NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Virgil C. Summer Nuclear Station	0 5 0 0 0 3 9 5	1 OF 0 5

TITLE (4)
Failure to Perform Fire Watch Following Fire System Computer Malfunction

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	3 0	8 8	8 8	— 0 1 0	— 0 0	1 0	0 6	8 8		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
1 0 0		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
W. R. Higgins, Supervisor, Regulatory Compliance	8 0 3 — 3 4 5 - 4 0 4 2

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	K P	C P U	J 0 7 3	N							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

At approximately 2034 hours on August 30, 1988, lightning struck the meteorological tower at the Virgil C. Summer Nuclear Station. It is believed that the lightning induced a logic shift in one of the remote signal processing units for the Integrated Fire System (IFS) computer. The change in logic caused the equipment to go into an off-line status and consequently was incapable of processing alarms or advisories from detectors located in eighteen (18) areas of the Intermediate Building.

Due to inadequate training and procedural guidance, the Fire Protection Officers (FPO) who reviewed an alarm summary from the computer failed to understand the significance of a computer generated symbol. The off-line status was identified at 0730 hours and compensatory action as required by Technical Specifications, had been completed by 0830 hours on September 6, 1988. The IFS logic error was corrected and system operation restored by 1505 hours on September 6, 1988.

The following corrective actions are to be taken as a result of this event:

1. This event has been reviewed with each FPO to insure that they are knowledgeable of IFS computer symbols and actions to be taken.
2. Security response guidelines have been modified to require that the FPO be contacted directly for all future power supply alarms.
3. System Operating Procedure (SOP) 509, "Fire Suppression System," deficiencies will be corrected in the next revision expected to be issued by November 15, 1988.
4. The Nuclear Technical Education and Training department will develop and implement a training program for the Fire Protection Staff by September 1989.

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

PLANT IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION:

Fire Service System - EIIS-KP

IDENTIFICATION OF EVENT:

At approximately 0730 hours on September 6, 1988, during a review of a computer Log Summary printout, the Fire Protection Supervisor determined that a computer remote signal processing unit (Loop Remote 6) was out of service. Further review determined that the loop remote had been off line and incapable of processing signals from fire detection sensors located in eighteen (18) areas of the Intermediate Building since approximately 2034 hours on August 30, 1988. The failure to detect and establish fire watches within one (1) hour of the initiating event is a violation of the requirements of Technical Specifications 3.3.3.7, "Fire Detection Instrumentation," and 3.7.10, "Fire Rated Assemblies."

EVENT DATE:

August 30, 1988

REPORT DATE: October 6, 1988

This report was initiated by Off-Normal Occurrence Number 88-054.

PREVIOUS SIMILAR EVENTS:

LER 87-018, dated August 27, 1987

CONDITIONS PRIOR TO EVENT:

Mode 1 - Reactor Power 100%

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

DESCRIPTION OF EVENT:

At approximately 2034 hours on August 30, 1988, lightning struck the meteorological tower (reference Special Report dated September 15, 1988 from Mr. O. S. Bradham to Dr. J. N. Grace) at the Virgil C. Summer Nuclear Station. The lightning apparently induced a voltage transient which caused a logic shift in the remote signal processing unit (Loop Remote 6) for the Integrated Fire System (IFS) Computer electronics. The change in logic caused Loop Remote 6 to go into an off-line condition. All equipment functions continued to indicate that no failures had occurred, however, the system was incapable of processing alarms or advisories from detectors located in eighteen (18) areas of the Intermediate Building.

At the time of the event, an alarm was received in the Central Alarm Station (CAS) and as part of the annunciator response the CAS operator notified the Control Room. Operations personnel subsequently requested the Fire Protection Officer (FPO) on duty at that time to check the status of the IFS. At 2037 hours, the FPO requested a log summary from the computer and noted during his review that there were no alarms. An "O" in the left hand margin of the printout was noted for various fire detection zones, however, the significance of the symbol was not understood by the FPO or the Shift Supervisor consulted during the review. The FPO noted during his turnover that a possible lightning strike had occurred at 2030 hours and that all loop remotes were operable. No abnormalities were observed on the log summary.

Subsequent FPO turnovers and system reviews failed to recognize the off-line status of the equipment until the Fire Protection Supervisor performed a review of the log summary at approximately 0730 hours on September 6, 1988. The Supervisor immediately recognized the significance of the off-line symbol and initiated fire watches as required by Technical Specifications for the affected areas of the Intermediate Building. Fire watches were established for the areas by 0830 hours. Subsequent reviews determined that the equipment had been incapable of performing its design function since approximately 2034 hours on August 30, 1988.

