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BUTLER, W.R.    Project Directorate I-2

SUBJECT: Provides summary of Class 1E/non-Class 1E isolation potential common mode failure issue.

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Harold W. Keiser  
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Director of Nuclear Reactor Regulation  
Attention: Dr. W. R. Butler, Project Director  
Project Directorate I-2  
Division of Reactor Projects  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION  
CLASS 1E/NON 1E ISOLATION-SUMMARY  
PLA-3302 FILES R41-2, A28-3B

Docket Nos. 50-387  
and 50-388

Dear Dr. Butler:

The purpose of this letter is to provide a summary of the Class 1E/non Class 1E isolation potential common mode failure issue.

As a result of the May 22, 1986 occurrence in which an open circuit in a diesel generator field circuit produced an inductive surge which migrated through the computer to ground detection alarms on all other diesel generators, an initial reassessment of the potential common mode failures related to separation was completed and documented in NCR 87-0021. The follow up investigation outlined in PLA-2987 focused on identifying and documenting the disposition of analog and digital Class 1E-non Class 1E interfaces to the Unit 1 computer and Unit 1 annunciator systems. This investigation also addressed potential high energy sources to the computer from current transformers, potential transformers and DC shunts.

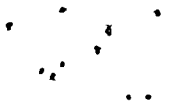
The results of this investigation showed that the following minor plant modifications, tracked by the listed Non Conformance Reports (NCR), are being implemented to assure that the plant design is in conformance to the FSAR analysis for separation.

NCR 87-0021

- 1) Add CT Protectors (THYRITES) to the Unit 1 and Unit 2 Main Generator 40,000/5A CT's used to develop computer inputs.

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- 2) Add nuclear qualified electrical isolation devices for the digital computer or annunciator inputs developed from:

Computer Input

HV-G33-1F001  
HV-G33-1F004  
HV-B21-1F016  
HV-B21-1F019

Annunciator Inputs

HV-151-F007A  
HV-151-F007B  
HV-155-F075  
HV-155-F079

- 3) Add nuclear qualified electrical isolation for the Unit 1 and Unit 2 RWCU Flow and RHR 'B' flow analog computer inputs.

NCR 88-0677

- o Add nuclear qualified electrical isolation for the Unit 1 and Unit 2 Main Steam Line Log Radiation Monitor computer and recorder inputs.

The assessment of the Unit 1 analog computer inputs developed from the Signal Processor Units NIT 15725A&B was inadvertently omitted from our initial investigation and will be completed by 12/31/89.

As a result of our ongoing Appendix R analysis, Unit 1 and Unit 2 RCIC flow and RHR 'A' flow analog computer inputs were identified as needing isolation. These circuits do not need to be modified as a result of the Class 1E-non Class 1E interface analysis. These circuit modifications are being tracked under our Appendix R project.

A review of the Engineering Analysis (SEAs), listed in Attachment 1, which documents the follow up investigation, revealed that the following is required to complete the reassessment of the FSAR exemption for providing electrical isolation between Class 1E circuits and low energy non Class 1E circuits.

- 1) Identify and disposition other potential high energy sources into the computer (such as motor RTD's).
- 2) Review the Unit 2 computer inputs developed from Limitorque limit switches and recommend plant modifications as required.
- 3) Review the Unit 2 annunciator inputs developed from Westinghouse MOC Auxiliary Switches, Limitorque and Namco Limit Switches and recommend plant modifications as required.

These activities extend the Unit 1 investigation commitments, outlined in PLA-2987, beyond the initial scope for high voltage sources into the computer and to the appropriate areas of Unit 2 design. This ensures that other postulated sources of high voltage are dispositioned and that potential welding shut of auxiliary and limit switches is addressed.

Additionally, completion of an isolator retest program for instrumentation signal isolators is planned to verify isolation capabilities of these devices under defined worst case fault conditions.



This investigation represents a rigorous and complete reassessment of the plant design to the FSAR analysis for electrical isolation. It is our conclusion that except for the above minor modifications, the existing design of the Class 1E-non Class 1E interfaces is in conformance with our FSAR commitments. The additional investigations, testing and modifications will be scheduled in accordance with our normal work process scheduling.

Very truly yours,



H. W. Keiser

cc: NRC Document Control Desk (original)  
NRC Region I  
Mr. G. S. Barber, NRC Sr. Resident Inspector  
Mr. M. C. Thadani, NRC Project Manager



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ATTACHMENT 1

SEA-EE-180	Rev. 0	"Evaluation of General Electric Nuclear Steam System for Compliance to IEEE279-1971"
SEA-EE-181	Rev. 0	"Evaluation of Open CT Secondary Voltages on the Unit 1 and Unit 2 Computer Input Circuits"
SEA-EE-182	Rev. 0	"Evaluation of Potential Transformers Used to Develop Unit 1 and 2 Computer Inputs"
SEA-EE-183	Rev. 0	"Evaluation of Unit 1 Computer Class 1E-non Class 1E Interfaces"
SEA-EE-184	Rev. 0	"Evaluation of Unit 1 Annunciator Class 1E-non Class 1E Interfaces"
SEA-EE-204	Rev. 0	"Evaluation of Units 1 & 2 Main Turbine Generator Field Computer Inputs"
SEA-JNPE-150	Rev. 1	"Isolation Capabilities of BOP Isolators"



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