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REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9209110038 DOC. DATE: 92/09/04 NOTARIZED: NO DOCKET #
FACIL: 50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315
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 92-008-00: on 920805, spent fuel exhaust ventilation sys inoperable due to leakage around charcoal absorber. Caused by aging of charcoal absorber bypass damper blade edge seal. Equipment history will be performed. W/920904 ltr.

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

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September 4, 1992

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

Operating Licenses DPR-58
Docket No. 50-315

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:

92-008-00

Sincerely,

A. Alan Blind

A. A. Blind
Plant Manager

/sb

Attachment

c: D. H. Williams, Jr.
A. B. Davis, Region III
E. E. Fitzpatrick
P. A. Barrett
R. F. Kroeger
B. Walters - Ft. Wayne
NRC Resident Inspector
J. F. Stang - NRC
J. G. Keppler
M. R. Padgett
G. Charnoff, Esq.
D. Hahn
INPO
S. J. Brewer/B. P. Lauzau
B. A. Svensson

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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-630), 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) D. C. COOK NUCLEAR PLANT - UNIT 1										DOCKET NUMBER (2) 0 5 0 0 0 3 1 5				PAGE (3) 1 OF 0 5		
TITLE (4) SPENT FUEL POOL EXHAUST VENTILATION SYSTEM INOPERABLE DUE TO UNACCEPTABLE LEAKAGE AROUND THE CHARCOAL ABSORBER																
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 5	9 2	9 2	0 0 8	0 0	0 9	0 4	9 2	COOK PLANT - UNIT 2				0 5 0 0 0 3 1 6			
OPERATING MODE (8) 6			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)													
POWER LEVEL (10) 0 0 0			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)			50.73(a)(2)(vii)			OTHER (Specify in Abstract below and in Text, NRC Form 366A)				
			20.405(a)(1)(iii)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(A)							
			20.405(a)(1)(iv)			50.73(a)(2)(iii)			50.73(a)(2)(viii)(B)							
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(ix)							
LICENSEE CONTACT FOR THIS LER (12)																
NAME G. A. WEBER - PLANT ENGINEERING SUPERINTENDENT										TELEPHONE NUMBER						
										AREA CODE 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 NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC						
X	D A	S E A L	J 0 7 3	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 August 5, 1992, with Unit 1 in Mode 6 (Refueling) and Unit 2 in Mode 5 (Cold Shutdown), a surveillance test on the Spent Fuel Pool Exhaust Ventilation System revealed that the charcoal absorber removal efficiency was 93 percent when tested in-place with a Halogenated Hydrocarbon Test Gas. The Technical Specification limit is: greater than 99 percent. This test measures leakage around or through the charcoal absorber but does not measure charcoal absorber efficiency. Upon discovery, all work in the Spent Fuel Pool was suspended.

This deficiency was caused by aging and loss of pliability of the seal material on the charcoal absorber bypass damper blade edge. The rubber seal material had taken a set and lost its pliability, and two damper blades were found bowed. The cause for the bowed damper blades could not be determined.

Following replacement of the damper blade edge seal material and straightening of the bowed damper blades, a retest revealed that the removal efficiency was 99.65 percent. The Spent Fuel Pit Filter Unit was returned to an operable status on August 8, 1992, at 1150 hours.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

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

Conditions Prior to Occurrence:

Unit One was in Mode 6 (Refueling)
Unit Two was in Mode 5 (Cold Shutdown)

Description of Event:

On August 5, 1992, during a routine surveillance of the Spent Fuel Pool Exhaust Ventilation System (AFX) (EIIS:DA), the charcoal absorber bed failed to meet the leakage criteria of Technical Specification 3.9.12. The surveillance test verifies that there is no significant leakage bypassing the air cleaning system. This test determines the amount of leakage through or around the charcoal absorber (EIIS:DA/ABS) not the performance of the charcoal absorber. Test results indicated that removal capability of the filter system was 93 percent. The minimum required removal capability is 99 percent. The filter unit was declared inoperable, and work inside the Spent Fuel Pool (EIIS:DA) was suspended, in accordance with Technical Specification requirements.

Upon discovery of the deficiency, an inspection was immediately performed inside the ventilation housing in an attempt to determine the leak path. The bypass dampers and filter bank were inspected. The bypass dampers are open to bypass the charcoal bed during normal operation and are closed during an accident to redirect the air flow through the charcoal bed. There are two sets of bypass dampers, operating in series. Inspection of these dampers revealed that they were not seating properly. One damper blade was bowed on one set of the up-stream and down-stream dampers.

Repairs consisted of straightening the bowed damper blades, tightening loose blades, increasing the closing force on the damper blades and replacing damper edge seal material on the up-stream and down-stream damper blades. The new seals are pliable and therefore more adaptable to the variations in seating surface of the dampers.

Following these activities, the leakage efficiency was 99.65 percent. The Spent Fuel Pool Filter Unit was returned to service on August 8, 1992, at 1150 hours.

Cause of Event:

Cause of the leakage is attributed to aging of the charcoal absorber bypass damper blade edge seals. The rubber seal material had taken a set and lost its pliability over time, thus resulting in a seat insufficient to meet the tight leakage criteria set by Technical Specifications and ANSI N510. ANSI N510 is designed to be used on systems built to ANSI N509, which is not the case with the Spent Fuel Pool Ventilation System.

