

**PRIORITY 1**  
(ACCELERATED RIDS PROCESSING)

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9409140285    DOC.DATE: 94/09/01    NOTARIZED: NO    DOCKET #  
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylvania    05000387  
 AUTH.NAME    AUTHOR AFFILIATION  
 LLOYD, H.    Pennsylvania Power & Light Co.  
 STANLEY, H.G.    Pennsylvania Power & Light Co.  
 RECIP.NAME    RECIPIENT AFFILIATION

SUBJECT: LER 94-012-00: on 940802, fire protection simplex system was disabled by an electrical impulse. Caused by lightning strike on site. System was repaired & returned to service. W/940901 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: 05000387

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	NRR/DE/EMEB	1 1	NRR/DORS/OEAB	1 1
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**Pennsylvania Power & Light Company**

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September 1, 1994

U.S. Nuclear Regulatory Commission  
Document Control Desk  
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SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 94-012-00  
FILE R41-2  
PLAS - 611

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

Attached is Licensee Event Report 94-012-00. This report is being made pursuant to 10CFR50.73(a)(2)(i)(B), in that a condition prohibited by Technical Specifications existed when continuous fire watches were not established within one hour to meet action statements due to inoperable fire suppression and detection equipment.

*H.G. Stanley*

H.G. Stanley  
VP - Nuclear Operations

HL/mjm

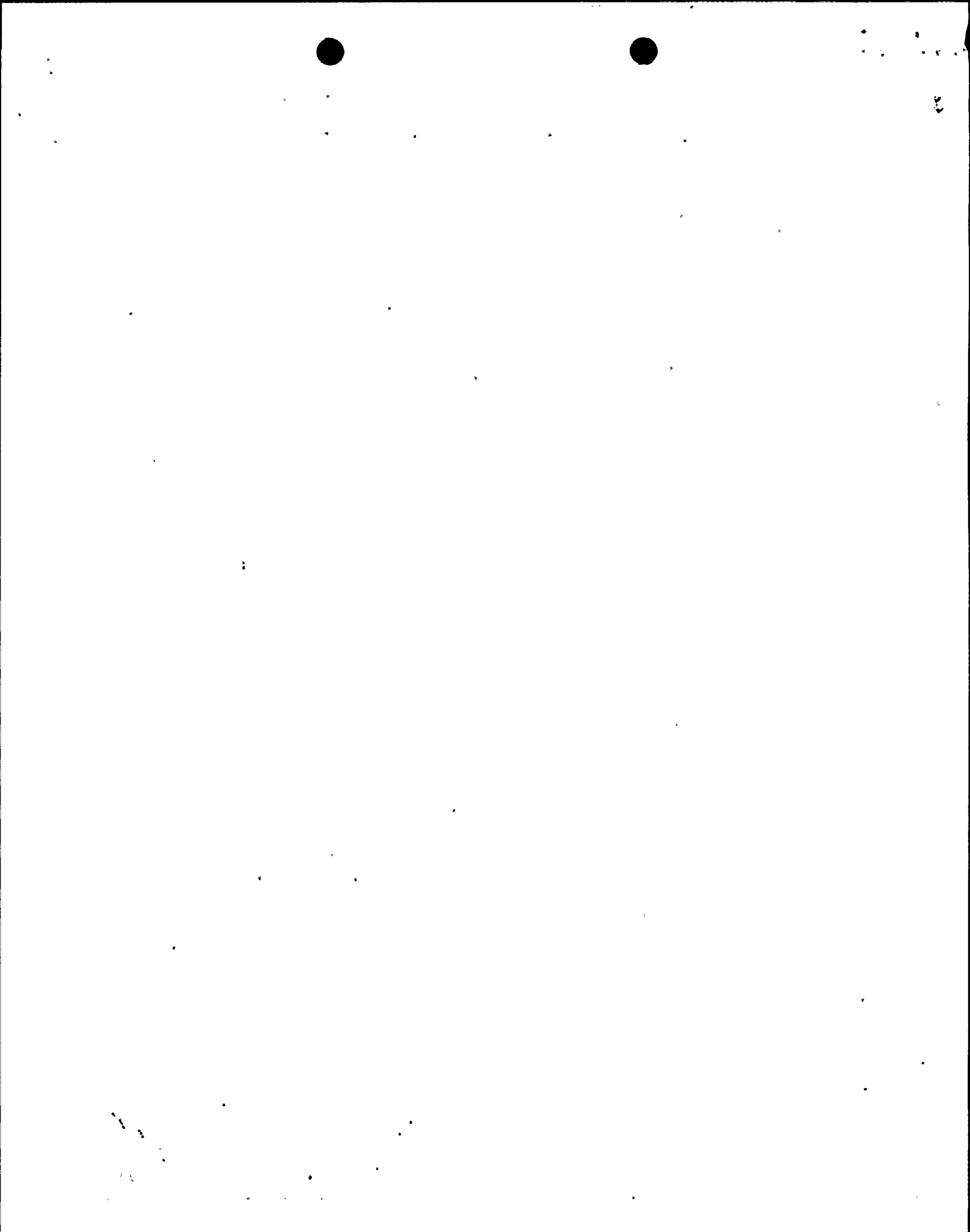
cc: Mr. T. T. Martin  
Regional Administrator, Region I  
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LICENSEE EVENT REPORT (LER)

