

# PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION

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March 16, 1992

GRAHAM M. LEITCH  
VICE PRESIDENT  
LIMERICK GENERATING STATION

Docket No. 50-352  
License No. NPF-39

Mr. Thomas T. Martin  
Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

SUBJECT: Limerick Generating Station, Unit 1  
Follow-up Written Request for a Regional Temporary  
Waiver of Compliance.

Dear Mr. Martin

This letter provides the follow-up written request for a Regional Temporary Waiver of Compliance. This request was discussed and approved by the NRC during a teleconference conducted on March 13, 1992, at 1930 hours, between Messrs. C. Hehl, A. Chaffee, W. Lanning, R. Clark, A. Blough, L. Doerflein, P. Eapen, and T. Kenny of the NRC, and Messrs. D. Neff and R. Krich of the Philadelphia Electric Company (PECo). As requested by the NRC during the March 13, 1992, teleconference, this follow-up written request is being submitted to the NRC on Monday, March 16, 1992.

## Discussion of the Requirements for Which the Waiver is Requested

This request involves a temporary extension of the time limit specified in Technical Specifications (TS) Section 3.0.3 from one (1) hour to four (4) hours to allow time to repair a Unit 1 electrical inverter before requiring a plant shutdown. A Unit 1 shutdown after one hour would be required upon removal of the inverter from service because a preliminary engineering review showed that one of four trains of the Low Pressure Coolant Injection (LPCI) system, one of two trains of the Core Spray (CS) system, and the High Pressure Coolant Injection (HPCI) system would be rendered inoperable. As a result, TS Section 3.5.1 Action c.1 would require entry into TS Section 3.0.3, that in turn requires that within 1 hour action shall be initiated to place the unit in an OPERATIONAL CONDITION in which the Specification does not apply by placing it, as applicable, in:

- a. At least STARTUP within the next 6 hours,
- b. At least HOT SHUTDOWN within the following 6 hours, and
- c. At least COLD SHUTDOWN within the subsequent 24 hours.

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Discussion of Circumstances, and Need for Prompt Action

On the evening of March 11, 1992, the cooling fan for the E21-K601D inverter was discovered to be inoperable. This inverter converts Division 4 DC power to AC power, supplying power to control circuits and initiation logic of various Emergency Core Cooling Systems (ECCS). Should the E21-K601D inverter fail, backup power is supplied automatically by Division 4 safeguard AC power. As a temporary corrective action, the panel door containing this inverter was opened to provide limited cooling to the D21-K601D inverter. Station personnel then started planning the necessary actions for replacing the fan. The impact of taking the inverter out of service was recognized and further reviews were initiated.

Discussions held with the inverter manufacturer on March 13, 1992 confirmed that the inverter could fail at any time if operation continued without the cooling fan in service due to elevated equipment temperature and that the fan should be replaced. A replacement cooling fan was located and the repair was planned in accordance with the corrective maintenance program. The repair was expected to take two (2) to four (4) hours to complete, during which time the inverter would be deenergized and Division 4 safeguard AC power would supply the loads of the E21-K601D inverter which includes the initiation logic for the HPCI system, 'D' train of the Low Pressure Coolant Injection (LPCI) system and the 'D' Core Spray pump of the 'B' Core Spray Subsystem (CSS). Since entry into TS Section 3.0.3 was required for this repair, actions to obtain a Regional Temporary Waiver of Compliance were initiated on March 13, 1992.

This waiver was requested because the preliminary engineering review showed that the 'B' CSS, the 'D' train of the LPCI system, and the HPCI system may not be able to meet response time requirements specified in TS because of a time delay in the backup AC power supply associated with the starting and loading of the D14 Emergency Diesel Generator (EDG). Accordingly, the 'D' LPCI system, 'B' CCS and HPCI system would be rendered inoperable. TS Section 3.5.1 Action c.1 could not be satisfied, thereby requiring TS Section 3.0.3 to be entered. Since the scope of the inverter cooling fan repair would exceed one hour, the removal of the inverter from service would result in initiation of a reactor shutdown in accordance with TS Section 3.0.3. This waiver was requested to enter TS Section 3.0.3 and to correct the problem within 4 hours or action shall be initiated to place the unit in an OPERATIONAL CONDITION in which TS Section 3.5.1 does not apply by placing it, as applicable, in:

- a. At least STARTUP within the next 6 hours,
- b. AT least HOT SHUTDOWN within the following 6 hours, and
- c. At least COLD SHUTDOWN within the subsequent 24 hours.

Because it would be prudent to correct the E21-K601D inverter cooling fan problem as a planned event rather than waiting for a potential E21-K601D inverter failure due to high temperature, prompt action was needed. This request for a Regional Temporary Waiver of

Compliance could not be avoided because repair of the E21-K601D inverter cooling fan necessitated deenergizing the inverter; thereby requiring entry into TS Section 3.0.3 and shutdown of Unit 1.

#### Discussion of Compensatory Actions

Compensatory actions are already included in the design of the power supply for the initiation logic of the ECCS powered by the inverter. The design includes automatic switching from the inverter to the backup safeguard AC power for the initiation logic from an offsite source. In the event of a Loss of Offsite Power (LOOP) event and/or Loss of Coolant Accident (LOCA), the initiation logic power would be supplied by the D14 EDG. In addition, the stability of the offsite power grid would be confirmed, the connection of Unit 1 to offsite power would be verified, and no activity on the operable ECCS and the offsite power connection equipment would be permitted during the repair of the inverter.

