the September 8, 2004, submittal.

PPL estimated the personnel DBA-LOCA radiation exposures for restoration of the SGTS during damper motor replacement of the reactor building recirculation fan damper motor as:

Maximum dose to an individual = 0.035 rem
Total exposure to all individuals = 0.19 person-rem

The personnel radiation exposure limit for vital area access under design-basis accident conditions is 5 rem whole-body or its equivalent to any part of the body (10 CFR Part 50, Appendix A, GDC 19). DBA-LOCA doses to personnel for restoration of the SGTS are well within the 5 rem dose limit.

3.5.2 NRC Staff's Radiological Assessment

The NRC staff's assessment involved the performance of confirmatory calculations but the confirmatory calculations were limited in scope. The NRC staff determined the dose consequences to individuals located at the EAB and the LPZ and to the control room operators based upon a 200-minute restoration period for secondary containment and the SGTS.
This amendment request only affects the LOCA releases which occur from the reactor building.

The releases occurring from main steam isolation valve (MSIV) leakage and secondary containment bypass are unaffected by this amendment. Therefore, the focus of the NRC staff's confirmatory calculations was the determination of the consequences of releases from the reactor building.

The NRC staff's assessment involved a two-step process. First, the NRC staff calculated the dose consequences from reactor building releases using the assumptions presented in the SSES 1 and 2 UFSAR. The NRC staff then subtracted these results from the total doses presented in the UFSAR. This determined the dose contribution arising from the MSIV and secondary containment bypass leakage pathways. Then the NRC staff calculated the dose consequences based upon the assumptions and proposed operating configuration associated with this amendment request. To this dose, the NRC staff added the dose contribution from MSIV leakage and secondary containment bypass to arrive at the total dose consequences for this amendment request.

The NRC staff's calculations of the control room operator's dose involved two different control room envelope in-leakage scenarios. One scenario involved use of the same control room envelope (CRE) in-leakage (10 cubic feet per minute (cfm)) as in the present UFSAR. The second scenario modified the assumption for CRE in-leakage to reflect the results of the CRE integrity testing which occurred in December 2004 and included 10 cfm for ingress/egress of the control room.

CRE integrity testing at SSES 1 and 2 had determined that CRE in-leakage was 150 cfm ± 235 cfm for the "A" division of control room habitability systems (CRHSs) and 129 cfm ± 298 cfm for the "B" division of CRHSs. Therefore, the NRC staff used an in-leakage value of 427 cfm plus 10 cfm for ingress/egress.

For the second control room operator dose scenario the NRC staff needed to adjust the dose contribution from the MSIV leakage and the secondary containment bypass pathways to account for the increased CRE unfiltered in-leakage. The NRC staff did this through the use of iodine protection factors (IPF). The NRC staff calculated the IPF for scenarios one and two. The dose contribution from MSIV leakage and from secondary containment bypass was increased by the ratio of scenario one's IPF to scenario two's IPF. The determination of the IPF is described in the Murphy-Campe paper presented at the 13th Air Cleaning Conference in August 1974.

The following sections discuss specific aspects of the NRC staff's calculations and focus on the reactor building releases originating from ESF leakage and releases from the drywell and suppression pool free air volume.

<u>ESF Leakage</u>

The assumed ESF leakage rate in the UFSAR is 20 gpm. This leakage rate (20 gpm) equates to a release rate of 2.676 cfm. The NRC staff assumed that 10 percent of the total leakage becomes airborne in the reactor building. For the UFSAR case, it was assumed that this leakage was mixed in all three zones of the reactor building. This leakage was assumed to be filtered and adsorbed by the SGTS at an efficiency of 99 percent. Additional details on this analysis are presented in Table 4.2.1-1 of this safety evaluation (SE).

For the purposes of this amendment request, it was assumed that the ESF leakage was limited to mixing in one zone of the reactor building during the period that the SGTS was not operating. However, once the SGTS began operation, the leakage was assumed to mix in all three reactor building zones.

