BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of	:	
	:	Docket No. 50-352
PHILADELPHIA ELECTRIC COMPANY		

APPLICATION FOR AMENDMENT

OF

FACILITY OPERATING LICENSE

NPF-39

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Philadelphia Electric Company, Licensee under Facility Operating License NPF-39 for Limerick Generating Station, hereby requests that the License and the Technical Specifications contained in Appendix A to the Operating License be amended to reflect modifications made to the Reactor Enclosure Cooling Water (RECW) valves, the outboard Drywell Chilled Water (DCW) containment isolation valves and the Hydrogen Recombiner redundant containment isolation valves and pressure relief valves. These modifications were made in accordance with License Conditions 10 and 11 of NPF-39 which required, prior to startup

following the first refueling outage, installation of additional isolation valves and signals.

The changes include the addition of new valves and controls to the existing list of containment isolation valv which require periodic surveillance and the deletion of Note 28 on page 3/4 6-43 which would no longer be applicable.

The proposed changes are indicated by bars in the margins of page 6 of the License and Technical Specification pages 3/4 6-21, 3/4 6-22, 3/4 6-24, 3/4 6-25, 3/4 6-26 and 3/4 6-43.

License Conditions Stipulate Modifications Needed

Facility Operating License NPF-39 includes Conditions (10) and (11) which provide:

- (10) Reactor Enclosure Cooling Water and Chilled Water Isolation Valves (Section 6.2.4.2, SER and SSER-3)

  The Licensee shall, prior to the startup following the first refueling outage, provide automatic and diverse isolation signals to the reactor enclosure cooling water inboard and outboard isolation valves in the supply and return lines to the recirculation pumps, and the drywell chilled water outboard isolation valves in the supply and return lines.

- (11) Hydrogen Recombiner Isolation(Section 6.2.4.2, SER and SSER-1 and SSER-2)

  The Licensee shall, prior to startup following the first refueling outage, install and test an additional automatic isolation valve in each of the hydrogen recombiner lines penetrating the primary containment.

Requirement for Plant Changes

As discussed in the Safety Evaluation Report (NUREG-0991), the Limerick Generating Station Containment Isolation System meets the requirements of General Design Criterion 56 except in certain instances pertaining to the Hydrogen Recombiners, and the Drywell Chilled Water System and Reactor Enclosure Cooling Water System. The applicable cases are discussed further below.

- Lines to and From the Hydrogen Recombiners penetrating containment do not contain two isolation valves in series

  The original Limerick design included a single motor-operated butterfly valve as a containment isolation valve in each recombiner supply and discharge line. The recombiners were originally considered closed systems outside containment and therefore, required only one isolation valve.

This design was reviewed by the NRC in the Limerick SER, page 6-39, and SSER-1, page 6-2. The NRC did not accept the licensee's rationale for the single isolation valve in the recombiner inlet and exhaust lines because (1) maintenance on the recombiners during plant operation would be prohibited, (2), the limited reduction in equipment availability that may be attributable to the installation of a second isolation valve does not warrant deviation from the requirements of GDC 56, and (3) NRC practice was to accept closed systems outside containment as the second isolation barrier only for ECCS systems which operate during an accident and only for the suction penetrations on these systems, which terminate below the minimum suppression pool water level.

The NRC staff found that a second containment isolation valve in each line was required. Therefore, License Condition (11) stipulates that prior to startup following the first refueling outage, a second additional automatic isolation valve is to be installed in each of the hydrogen recombiner lines penetrating the primary containment.

o Remote-manual isolation valves are used instead of automatic isolation valves in the RECW and DCW systems

The Reactor Enclosure Cooling Water (RECW) supply and return lines and the outboard Drywell Chilled Water (DCW) supply and return lines were isolated only by remote-manual isolation valves. Although the NRC staff determined that deviation from the requirements of SRP 6.2.4 during the first cycle of operation was acceptable, License Condition (10) stipulated that prior to the startup following the first refueling outage, automatic and diverse isolation signals were to be provided to the Reactor Enclosure Cooling Water inboard and outboard isolation valves and the Drywell Chilled Water (DCW) outboard isolation valves in all the supply and return lines.

Description of the Existing Systems and Modifications Required by License Conditions 10 and 11:

o Reactor Enclosure Cooling Water System

Description

The Reactor Enclosure Cooling Water (RECW) System supplies cooling to the reactor recirculation pump seal and motor oil coolers. This system is shown schematically in Figure 1 and is also shown in detail in FSAR Figure 9.2-25. The RECW system piping penetrates the primary containment in two locations; penetration 023 for the supply and penetration 024 for the return piping. The penetrations are four inches in

diameter with three inch piping welded to them by use of piping reducers.