#### Safety Significance and Potential Consequences

The safety significance of this waiver is a 3 second time delay added to the initiation response times of 'D' LPCI system, the 'B' CSS, and a potential increase to the HPCI system response time of up to 13 seconds. The increase to the HPCI system response time would only occur if, while the inverter is de-energized, both the Division 2 logic is lost and a LOCA signal is received during the HPCI initiation sequence. However, a General Electric Company (GE) analysis documented in NEDO-24708 "Additional Information Required for NRC Staff Generic Report on Boiling Water Reactors," dated December, 1980, bounds this event by concluding that only one low pressure ECCS system in conjunction with the Automatic Depressurization System (ADS) is needed to provide adequate core cooling by maintaining the peak fuel cladding temperature less than 2200 degrees Fahrenheit. During the time that the inverter would be removed from service, all other ECCS would be unaffected, and operable. This included 'B' and 'C' LPCI systems; 'A' CSS and 'B' CS pump; and all ADS safety relief valves. The 'A' LPCI system was inoperable but available because of problems with its associated minimum flow valve. Note, however, that the residual heat removal function of this LPCI pump was unaffected by the minimum flow valve problem. All EDGs were operable and available, except the D11 EDG which was inoperable but available following scheduled maintenance. A review of maintenance and surveillance records for the D11 EDG was completed prior to removing the inverter from service. Though not part of the ECCS, the reactor core isolation cooling system, feedwater system, condensate system, and all non-ADS safety relief valves were operable. Accordingly, the consequences of a LOCA and/or LOOP event during the time that the inverter would be removed from service remained bounded by the analysis in the Limerick Generating Station (LGS) Updated Final Safety Analysis Report (UFSAR).

Discussion of the Duration of the Request

The planned maintenance work package indicates 2 hours would be required to replace the inverter fan. A 2 hour contingency was included in the estimate to compensate for unanticipated problems. The total duration of the requested waiver was 4 hours, beginning when the inverter was removed from service.

Basis for Conclusion that Requested Waiver Does Not Involve a Significant Hazards Consideration

We have concluded that continued plant operation during the period of the requested Regional Temporary Waiver of Compliance does not involve a significant hazards consideration for the following reasons. Existing analysis cited in the LGS UFSAR, Table 6.3-3, "Single Failure Evaluation," for the failure of Division 2 DC power source assuming multiple failures with realistic conditions (GE NEDO-24708) bounds this condition. The UFSAR analyzed failure assumes one CS system loop, three LPCI systems, and all ADS valves are available to perform as designed. With the subject inverter out of service and assuming the same Division 2 DC failure, the same amount of ECCR would be available to perform as designed except for two versus three LPCI systems based on the existing unrelated 'A' LPCI system problem previously mentioned. Using the GE analysis, the UFSAR analysis bounds the requested waiver, was previously evaluated, and does not involve a significant hazards consideration.

Basis for Conclusion that Requested Waiver does not Involve Irreversible Environmental Consequences

The repair of the cooling fan to the E21-K601D inverter does not involve irreversible environmental consequences because the activity does not involve either an unreviewed environmental question or a change in the Environmental Protection Plan. This is not a matter which may result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement related to the operation of LGS Units 1 and 2, environmental impact appraisals, or in any decisions of the Atomic Safety and Licensing Board.

Confirmation that the Action has been Reviewed and Approved by the Plant Operations Review Committee (PORC)

At 1815 hours on March 13, 1992, the PORC reviewed the condition of Unit 1 and the proposed work and concluded that the work may proceed. Station management approved the action to correct the E21-K601D inverter cooling fan problem provided that the D11 EDG was made operable, the load dispatcher was contacted to ensure the offsite power grid was stable, and the Unit 1 offsite power availability surveillance test procedure was completed satisfactorily.

NRC Approval and Conditions

NRC approval of our oral request for Regional Temporary Waiver of Compliance was granted at the conclusion of the March 13, 1992, teleconference and included the following conditions.

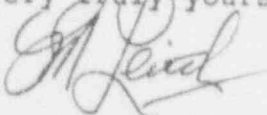
1. The D11 EDG was made operable prior to removing the inverter from service.
2. The load dispatcher confirmed the stability of the offsite power grid prior to removing the inverter from service.
3. The offsite power availability surveillance test procedure was performed satisfactorily prior to removing the inverter from service.
4. An orderly shutdown of Unit 1 would be commenced immediately during the four (4) hour waiver of compliance should another event or condition occur that would require entry into TS Section 3.0.3.

Termination of Regional Temporary Waiver of Compliance

The entry into TS Section 3.0.3 began at 0258 hours on March 14, 1992, when the inverter was removed from service and the affected ECCS were declared inoperable. Prior to the entry into TS Section 3.0.3, the D11 EDG was declared operable, the load dispatcher was contacted and the offsite power grid stability was confirmed, the offsite power availability surveillance test procedure was satisfactorily performed, and direction to commence an orderly plant shutdown of Unit 1 if necessary was provided to the Shift Manager. The inverter repair was successfully completed, TS Section 3.0.3 was exited, and the Regional Temporary Waiver of Compliance was terminated at 0536 hours on March 14, 1992, when the affected ECCS were declared operable.

If you have any questions or required additional information, please contact us.

Very truly yours,



JLP:cah

cc: U.S. NRC Document Control Desk  
T. J. Kenny, USNRC Senior Resident Inspector, LGS