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U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Stop P1-137  
Washington, D. C. 20555

**SUSQUEHANNA STEAM ELECTRIC STATION  
REPLY TO A NOTICE OF VIOLATION  
(50-388/97-01-01; 50-387/97-01-02; AND  
50-387/97-01-03; 50/388/97-01-03)  
PLA-4600 FILE R41-2**

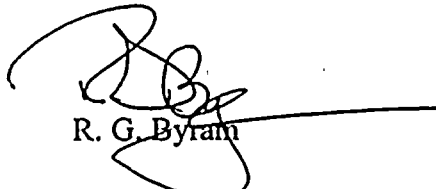
Docket Nos. 50-387  
and 50-388

This letter provides Pennsylvania Power and Light Company's response to the Notice of Violation (50-388/97-01-01; 50-388/97-01-02 and 50-387/97-01-03; 50-388/97-01-03) contained in NRC Integrated Inspection Report 50-387/97-01 and 50-388/97-01 dated March 14, 1997.

The notice requires submittal of a written reply within thirty (30) days of the date of the letter. However, as discussed with Mr. Michael C. Modes of NRC Region I on April 14, 1997, PP&L has been authorized to delay the response until April 18, 1997. We trust that the Commission will find the attached response acceptable.

If you have additional questions, please contact Mr. R. D. Kichline at (610) 774-7705.

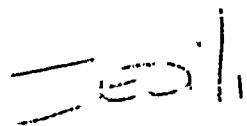
Very truly yours,



R. G. Byram

Attachment

copy: NRC Region I  
Mr. K. Jenison, NRC Sr. Resident Inspector  
Mr. C. Poslusny, Jr., NRC Sr. Project Manager



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## REPLY TO A NOTICE OF VIOLATION

### Violation A (50-388/97-01-01)

Technical Specification (TS) 6.8.1 requires that written procedures shall be established and implemented for applicable procedures recommended in Appendix 'A' of Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33, Appendix 'A', item 5, requires procedures for abnormal, off normal, and alarm conditions. Item 5 further states that procedures for annunciators should contain the immediate action that is to occur automatically and the immediate operator action.

Alarm response procedure AR-231-001 for the "Unit 2 Recomb Discharge H2 Conc Hi - Hi" annunciator lists the automatic action for a 2% hydrogen concentration as an Offgas System Isolation. Further, AR-231-001 Operator action 2.2.1 requires operators to ensure automatic actions occur.

Contrary to the above, on December 19, 1996, operators failed to ensure the automatic actions occurred after the "Unit 2 Recomb Discharge H2 Conc Hi - Hi" annunciator alarmed and after a grab sample showed a hydrogen concentration of 8%. Specifically, the offgas system did not automatically isolate and operators did not take immediate manual action to isolate it.

### Response

#### 1. Reason for the Violation

The reason for the violation was that no guidance had been provided to the operators on actions to be taken upon notification that an offgas grab sample exceeded the hydrogen concentration automatic isolation limit; therefore, the shift had to determine the appropriate actions.

On December 19, 1996, during a recombiner swap from the Unit 2 recombiner to the common recombiner, common recombiner hydrogen concentrations were normal as indicated by control room indicators and the Technical Specification required grab sample taken at the start of the recombiner swapping evolution. Common recombiner temperatures were also normal. Results of a second Technical Specification grab sample, taken approximately four hours later indicated a hydrogen concentration that exceeded the limit for an automatic isolation. Control room hydrogen concentration still indicated less than the automatic isolation limit with no upward trend. Common recombiner temperature indications were also still normal. Operators requested that another grab sample be taken to confirm the elevated hydrogen concentration results. This confirmatory grab sample also exceeded the limit for an automatic isolation. Shift supervision made the decision to isolate the common offgas recombiner and place the Unit 2 recombiner back in service. After notification of the confirmatory elevated hydrogen concentrations the common recombiner "A" channel Hydrogen indication became erratic and the "Unit 0 Recomb Discharge H2 Conc Hi-Hi" annunciator alarmed in the control room. Upon receipt of the alarm the appropriate alarm response procedure was entered. The alarm response procedure stated that an offgas isolation should occur and that if an automatic action

would not occur the operator were to ensure it did; however, it did not address the actions necessary to manually isolate offgas. Therefore, the shift had to determine the best way to perform the isolation.

**2. Corrective Steps Which Have Been Taken and the Results Achieved**

- a) The offgas system was manually isolated on December 19, 1996.
- b) The offgas system alarm response procedures (AR-031, 131 and 231-001) were revised to include instructions how to manually isolate the offgas system when an automatic isolation does not occur upon receipt of a "hi - hi hydrogen concentration" alarm.

