

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9201020202 DOC. DATE: 91/12/20 NOTARIZED: NO DOCKET #
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylv 05000387
 AUTH. NAME AUTHOR AFFILIATION
 RYDER, T.S. Pennsylvania Power & Light Co.
 STANLEY, H.G. Pennsylvania Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-016-00: on 911120, postulated App R fire could place plant outside analyzed design basis. Cause not found. Installation of a mod which rewires MOV circuits & places protective devices downstream. W/911220 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: LPDR 1 cy Transcripts. 05000387

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	NRR/DET/EMEB 7E	1 1	NRR/DLPQ/LHFB10	1 1
	NRR/DLPQ/LPEB10	1 1	NRR/DOEA/OEAB	1 1
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	NRR/DST/SRXB 8E	1 1	REG FILE 02	1 1
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December 20, 1991

U.S. Nuclear Regulatory Commission
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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 91-016-00
FILE R41-2
PLAS - 511

Docket No. 50-387
License No. NPF-14

Attached is Licensee Event Report 91-016-00. A condition was determined reportable per 10CFR50.73(a)(2)(ii)(B) in that a "hot short" resulting from a postulated Appendix R Control Room fire could place the plant in a condition that would be outside of its analyzed design basis.

H.G. Stanley
Superintendent of Plant - Susquehanna

TSR/mjm

cc: Mr. T. T. Martin
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LBZ
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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1) Susquehanna Steam Electric Station - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 8 7	PAGE (3) 1 OF 0 5
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TITLE (4)
Postulated Appendix R Fire Could Place the Plant Outside Its Analyzed Design Basis

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)
1	1	2 0 9 1	9 1	0 1 6	0 0 1	2 2	0 9	1	SSES - Unit 2		0 5 0 0 0 3 8 8
0 5 0 0 0											

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 1 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(e)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.38(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.38(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text NRC Form 366A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)							
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)								

LICENSEE CONTACT FOR THIS LER (12)

NAME T. S. Ryder - Power Production Engineer	TELEPHONE NUMBER 7 1 7 5 4 2 1 - 3 2 3 5
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

<input checked="" type="checkbox"/> YES (If yes complete EXPECTED SUBMISSION DATE)	<input type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15) 0 6 3 0 9 2
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ABSTRACT (Limit to 1400 spaces or approximately fifteen single space typewritten lines) (16)

On November 20, 1991 with both units operating at 100% power, it was determined that a postulated Appendix R fire in the Control Room could place the plant in a condition outside of its analyzed design basis. This condition has been determined to be reportable per 10CFR50.73(a)(2)(ii)(B). The fire could result in a hot short in the control circuit of one of a number of components required to shut down the unit from the Remote Shutdown Panel. Damage to the component could occur. The scenario is applicable to both units. Approximately ninety valves are impacted on each unit from the RHR, ESW, RHRSW and RCIC Systems. The postulated condition relates to an oversight in the Appendix R analysis in which the possibility of a malfunction of Path 2 safe shutdown components during a postulated Control Room Appendix R fire was not analyzed. The safety significance is considered minimal because of the low probability of occurrence as well as the fact that backup systems exist that are able to bring the plant to a successful safe shutdown, fire detection and suppression systems are operable in the Control Room, Operations Control Room personnel have been briefed on the scenario and are qualified fire watch/fire brigade personnel having access to portable fire fighting equipment in the Control Room. Further assessment regarding corrective actions to eliminate the postulated scenario is continuing. An LER report supplement will be provided when the corrective action plan has been finalized.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Unit 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2) 0 5 0 0 0 3 8 7	LER NUMBER (6)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

DESCRIPTION OF EVENT

On November 20, 1991, with both Unit 1 and Unit 2 operating at 100% power; evaluation of an identified postulated scenario concluded that the scenario would place the plant in a condition that would be outside of its analyzed design basis. The postulated scenario is as follows:

An Appendix R fire occurs in the Control Room causing a "hot short" in a control circuit of one of a number of components required to shutdown the unit from the Remote Shutdown Panel. This hot short would result in continuous operation of the affected component and would continue until control of the affected component is transferred to the Remote Shutdown Panel. Damage to the component could occur during the interim time frame.

The SSES Fire Protection Review Report (FPRR) identifies three paths to safe shutdown under a postulated Appendix R Fire. In the event an Appendix R fire occurs in the Control Room, Safe Shutdown Path 2 is utilized to bring the plant to cold shutdown from the Remote Shutdown Panels. Path 2 utilizes Main Steam Safety Relief Valves (EIIS Code: SB) for reactor vessel pressure control and Reactor Core Isolation Cooling (RCIC, EIIS Code: BN) for vessel level control. Analyses and modifications were performed to ensure the required Path 2 equipment and systems are available for this scenario.

