Mr. George A. Hunger, Jr.
Director-Licensing, MC 2A-1
PECO Energy Company
Nuclear Group Headquarters
Correspondence Control Desk
P.O. Box No. 195
Wayne, PA 19087-0195

January 27, 1995

SUBJECT: ALLOWED OUTAGE TIME FOR EMERGENCY SERVICE WATER SYSTEM, RESIDUAL HEAT REMOVAL SERVICE WATER SYSTEM, ETC. - LIMERICK GENERATING STATION, UNIT 1 (TAC NO. M89655)

Dear Mr. Hunger:

The Commission has issued the enclosed Amendment No. 86 to Facility Operating License No. NPF-39 for the Limerick Generating Station (LGS), Unit 1. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated June 10, 1994, as supplemented by letter dated December 19, 1994.

This amendment involves a one-time change affecting the Allowed Outage Time (AOT) for the Emergency Sevice Water (ESW) system, Residual Heat Removal Service Water (RHRSW) System, the Suppression Pool Cooling, the Suppression Pool Spray, and Low Pressure Coolant Injection modes of the Residual Heat Removal System, and Core Spray System to be extended from 3 and 7 days to 14 days during the Unit 2 refueling outage scheduled to begin in January 1995. This proposed extended AOT allows adequate time to install isolation valves and cross-ties on the ESW and RHRSW Systems to facilitate future inspections or maintenance.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice. You are requested to notify the NRC when this amendment has been implemented at LGS, Unit 1.

Sincerely,

Original signed by
Frank Rinaldi, Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-352
Enclosures:
1. Amendment No. 86 to License No. NPF-39
2. Safety Evaluation

cc w/encls:
See next page

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

January 27, 1995

Mr. George A. Hunger, Jr.
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P.O. Box No. 195
Wayne, PA 19087-0195

SUBJECT: ALLOWED OUTAGE TIME FOR EMERGENCY SERVICE WATER SYSTEM, RESIDUAL HEAT REMOVAL SERVICE WATER SYSTEM, ETC. - LIMERICK GENERATING STATION, UNIT 1 (TAC NO. M89655)

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Sincerely,

Frank Rinaldi

Frank Rinaldi, Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-352

Enclosures:
1. Amendment No. 86 to License No. NPF-39
2. Safety Evaluation

cc w/encls:
See next page

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

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 86
License No. NPF-39

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

   A. The application for amendment by Philadelphia Electric Company (the licensee) dated June 10, 1994, as supplemented by letter dated December 19, 1994, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

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

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

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

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

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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 Facility Operating License No. NPF-39 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 86 , are hereby incorporated into this license. Philadelphia Electric Company 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 and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

For

John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the
Technical Specifications

Date of Issuance: January 27, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 86

FACILITY OPERATING LICENSE NO. NPF-39

DOCKET NO. 50-352

Replace the following pages of the Appendix A Technical Specifications with the attached page. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove	Insert
3/4 5-1	3/4 5-1
3/4 5-2	3/4 5-2
3/4 6-15	3/4 6-15
3/4 6-16	3/4 6-16
3/4 7-1	3/4 7-1
3/4 7-3	3/4 7-3

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 ECCS - OPERATING

LIMITING CONDITION FOR OPERATION

3.5.1 The emergency core cooling systems shall be OPERABLE with:

a. The core spray system (CSS) consisting of two subsystems with each subsystem comprised of:

   1. Two OPERABLE CSS pumps, and

   2. An OPERABLE flow patch capable of taking suction from the suppression chamber and transferring the water through the spray sparger to the reactor vessel.

b. The low pressure coolant injection (LPCI) system of the residual heat removal system consisting of four subsystems with each subsystem comprised of:

   1. One OPERABLE LPCI pump, and

   2. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water to the reactor vessel.

c. The high pressure coolant injection (HPCI) system consisting of:

   1. One OPERABLE HPCI pump, and

   2. An OPERABLE flow path capable of taking suction from the suppression chamber and transferring the water to the reactor vessel.

d. The automatic depressurization system (ADS) with at least five OPERABLE ADS valves.

APPLICABILITY: OPERATIONAL CONDITION 1, 2* ** #, and 3* ** ## ###.

*The HPCI system is not required to be OPERABLE when reactor steam dome pressure is less than or equal to 200 psig.

**The ADS is not required to be OPERABLE when the reactor steam dome pressure is less that or equal to 100 psig.

#See Special Test Exception 3.10.6.

##Two LPCI subsystems of the RHR system may be inoperable in that they are aligned in the shutdown cooling mode when reactor vessel pressure is less than the RHR Shutdown cooling permissive setpoint.

