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FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana M 05000316
AUTH.NAME AUTHOR AFFILIATION
WEBER,G.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
BLIND,A.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 93-003-00:on 921016,discovered that charcoal filter face dampers were closed instead of open as indicated.Caused by incorrect solenoid installation.Procedures revised & dampers verified to be installed correctly.W/930408 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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INDIANA
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April 8, 1993

United States Nuclear Regulatory Commission
Document Control Desk
Rockville, Maryland 20852

Operating Licenses DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

93-003-00

Sincerely,

A.A. Blind
Plant Manager

/jas

Attachment

c: A.B. Davis, Region III
E.E. Fitzpatrick
P.A. Barrett
R.F. Kroeger
B. Walters - Ft. Wayne
NRC Resident Inspector
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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH 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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
D. C. COOK PLANT - UNIT 2	0 5 0 0 0 3 1 6	1 OF 0 5

TITLE (4) ESF Ventilation System Filter Train Damper Control Malfunction Due to Incorrect Solenoid Installation

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 5 0 0 0
1 0	1 6	9 2	9 3	0 0 3	0 0	0 4	0 8	9 3		0 5 0 0 0

OPERATING MODE (9): 5

POWER LEVEL (10): 0 0 0

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

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	X 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
G. A. WEBER - PLANT ENGINEERING SUPERINTENDENT	6 1 6 4 6 5 - 5 9 0 1

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
B	IF	SOL	A610	Y					

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)

On October 16, 1992, with Unit 2 in Mode 5 (Cold Shutdown) a problem was recognized concerning the operation/position of the Engineered Safeguards Charcoal Filter Dampers. An operator on tour discovered that the 2-HV-AES-2 (Train B) charcoal filter face dampers were closed when they should have been open. The Train-A Unit (2-HV-AES-1) had been removed from service (fan breaker was open). This condition should, by design, have automatically placed the Train-B charcoal filter in service by opening the face dampers and closing the two bypass dampers. This event was determined to be reportable on March 9, 1993, as an operation prohibited by Technical Specifications and; an event where an independent train became inoperable in a system controlling the release of radioactive material. This event was caused by a piping error on the instrument air supply to solenoid valve (2-XSO-560) which provides the control air for the damper operation. Upon actuation of a Containment Isolation Phase B (CI-B) signal, both ESF Ventilation Trains start with flow going through the associated charcoal filters. Solenoid Valve 2-XSO-560 actuates from a Train-A CI-B signal, or from the Train A fan being out of service and provides a cross-train feature to reposition the Train-B ESF Ventilation Filter Dampers. The piping and print errors were corrected. The cross-train solenoid features are being added to the CI Time Response Procedures prior to the next scheduled tests. The remaining solenoids for the AES dampers in both Unit 1 and 2 were verified to be installed correctly.

Conditions Prior to Occurrence:

Unit 2 was in Mode 5 (Cold Shutdown)

Description of Event:

On October 16, 1992, a problem was recognized concerning the operation/position of the Engineered Safeguards Features (ESF) Charcoal Filter Dampers (EIIS/BH-DMP). An operator on tour discovered that the 2-HV-AES-2 (Train B) charcoal filter face dampers were closed when they should have been open. The Train-A Unit (2-HV-AES-1) had been removed from service (fan breaker was open). This condition should, by design, have automatically placed the Train-B charcoal filter in service by opening the face damper and closing the two bypass dampers.

An investigation revealed that the incorrect position of the 2-HV-AES-2 face and bypass dampers was caused by an incorrect piping configuration (air supply piped to wrong solenoid part) of the instrument air supply to solenoid valve (2-XSO-560) (EIIS/LF-SOL) which provides the control air for the damper operation (see attached drawing). Upon actuation of a Containment Isolation Phase B (CI-B) signal, both ESF Ventilation Trains start with flow going through the associated charcoal filters. Solenoid Valve 2-XSO-560 actuates from a Train-A CI-B signal, or from the Train A fan being out of service and provides a cross-train feature to reposition the Train-B ESF Ventilation Filter Dampers. Solenoid 2-XSO-560 ensures cross-train backup for Solenoid Valve 2-XSO-564, which actuates on a Train-B, CI-B signal. If solenoid 2-XSO-564 would have failed during an accident, the supply air piping error would have prevented solenoid 2-XSO-560 from performing its backup design function for the Train-B ESF Ventilation Filter dampers and prevented use of the manually actuated Solenoid Valve 2-XSO-565 to correctly position the dampers.

