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U-601945
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2C.220

March 13, 1992
10CFR50.73

Docket No. 50-461

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20545

Subject: Clinton Power Station - Unit 1
Licensee Event Report No. 91-005-01

Dear Sir:

Please find enclosed Licensee Event Report No. 91-005-01:
Inadequate Design for Verifying Filter Paper Advancement Results in
Inoperable Leak Detection Fission Product Particulate Sample Panel.
This Licensee Event Report has been revised to make editorial
corrections and include the results of a detailed causal factor analysis
of the event and appropriate corrective actions. This report is being
submitted in accordance with the requirements of 10CFR50.73.

Sincerely yours,

F. A. Spangenberg, III
Manager, Licensing and Safety

PSE/flh

Enclosure

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
NRC Region III, Regional Administrator
Illinois Department of Nuclear Safety
INPO Records Center

Handwritten initials: JE 28

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.8 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (R&M), 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)

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DOCKET NUMBER (2)

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TITLE (4)

Inadequate Design For Verifying Filter Paper Advancement Results in Inoperable Leak Detection Fission Product Particulate Sample Panel.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (3)			OTHER FACILITIES INVOLVED (8)							
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)					
1	0	1	5	9	1	9	1	0	0	5	0	5	0	0	0	0
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																
OPERATING MODE (8)			20.402(b)			20.406(c)			50.73(a)(2)(iv)			73.71(b)				
POWER LEVEL (10)			20.406(a)(1)(i)			50.36(a)(1)			50.73(a)(2)(v)			73.71(c)				
			20.406(a)(1)(ii)			50.36(a)(2)			50.73(a)(2)(vi)			OTHER (Specify in Abstract below and in Text, NRC Form 306A)				
			20.406(a)(1)(iii)			X 50.73(a)(2)(i)			50.73(a)(2)(vii)(A)							
			20.406(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)							
			20.406(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(ix)							

LICENSEE CONTACT FOR THIS LER (12)

NAME

W. M. Clark, Assistant Director -
Plant Maintenance, extension 3628

TELEPHONE NUMBER

AREA CODE

2 1 7 9 3 5 - 8 8 8 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	
B	I	J	M	O	N	G	O	8	O	N

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/>	<input checked="" type="checkbox"/>				

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

On October 15, 1991, with the plant in POWER OPERATION, a technician performing scheduled preventive maintenance discovered the moving filter paper in the Leak Detection System fission product particulate sample panel 1E31-P002 had stopped advancing. The filter paper had not advanced since the last preventive maintenance task had been completed on October 3, 1991. The Operations Shift Supervisor determined that the failure of the filter paper to advance constituted an inoperable drywell atmosphere particulate radioactivity monitoring system and directed the drywell atmosphere to be manually sampled and analyzed at least once per 24 hours as required by the Technical Specifications. Operating the plant with an inoperable drywell atmosphere particulate radioactivity monitoring system without complying with the required action statement is a condition which is prohibited by Technical Specification 3.4.3.1. The cause of this event was inadequate design of the sample panel. Corrective actions include: implementing a temporary modification to allow visual verification of filter paper advancement; briefing personnel on this event; evaluating new fission product monitors for potential replacement of the existing sample panel; and incorporating the filter paper replacement activity into a procedure and the surveillance tracking program.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 305A's) (17)

DESCRIPTION OF EVENT

At approximately 0930 hours on October 15, 1991, with the plant in Operational Condition 1 (POWER OPERATION) at approximately 50 percent reactor [RCT] power, a utility Control and Instrumentation (C&I) technician performing scheduled preventive maintenance task PCILDW001 discovered the moving filter [FLT] paper in the Leak Detection System [LJ] fission product particulate sample panel [PL] 1E31-P002, was not advancing. The sample panel monitors air particulates of the drywell atmosphere for radioactivity. This monitoring is accomplished by drawing a representative sample of gaseous and effluent particulates from the drywell atmosphere and trapping the particulate matter on the moving filter paper. The filter paper is designed to retain the particulates as it passes in front of a scintillation detector [DET] where any radiation is detected. The panel provides continuous indication and activates alarms [ALM] in the Main Control Room. Since the filter paper was not advancing, the drywell air particulate sample panel was not performing its intended design function. Therefore, the drywell atmosphere particulate radioactivity monitoring system was not operable as required by Technical Specifications. The ACTION statement of Technical Specification 3.4.3.1. was not met; therefore, this event constituted operation prohibited by the Technical Specifications. The Reactor Coolant System Leakage Detection System is required to be Operable in Operational Condition 1, Operational Condition 2 (STARTUP) and Operational Condition 3 (HOT SHUTDOWN).

