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see Rpt

SUBJECT: Forwards "Evaluation of Potential High Voltage Sources Into Unit 1 & 2 Computers."

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Harold W. Kelsner
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June 19, 1990

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, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
CLASS 1E/NON 1E ISOLATION - SUMMARY REVISION
PLA-3396 FILES R41-2, A28-3B

Docket Nos. 50-387
50-388

Dear Dr. Butler:

The purpose of this letter is to provide you with the Pennsylvania Power & Light Company's reports which closeout the commitment made during our meeting with your Staff on January 18, 1990 and revised reports resulting from additional design changes. Also, a revised summary is provided.

Attached is a copy of Pennsylvania Power & Light Company's report, "Evaluation of Potential High Voltage Sources Into Unit 1 and 2 Computers". This evaluation shows that there are no in plant potential high voltage sources, not previously evaluated, that could migrate through the plant computers to safety systems and prevent these safety systems from performing their minimum requirements.

High voltage cables (480 VAC and higher) are not potential sources since these cables do not come in contact with the computer input cables. Rotating machine and distribution transformer temperature sensors are not high voltage sources into the computer since one lead of these devices is connected to ground or through insulating film disc devices preventing high voltages from developing at a sensor outputs.

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Attached is a copy of Pennsylvania Power & Light Company's report, "Evaluation of Welded Contacts of Class 1E Circuit Breaker Auxiliary Switches and Limit Switches Used for Unit 2 and Common Annunciator Inputs". This evaluation shows that the Westinghouse auxiliary switches used for annunciator inputs are from the Engineered Safeguard System 4 kV Buses normal and alternate source incoming circuit breakers. These auxiliary switches are in series with undervoltage time delay relay contacts.

When the circuit breaker is closed and its incoming line voltage is less than 92% of rated for more than 10 seconds the annunciator input circuit closes exposing the Westinghouse auxiliary switch contact to potential welding until the low voltage problem is corrected. This low voltage will be promptly corrected (within 1 hour) by transfer of loads to an alternate source. Thus, exposure of the auxiliary switch contact to potential welding is eliminated and, therefore, affects of welded contacts do not require further consideration.

Analysis of the Class 1E valves which use Namco limit switches for annunciator inputs shows that these valves will meet their minimum performance even if their annunciator input limit switches should weld shut. This conclusion is based upon the evaluation that shows:

- o The limit switches are used for alarm and indication only and are not used in Class 1E circuits.

or

- o The limit switches are in affiliated circuits and are not used in Class 1E circuits.

Analysis of the Unit 2 Class 1E motor-operated valves shows that these valves, except for the RHR Minimum Flow Valves HV-E11-2F007A and HV-E11-2F007B, will meet their minimum performance requirements even if the annunciator input limit switches should weld shut. This is based upon an evaluation that shows:

- o The valves change position and meet their minimum performance requirements before the annunciator input switches are exposed to potential welding, i.e. the valve limit switches are normally open and they close when the valves change to their isolation position.
- o The HV-21210A and HV21210B valves meet their minimum performance requirements even with annunciator input limit switches welded shut, i.e. the valves can open to throttle RHR service water flow with the annunciator input switches welded shut.

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In the event annunciator input limit switches for HV-E11-2F007A and HV-E11-2F007B weld shut, the limit switch main drive shafts could perhaps break loose internal to the valves causing the valves to jam, thus potentially preventing full closure of the valves. More than likely, the welded shut limit switches would cause damage to the limit switch gearing, but would not prevent the subject valves from closing.

A copy of Pennsylvania Power & Light Company's report, "Evaluation of Welded Shut Class 1E Limitorque Limit Switches Used for Unit 2 Computer Inputs," is attached. This evaluation shows that the Unit 2 Class 1E motor-operated valves, except for Main Steam Line Drain Isolation Valves HV-B21-2F016 and HV-B21-2F019 and the Reactor Water Cleanup Isolation Valves HV-G33-2F001 and HV-G33-2F004, will meet their minimum performance requirements even if the computer input limit switches should weld shut. This conclusion is based upon an evaluation that shows:

- The valves change position and meet their minimum performance requirements before the computer input limit switches are exposed to potential contact welding, i.e. the valve limit switches are normally open and they close when the valve changes position to its isolation position.