Security Maintenance inspection of the loop remote initially revealed no problem. The off-line condition of the loop remote was confirmed when the individual sensors placed in alarm failed to actuate the computer. Bypassing the loop remote manually produced a System Advisory, however, returning the system from bypass to normal cleared the advisory but failed to restore the system to an on-line status. Maintenance personnel had to deenergize and reenergize the equipment to restore the system logic so that it was on-line. The system was returned to service at 1505 hours on September 6, 1988.

CAUSE OF EVENT:

The event was due to personnel error as a result of inadequate training and procedural guidance for the Fire Protection Officers prior to and following the assumption of their duties on March 28, 1988. Each of the officers reviewed a similar printout prior to each shift turnover during the period of six and one-half days and failed to recognize the computer provided system status. The significance of the computer indication was addressed during the initial on-the-job training, however, there was no reinforcement procedurally or through a requalification training program for the five (5) FPO's.

ANALYSIS OF EVENT:

The as found status of the equipment indicates that a voltage transient caused the change in logic but failed to cause the normal computer message indicating an "off-line" status. The normal computer response to an off-line condition would have been the transmittal of a printer message which would have stated:

LR 06 OFF LINE

This message was not transmitted and when the FPO's reviewed the log summary, on the night of August 30, 1988, and prior to each shift turnover, they thought the "0" symbol in the left hand margin for various monitored points was an error being generated by either the computer or printer. An example of the information reviewed by the FPO's is as follows:

```
CM COAX MONITOR   6 LR NUMBER
 0   1  LOOP        OK          0   2   LOOP        OK
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The "0" to the left of the loop numbers indicates that the system is off-line whereas the computer is still indicating that electronically it is still functional by the presence of the "OK."

The consequences due to this event were minimal. Security personnel routinely patrol the areas monitored by this loop remote every two (2) hours. All Security personnel are qualified Fire Watch's and trained observers for abnormal situations. South Carolina Electric & Gas Company feels confident that with the housekeeping standards maintained at the Virgil C. Summer Nuclear Station and the alertness of Security personnel, there was minimal chance of fire propagation which could have damaged vital equipment or structures.

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

CORRECTIVE ACTION:

Management had previously initiated an independent review of the Fire Protection organization to determine what long term actions were needed to prevent further violations in this functional area. The consultant's recommendations were received on September 7, 1988, and are currently under review. Actions taken following this review will be designed to improve this functional area's performance. In addition, SCE&G has recently completed a feasibility study for the replacement of the IFS computer and is currently evaluating options to improve the human interface and monitoring capabilities.

A Management Review Board (MRB) meeting, chaired by the Vice President, Nuclear Operations, was convened on September 15, 1988, to review this specific event. As a result of this meeting, the below listed corrective actions were determined to be appropriate to address this event and prevent its recurrence.

1. The Fire Protection Supervisor has individually reviewed this event with each FPO to insure that they are knowledgeable of computer symbols and actions to be taken.

2. Security (CAS) response guidelines have been modified to require that the FPO be contacted directly for all future power supply alarms.

3. System Operating Procedure (SOP) 509, "Fire Suppression System," was reviewed for adequate guidance in diagnosing IFS problems. The procedure was found to only address alarm response and provides a table of system advisory messages. No instructions are provided concerning verification of system function once on line and no legend is provided for the cryptic reports generated. Deficiencies in this procedure will be corrected in the next revision expected to be issued by November 15, 1988.

4. The Nuclear Technical Education and Training department has been requested to develop and implement a craft training program for the Fire Protection organization. This program is expected to be completely established by September 1989 and will include initial and requalification training for all personnel within this organization. Special attention is to be placed on the Integrated Fire System computer and procedural guidance for the Fire Protection Program.

10CFR50.73

SCE&G
A SCANA Company

South Carolina Electric & Gas Company
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Ollie S. Bradham
Vice President
Nuclear Operations

October 6, 1988

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: Virgil C. Summer Nuclear Station
Docket No. 50/395
Operating License No. NPF-12
LER 88-010

Gentlemen:

Attached is Licensee Event Report No. 88-010 for the Virgil C. Summer Nuclear Station. This report is submitted pursuant to the requirements of 10CFR50.73(a)(2)(i).

Should there be any questions, please call us at your convenience.

Very truly yours,

O. S. Bradham

CJM/OSB:lcd
Attachment

c: D. A. Nauman/J. G. Connelly, Jr./O. W. Dixon, Jr./T. C. Nichols, Jr.
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