Containment isolation valves for these penetrations are motor-operated gate valves. The inboard isolation valve for each RECW penetration is a four inch gate valve welded directly to the containment penetration (valves HV-13-106 and HV-13-107, respectively). The outboard isolation valves are three inch motor-operated gate valves welded close to the containment penetration, meeting the requirements of Regulatory Guide 1.141. The piping between the isolation valves is designed to ASME Section III, Class 2, and is Seismic Category I.

The reactor enclosure cooling water supply and return lines are designed with both containment isolation valves located outside containment because an adverse environment is experienced inside the containment when most of the valves may be needed, and the location of the valves outside containment allows inspections and maintenance to be performed during normal operation when the primary containment is inerted. The NRC staff previously found the placement of these valves acceptable, as documented in the LGS SER, page 6-39.

The NRC review found the overall system design acceptable in the Safety Evaluation report (NUREG-0991), page 6-41. The NRC qualified its acceptance of the RECW system design on the condition that the licensee add automatic diverse isolation

signals to the RECW isolation valves prior to restart after the first refueling outage. The NRC also granted a scheduler exemption to the requirements of 10CFR50, Appendix A, GDC 56 until restart following completion of the first refueling outage as discussed in Limerick SSER-3, page 6-3.

Modifications:

The licensee has installed the following automatic diverse isolation signals to the RECW valves:

- High Drywell Pressure or
- Low Reactor Vessel Water Level (Level 1). These isolation signals meet the requirements of SRP6.2.4, paragraph II.1, and NUREG-0737, Item II.E.4.2

- Drywell Chilled Water System

Description:

The Drywell Chilled Water (DCW) System provides cooling water to the drywell unit coolers and to the recirculation pump motor air coolers. The DCW system is discussed in the FSAR in Section 9.2.10 and is also shown schematically in the FSAR, Figure 9.2.27. The DCW is a dual-loop system, penetrating the primary containment in four locations; at penetrations 053 and 055 for the supply lines for each loop

and penetrations 054 and 056 for the return of each loop. The DCW penetrations are each eight inches in diameter. The DCW system is a closed loop inside containment.

Figure 2, which is attached, is a schematic of the DCW containment isolation provisions. The inboard isolation valve for each containment penetration is a motor-operated eight inch gate valve welded directly to the penetration. These valves are designated as HV-87-122, HV-87-123, HV-87-128 and HV-87-129. The original Limerick design previously provided only one containment isolation valve on each penetration, since the DCW system was considered a closed system inside containment. However, the closed system did not meet the piping design criteria specified in SRP 6.2.4, Item II.o. The licensee reclassified the DCW/RECW selection valves, HV-87-120(A) and (B); HV-87-121(A) and (B); HV-87-124(A) and (B); and HV-87-125(A) and (B) which are motor operated gate valves, designating them as the outboard containment isolation valves.

The drywell chilled water supply and return lines are designed with both containment isolation valves located outside containment because an adverse environment is experienced inside the containment when most of the valves may be needed, and the location of the valves outside containment allows inspections and maintenance to be performed during normal operation when the primary containment is inerted. The NRC staff previously found the

placement of these valves acceptable, as documented in the LGS SER, page 6-39.

The inboard isolation valves on the DCW/RECW were equipped with automatic diverse containment isolation signals, upon receipt of either triple-low reactor water level or high drywell pressure. They are also equipped with a keylocked bypass switch to allow reopening of the valves, if required, under plant administrative control. The NRC accepted the DCW/RECW design in the Safety Evaluation Report, page 6-41.

The NRC, however, qualified its acceptance of the DCW/RECW design with the condition that automatic diverse isolation signals were to be added to the outboard valves prior to restart following the end of the first refueling outage. The NRC granted, in the SSER-3, page 6-3, this schedular exemption from GDC-56 only for the first cycle of operation.

Modifications:

The licensee installed the following automatic diverse isolation signals to the outboard isolation valves in penetrations 053 through 056:

- High drywell pressure, or
- Low Reactor Vessel Water Level (Level 1)

A keylocked isolation signal bypass switch was also provided to allow reopening of these valves to re-establish drywell cooling if needed. Use of the keylock feature requires operator action and was installed in accordance with NUREG 0737, Item II.E.4.2, position 4.

o Hydrogen Recombiner System

Description:

The Containment Hydrogen Recombiner system is part of the Containment Atmospheric Control system, and is discussed in FSAR Sections 6.2.5, and 9.4.5.1 and shown schematically in FSAR Figure 9.4-5. In an inerted containment the purpose of the recombiner system is to control the quantity of oxygen postulated to be generated inside the containment following a LOCA, by recombining it with hydrogen.