OR

- The valves are in affiliated (associated) circuits and contacts from these devices are not used in Class 1E circuits, i.e. operation of the valve is not required for design basis event conditions.

In the event computer input limit switches for HV-G33-2F001, HV-G33-2F004, HV-B21-2F016 and HV-B21-2F019 weld shut, the limit switch main drive shafts could perhaps break loose internal to the valves causing the valves to jam, thus potentially preventing full closure of the valves. More than likely the welded shut limit switches would cause damage to the limit switch gearing, but would not prevent the subject valves from closing.

The above referenced reports complete the open items on this issue.

The following reports were revised 1) to recommend that the computer input contacts for HV-B21-1F016, HV-B21-F019, HV-G33-1F001 and HV-G33-1F004 be changed to open contacts when the valves are open instead of adding isolation devices; and 2) placed valves HV-E41-1F075 and HV-E41-1F079 in Group 2 (valves requiring automatic closure). These changes prevent the annunciator limit switches from being exposed to potential welding during normal plant line-up:

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- o Evaluation of Unit 1 Computer Class 1E - Non-Class 1E Interfaces - Revision 1
- o Evaluation of Unit 1 Annunciator Class 1E - Non-Class 1E Interfaces

Attachment 1 provides a summary of the reports which are applicable to this issue.

Attachment 2 provides a summary of the Design Change Packages (DCP) of physical work which needs to be completed.

It is our conclusion that except for the modification listed in Attachment 2, the existing design of the Class 1E - Non-Class 1E interfaces is in conformance with our FSAR commitments.

Very truly yours,



H. W. Keiser

CTC/nl
pla\3396.ctc

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

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. 1	"Evaluation of Unit 1 Computer Class 1E-non Class 1E Interfaces"
SEA-EE-184	Rev. 1	"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-EE-221	Rev. 0	"Evaluation of Unit 1 Analog Computer Class 1E-non Class 1E Interfaces"
SEA-JNPE-150	Rev. 1	"Isolation Capabilities of BOP Isolators"
SEA-EE-226	Rev. 1	"Evaluation of Welded Shut Class 1E Limitorque Limit Switches Used for Unit 2 Computer Inputs"
SEA-EE-231	Rev. 0	"Evaluation of Welded Contacts of Class 1E Circuit Breaker Auxiliary Switches and Limit Switches Used for Unit 2 and Common Annunciator Inputs"

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ATTACHMENT 2

ELECTRICAL ISOLATION SUMMARY

The results of PP&L's investigation for electrical isolation showed that the following modifications are needed to assure that the plant design is in conformance to the analysis for isolation (separation):

<u>DCP</u>	<u>Description</u>
90-9001	Add CT protectors to the Unit 1 Main Generator CT's used to develop computer inputs.
90-9002	Add CT protectors to the Unit 2 Main Generator CT's used to develop computer inputs.
90-9007	Add electrical isolation or rewire eleven (11) circuits in Unit 1, used to develop computer or annunciator inputs.
90-9008	Add electrical isolation or rewire eleven (11) circuits in Unit 2, used to develop computer or annunciator inputs.
89-3038	Add electrical isolation to the Unit 1 RCIC and RHR Sys. A flow circuits.
89-3039	Add electrical isolation to the Unit 2 RCIC and RHR Sys. A flow circuits.
89-9175	Add electrical isolation to the Unit 1 Main Steam Line Log Rad monitor outputs to computer and recorders.
89-9176	Add electrical isolation to the Unit 2 Main Steam Line Log Rad monitor outputs to computer and recorders.