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-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) <b>Susquehanna Steam Electric Station - Unit 1</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 3 8 7</b>	PAGE (3) <b>1 OF 0 5</b>
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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)
0 8	0 2	9 4	9 4	0 1 2	0 0 0	9 0	1 9	4	<b>S.S.E.S. Unit 2</b>		<b>0 5 0 0 0 3 8 8</b>
									<b>0 5 0 0 0</b>		

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9) <b>1</b>	20.402(b)	20.405(c)	60.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) <b>1 0 0</b>	20.405(a)(1)(i)	50.36(c)(1)	60.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(iv)	50.36(c)(2)	60.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	60.73(a)(2)(viii)(A)		
20.405(a)(1)(iv)	50.73(a)(2)(ii)	60.73(a)(2)(viii)(B)		
20.405(a)(1)(v)	50.73(a)(2)(iii)	60.73(a)(2)(ix)		

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>Harrison Lloyd, Jr. - Power Production Engineer</b>	TELEPHONE NUMBER <b>7 1 7 5 4 2 - 3 9 1 7</b>
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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	IIC	EIC B D	S 2 2 6	N					

SUPPLEMENTAL REPORT EXPECTED (14)

<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15) <b>1 1 0 1 9 4</b>
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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. Our corrective actions identified to date include: 1) Develop a comprehensive instruction to assist in timely evaluation and response for this type event, 2) Training of Operations personnel on this event, the new instruction, and expectations with regard to Technical Specification adherence, 3) Evaluation of possible improvements to the Technical Specification for fire protection, 4) Review of the Simplex System for additional improvements in design.

**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-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)  Unit 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2)  0   5   0   0   0   3   8   7	LER NUMBER (6)			PAGE (3)		
		YEAR 9   4	SEQUENTIAL NUMBER -   0   1   2	REVISION NUMBER -   0   0			

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 firewatch 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.