During the 200-minute period that the SGTS was being restored, the reactor building was assumed to leak at a rate of 1.935 percent per day. During the 3-minute period that the SGTS was starting up, the reactor building leakage rate was assumed to be 200 percent per day. Once the SGTS began operation, reactor building leakage ceased and the performance of the SGTS mirrored the UFSAR analysis. Additional details on this analysis are presented in Table 4.2.1-2 of this SE.

<u>Drywell & Suppression Pool Free Air Volume (Containment) Leakage</u>

The approved SSES 1 and 2 LOCA analysis assumes that the fuel material released from the core passes through the suppression pool. The suppression pool is assumed to remove a certain portion of the elemental and particulate forms of iodine but none of the organic forms of iodine. A certain fraction of the material released from the fuel passes through the suppression pool but is assumed to bypass the reactor building (secondary containment bypass) and to be released to the environment. The material which is released via this pathway is unaffected by the unavailability of the SGTS. As noted above, the dose contribution from this pathway was determined in conjunction with the MSIV-leakage pathway.

For the UFSAR case, it was assumed that the release from the fuel was mixed in all three zones of the reactor building with an effective mixing volume of 50 percent. Material in the reactor building was assumed to be released via the SGTS and to be filtered and adsorbed at an efficiency of 99 percent prior to release. Additional details on this analysis are presented in Table 4.2.1-1.

For the analysis of the consequences associated with this amendment request, the release of material from the fuel was assumed to be limited to mixing in one zone of the reactor building during the period that the SGTS was not operating. Once the SGTS began operation, the radioisotopes were assumed to mix in all three reactor building zones as noted above.

During the 200-minute period that the SGTS was being restored, the reactor building was assumed to leak at a rate of 1.935 percent per day. During the 3-minute period that the SGTS was starting up, the reactor building leakage rate was assumed to be 200 percent per day. Once the SGTS began operation, reactor building leakage ceased and the performance of the SGTS mirrored the UFSAR analysis. Additional details on this analysis are presented in Table 4.2.1-2.

3.6 NRC Staff's Conclusions

Table 4.2.3-1 in this SE presents the dose calculated by NRC staff for the reactor building release pathway. Whole body and thyroid doses are presented for individuals located at the EAB, LPZ, and in the control room. Doses are presented based upon two cases. One case is based upon the existing UFSAR assumptions. A second case is based upon the circumstances and assumptions associated with this amendment request.

The July 8, 2005, PPL letter contained the doses presented in the SSES 1 and 2 UFSAR. A review of the doses presented in the July 8th letter and in Table 4.2.3-1 shows that neither the whole-body dose criteria of 25 rem for the EAB and LPZ nor the 5-rem whole-body for the control room operators is in danger of being exceeded as a result of this proposed amendment request. Therefore, the remaining discussion and the information presented in Tables 4.2.3-2 and 4.2.3-3 in this SE, are limited to the thyroid dose.

Table 4.2.3-2 in this SE presents the NRC staff's determination of the dose contribution from MSIV leakage and secondary containment bypass to individuals located at the EAB, LPZ, and in the control room. As previously noted, this contribution was determined by subtracting the contributions for ESF leakage and secondary containment filtered and leakage releases based upon the present UFSAR assumptions from the total doses reported in the UFSAR. The contribution established for MSIV leakage and secondary containment bypass was then added to the doses calculated for releases from the reactor building for this one-time amendment to obtain the total resultant dose. The resultant doses are presented in Table 4.2.3-3.

