



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 45 TO FACILITY OPERATING LICENSE NO. NPF-39

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION, UNIT 1

DOCKET NO. 50-352

1.0 INTRODUCTION

By letter dated June 1, 1990, Philadelphia Electric Company (the licensee) requested an amendment to Facility Operating License No. NPF-39 for the Limerick Generating Station (LGS), Unit 1. The proposed amendment would revise the Technical Specifications (TS) to reflect two fire protection modifications which the licensee has committed to perform during the fall of 1990 refueling outage of Unit 1.

Modification No. 1 would replace the existing suppression pool water temperature indication (actually the water temperature at the suction of the 'A' Residual Heat Removal pump) at the Remote Shutdown Panel (RSP) with direct temperature indication of the suppression pool water by using spare resistance temperature detector elements from the existing Suppression Pool Temperature Monitoring System (SPTMS).

Modification No. 2 would provide the ability at the RSP to manually transfer from the normal power supply to the emergency power supply when fire-induced damage prevents the reopening of a valve (described below) needed to ensure safe plant shutdown.

These modifications are proposed to be performed during the next (third) refueling outage for LGS, Unit 1, currently scheduled to begin in September 1990, based on commitments in Licensee Event Report (LER) Nos. 1-89-002, "Unavailability of the Reactor Core Isolation Cooling System Due to Insufficient Protection of Various Control and Power Cables from Postulated Fire Damage," Rev. 01, dated March 31, 1989, and 1-89-023, "Lack of Protected Suppression Pool Level and Temperature Indication in the Event of a Fire," dated May 5, 1989. For plants licensed after January 1, 1979 (such as LGS, Unit 1), the requirements of 10 CFR 50.48 have been incorporated into Appendix R.

2.0 DISCUSSION:

Modification No. 1

The remote shutdown system instrumentation and controls located on RSP were designed in accordance with General Design Criterion (GDC) 19 of 10 CFR Part 50, Appendix A to ensure that sufficient capability is available

for prompt hot shutdown of the reactor from locations outside of the main control room (MCR) in the event MCR habitability is lost. The remote shutdown system instrumentation and controls are also used to satisfy the shutdown requirements for shutdown from outside of the MCR in the event of a fire. TS Table 3.3.7-4-1, "Remote Shutdown System Instrumentation and Controls," TS page 3/4 3-77, currently reflects that the suppression pool water temperature indication at the RSP is actually an indication of the water temperature at the suction of the 'A' Residual Heat Removal (RHR) pump (i.e., when the RHR pump is aligned for suppression pool cooling).

In LER No. 1-89-023 for LGS, Unit 1, the licensee reported that this indication of suppression pool water temperature may be lost in the event of a fire for which shutdown from the RSP is required since the 'A' RHR pump suction water temperature indicator, TI-51-104A, is powered from a non-Class 1E electrical power source and its associated cabling is not protected from fire damage. In LER 1-89-023, the licensee committed to perform a modification during the third refueling outage to provide suppression pool water temperature indication at the RSP which would be available to support safe shutdown of the plant from outside the MCR in the event of a fire. This proposed modification will replace the 'A' RHR pump suction water temperature indication at the RSP with direct temperature indication of the suppression pool water using spare resistance temperature detector (RTD) elements from the existing SPMS. SPTMS provides suppression pool water temperature indication in the MCR only. This proposed modification will provide suppression pool water temperature indication which is powered from a Class 1E electrical power source and for which the associated cabling is protected from fire damage.

Once this proposed modification is complete, the TS reference "(Actually RHR Pump 'A' Suction Temperature)" for the suppression pool water temperature indication on TS Table 3.3.7.4-1 will no longer be valid. Therefore, a change is proposed to TS page 3/4 3-77 to delete this reference such that TS Table 3.3.7.4-1 will specify "Suppression Chamber Water Temperature" only.

Modification No. 2

The Reactor Core Isolation Cooling (RCIC) system is used to support certain methods of safe shutdown of the plant in the event of a fire. In LER No. 1-89-002, the licensee reported that a fire in certain areas of the plant could result in the unavailability of the RCIC system's steam supply line inboard containment isolation valve, HV-49-1F007. This valve is controlled from the RSP in support of safe shutdown from outside the MCR in the event of a fire. Although the RSP is powered by electrical Division 1 AC power, the HV-49-1F007 valve is powered from electrical Division 3 AC power, and will automatically close upon receipt of a Division 3 isolation signal. However, Division 3 control and power cables were not protected in those fire areas for which the RCIC system is used to support safe shutdown of the plant in the event of a fire. Fire-induced damage to the Division 3 control cables could produce a false isolation signal which would cause the HV-49-1F007 valve to close. Fire-induced damage to the Division 3 cables, from the same fire, could cause a loss of power required to reopen the valve.