For the assumed fire in the Control Room, our Appendix R design basis assumes all required safe shutdown systems will operate when Operations personnel reach the Remote Shutdown Panels and isolate the Control Room circuitry. However, a potential spurious action has been identified that may render one of a number of motor operated valves (MOV's) inoperable from the Remote Shutdown Panel. With our standard motor operated valve control circuit design, a hot short may occur in the Control Room part of the circuit that bypasses all limit switches, torque switches and overload relay contacts (refer to Figure 1). Due to the short's location, the limit and torque switches and the overload relay contacts are bypassed (or upstream of the hot short) and would be unable to trip the power feed running the valve motor.

Therefore, until the Control Room circuitry with the hot short is isolated by manual operation of a transfer switch at the Remote Shutdown Panel(s), the motor would continue to run/stall with the valve in a closed or open position. This may potentially result in permanent damage to the valve motor and loss of operation of the Path 2 safe shutdown valve.

An investigation has determined that this fire scenario may affect all motor operated valves on Path 2 that are isolated from the Control Room and operated at the Remote Shutdown Panel(s). The scenario is applicable to both units. Approximately ninety MOV's are impacted on each unit from the Residual Heat Removal (RHR, EIIS Code: BO), Emergency Service Water (ESW, EIIS Code: BI), Residual Heat Removal Service Water (RHRSW, EIIS Code: BI) and RCIC Systems.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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					0	3 OF 0 5

TEXT (If more space is required, use additional NRC Form 366A's) (17)

CAUSE OF EVENT

The condition was identified during engineering review of industry events, specifically an ENS call made by Washington Public Power Supply System stating that utility had the same postulated scenario.

The postulated condition relates to an oversight in the Appendix R analysis. The possibility of a malfunction of Path 2 safe shutdown components during a postulated Appendix R fire in the Control Room was not analyzed in the FSAR or in the Fire Protection Review Report which is considered part of the FSAR. The analysis did consider the possibility of a hot short in the control circuit of MOV's required to shutdown the unit from the Remote Shutdown Panel and confirmed that the Remote Shutdown Panel transfer switches mitigate the spurious action. The oversight was to take into consideration the interim time period from the occurrence of the hot short until the transfer switches would be operated.

REPORTABILITY/ANALYSIS

This condition was determined to be reportable per 10CFR50.73(a)(2)(i)(B) in that the postulated scenario of a hot short resulting from an Appendix R Control Room fire would place the plant in a condition that would be outside of its analyzed design basis. Valve operation can be affected only under a very precise set of circumstances. That is, it requires a hot short to occur at a precise point in the circuitry at a precise point in time in an Appendix R postulated fire. Electrical design basis for the specific single failure would only affect equipment in one division or channel, and, as such, the redundant equipment is considered OPERABLE.

The condition does not significantly compromise plant safety. Its safety significance is considered to be minimal because the probability of occurrence is low since the Control Room is continuously manned, and backup systems exist that are able to bring the plant to a successful safe shutdown. Fire detection and suppression systems in the Control Room are OPERABLE. Operations Control Room personnel have been briefed on the scenario and are qualified fire watch/fire brigade personnel. Portable fire fighting equipment is available for use by Operations personnel in the immediate Control Room area.

The condition is covered in the plant's Emergency Procedure on shutdown from outside the Control Room (EO-100(200)-009). This procedure addresses the actions that need to be taken in the event that a Control Room fire may cause equipment to fail or operate spuriously.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

The condition of the postulated hot short resulting in a malfunction of equipment on Safe Shutdown Path 2 does increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the FSAR since the FPRR is a part of the FSAR. As a result this condition meets the criteria PP&L established with the NRC in PLA-3449 for reporting conditions outside the design basis of the plant.

In accordance with the guidance provided in NUREG 1022 Supplement 1, Item 14.1, the required submission date for this report was determined to be December 20, 1991.

CORRECTIVE ACTIONS

Further assessment regarding corrective actions to eliminate the postulated scenario is continuing. Two potential solutions are being investigated at this time:

- (1) Installation of a modification which rewires the MOV circuits and places the protective devices downstream of the Control Room wiring. The protective devices will then still function in the event of a hot short and MOV failure will be prevented.
- (2) Additional components are being reviewed for compliance to Appendix R. The Remote Shutdown Panels were also designed to meet GDC-19 requirements and therefore, redundant capabilities exist. The Appendix R safe shutdown analysis assured that a single set of components remained available in the event of Control Room fire. The additional redundant capabilities in place to meet the GDC-19 requirements may provide the ability to compensate for the spurious operation of a MOV.