It should be noted that the control room operator dose presented in Table 4.2.3-3 required an adjustment to the MSIV leakage and the secondary containment bypass component presented in Table 4.2.3-2. The value in the table reflects a dose based upon a CRE in-leakage rate of 10 cfm rather than 427 cfm plus 10 cfm for ingress/egress. The adjustment was made by calculating an iodine IPF for the two different CRE in-leakages. The manner in which the IPF was calculated is presented in Table 4.2.3-4 in this SE. The control room operator's dose presented in Table 4.2.3-2 was multiplied by the ratio of the IPF calculated for 10 cfm of the CRE in-leakage to the IPF calculated for the 437 cfm of the CRE in-leakage. This ratio is 6.77. Multiplication of the MSIV leakage and secondary containment bypass dose contribution to the UFSAR control room operator dose by this ratio results in a control room operator dose which exceeds 30 rem. However, in its September 28, 2005, letter PPL informed the NRC that it has in place additional measures to limit control room operator dose including KI [potassium] tablets and respiratory equipment (self-contained breathing apparatus) staged and ready for use. The NRC staff finds that PPL's action would not result in doses which would exceed the criteria in 10 CFR Part 100 and GDC 19. Consequently, the proposed one-time increase in completion times for TS 3.6.4.1, "Secondary Containment," and TS 3.6.4.3, "Secondary Gas Treatment System," is acceptable.

Table 4.2.1-1
NRC Staff's UFSAR Analysis Assumptions

Item	**Value**
Reactor Power Level (Mwt)	3,616
Initial Activity Released to Primary Containment (%) Noble Gases Iodine	 100 25
Initial Activity Released to Suppression Pool for ESF Leakage Pathway (%) Noble Gases Iodine	 0 50
Iodine Form Fractions Elemental Organic Particulate	 0.91 0.04 0.05
Total MSIV Leakage (scfh)	300
Secondary Containment Bypass Leak Rate (scfh)	9
ESF & Control Rod Drive Leakage to Reactor Bldg. (gpm)	20
Flashing Fraction for ESF & Control Rod Drop Leakage	0.10
Reactor Building Recirculation System Mixing Efficiency (%)	50
Reactor Building Leakage Rate (%/day) 0-3 minutes > 3 minutes	 200 0
Effective Reactor Building Volume (ft^3)	2,878,000
SGTS Flow Rate (cfm) 0-30 seconds 30 seconds - 3 minutes > 3 minutes	 0 10,500 4,400
SGTS Efficiency for Iodine (%)	99
Drywell & Suppression Pool Free Air Volume (ft^3)	388,190

Suppression Pool Scrubbing Efficiency (%) 0-3 minutes > 3 minutes Organic Elemental & Particulate	 0 0 87.4
Containment Leakage Rate (cfm)	2.64
Atmospheric Dispersion Factor (sec/m^3) EAB LPZ 0-8 hr 8-24 hr 1-4 days 4-30 days	 9.6E-4 2.18E-5 2.83E-6 1.43E-6 1.08E-6
Control Room Atmospheric Dispersion Factor (sec/m^3) 0-8 hr 8-24 hr 1-4 days 4-30 days	 3.322E-4 1.96e-4 1.25e-4 5.48e-5
Control Room Free Air Volume (ft^3)	110,000
Control Room ESF Ventilation System Makeup Flow Rate (cfm)	5,810
Control Room ESF Ventilation System Removal Efficiencies (%)	99
Control Room Envelope In-leakage Value (cfm)	10

Table 4.2.1-2
NRC Staff's Amendment Request Analysis Assumptions

Item	Value
Reactor Power Level (Mwt)	3,616
Initial Activity Released to Primary Containment (%) Noble Gases Iodine	 100 25
Initial Activity Released to Suppression Pool for ESF Leakage Pathway (%) Noble Gases Iodine	 0 50
Iodine Form Fractions Elemental Organic Particulate	 0.91 0.04 0.05
Total MSIV Leakage (scfh)	300
Secondary Containment Bypass Leak Rate (scfh)	9
ESF & Control Rod Drive Leakage to Reactor Bldg. (gpm)	20
Flashing Fraction for ESF & Control Rod Drop Leakage	0.10
ESF Leakage Airborne in Reactor Bldg. (cfm)	2.674
Reactor Bldg Leakage Rate (%/day) 0-200 minutes 200-203 minutes > 203 minutes	 1.935 200 0
Effective Reactor Bldg. Volume (ft^3) 0-200 minutes >200 minutes	 744,300 2,878,000
SGTS Flow Rate (cfm) 0-200 minutes 200 minutes-203 minutes > 203 minutes	 0 10,500 4,400
SGTS Efficiency for Iodine (%)	99