If, in the event of a fire, the valve closes and power is lost before the valve can be reopened, the RCIC system would be rendered inoperable. In LER 1-89-002, the licensee committed to perform a modification during the third refueling outage which would provide the capability, through a manual transfer switch located at the RSP, to power valve HV-48-1F007 from an emergency (Division 1) power source. This emergency power source would be available in the event of a fire to provide the ability to reopen the valve. As part of the proposed modification, this emergency source will be powered through a normally locked open, instantaneous magnetic circuit breaker mounted in an electrical Division 1 motor control center (MCC). Also, a second, normally closed, thermomagnetic circuit breaker will be added as a back-up breaker to provide the redundant protection specified by Regulatory Guide 1.63, "Electric Penetration Assemblies in Containment Structures for Nuclear Power Plants," for electrical cables and wiring that penetrate the primary containment. This second circuit breaker is also required to assure capability to disconnect from the Division 1 power bus for any faulted load condition.

As a result of this proposed modification, a change is proposed to TS Table 3.8.4.1-1, "Primary Containment Penetration Conductor Overcurrent Protective Devices," TS page 3/4 8-24. The change would add to this table the primary and backup circuit breakers for the Division 1 emergency power supply to the RCIC system's steam supply inboard containment isolation valve, HV-49-1F007. Both breakers are identified by a single circuit breaker number 52-21331, since both breakers are located in the same MCC cubicle. TS Table 3.8.4.1-1 currently lists the primary and backup breakers (circuit breaker no. 52-22313) for the normal Division 3 power supply to the HV-49-1F007 valve.

3.0 EVALUATION

Modification No. 1 will provide assured suppression pool water temperature monitoring capability which will continue to satisfy GDC 19 of 10 CFR Part 50, Appendix A, since it will provide direct indication of suppression pool water temperature at the RSP instead of the 'A' RHR pump suction water temperature, and it will also provide the operator with the ability to select between two temperature elements on opposite sides of the suppression pool to give a better profile of the suppression pool water temperature.

This modification does not add any new interfaces with systems that are not related to suppression pool temperature monitoring. The design temperature monitoring capability of SPTMS is unaffected by the proposed modification. There is no impact on RHR system operation and the 'A' RHR pump suction water temperature indication is still available in the MCR.

The new temperature instrumentation loop will provide increased reliability since its design conforms to applicable criteria for physical separation, redundancy, and divisionalization. This new temperature instrumentation loop will be powered from an electrical Division 1, Class 1E source.

Modification No. 2 will provide the RSP operator the ability to manually switch to an emergency power supply. This action may be required to reopen valve HV-49-1F007 in the event the valve closes and the normal Division 3 power supply is lost as the result of fire-induced damage caused by a fire in certain areas of the plant. This proposed modification will provide the operators the ability to restore the RCIC system to service in the event the RCIC system is rendered inoperable for the reasons described previously as a result of a fire, and to provide for safe shutdown of the plant in accordance with the safe shutdown methods described in the Fire Protection Evaluation Report (FPER) for LGS.

The manual transfer switch box at the RSP will be locked closed. The position of the transfer switch will be indicated on a MCR panel, and will cause an alarm in the MCR when placed in the emergency position. The electrical Division 1 instantaneous breaker (the primary breaker) will be locked open. The keys to these locks will be under administrative control so that control of the manual transfer switch and the Division 1 primary breaker will be limited to, aside from testing and maintenance, procedure-directed operator discretion only in the event of a fire with concurrent loss of electrical Division 3 AC power.

The design of this proposed modification is such that physical independence of electrical systems and application of the single failure criterion will be maintained, with the exception that when the manual transfer switch is placed in the emergency position, normal Division 3 power and control cabling for the valve will become energized from an electrical Division 1 power source. The licensee is establishing appropriate restrictions for testing the operation of valve HV-49-1F007 and appropriate procedural controls on the manual transfer switch. These restrictions will limit the time that the electrical Division 1 power source is exposed to the electrical Division 3 wiring loads. They will also provide additional assurance that the two power divisions will not become interconnected.

The proposed modifications are acceptable to resolve the fire protection deficiencies, along with the associated changes to the TSs.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The 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 occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding.

Accordingly, this 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 nor environmental assessment need be prepared in connection with the issuance of this amendment.

5.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (55 FR 26288) on June 27, 1990 and consulted with the Commonwealth of Pennsylvania. No public comments were received and the Commonwealth of Pennsylvania did not have any comments.

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

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Dated: September 19, 1990