Two bowed damper blades were also found. The cause for the bowed damper blades could not be determined.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

Analysis of Event:

This event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by Technical Specifications since this condition would have existed prior to the surveillance test; and fuel movement occurred in the Spent Fuel Pool during the current Unit 1 Refueling Outage and previous Unit 2 Refueling Outage.

According to ANSI N510 - 1980, Appendix A, the purpose of the In-Place Leak Test is to verify that there is no significant leakage bypassing the air cleaning system. The tests are designed to determine only the amount of leakage through or around the installed bank of absorber cells. Poor performance of the absorbent is not detected by these tests.

The fuel handling accident analyses are presented in Chapter 14.2.1 of the UFSAR. Two analyses are presented, one for an accident inside the Containment Building, and the other for an accident in the Spent Fuel Pool. In the analysis for the accident inside Containment, no credit was taken for iodine removal by filters or for containment isolation. The calculated doses were approximately 80 Rem to the thyroid, which is well within the 10 CFR 100 limit of 300 Rem to the thyroid.

In the analysis for the accident in the Spent Fuel Pool it was assumed that the charcoal filters removed 90 percent of the radiiodine released from the Spent Fuel Pool. This number cannot be compared directly to the Technical Specification methyl iodide removal efficiency lab test acceptance criteria of 90 percent, since 1) the Technical Specification value is specific to methyl iodide, and 2) the Technical Specification limit on bypass leakage must be taken into account.

The UFSAR analysis assumes that 99.75 percent of the iodine released into the Spent Fuel Pool from a shattered assembly is in the form of elemental iodine, and 0.25 percent is methyl iodide. The analysis further assumes a Spent Fuel Pool decontamination factor of 150 for elemental iodine, and 1 for methyl iodide. This means that only 1/150 of the elemental iodine is released from the pool into the Auxiliary Building, along with all of the methyl iodides. After accounting for the pool decontamination factors, the iodine released to the Auxiliary Building atmosphere is composed of 73 percent inorganic iodine and 27 percent methyl iodide.

The overall efficiency is a combination of the individual efficiencies for elemental and methyl forms of iodine, as well as the allowable filter bypass leakage. There is no Technical Specification testing which directly measures elemental iodine removal efficiency. However, ERDA 76-21, entitled "Nuclear Air Cleaning Handbook" states that "...the efficiency of nearly any good grade of activated carbon, impregnated or not, will be at least 99 percent under any combination of temperature and humidity that would be encountered in a nuclear air cleaning system." Methyl iodide removal is required to be at least 90 percent, per the Technical Specifications. Bypass leakage is limited by the Technical Specifications to 1 percent.

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

Analysis of Event continued:

With the above assumptions, the overall efficiency of the absorbers is:

$$(0.73)(.99-.01) + (0.27)(.90-.01) = 96 \text{ percent.}$$

This is conservative with respect to the UFSAR assumption of 90 percent overall removal efficiency.

With the bypass leakage increased to 7 percent, the overall efficiency is:

$$(0.73)(.99-.07) + (0.27)(.90-.07) = 0.90 \text{ percent.}$$

Therefore, the UFSAR assumption of 90 percent overall removal efficiency was met.

It should be noted that the fuel handling accident for the Spent Fuel Pool would have acceptable results even with no charcoal filtration. With no filtration, the accident becomes the same as the accident inside Containment. In that analysis, no credit was taken for filtration or containment isolation. This argument was used in our submittal AEP:NRC:0959, which proposed a Technical Specification change to allow fuel handling operations with the crane bay roll-up door and the drumming room door open (this could result in iodine being released from a fuel handling accident that bypasses the charcoal filters.) The NRC accepted the proposed change via Technical Specification Amendments 124 (Unit 1) and 111 (Unit 2). In the Safety Evaluation Report for those amendments, the NRC concluded:

An independent analysis of the consequences of a fuel handling accident in the Auxiliary Building was performed. No credit was given for removal of radioiodine by the charcoal absorbers. Based on this, the analysis estimates that the 0-2 hour site boundary thyroid dose, without credit for containment and charcoal filtration, meets the intent of the SRP Section 15.7.4, "Radiological Consequences of Fuel Handling Accidents," acceptance criteria for "well within" the 10 CFR 100 exposure guideline values, i.e., 75 Rem for the thyroid...".

In conclusion, this event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by the Plant's Technical Specifications. However, the problem did not significantly impact public health and safety. The UFSAR overall removal efficiency was still met with the increased bypass leakage. Moreover, the 10 CFR 100 limits can be met even without any credit for the charcoal absorbers.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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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Corrective Actions:

The bowed damper blades were straightened and the damper blade edge material was replaced on the upstream and downstream damper blades.

The Engineered Safety Feature (ESF) Ventilation Systems for both Unit 1 and Unit 2 may have similar damper seals. Both the Unit 1 and Unit 2 ESF System passed their last In-Place Leak Tests. The pliability of the damper edge seal material will be checked for these units. In addition, an equipment history review will be performed to determine the age of the seals currently in use. These activities will be completed by September 21, 1992.

The dampers are currently checked monthly by an Operations Department surveillance activity and every eighteen months by a Plant Engineering surveillance activity.

Failed Component Identification:

Component I.D.: J073
Manufacturer: Johnson Controls
Model: D-1300

Previous Similar Events:

There have been no previous similar events.