On October 15, 1991, C&I technicians started to implement preventive maintenance task PCILDW001. This task is performed at two-week intervals for the purpose of replacing the used roll of filter paper with an unused roll of filter paper. The task frequency of biweekly was established based on the length of the filter paper roll and the speed of the slow speed motor. Upon removal of the spool covers of panel 1E31-P002 by the C&I technicians on October 15, the technicians observed that the filter paper had not advanced since the previous preventive maintenance task was completed on October 3, 1991. The fission product particulate sample panel contains no external indication of filter paper movement. Therefore, based on the current configuration of this panel, it is necessary to remove the covers from the take-up and feed spools to verify paper movement. The technicians removed the previously-installed roll of filter paper from 1E31-P002. Additionally, as required by corrective actions for Licensee Event Report (LER) 90-009, the drive mechanism was removed from the panel housing and inspected for loose gears or set screws. No additional anomalies were noted. The Operations Shift Supervisor was notified of the failure of the filter paper to advance. Subsequently, the appropriate ACTION statement of Technical Specification 3.4.3.1 was entered and the required grab sample was initiated.

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

Troubleshooting of 1E31-P002 resulted in the identification that the capstan tensioner was out of adjustment. This prevented the filter paper from advancing. It should be noted that the vendor service manual associated with 1E31-P002 does not provide detailed guidance, neither quantitative nor qualitative data, on proper capstan tensioner adjustment. Upon the reinstallation of the gearing assembly and drive motor of sample panel 1E31-P002 and adjustment of the capstan tensioner within the guidance of preventive maintenance task PCILDW001, verification of proper operation was performed by running the sample panel in both fast and slow speeds. The sample panel failed to operate in fast speed. The sample panel was disassembled a second time to examine the drive mechanism. As a result of this examination, it was determined that the fast speed gears were jammed, probably as a result of reinstallation from the current inspection cycle. The fast speed gears were freed and the drive mechanism was reinstalled. After final adjustment to the capstan tensioner, the sample panel operated satisfactorily in fast speed. Operation of the sample panel in slow speed was verified on October 16, 1991. On October 16, C&I technicians verified, by observation with the supply and take-up spool covers removed, proper paper movement and proper capstan operation in slow speed. Again on October 18, 1991, C&I technicians verified that filter paper had been advancing in the sample panel. The sample panel was restored to service on October 18, 1991 at 1200 hours.

During the evaluation of this event to determine reliability of the fission product particulate sample panel, numerous previously completed preventive maintenance tasks were reviewed. The specific preventive maintenance tasks reviewed were those that had been completed since April 27, 1990, the event date of the most recent Licensee Event Report (90-009) on this subject. This evaluation concluded:

Clinton Power Station has had difficulty in maintaining the fission product particulate sample panel operable. From April 27, 1990, to October 2, 1991, completed documentation of preventive maintenance task PCILDW001 shows that on six different occasions, the filter paper in the sample panel was not advancing or not in need of changing. This data was recorded in the preventive maintenance work request packages performed July 11, 1990; July 31, 1990; April 22, 1991; June 25, 1991; August 26, 1991; and October 2, 1991.

During performance of preventive maintenance task PCILDW001, the C&I technicians returned the sample panel to service by ensuring that the filter paper was advancing in both fast and slow speeds. Preventive maintenance task PCILDW001 did not provide adequate direction as to the importance of ensuring that the filter paper had been advancing. No qualitative or quantitative criteria were provided to the C&I technicians

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TEXT (if more space is required, use additional NRC Form 3054's) (17)

nor did the technicians have knowledge that the failure of the filter paper to advance constituted an inoperable drywell atmosphere particulate radioactivity monitoring system. Additionally, Operations personnel failed to associate the absence of filter paper movement with an inoperable fission product particulate sample panel on certain occasions.