Containment isolation provisions for the recombiners is shown schematically in Figure 3, attached. Recombiner piping from the containment consists of four inch pipes connected to the twenty-four inch diameter drywell purge supply and exhaust lines. The recombiner discharges through six inch pipes connected to the suppression pool purge supply and exhaust lines. The recombiner isolation valves are automatically closed upon receipt of reactor low water level (Level 2); high drywell pressure; high radiation in the refueling floor

exhaust ducts, and high radiation in the reactor enclosure exhaust ducts.

The recombiner design was reviewed by the NRC in the Limerick SER, page 6-39, and SSER-1, page 6-2. The NRC conditioned the Unit 1 operating license by stipulating that the licensee install a second isolation valve in each line prior to restart after the first refueling outage.

Modification:

A redundant motor-operated containment isolation valve on the outlet of each recombiner was installed as a plant modification. These new isolation valves are powered from the same electrical division as the existing isolation valves. An existing motor-operated valve on each of the recombiner inlet lines has also been provided with a containment isolation signal to isolate the recombiners by closure of the valves in the event of an accident. To permit the recombiners to operate after an accident, each recombiner train will have a keylocked isolation bypass hand switch in the control room.

In order to meet ASME Code Section III, Article NC-7000 requirements, a safety grade pressure relief valve with its discharge routed to a Dirty Radwaste (DRW) system open floor drain was installed in both hydrogen recombiner discharge lines upstream of the outboard containment isolation valves.

Based on the design and installation described above in regard to the Hydrogen Recombiner System, Licensee proposes to list the new valves, along with the existing valves, in the table of primary containment isolation valves in the Technical Specifications.

The design and installation schedule for the modifications, as described, allowed compliance with License Condition (11) prior to restart following the first refueling outage.

List of Proposed Changes

License Page 6	Delete conditions (10) and (11)
Page 3/4 6-21	Delete Notes 28 and 29
Table 3.6.3-1	previously applicable to valves HV13-106, HV13-107, HV13-108, HV13-111. Add isolation signals C, H to these valves.
Page 3/4 6-22	Add valves FV-C-DO-101B
Table 3.6.3-1	under penetration 025, valve FV-C-DO-101A under penetration 026. Adds isolation times, isolation signals and notes to both penetrations
Page 3/4 6-24	Delete notes 28 and 29 previously applicable
Table 3.6.3-1	to valves HV87-120A and HV87-125A. Add isolation signals C, H to these valves.
Page 3/4 6-25	Delete Notes 28 and 29 previously appli-
Table 3.6.3-1	cable to valves HV87-121A, HV87-124A, HV87-120B HV87-125B, HV87-121B and HV87-124B. Add isolation

signals C, H to these valves.

Page 3/4 6-26 Table 3.6.3-1	Adds HV57-164 as separate valve, penetration 201A with outboard isolation HV57-169 and also adds HV57-162, penetration 202 with HV57-166 as outboard isolation; Both additions include isolation times, signals and applicable notes.
Page 3/4 6-43	Delete Note 28 which would no longer be applicable.

Safety Significance

A discussion of the safety significance of the proposed changes to the Technical Specification follows. Following the discussion of the safety significance, a separate discussion is presented for each of the three standards as set forth in 10 CFR Section 50.92 to support the Licensee's conclusion that the changes do not involve any Significant Hazards Considerations.

o Modifications to the plant are required by the license.

The plant modifications for the Reactor Enclosure Cooling Water, the Chilled Water System and the Hydrogen

Recombiner are required as a condition of the license and were, therefore, previously evaluated by the NRC staff.

- o The design of the modifications meets all required design criteria.

  The modifications to the plant meet the design requirements of the guidelines of Standard Review Plan Section 6.2.4. and Regulatory Guide 1.141.

Conclusion - Safety Concerns

The plant modifications revising the Reactor Enclosure Cooling Water, the Chilled Water Systems and the Hydrogen Recombiner meet the requirements of SRP 6.2.4 and NRC Regulatory Guide 1.141. Based on the design and on the previous NRC staff approval in the SER the modifications as discussed, which are reflected in the proposed Technical Specification change, do not pose a safety concern.

