

LICENSEE EVENT REPORT (LER)

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-530), U7.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)
Loss of Fire Detection / Suppression - Condition Prohibited By Technical Specification

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)																																				
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(LICENSEE CONTACT FOR THIS LER (12))

NAME Richard R. Wehry - Project Engineer, Nuclear Licensing						TELEPHONE NUMBER 7 1 7 5 4 2 - 3 6 6 4					
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
C	I	C E C B D	S 2 2 6	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On August 2, 1994, at 2131 hours, with Units 1 & 2 at 100% power, the Fire Protection Simplex System was disabled by an electrical impulse from an apparent lightning strike on site. The Technical Specification action statements were entered and compensatory measures were begun. Between the time of this event and 0730 on 8/3/94, only hourly fire watches were established, contrary to the required continuous fire watches within one hour. Between the hours of 0230 and 1210 identification of fire zones requiring continuous fire watches was completed and manning of the zones was in progress. At 1145 hours, the system was repaired and returned to service and at 1250 hours the fire watches were discontinued. The causes of failing to comply with Technical Specifications were: 1) Difficulty in determining required firewatch coverage and obtaining the large number of personnel required, 2) Inadequate corrective actions from previous Simplex System Events, and 3) Communication problems during assessment of this event. The details of why previous corrective actions were inadequate are described in this report. The event was determined to be reportable per 10CFR50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications in that the required LCO action was not taken within the required action time. There were no safety consequences as a result of this event and safety compromises were minimal as described. Corrective actions included: 1) Development of a comprehensive instruction to assist in timely evaluation and response for this type event, 2) Training of Operations personnel on this event and the new instruction, 3) Emphasis on Technical Specifications compliance and a review of expected communications practices provided to Nuclear Department personnel, 4) Review of the Simplex System design for operational enhancements.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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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)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER						
		9 4 —	0 1 2 —	0 1	2	OF	5			

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

DESCRIPTION OF EVENT

On August 2, 1994, at 2131 hours, with Units 1 & 2 in Condition 1 (Run) at 100% power, a lightning storm in the area of the site caused an apparent electrical impulse in the Fire Protection Simplex System (EIS Code: IC) which disabled a major portion of the system detection capabilities and portions of the suppression system. Channel 2 of the Simplex System was declared inoperable. The Limiting Condition for Operation action statements for Technical Specifications 3.3.7.9, 3.7.6.2, 3.7.6.3 and 3.7.7 were entered. In addition, with fire barriers already inoperable (LER 92-015-00) due to the fire rating issue with thermo-lag, continuous fire watches were required to be established within one hour. Operations personnel (utility, licensed) began calling out additional personnel for fire watches and to assist in troubleshooting and repair of the Simplex System problems. At approximately 2230 hours, personnel were on site to assist in the evaluation of necessary actions and to begin efforts to repair the Simplex System. Following this evaluation it was decided that additional hourly fire watches would be implemented. At 2231 hours, Technical Specification 3.0.2 was entered since the requirements of the LCO action statement had not been met within the required time frame. At 0001 hours on 8/3/94, the additional hourly fire watches were in place. At 0730 hours, following shift turnover, it was determined that continuous fire watches still needed to be established and efforts were begun to man the continuous fire watches. Between 0800 and 1210 hours, identification of all fire zones requiring continuous fire watch was completed and manning of these zones was in progress. At 1145 hours, the Simplex System was restored and at 1250 hours the fire watches established for this event were removed.

CAUSE OF EVENT

The cause of the malfunction in the Simplex System was an apparent electrical impulse due to a lightning strike which disabled electronic components in some of the system transponder cards.

The root causes identified for failing to comply with the requirements of the Technical Specification action statements were:

- 1) Inadequate action to prevent recurrence from previous events involving Simplex problems.
- 2) Miscommunication and inadequate communication during assessment of the impact of this event and resulting required action.