**3. Corrective Steps Which Will Be Taken to Avoid Further Violations**

Training of this event will be incorporated in the Manager of Operations training agenda.

**4. Date of Full Compliance**

Based on 2a above, PP&L is in full compliance.



Violation B (50-387/97-01-03; 50-388/97-01-03)

10 CFR Part 50, Section 50.55a, "Codes and Standards," requires that protection systems meet the requirements of the Institute of Electrical and Electronic Engineers (IEEE) "Criteria for Nuclear Power Plant protection systems," Std 279-1971. IEEE 279, Section 4.13, requires that, if the protective action of some part of the protection system has been bypassed, or deliberately rendered inoperative for any purpose, this fact shall be continuously indicated in the control room.

Regulatory Guide (RG) 1.47, May 1973, describes an acceptable method of complying with the requirements of IEEE Std 279. RG 1.47 states that an acceptable system will automatically indicate at the system level the bypass or deliberately induced inoperability of the protection system.

Contrary to the above, since initial operation, the bypass indication system (BIS) at Susquehanna has not provided the continuous control room indication required by IEEE 279, and 10 CFR 50.55a, when a portion of the residual heat removal system is bypassed. The BIS does not automatically indicate at the system level when an RHR pump is rendered inoperative by a trip circuit that is enabled when the pump's suction valve is not full open. As a result, the RHR system is inoperative during quarterly RHR suction valve testing and no automatic indication of this condition is provided at the system level.

Response

1. Reason for the Violation

The Bypass Indication System (BIS) was provided as a part of the original Susquehanna SES design. Regulatory Guide 1.47 formed the regulatory basis for the design and implementation of the BIS. This Regulatory Guide requires that if the protective action of some part of the protection system has been bypassed or deliberately rendered inoperative for any purpose, this fact shall be continuously indicated in the control room. The Regulatory Guide also states that automatic indication of inoperability or a bypassed condition is not feasible for all the possible means by which safety-related systems could be rendered inoperative. Therefore, the intent of Regulatory Guide 1.47 requirements were interpreted to include a system design which utilized the BIS and the control room annunciator systems to aid the operator for long term indication of a safety system which was intentionally bypassed or otherwise rendered inoperative.

The Susquehanna SES design includes a system level control room annunciator which provides immediate indication that the RHR Loop is out of service as soon as the keylock control switch for the RHR suppression pool suction valve is placed in the CLOSED position. Operation of this control switch also provides immediate indication on the BIS panel that the RHR suppression pool suction valve is closed. When the suction valve reaches the 100% closed position, limit switches in the valve operator provide parallel inputs to the same annunciator and BIS alarm points. Upon opening the RHR suppression pool suction



valve, the control switch is placed to the OPEN position and when the valve is not 100% closed the input to the system level out of service indication is removed. However, the trip circuit to the pump remains enabled (therefore continuing the inoperable condition) until the valve is 100% open. During this time the system level annunciator still remains energized due to the valve motor overload being manually inserted. This system level annunciator will remain until the operator verifies that the pump suction valve is full open at which time he will manually remove the motor overload which will clear the system level annunciator. This design is discussed, in general, in the Susquehanna SES FSAR in Section 7.3.2a.1.2.1.7. The NSSS portion of the BIS and control room annunciator designs were judged to meet the Regulatory Guide 1.47 requirements. However, upon further review of the system design, PP&L plans to develop a modification to the BIS and/or control room alarm system which provides the system level annunciation from the same RHR suppression pool suction valve position (i.e., not 100% open) as the pump trip logic.

## **2. Corrective Steps Which Have Been Taken and the Results Achieved**

Corrective actions were taken to ensure the RHR suppression pool suction valve trip logic is deactivated after valve operation. Procedure changes were made to verify the trip relays are deenergized after the valve strokes open. These procedure changes will remain in effect until proper valve limit switch setup is verified. Administrative controls (i.e., the motor overloads for the RHR suppression pool suction valves are enabled which provides system level indication in the control room) are in place to ensure that manual activation of the BIS and/or control room annunciator is performed for the time the RHR pump trip logic is enabled. This is considered acceptable because the operator will be monitoring the valve position during remote manual valve operation. These valves have no automatic opening features.