Drywell & Suppression Pool Free Air Volume (ft^3)	388,190	
Suppression Pool Scrubbing Efficiency for Iodine (%) 0-3 minutes > 3 minutes Organic Elemental & Particulate	 0 0 87.4	
Containment Leakage Rate (cfm)	2.64	
Atmospheric Dispersion Factor (sec/m^3) EAB LPZ 0-8 hr 8-24 hr 1-4 days 4-30 days	 9.6E-4 2.18E-5 2.83E-6 1.43E-6 1.08E-6	
Control Room Atmospheric Dispersion Factor (sec/m^3) 0-8 hr 8-24 hr 1-4 days 4-30 days	 3.322E-4 1.96e-4 1.25e-4 5.48e-5	
Control Room Volume (ft^3)	110,000	
Control Room ESF Ventilation System Makeup Flow Rate (cfm)	5,810	
Control Room Envelope In-leakage Value (cfm)	Scenario 1	Scenario 2
	10	427
Control Room ESF Ventilation System Removal Efficiencies (%)	99	

Table 4.2.3-1
NRC Staff's Calculations of Dose (Rem) Consequences from Reactor Building Pathways

Case	Pathway	EAB		LPZ		Control Room	
		Whole Body	Thy-roid	Whole Body	Thy-roid	Whole Body	Thyroid
UFSAR	ESF Leakage	0.0224	4.73	0.00463	4.64	6.14E-5	2.54
UFSAR	Containment Leakage	2.79	2.05	0.582	1.42	0.584	0.747
UFSAR	Total	2.81	6.78	0.587	6.06	0.584	3.29
One Time Amend-ment	ESF Leakage	0.0206	4.52	0.00481	4.74	6.31E-5*	2.57*
						4.28E-4[#]	17.4[#]
One Time Amend-ment	Containment Leakage	0.0354	1.54	0.459	1.72	0.515*	0.804*
						0.516[#]	5.34[#]
One Time Amend-ment	Total	0.056	6.06	0.463	6.46	0.517[#]	23.0[#]

* Based upon 10 cfm of unfiltered inleakage to the control room envelope.
[#] Based upon 427 cfm of unfiltered inleakage to the control room envelope.

Table 4.2.3-2
Thyroid Doses from MSIV Leakage & Secondary Containment Bypass Pathways

Location	Total Dose UFSAR (Rem)	NRC Staff's Calculated Contribution from ESF Leakage and Release from Reactor Bldg.	Dose from MSIV Leakage and Secondary Containment Bypass
EAB	45.1	ESF Leakage = 4.73 Containment = 2.05	38.32
LPZ	24.2	ESF Leakage = 4.64 Containment = 1.42	18.14
Control Room	10.8	ESF Leakage = 2.54 Containment = 0.747	7.51

Table 4.2.3-3
Resultant NRC Staff's Thyroid Doses

Location	Dose	Acceptance Criteria
EAB	44.4	300
LPZ	24.6	300
Control Room	73.5 without KI 7.35 with KI	30

Table 4.2.3-4
Calculation of Iodine Protection Factor (IPF)

IPF = $(F_1 + \eta F_2 + F_3)/([1-\eta]F_1 + F_3)$		
Parameter	UFSAR Case	Staff Analysis Case
F_1 - Filtered Makeup Flow Rate (cfm)	5,810	5,810
η - Makeup Absorber Efficiency (%)	99	99
F_2 - Recirculation Filter Flow Rate (cfm)	0	0
F_3 - Control Room Envelope In-leakage (cfm)	10	437
IPF	85.46	12.62

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change the surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (70 FR 9994). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

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

Principal Contributor: J. Hayes

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