The evaluation also showed that anomalies exist concerning implementation of preventive maintenance task PCILDW001 within established frequencies and within the limitations of the sample panel. Based on the speed of the filter paper advancement (approximately one and one half inch per hour in slow speed) and the length of the roll of filter paper (approximately 60 feet), the filter paper at normal operation would be exhausted in approximately 20 days. On March 1, 1991, preventive maintenance task PCILDW001 was performed and a new roll of filter paper was installed. The next preventive maintenance task performed to replace the filter paper was not accomplished until April 22, 1991. On April 22, the technicians, upon removal of the spool covers of the sample panel, noted that the paper drive had not been turning and that the new filter paper had not been used. However, had the sample panel been operating correctly, the filter paper supply would have been exhausted long before the filter paper roll would have been replaced. This condition would have resulted in an inoperable fission product particulate sample panel.

CAUSE OF THE EVENT

The primary cause of this event is the inadequate design of the fission product particulate sample panel. This cause and other causal factors that were identified are summarized below:

- * The design of the fission product particulate sample panel does not provide indication (external to the monitor) for movement of the filter paper drive mechanism. This design is also inadequate in providing the continuous operation of the monitor as required by CPS Technical Specifications, since, on numerous occasions after December 1989, preventive maintenance task (PCILDW001) identified the as-found condition of the paper drive as not functioning.
- * The preventive maintenance program for the filter paper drive mechanism was not established until November 1989. The lack of a regularly scheduled preventive maintenance task prior to this time left replacement and verification of the filter paper to personal discretion. Without regular replacement of the paper via a controlled mechanism, failure of the equipment was not apparent to Operations or Maintenance personnel.

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TEXT (If more space is required, use additional NRC Form 366A's (1/7))

- * The preventive maintenance task developed in November 1989 did not include guidelines for operability concerns associated with the monitor.
- * Performance of the preventive maintenance task has been inconsistent and, as a result, did not ensure operability of the fission product particulate sample panel. Preventive Maintenance tasks performed at a greater-than-monthly frequency are scheduled and tracked by the group responsible for their performance. This program did not ensure that these tasks were performed at the required frequency.
- * The filter paper did not advance properly in the fission product particulate sample panel due to the capstan tensioner which was found out of adjustment and prevented the panel from performing its intended function.

CORRECTIVE ACTION

The drywell atmosphere will continue to be manually sampled and analyzed at least once every 24 hours (when operating in Operational Conditions 1, 2 or 3) until reliability of the sample panel can be demonstrated.

Applicable maintenance personnel, maintenance supervisors and operations shift personnel have been briefed on this event in an effort to enhance their understanding of the equipment's operation and function.

Temporary modification 92-18 has been approved and implemented. This temporary modification installed a clear window on the front of the fission product particulate sample panel in accordance with Maintenance Work Request D27365. The window is expected to allow Operations personnel to periodically verify that the filter paper is advancing. Operations personnel are evaluating methods for filter paper movement verification. This evaluation will be completed prior to the startup from the third refueling outage.

Additionally, the Nuclear Station Engineering Department (NSED) is currently evaluating two new fission product monitors for potential replacement of the existing fission product particulate sample panel. Recommendations regarding the above monitors are expected by May 4, 1992.

Since proper operation of the filter paper drive mechanism is necessary for operability, the replacement of the filter paper has been incorporated into CPS procedure 8643.03, "Air Particulate Monitor 1E31-P002 Filter Paper Replacement." Additionally, completion of this requirement is tracked in accordance with the CPS Surveillance Tracking program, which maintains stricter controls for completion of frequent activities than the preventive maintenance program. CPS Procedure

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TEXT (If more space is required, use additional NRC Form 308A's) (7)

8643.03 requires that the Operations Shift/Assistant Shift Supervisor be notified if the filter paper is not advancing when the monitor is opened for paper replacement. Preventive Maintenance task PCILDM001 is no longer used to track the filter paper replacement.