## **3. Corrective Steps Which Will Be Taken to Avoid Further Violations**

- a) A modification to the BIS indication or other control room alarm which provides additional system level annunciation as a result of a RHR suppression pool suction valve limit switch actuation when the valve is not 100% open will be developed. This modification is scheduled to be installed on both the Unit 1 and Unit 2 RHR suction valves prior to December 31, 1997.
- b) An evaluation of the BIS and other control room alarm logic and inputs related to the various Emergency Core Cooling System (ECCS) motor operated valves with bypass indication will be performed and any necessary corrective actions will be taken prior to December 31, 1997.

## **4. Date of Full Compliance**

PP&L will complete the installation of the modification noted in 3a above prior to December 31, 1997.

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**Violation C (50-387/97-01-02)**

10 CFR 50, Appendix B, Criterion XVI, requires that licensees establish measures to assure that conditions adverse to quality such as failures, malfunctions, deficiencies, defective material and equipment and nonconformances are promptly identified and corrected.

Contrary to the above, two examples were identified where the licensee failed to control maintenance activities such that conditions adverse to quality were created and not promptly identified and corrected.

1. In 1991, the licensee failed to implement adequate corrective actions in response to a vendor letter that identified a deficiency on the contact surfaces of the 'E' emergency diesel generator bridge transfer switch. As a result of the licensee's failure to implement corrective actions to preclude the condition identified by the vendor, the transfer switch failed to perform its function on December 10, 1996, during an 'E' emergency diesel surveillance test.
2. In December 1996, the licensee's corrective actions in response to the failed 'E' diesel generator transfer switch included the development of a trouble shooting plan. As a result of inadequate control and review of the trouble shooting plan, a failure was induced in safety related equipment and the 'E' emergency diesel generator failed a second surveillance test.

**Response****1. Reason for the Violation****Vendor Letter**

The vendor letter dated June 7, 1991, which identified a concern related to the Emergency Diesel Generator (EDG) static exciter voltage regulator, stated that they recently were made aware that oxidization of the bridge transfer switch contacts may occur under certain conditions, but that the function of the system was not affected. The recommendations contained in the letter were incorporated into the appropriate IOM in July 1991. A specific corrective action to an unrelated 1992 EDG event was to generate a preventative maintenance (PM) activity that included the bridge transfer switch on the A through D EDG's. The PM's on the A through "D" EDG's were issued in 1993 and were scheduled to be performed on a three years frequency beginning with the issuance of the PM. The PM's on these EDG's were completed in early 1995. The same PM was issued for the "E" EDG bridge transfer switch in 1995. This PM had the same scheduling frequency as the PM's for the other EDG's. The "E" EDG PM was scheduled to be performed in January 1998. The issuance and scheduling for the "E" EDG PM was considered to be acceptable since there had been no EDG problems related to the bridge transfer switch performance, due to the concern expressed in the 1991 vendor letter, prior to the December 10, 1996 event and because of age, design and operational differences between the "E" EDG and the other four EDG's.

### Trouble Shooting

During performance of silicone control rectifier (SCR) checks the Electrical Test technician lifted the primary lead on the SCR's, however, did not lift secondary wiring that interfaces directly with the Remote Gate Firing Module (RGFM) circuitry. This resulted in an improper voltage being applied to the RGFM circuitry. Consequently, electrical components in the RGFM were damaged to the extent that the expected voltage regulation for the "E" EDG could not be achieved.

These failures that occurred on the "E" EDG in December 1996, resulted in the "E" EDG being delayed to a status of a "ready" spare EDG. It was never placed in service or required for service.

## 2. Corrective Steps Which Have Been Taken and the Results Achieved

### Vendor Letter

The PM activity, which contained the recommendations identified in the 1991 vendor letter, was completed on February 10, 1997.

### Trouble Shooting

- a) Repairs to the "E" EDG that occurred as a result of trouble shooting activities were completed on January 10, 1997.
- b) Non-routine training of this event has been conducted with personnel who perform this trouble shooting activity.

## 3. Corrective Steps Which Will Be Taken to Avoid Further Violations

### Vendor Letter

Outstanding EDG vendor recommendations will be evaluated for incorporation into the EDG preventive maintenance program. The appropriate PM procedures will be revised to incorporate appropriate EDG vendor recommendations identified by the evaluation by February 1, 1998.

### Trouble Shooting

A precautionary note will be added to the appropriate EDG instruction and operation manual to assure that voltage considerations are addressed for troubleshooting activities. This precautionary note will be incorporated into the appropriate instruction by June 16, 1997.

## 4. Date of Full Compliance

Based on 2 above, PP&L is in full compliance.