###During the 14 day extended AOT period allowed for installation of the common ESW and RHRSW system Modifications P-0166, P0167, and P0168 during the Unit 2 third refueling outage (2R03), in addition to the inoperable 'B' and 'D' LPCI subsystems of the RHR system and the inoperable 'B' CSS subsystem, the 'A' LPCI subsystem of the RHR system may be inoperable in that it is aligned in the shutdown cooling mode when reactor vessel pressure is less than the RHR Shutdown cooling permissive setpoint.

ACTION:

a. For the core spray system:

1. With one CSS subsystem inoperable, provided that at least two LPCI subsystems are OPERABLE, restore the inoperable CSS subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.#

2. With both CSS subsystems inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

b. For the LPCI system:

1. With one LPCI subsystem inoperable, provided that at least one CSS subsystem is OPERABLE, restore the inoperable LPCI pump to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one RHR cross-tie valve (HV-51-182 A or B) open, or power not removed from one closed RHR cross-tie valve operator, close the open valve and/or remove power from the closed valves operator within 72 hours, or be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

3. With no RHR cross-tie valves (HV-51-182 A, B) closed, or power not removed from both closed RHR cross-tie valve operators, or with one RHR cross-tie valve open and power not removed from the other RHR cross-tie valve operator, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

4. With two LPCI subsystems inoperable, provided that at least one CSS subsystem is OPERABLE, restore at least three LPCI subsystems to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.#

5. With three LPCI subsystems inoperable, provided that both CSS subsystems are OPERABLE, restore at least two LPCI subsystems to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

6. With all four LPCI subsystems inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.*

c. For the HPCI system, provided the CSS, the LPCI system, the ADS and the RCIC system are OPERABLE:

1. With the HPCI system inoperable, restore the HPCI system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤ 200 psig within the following 24 hours.

---

*Whenever both shutdown cooling subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

#The Allowed Outage Times (AOTs) of the 'B' Core Spray subsystem and the 'B' and 'D' LPCI subsystems may be extended up to 14 days to allow for installation of the common ESW and RHRSW system Modifications P-0166, P-0167, and P-0168 during the Unit 2 third refueling outage (2R03).

SUPPRESSION POOL SPRAY

LIMITING CONDITION FOR OPERATION

3.6.2.2 The suppression pool spray mode of the residual heat removal (RHR) system shall be OPERABLE with two independent loops, each loop consisting of:

a. One OPERABLE RHR pump, and

b. An OPERABLE flow path capable of recirculating water from the suppression chamber through an RHR heat exchanger and the suppression pool spray sparger(s).

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With one suppression pool spray loop inoperable, restore the inoperable loop to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.#

b. With both suppression pool spray loops inoperable, restore at least one loop to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN* within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.2 The suppression pool spray mode of the RHR system shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. By verifying that each of the required RHR pumps develops a flow of at least 500 gpm on recirculation flow through the RHR heat exchanger and the suppression pool spray sparger when tested pursuant to Specification 4.0.5.

*Whenever both RHR subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

#The Allowed Outage Time (AOT) of the 'B' loop of the suppression pool spray mode of the RHR system may be extended up to 14 days to allow for installation of the common ESW and RHRSW system Modifications P-0166, P-0167, and P-0168 during the Unit 2 third refueling outage (2R03).

SUPPRESSION POOL COOLING

LIMITING CONDITION FOR OPERATION

3.6.2.3 The suppression pool cooling mode of the residual heat removal (RHR) system shall be OPERABLE with two independent loops, each loop consisting of:

a. One OPERABLE RHR pump, and

b. An OPERABLE flow path capable of recirculating water from the suppression chamber through an RHR heat exchanger.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With one suppression pool cooling loop inoperable, restore the inoperable loop to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.#

b. With both suppression pool cooling loops inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN* within the next 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.3 The suppression pool cooling mode of the RHR system shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. By verifying that each of the required RHR pumps develops a flow of at least 10,000 gpm on recirculation flow through the flow path including the RHR heat exchanger and its associated closed bypass valve, the suppression pool and the full flow test line when tested pursuant to Specification 4.0.5.

---

*Whenever both RHR subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by this ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

#The Allowed Outage Time (AOT) of the 'B' loop of the Suppression Pool Cooling mode of the RHR system may be extended up to 14 days to allow for installation of the common ESW and RHRSW system Modifications P-0166, P-0167 and P-0168 during the Unit 2 third refueling outage (2R03).