Additional clarification has been placed in CPS procedure 8643.03 concerning adjustment of the capstan tensioner. This clarification provides guidance in ensuring the roller is not contacting the metal collar on top of the capstan, thus increasing reliability of the sample panel. This action has been completed.

The corrective action commitments to LER 90-009 included a commitment to inspect the gear assembly for proper gear engagement and tightness of set screws. Since implementation of this commitment, 24 inspections have been performed with no instances noted where loose gears or set screws would have affected the movement of the filter paper. Therefore, loose gears and set screws do not appear to be a recurring failure mode. The fission product particulate sample panel is not configured in a manner that readily allows for inspection of the drive mechanism gears without extensive disassembly of the sample panel. Interviews with technicians indicated that performing this inspection requires excessive handling of the gear assembly. Therefore, performing this inspection may be reducing rather than increasing the reliability of the sample panel. Documentation in several completed preventive maintenance tasks associated with gear binding upon reinstallation of the gear assembly supports this conclusion. The inspection of the gears and set screws has been included in a preventive maintenance task (PCILDM001) that is performed every 18 months instead of being performed during each filter paper replacement.

The preventive maintenance data base was reviewed to determine if there are any preventive maintenance tasks which must be performed to maintain Technical Specification operability. The review determined that ten tasks were being performed to maintain Technical Specification operability; however, these tasks had greater-than-monthly frequencies and are adequately scheduled and tracked by the preventive maintenance program. These tasks have been appropriately annotated to indicate an impact on Technical Specification requirements.

Additionally, CPS procedure 1034.01, "Station Preventive Maintenance," has been revised to require notification of the Work Authority (Shift Supervisor, Radwaste Shift Supervisor or Security Shift Liaison, depending on the affected system/component) when equipment is found inoperable during preventive maintenance performance.

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TEXT IF more space is required, use additional NRC Form 365A (7/11)

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(1)(B) because the plant was operated in a condition prohibited by Technical Specification 3.4.3.1.

The length of time the filter paper had not been moving during each of the events cannot be conclusively determined. However, the amount of filter paper on the take-up reel provided indication that the sample panel had been inoperable during some of the times it was required to be operable. Therefore, the sample panel was considered to be inoperable from June 23, 1990 to July 11, 1990; July 11, 1990 to July 14, 1990; July 26, 1990 to July 31, 1990; March 4, 1991 to April 22, 1991; May 31, 1991 to June 25, 1991; August 9, 1991 to August 28, 1991; August 28, 1991 to October 3, 1991; and October 3, 1991 to October 15, 1991. With each event, the fission product particulate sample panel was returned to service by verifying that the filter paper was properly advancing in both fast and slow speed.

During the most recent event, the sample panel was restored to service at 1200 hours on October 18, 1991.

Analysis of the safety consequences and implications of this event indicates this event was not nuclear safety significant. At the times of these events, other instrumentation was available and operable to provide both continuous indication and activate alarms in the Main Control Room if unidentified reactor coolant leakage inside the drywell had exceeded specified limits. This instrumentation included the drywell sump flow monitoring system and either the drywell atmosphere gaseous radioactivity monitoring system or the drywell air coolers condensate flow rate monitoring system. During this event there was no unidentified leakage inside the drywell in excess of the specified limits.

ADDITIONAL INFORMATION

Drywell fission products monitor 1E31-P002 is model number 133D9025G manufactured by General Electric.

LER 88-005-00 discusses a licensed operator failure to recognize an inoperable drywell atmosphere particulate radioactivity monitoring system which resulted in missed particulate grab samples.

LER 90-009-00 discusses a loose set screw on a gear train of the moving filter paper drive mechanism which resulted in the paper not moving and an inoperable leak detection drywell air particulate sample panel.

For further information regarding this event, contact W. M. Clark, Assistant Director - Plant Maintenance at 217-935-8881, Ext. 3628.