A supplement to this report will provide when the corrective action plan has been finalized.

ADDITIONAL INFORMATION

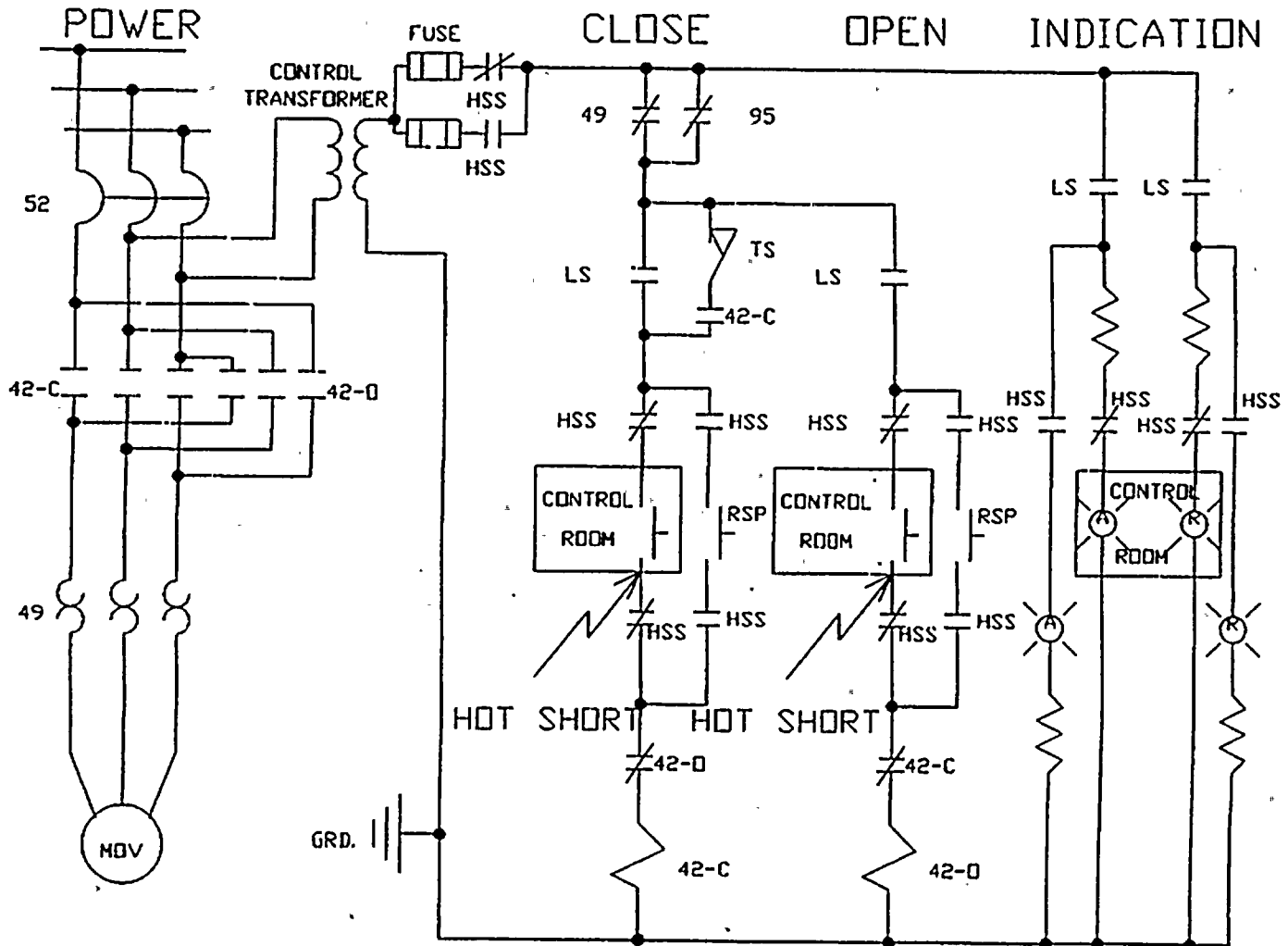
Failed Components Identification: Not Applicable.

Previously Reported Similar Events: None.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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LEGEND	
HSS	R.S.P. TRANSFER SWITCH
LS	M.D.V. LIMIT SWITCH
TS	M.D.V. TORQUE SWITCH
42	STARTER
49	OVERLOAD RELAY
95	OVERLOAD BYPASS

FIGURE 1