LIMITING CONDITION FOR OPERATION

3.7.1.1 At least the following independent residual heat removal service water (RHRSW) system subsystems, with each subsystem comprised of:

a. Two OPERABLE RHRSW pumps, and

b. An OPERABLE flow path capable of taking suction from the RHR service water pumps wet pits which are supplied from the spray pond or the cooling tower basin and transferring the water through one Unit 1 RHR heat exchanger,

shall be OPERABLE:

a. In OPERABLE CONDITIONS 1, 2, and 3, two subsystems.

b. In OPERABLE CONDITIONS 4 and 5, the subsystem(s) associated with systems and components required OPERABLE by Specification 3.4.9.2, 3.9.11.1, and 3.9.11.2.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5.

ACTION:

a. In OPERATIONAL CONDITION 1, 2, or 3:

1. With one RHRSW pump inoperable, restore the inoperable pump to OPERABLE status within 30 days, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one RHRSW pump in each subsystem inoperable, restore at least one of the inoperable RHRSW pumps to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one RHRSW subsystem otherwise inoperable, restore the inoperable subsystem to OPERABLE status with at least one OPERABLE RHRSW pump within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.#

4. With both RHRSW subsystems otherwise inoperable, restore at least one subsystem to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN* within the following 24 hours.

*Whenever both RHRSW subsystems are inoperable, if unable to attain COLD SHUTDOWN as required by the ACTION, maintain reactor coolant temperature as low as practical by use of alternate heat removal methods.

#The Allowed Outage Time (AOT) of the 'B' RHRSW subsystem may be extended up to 14 days to allow for installation of the common ESW and RHRSW system Modifications P-0166, P-0167, and P-0168 during the Unit 2 third refueling outage (2R03).

EMERGENCY SERVICE WATER SYSTEM - COMMON SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least the following independent emergency service water system loops, with each loop comprised of:

a. Two OPERABLE emergency service water pumps, and

b. An OPERABLE flow path capable of taking suction from the emergency service water pumps wet pits which are supplied from the spray pond or the cooling tower basin and transferring the water to the associated Unit 1 and common safety-related equipment,

shall be OPERABLE:

a. In OPERATIONAL CONDITIONS 1, 2, and 3, two loops.

b. In OPERATIONAL CONDITIONS 4, 5, and *, one loop.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, 5, and *.

ACTION:

a. In OPERATION CONDITION 1, 2, or 3:

1. With one emergency service water pump inoperable, restore the inoperable pump to OPERABLE status within 45 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one emergency service water pump in each loop inoperable, restore at least one inoperable pump to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one emergency service water system loop otherwise inoperable, declare all equipment aligned to the inoperable loop inoperable**, restore the inoperable loop to OPERABLE status with at least one OPERABLE pump within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.#

*When handling irradiated fuel in the secondary containment.

**The diesel generators may be aligned to the OPERABLE emergency service water system loop provided confirmatory flow testing has been performed. Those diesel generators no aligned to the OPERABLE emergency service water system loop shall be declared inoperable and the actions of 3.8.1.1 taken.

#The Allowed Outage Time (AOT) of the 'B' loop of the Emergency Service Water system may be extended up to 14 days to allow for installation of the common ESW and RHRSW system Modifications P-0166, P-0167, and P-0168 during the Unit 2 third refueling outage (2R03).

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 86 TO FACILITY OPERATING LICENSE NO. NPF-57

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION, UNIT 1

DOCKET NO. 50-352

1.0 INTRODUCTION

By letter dated June 10, 1994, as supplemented by letter dated December 19, 1994, the Philadelphia Electric Company (the licensee) submitted a request for changes to the Limerick Generating Station, Unit 1, Technical Specifications (TS). The requested changes would permit a one-time change affecting the Allowed Outage Time (AOT) for the Emergency Sevice Water (ESW) system, Residual Heat Removal Service Water (RHRSW) System, the Suppression Pool Cooling, the Suppression Pool Spray, and Low Pressure Coolant Injection modes of the Residual Heat Removal System, and Core Spray System to be extended from 3 and 7 days to 14 days during the Unit 2 refueling outage scheduled to begin in January 1995. This proposed extended AOT allows adequate time to install isolation valves and cross-ties on the ESW and RHRSW Systems to facilitate future inspections or maintenance. The December 19, 1994, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 EVALUATION

The licensee has proposed a one-time (i.e.,temporary) change to extend the Allowed Outage Times (AOT) for the emergency service water system (ESW), the residual heat removal service water system (RHRSW), suppression pool cooling (SPC), suppression pool spray (SPS) and low pressure coolant injection modes of the RHR system. The AOTs are to be extended from 3 days to 14 days for ESW, RHRSW and SPC, and from 7 days to 14 days for LPCI, SPS, and core spray. The proposal is intended to allow adequate time to install isolation valves and cross-ties on the ESW and RHRSW systems, while continuing to operate Unit 1. The modifications will facilitate future inspections and maintenance by allowing isolation of one ESW loop from one unit while maintaining the operability of the remaining ESW loop to support operation of the other unit.