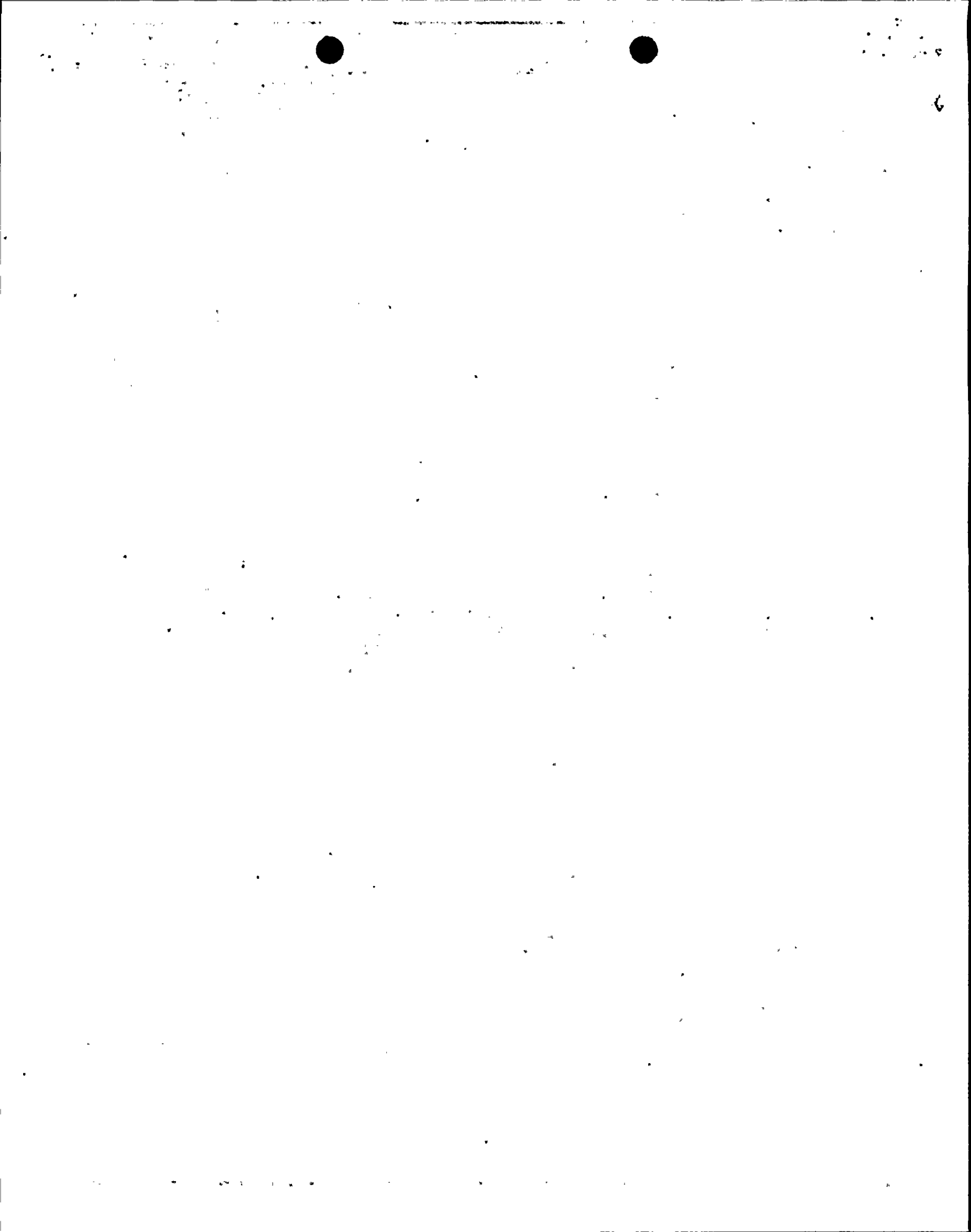
Our initial assessment of causes of this event and associated corrective action has been completed and is described below. The formal root cause analysis is not yet complete. Should any additional information be determined which is pertinent to this report, the information will be provided via an update to this report.

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 to date of 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.