Significant Hazards Considerations Determination

(1) The proposed changes to the Technical Specifications to include the additional primary containment isolation valves do not involve a significant increase in the probability or consequences of an accident previously evaluated.

As evaluated in Section 6.2.4.3 of the FSAR, the main objective of the containment isolation system is to prevent release to the environment of radioactive materials. This is accomplished by isolation of system lines penetrating the primary containment. Redundancy is provided so that active failure of any single valve or component does not prevent containment isolation.

The evaluation in Section 15.6.5 of the FSAR concludes that the primary containment is designed to maintain pressure integrity in the event of an instantaneous rupture of the largest single primary system piping within the structure, while also accommodating the dynamic effects of the pipe break. Therefore, any postulated LOCA would not exceed the containment design limits. The additional automatic features and valves to be installed in the primary containment isolation system will enhance the plants ability to isolate the primary containment in the event of an accident.

Based on the design which meets the requirements of SRP 6.2.4, and NRC Regulatory Guide 1.141, the valves and automatic features which are being added to the Hydrogen Recombiners; The Reactor Enclosure Cooling Water and the Drywell Chilled Water Systems, and based on the previous approval by the NRC Staff, the proposed changes to the Technical Specifications do not involve an increase in the probability or consequences of any previously evaluated accidents.

(2) The proposed changes to the Technical Specifications to include the additional primary containment isolation valves do not create the possibility of a new or different kind of accident from any previously evaluated.

The Containment Isolation System design was evaluated in the Final Safety Analysis Report (FSAR) and the SER. In the FSAR, the system design was evaluated as follows:

- Code Class and Seismic Design - Section 3.2
- Missile Protection - Section 3.5
- Protection Against Dynamic Effects Associated with the Postulated Rupture of Piping - Section 3.6
- Environmental Design - Section 3.11
- Valve Endurance/Operability - Section 3.9.3
- Leakage - Manual Valves - Section 5.2.5
- Containment Isolation - Section 6.2.4
- Leakage Testing - Section 6.2.6
- Essential/Non-Essential Classification - Table 6.2-27
- Normal/Accident Environmental Conditions - Section 3.11
- Control/Automatic Systems - Section 7.3.1.1.2

Further, the design and implementation of this modification has no effect on the ability to safely shutdown the Plant in the event of a fire, as required by Appendix R of Title 10 CFR Section 50.

Based on the previous evaluation contained in the FSAR and based upon the previous NRC acceptance of these changes in the SER, and based on the modifications meeting the requirements of NRC Regulatory Guide 1.141, the proposed changes to the Technical Specifications listing these additional valves along with the existing primary containment isolation valves, do not create the possibility of a new or different kind of accident from any previously evaluated.

(3) The proposed changes to the Technical Specifications to include the additional primary containment isolation valves do not involve a significant reduction in a margin of safety.

The Containment Isolation System is designed to prevent or limit the release of radioactive materials that may result from postulated accidents. This is accomplished by providing isolation barriers in lines that penetrate primary containment. The additional valves and controls being added allow for automatic isolation of the primary containment and their inclusion in the list of primary containment isolation valves does not involve a reduction in a margin of safety.

Conclusion

Based on the discussion above, operation of the facility under the proposed Technical Specifications with regard to primary containment isolation valves does not involve Significant Hazards Considerations.

Environmental Considerations

This amendment would revise the list of primary containment isolation valves in the Technical Specifications. The proposed amendment involves no increase in the amounts and no change in the types of any effluents that may be released offsite and no increase in the individual or cumulative occupational radiation exposure.

The Plant Operations Review Committee and the Nuclear Review Board have reviewed these proposed changes to the Technical Specifications and have concluded that they do not involve unreviewed safety questions or involve Significant Hazards Considerations and will not endanger the health and safety of the public.

Respectfully submitted,
PHILADELPHIA ELECTRIC COMPANY

By _____
Vice President

COMMONWEALTH OF PENNSYLVANIA :

: ss.

COUNTY OF PHILADELPHIA :

J. W. Gallagher, being first duly sworn, deposes and says:

That he is Vice President of Philadelphia Electric Company, the Applicant herein; that he has read the foregoing Application for Amendment of Facility Operating License and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

J. W. Gallagher

Subscribed and sworn to
before me this 11th day
of May, 1988

Melanie R. Campanella

Notary Public

MELANIE R. CAMPANELLA
Notary Public, Philadelphia, Philadelphia Co.
My Commission Expires February 12, 1990