This evaluation assesses the adequacy of the proposed change and discusses the containment heat removal and depressurization functions of the RHR system (SPC, SPS), the acceptibility of the temorary extension of the AOT, the risk impact based upon the incremental core damage probability due to the proposed activity, and the safety implications of extending the AOTs for ESW and RHRSW.

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2.1 Containment Heat Removal/Depressurization Systems Design Bases

2.1.1 Suppression Pool Spray Mode of RHR Operation

Design Basis: Following a DBA, the RHR Suppression Pool Spray System (the Suppression Pool Spray mode of the RHR System) removes heat from the suppression chamber airspace in the suppression chamber above the suppression pool. The suppression pool is designed to absorb the sudden input of heat from the primary system resulting from a DBA or a rapid depressurization of the reactor pressure vessel (RPV) through safety/relief valves. The heat addition to the suppression pool results in increased steam in the suppression chamber, which increases primary containment pressure. A small amount of the steam discharged into the drywell during a DBA can bypass the suppression pool and end up in the suppression chamber airspace without being condensed in the pool. This steam is known as suppression pool bypass leakage. The suppression pool airspace is sized to accommodate the noncondensible gases in the primary containment. Spraying cooled water into the suppression pool airspace provides a means to condense the bypass leakage steam.

The suppression pool spray function is provided by two of four independent RHR loops. Each of these two (A and B) RHR suppression pool spray subsystems contains a pump and heat exchanger. (The A and B pumps are backed-up by C and D pumps located in LPCI loops which lack heat exchangers). Each pump has two 100% suction strainers.) The two subsystems perform the suppression pool spray function by circulating water from the suppression pool through the RHR heat exchangers and returning the water to the suppression chamber via spray spargers and a return line. The spargers only accommodate a small portion (500 gpm) of the total RHR pump flow (10,000 gpm); most of the flow returns to the suppression pool through the suppression pool cooling return line. Thus, both suppression pool cooling and suppression pool spray functions are performed when the Suppression Pool Spray System is initiated. A minimum of one RHR suppression pool spray subsystem is required to mitigate potential bypass leakage paths and maintain the primary containment peak pressure below the design limits.

Supporting cooling water systems: During the suppression pool spray mode of RHR operation, RHRSW, circulating through the tube side of the RHR heat exchanger exchanges heat with the suppression pool water and discharges this heat to the external heat sink. The RHR pump motor oil coolers and the RHR compartments, are cooled using ESW. The loss of these supporting systems will result in one train of suppression pool spray becoming inoperable. (It is noted that raw RHRSW can be supplied directly to the suppression pool spray nozzles if necessary.)

Generic staff position on AOT: From NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR/4," the generic staff position for a one-train AOT is:

> With one RHR suppression pool spray subsystem inoperable, the inoperable subsystem must be restored to OPERABLE

> status within 7 days. The overall reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced primary containment bypass mitigation capability. The 7 day Completion Time is based on the redundant RHR suppression pool spray capabilities afforded by the OPERABLE subsystem and the low probability of a DBA occurring during this period.

Although a permanent 7-day AOT would be acceptable under the terms of the new (NUREG-1433) generic position, the current Limerick TS specifies a 72-hour AOT. At the time of Limerick's licensing 72 hours was the generic position (NUREG-0123).

2.1.2 Suppression Pool Cooling Mode of RHR Operation

Design basis: Following a DBA, the RHR Suppression Pool Cooling System removes heat from the suppression pool. The suppression pool is designed to absorb the sudden input of heat from the primary system blowdown. In the long term, the pool continues to absorb residual heat generated by fuel in the reactor core. A means must be provided to remove heat from the suppression pool so that the temperature inside the primary containment remains within design limits. This function is provided by the suppression pool cooling mode of operation of the RHR system. Water is drawn from the suppression pool by an RHR pump and circulated through an RHR heat exchanger to reduce its temperature. It is then returned to the suppression pool. This mode of operation is similar to the spray mode described above, and used the same equipment, except that the suppression chamber spray spargers are not used.

Supporting cooling water systems: The same support system requirements apply for suppression pool cooling and for suppression pool spray mode.

Generic staff position on AOT: From NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR/4," the generic staff position for a one-train AOT is:

> With one RHR suppression pool cooling subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. The overall reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced primary containment bypass mitigation capability. The 7-day Completion Time is based on the redundant RHR suppression pool spray capabilities afforded by the OPERABLE subsystem and the low probability of a DBA occurring during this period.