The instrument air piping in the plant agreed with the appropriate Plant Drawing. With the piping in the incorrect configuration, the 2-HV-AES-2 face and bypass dampers would not have operated on a CI-B signal from Train A, or from the open breaker on fan 2-HV-AES-1 as originally designed.

The control system for the AES face and bypass dampers was modified by a Design Change (RFC-12-991) in 1977. The change provided Train redundancy. It could not be conclusively determined if the piping was originally installed as shown on the drawing, or if there was a drawing error and the tubing at the solenoid was changed at a later date to match the drawing.

The condition has gone undetected until this time due to the fact that the cross-train features were not included in the individual ESF Time Response Tests for Train-A or Train-B Containment Isolation. The dampers are locally verified to operate when their respective Train CI operates. Neither the cross-train solenoid actuation or verification of subsequent damper operation was included in the surveillance tests. Protection was still provided by the Train B CI-B circuit.

Description of Event continued:

This event was determined to be reportable on March 9, 1993, as an operation prohibited by Technical Specifications, and an event where an independent train became inoperable in a system designed to control the release of radioactive material.

Cause of Event:

This event was the result of a print error. It could not be determined when the solenoid had been installed incorrectly since a review of the design change test data indicates that the solenoid valve was successfully tested in 1977. The Design Change Test included the following steps:

1. Initiate Phase B, Train A isolation signal, and verify that the bypass dampers for both AES-1 and AES-2 move to the charcoal flow position."

2. Open the main breaker for fan AES-1 and verify that dampers for both AES-1 and AES-2 move to the charcoal flow position."

While these steps were signed off as having been successfully performed, the record did not provide an indication as to whether the damper position was visually confirmed or confirmed by way of the Control Room status light.

In addition to the print error, verification of the cross-train solenoid actuation/damper operation was not added to the appropriate surveillance, following installation of Design Change RFC 12-991.

Analysis of Event:

The determination of operability is based on the following scenario: Assume an initiating event whereby both AES Fans start. Assume that a Phase B isolation signal is provided by both Trains. The single failure assumption is that XSO-564 (control solenoid for Train B Phase B isolation signal to Train B AES vent and filter train) does not move to its trip position. Given the above single failure and that XSO-560 (control solenoid for Train A Phase B isolation signal to Train B AES vent and filter train) was piped improperly, bypass dampers HV-AES-2-D1 and 2-D2 would not close and Face Damper, HV-AES-2-D3, would not open. This would cause the Charcoal Filter System to remain in its bypass mode.

The safety significance of the inoperability of the Train B ESF Ventilation System air exhaust filter has been reviewed. Nuclear Safety and Licensing calculation RD 85-03, dated May 20, 1985, provided an analysis of the off-site 0-2 hour thyroid dose resulting from RCS leakage outside Containment following a large-break LOCA. Using the assumptions from Section 14.3.5 of the UFSAR, and taking no credit for the removal of radioactive iodine by the ESF Ventilation System charcoal filters. The results of the analysis indicated that the 0-2 hour dose at the site boundary would be approximately 4.6 rem.

Analysis of Event continued:

The 4.6 rem increase in the site boundary dose represent a relatively small increase in the 0-2 hour site boundary dose of approximately 150 rem reported in the UFSAR for the large-break LOCA. Considerable margin still exists before reaching the 10 CFR 100 limit of 300 rem to the tyroid, even with no credit for charcoal filtration.

The failure of Train-B of the ESF ventilation unit dampers to function properly is reportable under 10 CFR 50.73.(a)(2)(i)(B) and 10 CFR 50.73.(a)(2)(vii)(C). Based on the results of the analysis, it is concluded that the condition described above did not represent a significant hazard to the health and safety of the public.

Corrective Actions:

The tubing configuration was corrected and 2-HV-AES-2 was returned to service on November 7, 1992. Proper operation of the circuit was verified by opening the breaker for Fan 2-HV-AES-1 and ensuring that the AES-2 Face and Bypass Dampers cycled to the correct position, directing flow through the charcoal filter in 2-HV-AES-2. The solenoid piping and associated drawings, for the remaining AES System solenoids for both Units 1 and 2, were verified to be correct.

The design change process has undergone many improvements since 1977. More detailed reviews are conducted, and better documentation is provided, of Design Change testing required to verify operability and design function of the system.

To ensure that the system continues to operate as designed, procedure change requests have been issued for surveillance procedures which test these systems. Revisions to the ESF time response Train-A and Train-B Procedures will include verification that each AES fan's dampers will move to the charcoal filtration mode when the opposite Train receives a Safety Injection signal. These procedure revisions are scheduled to be completed by December 15, 1993 (prior to the next scheduled test). The drawing has been revised to show the correct piping configuration.