NRC FORM 366a (6-89)	U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) TEXT CONTINUATION	APPROVED OMB NO. 3159-0104 EXPIRES: 4/30/92 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-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.
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Concerning inadequate actions to prevent recurrence from previous similar events (See Additional Information section of this report), four main causes were common to these events. They were: 1) Complexity of analyzing system operability, especially given that inoperable fire barriers further complicate assessing compensatory measures. 2) Difficulty in complying with the LCO required action time frame. 3) Lack of or inadequate procedural guidance for responding to Simplex System problems. 4) Susceptibility of the system to electrical surges from lightning. The actions taken to address these causes did improve our ability to respond to these events but were proven to be inadequate given the recurrent nature of difficulties in responding to Simplex System events. These actions included generation of Alarm Response procedures, revision and improvement of these procedures, consideration of use of on site fire brigade personnel to man fire watches until additional personnel arrived, hardening of the Simplex System via modifications to reduce effects of electrical impulses, and evaluation of changes to the required action time in the Technical Specifications.

Concerning the communications aspect of this event, miscommunication occurred between Shift Supervision (utility, licensed) and the Site Fire Protection Engineer (utility, non-licensed). Shift Supervision asked if the hourly fire watches were acceptable given the situation and the Fire Protection Engineer responded that it was. However, Shift Supervision interpreted this to mean acceptable for the duration and what the Fire Protection Engineer actually meant by his response was that this was acceptable in the interim until additional personnel were called in to man the continuous fire watches. The inadequate communication occurred during conversation between Shift Supervision and Management during notification of the event. Assumptions were made by Management as to the action plan and recovery efforts for the remainder of the evening and questioning and / or additional conversation would have led to a more appropriate response, specifically continued effort to man the continuous firewatch as soon as possible. These communication problems were not the cause of failing to meet the one hour action, but rather were the cause of the delay in establishing continuous fire watches.

As mentioned previously, the Simplex Systems ability to withstand electrical surges has been improved and between 1990 and 1993 there were no events as a result of lightning. However, given two events in the last year, it appeared the system may need additional improvements in design.

REPORTABILITY / ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(20)(i)(B), as a condition prohibited by Technical specifications in that the required action of establishing continuous fire watches per Technical Specification 3.3.7.9, 3.7.6.2 & 3.7.7 were not accomplished within one hour as required.

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9 4	—	0	1	2	—	0	1	4 OF 5																					

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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 September 1, 1994.

The Simplex System provides early warning and detection of a fire in the plant, as well as automatic initiation of suppression systems. At the time of this event, hourly roving fire watches were already in place for a large portion of the plant. By 2300 hours, three additional roving fire watches were in place and by 2400 hours, three more were in place. The suppression systems affected by this event can be manually initiated both in the Control Room and at local stations throughout the plant. In the unlikely event of a fire, personnel could have manually initiated suppression at these locations. Therefore, this event created no safety consequences and safety compromises to health and safety of the public and/or plant personnel were minimal. This event would not have been more severe at any other initial operating conditions.

CORRECTIVE ACTION

The immediate corrective action was to mobilize personnel to respond to the event and effect necessary repairs. CPU chips were replaced in two system transponder cards and the system was restored. Actions to prevent recurrence included:

- 1) An Operating Instruction was developed to assist in the timely identification of system effects and required compensatory measures as a result of Simplex System malfunctions. As mentioned previously, action from previous events included procedural enhancements which were intended to address this issue. However, given the complexity of responding to these event, further complicated by the existence of inoperable fire barriers, it was determined that a comprehensive instruction to guide the operator through assessment and compensatory measures was appropriate.
- 2) Operations personnel received training on this event including the instruction discussed above.
- 3) Senior Management direction was provided to Nuclear Department personnel to emphasize compliance with the Technical Specifications. Individual work groups, including Operations, have reviewed expectations regarding communications with their personnel. In the case of this event, two communication weaknesses contributed to the delay in the failure to comply with Technical Specification and non-compliance with Technical Specifications was not a generic concern.

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4) A review of the Simplex System design was completed and identified software and hardware enhancements to improve system operation. Implementation of these enhancements has been targeted for the end of 1995.

ADDITIONAL INFORMATION

Failed Component Identification: ECBD*

* The components which failed within the Simplex 2120 Central Alarm Station are not specifically identified.

Previous Similar Reported Events:

Docket No. 50-387, LER 88-015-00, Loss of Fire Detection Due to Thunderstorm Activity

Docket No. 50-387, LER 89-007-00, Loss of Fire Detection Due to Component Failure

Docket No. 50-387, LER 90-001-00, Simplex Circuit Failure Causes Failure to Comply With Technical Specifications

Docket No. 50-387, LER 93-010-00, Loss of Fire Detection/Suppression - Operation Prohibited by Technical Specifications