The current Limerick TS requirement is consistent with the generic staff position.

2.2 Acceptability of Temporary Extension of AOTs

The proposed amendment would, for Unit 1, extend the AOT for TS 3.6.2.2, Suppression Pool Spray, from 7 days, to 14 days, one-time, for Loop B. The AOT for TS 3.6.2.3 Suppression Pool Cooling Mode of RHR, would be extended from 72 hours to 14 days, one-time, for Loop B. These two 14-day periods would coincide.

During the proposed 14-day AOT period, both units will be subject to single-failure vulnerabilities that do not normally exist. The licensee has performed an analysis to identify single-active vulnerabilities. The components were found to be motor-operated valves (MOVs), six in number, all located outside containment. The licensee then examined the maintenance history records for those MOVs. The maintenance records indicate that the "failure to operate on demand" history, for these valves is approximately 1.18% of the industry average, based on industry data, for such valves. Based on this information, the staff concludes that the AOTs may, on a one-time basis, as described in the application, be extended to 14 days which is 200% of the AOTs specified in the STS.

2.3 Conclusion

The licensee has satisfactorily demonstrated that the suppression pool cooling and spray functions of RHR may be granted a temporary, one-time 14-day AOT to permit modifications that will improve the reliability of the ESW and RHRSW systems.

2.4 Risk Impact Discussion

The licensee performed a Probabilistic Safety Assessment (PSA) for an ESW and RHRSW loop being inoperable for 14 days at power. The analysis assumes that Emergency Diesel Generator (EDG) D12 is aligned to the "A" ESW, and that High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) do not require room cooling. The Core Damage Frequency (CDF) increased by 2.7E-06/reactor-yr., from 5.1E-06/reactor-yr. to 7.8E-06/reactor yr. The corresponding incremental Core Damage Probability is approximately 1E-07, an acceptable level which is substantially less than the screening criterion level used to determine acceptability of Completion Times (i.e., AOTs) in the new Standard Technical Specifications.

Additionally, the licensee is writing a special procedure to provide administrative control to operability maintenance of specified components and implementation of appropriate compensatory measures necessary during the proposed 14 day AOT.

2.4.1 Conclusion

The licensee's PSA analysis has established that the requested one-time AOT extensions to 14 days are acceptable to the staff, given that inoperable systems are returned to operable status as soon as possible and the

new special procedure providing administrative control of component operability maintenance and compensatory measures during the activity is in place prior to the installation of isolation valves and cross-ties on the ESW and RHRSW.

The installation of the isolation valves and cross-ties on the ESW and RHRSW systems will remove the need to remove an entire loop from service, reducing future plant risk.

2.5 Safety Implications of Extending AOT for ESW and RHRSW

2.5.1 RHR and Emergency Service Water

RHRSW is a safety-related system, consisting of two independent supply and return loops (A and B) common to both units. Each loop services one RHR heat exchanger in each unit, and furnishes sufficient cooling for safe shutdown, cooling and accident mitigation in both units. The RHR heat exchangers furnish decay heat removal (DHR) capability for normal shutdown cooling as well as primary containment suppression pool and drywell temperature and pressure control during accident mitigation. Each loop has two pumps, each supplying 100 percent flow to one RHR heat exchanger. The removal of either loop of RHRSW from service will impact the operability of the RHR heat exchangers in the affected loop.

The ESW system is a safety-related system designed to supply cooling water to selected equipment during a loss of off-site power or LOCA. Safety-related equipment serviced by ESW includes: RHR pump motors, pump compartment unit coolers for RHR, RCIC, HPCI, and core spray, and standby diesel generator heat exchangers. The system is common to Units 1 and 2, and is composed of two loops (A and B), with two 50 percent system capacity pumps per loop. The essential heat loads listed are automatically transferred to the ESW system under accident conditions, the ESW pumps start automatically on diesel generator (DG) operation and the pumps take suction on the spray pond. Each DG can be supplied with cooling water from 'A' or 'B' ESW. Normal alignment is such that loop 'A' furnishes cooling to the A and C diesel generators, and loop 'B' to the B and D diesel generators. Only two RHR pumps may be cooled by each ESW loop due to the RHR pumps arrangement. Each ESW return loop is connected to both ESW/RHRSW combined return headers to the spray pond, so that loss of a combined return header does not cause loss of an ESW loop.

