

# PHILADELPHIA ELECTRIC COMPANY

NUCLEAR GROUP HEADQUARTERS

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U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

SUBJECT: Limerick Generating Station, Units 1 and 2  
Philadelphia Electric Company Position on  
Operability of the Main Control Room  
Heating, Ventilation, and Air-Conditioning  
System Chlorine Isolation Mode

Gentlemen:

On February 26, 1990, Philadelphia Electric Company (PECo) submitted Licensee Event Report (LER) No. 1-90-002, "The Main Control Room Ventilation System is outside of the design basis due to misapplication of the design basis assumptions," for Limerick Generating Station (LGS), Units 1 and 2. This LER reported that, as a result of a modification, the chlorine detection system for the automatic chlorine isolation mode of the Main Control Room (MCR) Heating, Ventilation, and Air Conditioning (HVAC) system no longer meets the single failure criterion when the MCR HVAC system is in the radiation isolation mode. A meeting was subsequently held on March 7, 1990, between representatives of PECo and the NRC to further discuss the details of this condition, including the operability of the chlorine detection system in accordance with Technical Specifications (TS). At this meeting, PECo representatives provided the NRC with the results of a MCR habitability analysis with regard to the MCR HVAC system remaining in the radiation isolation mode in the event of a chlorine release accident affecting the LGS site. The information below provides a synopsis of the condition, the results of the habitability analysis, and PECo's position on the operability of the MCR chlorine detection system.

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If chlorine is introduced after the MCR HVAC system is already in the radiation isolation mode (i.e., with the outside air intake dampers open), because of testing or as required by the Action statement of the associated TS Limiting Condition of Operation (LCO), the chlorine detectors would sense the presence of chlorine and initiate an automatic isolation of the MCR outside air intake dampers, thus overriding the radiation isolation mode. However, the logic of the chlorine detection system with the MCR HVAC system initially in the radiation isolation mode is such that a single failure of the chlorine detection system could allow the filtered outside air intake dampers to remain open, and thus, the MCR HVAC system would remain in the radiation isolation mode. Under these circumstances, once the chlorine has been detected and alarmed in the MCR, manual action can be taken to realign the system to the chlorine isolation mode.

Analysis of this event assumes that the MCR HVAC system remains in the radiation isolation mode with 525 cfm of outside air being mixed with 2,475 cfm of recirculated MCR air for a total of 3,000 cfm being passed through the charcoal adsorber filter trains, and that the filter has no effect on removal of chlorine. The results of the analysis indicate that, with the MCR HVAC system in the radiation isolation mode, automatic chlorine isolation is not required to satisfy General Design Criterion (GDC) 19 of 10 CFR 50, Appendix A. Calculations show that the incapacitation time due to a railroad release of chlorine gas with the MCR HVAC system operating in the radiation isolation mode, with an elevated air intake, is 6.5 minutes. This time is greater than the 4.3 minute incapacitation time given in the Updated Final Safety Analysis Report (UFSAR) for a railroad release of chlorine with the MCR HVAC system operating in the chlorine isolation mode with ground level air intake. While in the radiation isolation mode, the only source of chlorine is through the elevated air intake. Regulatory Guide 1.78, "Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," Revision 0, has a two minute guideline for incapacitation times. Thus, the MCR operators would have sufficient time to don breathing apparatus after an alarm has sounded in the MCR. Since automatic chlorine isolation is not required to satisfy GDC 19 under this condition, the chlorine detection system is considered operable in accordance with the associated TS LCO when the MCR HVAC system is in the radiation isolation mode, even though the logic of the chlorine detection system for automatic chlorine isolation is not "single failure proof" in this condition.

Additionally, LER 1-90-002 reported a condition whereby automatic entry into the radiation isolation mode of the MCR HVAC system will not occur upon receipt of a high radiation signal when the MCR HVAC system is initially in the chlorine isolation mode. This original system design recognizes that the infiltration of chlorine gas into the MCR is a more immediate threat to the operations personnel in the event of an accident resulting in both high radiation exposure and chlorine gas exposure. The information below describes the results of the MCR habitability analysis provided to the NRC at the March 7, 1990 meeting with regard to the MCR HVAC system remaining in the chlorine isolation mode in the event of a postulated radioactive release accident.

Calculations show the MCR operator radiation exposure doses with the MCR HVAC system operating in the chlorine isolation mode are well below the GDC 19 limits. The following table compares calculated personnel doses for the MCR HVAC system operating in the radiation isolation mode and the chlorine isolation mode during a UFSAR postulated radiation accident.

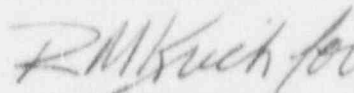
	<u>Radiation Isolation Mode (rem)</u>	<u>Chlorine Isolation Mode (rem)</u>	<u>GDC 19 Limits (rem)</u>
Thyroid	0.0043	14.0	30
Skin Beta	7.6	7.6	30
Whole-Body Gamma	0.38	0.38	5

The chlorine isolation mode personnel doses are based on methodology given in NUREG-0991, "Safety Evaluation Report Related to the Operation of Limerick Generating Station, Units 1 and 2." As a result of the increased thyroid dose while in the chlorine isolation mode, PECO is considering a future change to the chlorine detection system TS Action statements regarding actions to be taken when the system is out of service. This was discussed with the NRC at the March 7, 1990 meeting.

Based on the results of the MCR habitability analysis under both conditions, we have concluded that the MCR continues to satisfy GDC 19 and the MCR operators are sufficiently protected from both chlorine and radiological accidents when the MCR HVAC system is in either the chlorine or radiation isolation mode.

If you have any questions, please do not hesitate to contact us.

Very truly yours,



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GHS:clp

cc: T. T. Martin, Administrator, Region I, USNRC  
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