Failed Component Identification:

Component I.D.: 2-XSO-560, 2-HV-AES-1-D1, D2, and D3 - Containment Isolation Phase-B TR-A Control Solenoid (EIIS/LF-SOL).

Manufacturer: Automatic Switch Co.

Model: JHB830081F

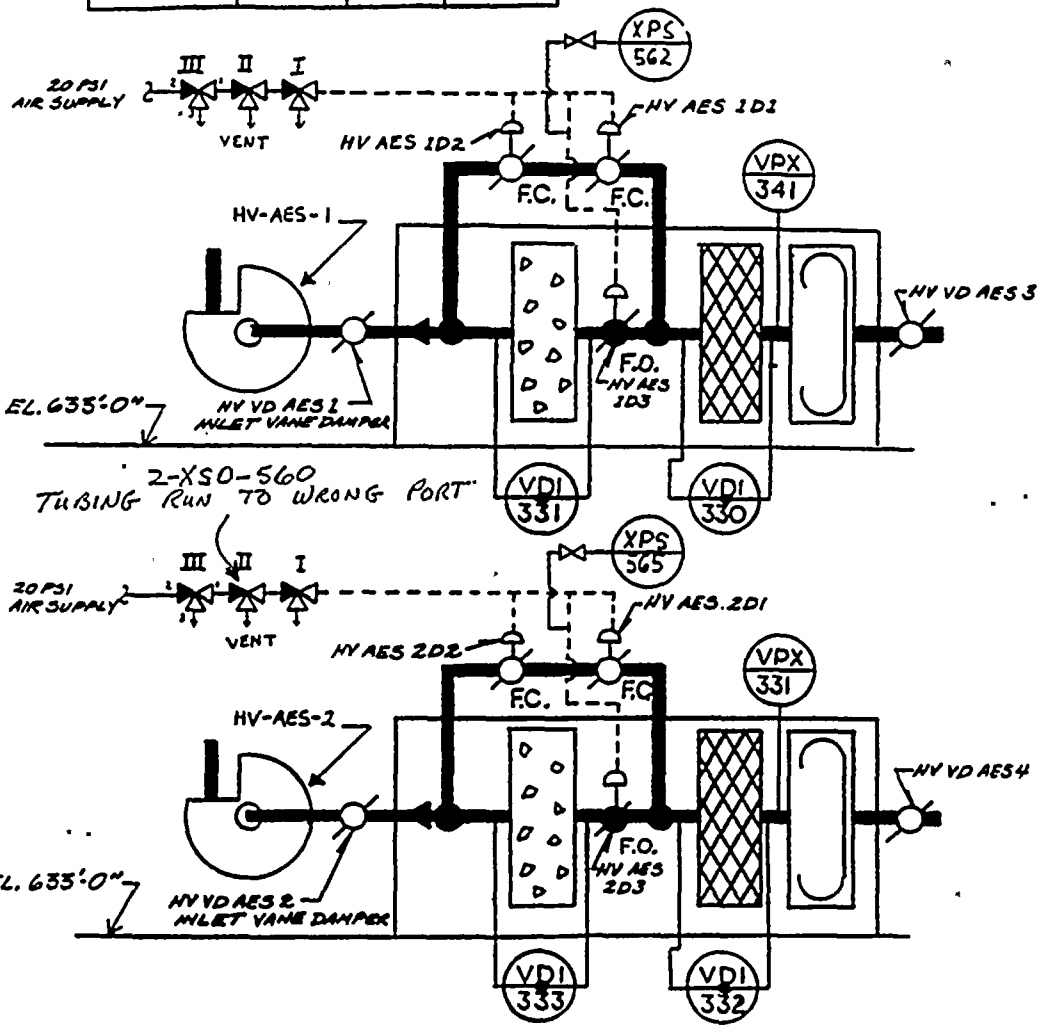
Previous Similar Events:

There have not been any previous similar events.

This drawing shows the correct solenoid installation.

UNIT	XSO-I	XSO-II	XSO-III
HV-AES-1	561	563	562
HV-AES-2	564	560	565

XSO-562, 565 ARE IN THE CONTROL CIRCUIT
XSO-560, 561 ARE POWERED FROM TRAIN A
XSO-563, 564 ARE POWERED FROM TRAIN B



SOLENOIDS I & II TO DE-ENERGIZE ON CONTAINMENT ISOLATION PHASE "B" SIGNAL CAUSING AIR TO FLOW THROUGH FILTER