The purpose of the proposed amendment is to support modifications to install jumpers, valves and crossties in the ESW and RHRSW systems during Unit 1 operation. The modifications will be performed during the upcoming Unit 2 refueling outage, during which the B loop of each system will be removed from service concurrently. The proposal involves TS 3.7.1.1, Action a.3 pertaining to an inoperable RHRSW subsystem, requiring one RHRSW subsystem restored with at least one RHRSW pump in 72 hours. An RHRSW subsystem consists of two RHRSW pumps and the flow path capable of cooling one RHR heat exchanger. Also involved is TS 3.7.1.2, Action a.3 pertaining to an inoperable ESW system loop, requiring the inoperable loop to be restored within 72 hours. The

amendmdent would temporarily change the AOTs to 14 days. TS 3.5.1 for ECCS during plant operation is amended with a note linking the inoperability of LPCI 'A' to the SDC lineup when reactor pressure is below the RHR SDC permissive set point. The AOT for LPCI in TS 3.5.1 is also extended to 14 days.

The following discussion considers operability implications of related ECCS and DHR equipment, as well as safety implications of standby diesel generator inoperability.

2.5.2 Standby Diesel Generator Impact

There are eight standby diesel generators (SDG) at LGS, four assigned to each unit. They are designated by two digits, the first indicating the unit, the second denoting the generator. Without the 'B' loop of ESW, SDGs D14, D22, and D24 will be inoperable. SDG D11 will be maintained operable since its heat exchanger will be aligned to 'A' ESW. SDGs D11, D12, D13, D21, and D23 remain operable, with their normal source of ESW cooling available. TS 3.8.1.1 requires a minimum of four operable separate and independent diesel generators for the operating unit (Unit 1), and TS 3.8.1.2 requires a minimum of two SDGs operable for the shutdown of Unit 2. The TS requirement for Unit 2 is satisfied with SDGs D21 and D23 operable. Unit 1 will have one inoperable SDG, thus Action (a) of TS 3.8.1.1, with an associated 30 day AOT will be in effect during the extended AOT period of 14 days. Since the inoperability is due to preplanned maintenance, the licensee may demonstrate operability of the remaining Unit 1 SDGs (D 11, D12, and D13) by performing surveillance requirement 4.8.1.1.1 (a) (breaker alignment and power availability checks). This conclusion is based on the intent of the Action statement as described in the LGS TS Bases and in the BWR4 Standard Technical Specification Bases (NUREG 1433). Upon failure of a DG, the concern of a possible common mode failure is addressed by testing of the remaining operable DGs (Per surveillance requirement 4.8.1.1.2a.4). However, since the planned inoperability in this case does not introduce the possibility of common mode failures of the remaining Unit 1 DGs, the staff considers the DG startup tests unnecessary.

SDG inoperability is also addressed in the TS sections for RHRSW and ESW in terms of pump/diesel generator pairs. During the extended AOT, two RHRSW pump/DG and ESW pump/DG pairs will be inoperable for Unit 1, thus TS 3.7.1.1 (RHRSW) Action a.5 will be in effect, imposing a 30 day AOT. TS 3.7.1.2 (ESW) requirements are satisfied with two operable ESW pump/DG pairs.

2.5.3 ECCS Impact

ESW supports ECCS operation by providing cooling directly to some equipment, to ECCS equipment room coolers, and to diesel generator heat exchangers. One loop of ESW is sufficient to furnish cooling to half of the ECCS equipment. Per TS 3.7.1.2 Action a.3, which requires that all equipment aligned to the inoperable cooling loop be declared inoperable, removal of the 'B' ESW loop from service will result in the inoperability of loop 'B' core spray, and LPCI 'B' and 'D' loops. If necessary, even without ESW cooling, the affected LPCI

and core spray pumps could be operated on a short term basis. If equipment room temperatures became excessive (indications are available to control room personnel), operators could then follow procedures to reduce room temperatures. Several hours are available to take actions to preclude equipment overheating.

Without the ESW 'B' loop cooling, the following operable ECCS equipment is available to respond to a LOCA: HPCI, core spray loop 'A', LPCI loops 'A' and 'C', and ADS. A modification implemented for HPCI room cooling (LGS Modification P-00212) will allow HPCI to remain operable throughout the extended AOT. The licensee has stated that the modification permanently eliminates the need for ESW as a HPCI support system. Although not specifically included in the ESW system design basis, the cooling furnished by a single ESW loop is sufficient to safely shut down both units at all times except for the first 10 minutes of a postulated DBA LOCA. During the initial stage, three RHR pumps may be required to flood the LOCA unit using LPCI mode.