**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
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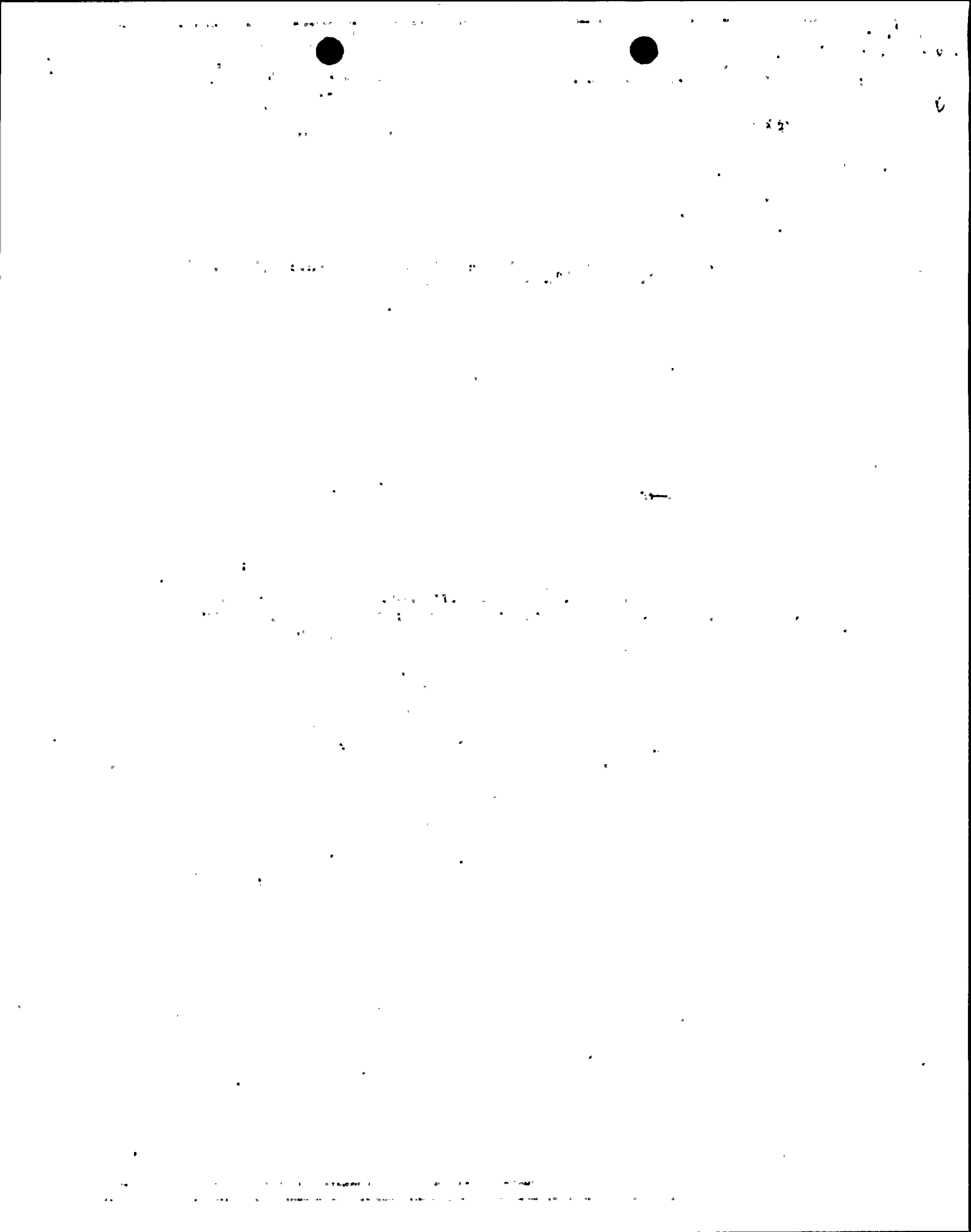
Concerning inadequate actions to prevent recurrence from previous similar events (See Additional Information section of this report), four main causes were common to these events. They were: 1) Complexity of analyzing system operability, especially given that inoperable fire barriers further complicate 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 appears 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.





LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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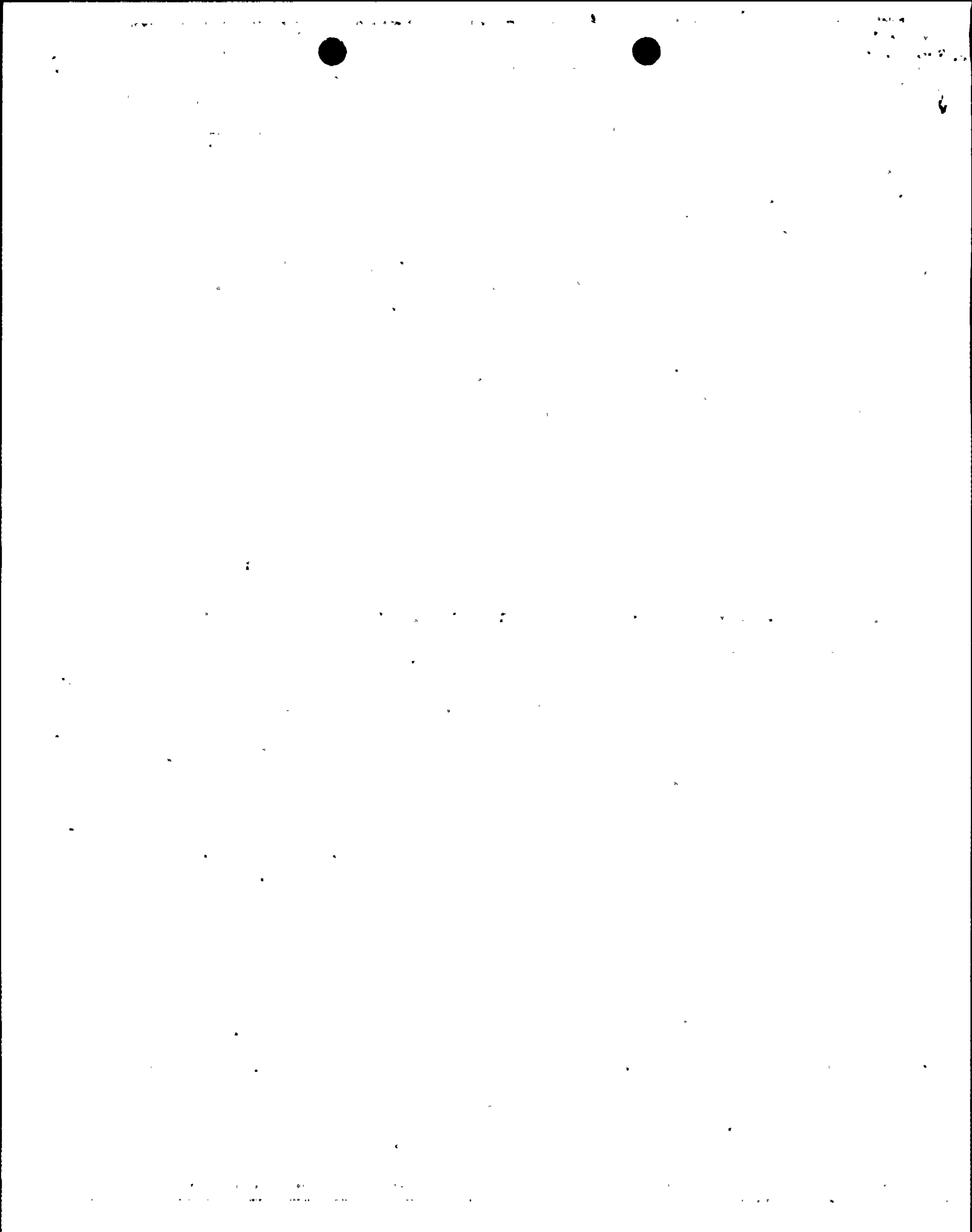
In accordance with the guidance provided in NUREG 1022, Supplement 1 Item 14.1, the required submission date for this report was determined to be September 1, 1994.

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. Our short term corrective actions / actions to prevent recurrence are as follows:

- 1) An Operating Instruction is being 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 deemed appropriate.
- 2) Operations personnel will receive training on this event including the instruction discussed above. In addition, Shift Supervision personnel will be trained by Operations Management on management expectations regarding adherence to Technical Specification and the importance of effective and thorough communications. 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 is not a generic concern.
- 3) Our Licensing group is evaluating the fire protection Technical Specification for possible changes which will improve our ability to comply in all cases. The specific areas under consideration are the intent of continuous fire watches and the required action time of establishing fire watches during events involving the fire protection system.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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- 4) A review of the Simplex System will be conducted to determine potential additional improvements to the system to minimize the effect of electrical impulses on the system. Previous efforts in this area have improved this condition but additional improvements may be warranted.

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