The combination of remaining ECCS equipment is not sufficient to accommodate the single failure evaluations listed in UFSAR Table 6.3-3. Further, for an ECCS pipe break LOCA, the low pressure ECCS would not be single failure proof since a 'C' LPCI injection line break and a failure of division 1 AC power would incapacitate core spray 'A' and LPCI 'A' and 'C'. However, while the plant is operating under an LCO, the minimum ECCS requirements are based on analyses presented in NEDO-24708A, which is incorporated into the LGS UFSAR by reference. The generic analysis of DBA suction line breaks shows that one low pressure ECCS along with ADS is adequate to reflood the vessel and maintain core cooling and preclude fuel damage. The UFSAR discusses the outcome of LOCA studies documented in NEDO-30936P which were done to establish success criteria for ECCS injection functions. Table 3-7 in NEDO-30936P shows the minimum systems required to successfully respond to large, intermediate, and small LOCAs for BWR4 plants. The most restrictive combination shown is a single means of low pressure injection (LPCI or LPCS) and ADS.

The report stipulates (repeated in Section 6.3.1.1.2 of the LGS UFSAR) that an alternate cooling path may be needed for long term LOCA cooling. This is because LPCI injects directly into the core shroud, which would maintain a substantial subcooling margin in the water around the core, thereby quenching any steam cooling effects. The availability of core spray satisfies the need for another means of long term cooling. In the event core spray is lost, sufficient time exists for plant operators to take appropriate measures to establish other cooling means such as HPCI, ADS, SDC loop A, or the reactor water cleanup system.

Based on the generic analyses described above, the extension of the AOTs for the systems affecting ECCS capability are acceptable.

Although the injection capability of the ECCS will not be affected when the 'B' RHRSW loop is inoperable, the 'B' RHR heat exchanger is declared

inoperable. The operability of RHR modes of operation dependent upon heat exchanger operability will be affected and is discussed in the following section. The suppression pool cooling and suppression pool spray mode of RHR are considered in a separate review.

2.5.4 DHR Impact

Two loops of shutdown cooling are required to be operable in accordance with TS Sections 3.4.9.1 (for hot shutdown) and TS 3.4.9.2 and 3.9.11.2 (for cold shutdown and refueling). Otherwise, an alternate method of decay heat removal is required.

While Unit 2 is shutdown and Unit 1 is operating, the Unit 2 SDC TS is satisfied with the operability of A and C loops of RHR. If Unit 1 is required to shutdown, the 'A' and 'C' RHR pumps would remain in their LPCI mode alignment while depressurizing the plant to the RHR cut-in permissive set point. Once the set point pressure is reached, TS 3.4.9.1 Action a must be entered since only the 'A' SDC loop will be operable since it is capable of being aligned from the control room under normal shutdown conditions. The operability of alternate DHR methods would then be demonstrated in order to meet TS 3.4.9.1 requirements, following approved plant procedures, and would not be implemented unless SDC 'A' was rendered inoperable.

With the 'A' loop of RHR aligned to SDC, 'A' LPCI is then inoperable since the suppression pool suction isolation valve is shut. Thus, during the AOT, if Unit 1 is to be shutdown, three LPCI loops and a core spray loop would be inoperable, a condition not addressed in TS 3.5.1 Actions a.1 and b.5. The licensee is proposing a change to TS 3.5.1 which adds a note addressing this situation for the extended AOT. The note links the inoperability of LPCI 'A' to the SDC lineup when reactor pressure is below the RHR SDC permissive set point, permitting this situation during the extended AOT. Under the conditions imposed by a Unit 1 shutdown, sufficient ECCS (i.e., LPCI 'C' and core spray 'A') are available, since an active single failure is not postulated during the AOT and only one low pressure ECCS is necessary per NEDO-24708A and NEDO-30936P, as discussed earlier.

The TS modification to accommodate the inoperability of LPCI during Unit 1 shutdown is considered acceptable since the plant is not expected to remain in hot shutdown for an extended duration and a single low pressure system will be available for LOCA response as discussed previously in this evaluation.

Once Unit 1 is in cold shutdown, both the 'A' and 'C' RHR loops will be considered operable for SDC according to TS 3.4.9.2, and TS 3.4.5.2 ECCS requirements for plant shutdown will be met by having a core spray and a LPCI loop available.

2.5.5 Impact on Other Systems

The application included evaluations of the safety impact of reduced RHRSW and ESW operability on a number of other systems, including non-safety related

systems, due to reduced cooling or loss of associated SDGs. Among the safety-related systems evaluated were;

RCIC,
Fuel Pool Cooling,
Main Control Room Chillers,
* Control Room Emergency Fresh Air System,
Standby Gas Treatment System,
Reactor Enclosure Recirculation System,
Standby Liquid Control,
* Hydrogen/Oxygen Analyzers,
* Containment Hydrogen Recombiners,
Main Steam Isolation Valve Leakage Control,
* Drywell Mixing System,
Spray Pond Pump House HVAC,
Safeguard Piping Fill System,
* Fire Protection,
Batteries and Battery Chargers,
Remote Shutdown System.

Except for the systems or functions asterisked, the licensee determined that if the system operability was affected (in many cases the systems remained fully operable), that TS requirements were satisfied and that no related Action Statements were entered.

The effect on fire protection capability does not place TS restrictions on the plant, but as discussed in the Compensatory Measures Section of this Evaluation the licensee is instituting measures to assure that adequate fire protection is available during the extended AOT period. The inoperability introduced by loss of ESW cooling capability to the other asterisked systems places the plant in 30 day AOTs, which are bounded by the proposed extended AOT period of 14 days. The licensee also evaluated the single failure implications for equipment left operable during the AOT in the case of a combined LOCA/LOOP. Such an evaluation was a prudent measure, although single failures are not required to be considered during an AOT. Thus, operation under the LCO Action statements considered here do not pose an adverse safety impact during this one-time AOT extension. The licensee evaluation of the risk impact determined through a probabilistic safety assessment reinforces that conclusion.

2.5.6 Compensatory Measures

The licensee intends to implement a number of compensatory measures during the extended AOT period to offset the reduction in safety margin resulting from the out-of-service systems. A special procedure, LGS Special Procedure SP-152 (SP-152), will be enacted to control plant activity for the duration of the extended AOT. Significant among the steps to be taken are:

a. In order to maintain D12 operability, ESW cooling water for the SDG D12 will be realigned so that 'A' ESW loop is the cooling source.

b. The ESW 'A' return valve to the 'A' RHRSW return header will be verified blocked open, and the ESW 'B'return valve to the 'B' RHRSW return header will be blocked closed, prior to entering the AOT. This is done to limit single failure potential during the extended AOT. The licensee will follow established plant procedures (the LGS Clearance and Tagging Manual) to carry out the specific valve blocking guidance in SP-152.

c. Operability of specifically listed equipment necessary to support power operation of Unit 1 will be verified prior to implementing the extended AOT.

d. Unit 1 suppression pool temperature is to be maintained low, (the licensee stated objective is below 80°F) for the duration of the extended AOT.

e. Work on the 'B' RHRSW loop will not commence until the Unit 2 decay heat generation rate is within the capability afforded by the remaining equipment ('A' RHR heat exchanger) is available, as specified by plant procedure.

f. The Unit 2 reactor cavity will not be drained until the 'B' RHRSW loop is returned to service or an alternate DHR method is available. Procedures to establish an alternate heat removal capability are incorporated into SP-152.

g. The Unit 1 SDG D11 and D13 as well as the Unit 2 SDG, D21 and D23 must be maintained operable to maintain the full operability of the 'A' RHRSW and 'A' ESW loops.

h. The standby AC power source to non-safeguard fire systems common to both units will not be operable when D14 is inoperable. These affected fire protection systems are normally powered from offsite power sources and while SDG D14 is inoperable, the offsite sources will be available, thus maintaining the operability of these fire protection systems. The licensee performed fire susceptibility analysis for plant areas that rely on safe shutdown systems that would be affected by the inoperable ESW and RHRSW loops and could hinder safe plant shutdown. The licensee will maintain the operability of fire protection systems. However, additional compensatory measures will be implemented as described in SP-152, which include frequenty (several times a shift) walkdowns of affected equipment areas.

i. The licensee has committed to minimize the number of surveillances on safety-related equipment identified in SP-52. The procedure requires that operability of the specified equipment be verified before the AOT and verified on a daily basis.

These compensatory measures, along with the licensee's commitment to limit the performance of surveillances during the extended AOT, support the contention that the safety impacts of the reductions in RHRSW and ESW capabilities are being minimized. The staff finds these steps to be adequate for the extended AOT duration.

2.5.7 Conclusion

The staff has evaluated the safety implications of the proposed one-time extension of the AOTs for ESW, RHRSW, the LPCI mode of RHR, and core spray during modification of the ESW and RHRSW systems. The conclusions reached on containment cooling and depressurization functions, and on the licensee's risk assessment were considered for this review. The licensee's appraisal of the operability impact of the systems listed in Section 2.5 of this Evaluation appears sound. Based on the evaluation of the safety-related system capabilities maintained, compensatory measures instituted using the special procedure SP-152, and the licensee's commitment to limit surveillances, the staff finds the proposed TS changes acceptable on the limited one-time basis required during the Unit 2 third refueling outage.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (59 FR 37077). Accordingly, the amendment meets 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 amendment.

5.0 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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

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