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ACCESSION NBR:9108260077 DOC.DATE: 91/08/16 NOTARIZED: NO DOCKET #
 FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana & 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 91-005-00:on 910718,design documents not discovered to
 demonstrate capability of DG ventilation & exhaust
 structures to w/stand effects of tornado.Cause unknown.
 Mods completed on outside structure.W/910816 ltr.

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

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EXTERNAL:	EG&G BRYCE,J.H		3	3		L ST LOBBY WARD		1	1	
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One Cook Place
Bridgman, MI 49106
616 465 5901



August 16, 1991

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:

91-005-00

Sincerely,

A.A. Blind
Plant Manager

ABB/cmw

Attachment

cc: D.H. Williams, Jr.
A.B. Davis, Region III
E.E. Fitzpatrick
P.A. Barrett
B.F. Henderson
R.F. Kroeger
B. Walters - Ft. Wayne
NRC Resident Inspector
T. Colburn - NRC
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JE22

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-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) D. C. Cook Nuclear Plant, Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 3 1 1 5										PAGE (3) 1 OF 17																	
TITLE (4) Design Documents could not be located that would demonstrate the capability of the Diesel Generators Ventilation and Exhaust structures to withstand the effects of a tornado.																																					
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	7	1	8	9	1	9	1	0	0	5	0	0	0	8	1	6	9	1	Cook Plant - Unit 2						0 5 0 0 0 3 1 1 6												
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)				20.406(a)				80.73(a)(2)(iv)				73.71(b)																						
POWER LEVEL (10)			20.406(a)(1)(i)				80.36(a)(1)				80.73(a)(2)(v)				73.71(e)																						
0 1 9 1 7			20.406(a)(1)(ii)				80.36(a)(2)				80.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 356A)																						
			20.406(a)(1)(iii)				80.73(a)(2)(ii)				80.73(a)(2)(vii)(A)																										
			20.406(a)(1)(iv)				80.73(a)(2)(iii)				80.73(a)(2)(vii)(B)																										
			20.406(a)(1)(v)				80.73(a)(2)(iv)				80.73(a)(2)(viii)																										
LICENSEE CONTACT FOR THIS LER (12)																																					
NAME										TELEPHONE NUMBER																											
G. A. Weber - Plant Engineering Superintendent										AREA CODE																											
										6 1 6				4 1 6 1 5 1 5 1 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		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC															
B	E	K	D	U	C	T	A	2	7	4	N																										
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)				MONTH DAY YEAR																							
X YES (If yes, complete EXPECTED SUBMISSION DATE)														1				10				3				1				9				1			
NO																																					

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

During an Engineering Review, design documents could not be located that would demonstrate the capability of the Emergency Diesel Generator (EDG) combustion air engine exhaust, and room ventilation systems to withstand the effects of a tornado. Components found to be potentially vulnerable to a postulated tornado included the combustion air intake filter and silencer, the EDG exhaust stack and silencers, and the duct work associated with the room ventilation supply of the Plant's four EDGs. Upon recognition of this condition, actions were taken to provide a pressure equalization path to protect the ventilation duct work and the intake air silencer from the postulated differential pressure loads. The NRR granted a 30 day exemption of the Tornado Design Criterion to allow modification of the specific components mentioned. Modifications to the outside structures, to provide additional assurance that the wind forces from a tornado can be withstood, were completed on August 16, 1991. An additional damper will be installed on the EDG Room ventilation supply to isolate the internal duct work from tornado effects. This damper is expected to be installed by December 31, 1991.

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.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Conditions Prior to Occurrence

Unit 1 in Mode 1, at 97 percent power.
Unit 2 in Mode 1, at 99 percent power.

Description of Event

During an Internal Engineering Review, documentation could not be located to support the ability of certain Unit 1 and Unit 2 Emergency Diesel Generator (EDG) ventilation structures to withstand the effects of a tornado.

The specific items in question are the ventilation duct work structures which supplies cooling air to the rooms in which the diesel generators are located, the intake filter and silencer for the EDG combustion air, and the EDG exhaust.

Specifically, during a tornado, the intake duct work supplying the EDG Room ventilation may be subjected to a sudden decrease in internal pressure. If the ventilation system is not running at the time the tornado passes, a damper in the line would be normally closed, effectively isolating the internal area of the upstream ducting from the EDG Room. Because this ducting passes through the EDG Room and the room might not be adequately vented, a differential pressure could be imposed across the ducting upstream of the damper (See attached figure).

In addition, the EDG combustion air intake filter and exhaust silencer could also be exposed to the high wind forces generated by a tornado. These components are located such that these structures are provided a measure of shielding from tornado effects. After reviewing the background information concerning the requirements for designing structures and components to withstand the effects of tornadoes, it was realized that these requirements may not have been considered during the initial design of these components.

Initially the ability of the EDG combustion air intake silencer, located inside the DE Rooms, to withstand the vacuum effects of a tornado was also questioned. The as-found condition was evaluated and found acceptable. No additional actions are necessary for the Combustion Air Intake Silencers.

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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TEXT (If more space is required, use additional NRC Form 386A's) (17)

Description of Event Continued

On July 18, 1991, an NRR Temporary Waiver of Compliance was requested in accordance with 10CFR51.22, for Technical Specification 3.8.1.1 with the provision that the surveillance requirements associated with the Technical Specification would continue to be met.

On July 18, 1991, at 1215 hours, both Units 1 and 2 Emergency Diesels were declared inoperable. An Unusual Event was declared. Technical Specification 3.8.1.1 Action E states:

With two of the above required Diesel Generators inoperable, demonstrate the OPERABILITY of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1a within 1 hour and at least once per 8 hours thereafter; restore at least one of the inoperable Diesel Generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With one Diesel Generator unit restored, follow ACTION Statement b* or c*.

On July 18, 1991, at 1345 hours, the 2 hour time limit, identified in T.S. 3.8.1.1 Action E (above), was temporarily waived by the NRC. At 1420 hours, the NRC had verbally approved the Temporary Waiver of Compliance for Technical Specification 3.8.1.1.b until a Temporary Exemption pursuant to 10CFR50.12, Appendix A, General Design Criterion 2 (GDC 2), for the ability of the Emergency Diesel Generator Ventilation Systems to withstand the effects of a tornado. All EDG's were declared operable and the Unusual Event was exited.

On July 19, 1991, an additional submittal was made to the NRR requesting a 10CFR50.12(a)(2)(v) Exemption for the Emergency Diesel Technical Specification concerns.

On July 19, 1991, a Temporary Waiver of Compliance from Technical Specification 3.8.1.1.b was issued by NRR.

On July 26, 1991, NRR issued an exemption from 10CFR50, Appendix A, General Design Criterion 2.

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

Cause

Documentation could not be located which would demonstrate the ability of the components in question, to survive the differential pressure and wind forces associated with a tornado.

Corrective/Preventive Actions

Actions have been completed to alleviate the concerns associated with vacuum induced pressure differential across the ventilation duct work and the combustion air intake silencer. An evaluation has led us to conclude that venting of the EDG's Room and the passages through which the duct work pass will alleviate the pressure difference between the outside and inside of the duct work and silencer.

This is being accomplished by:

1. Running the EDG Room ventilation fans. This opens the damper which provides a path for pressure equalization. This action was completed on July 18, 1991.
2. Opening the doors to the EDG Rooms. This also provides a path for venting the EDG Room and equalizing the pressure. This action was completed on July 18, 1991.
3. Opening doors and manways in other compartments through which the duct work passes. This provides a vent path and reduces potential for pressure differential in these areas. This action was completed on July 18, 1991.

For a permanent solution to the pressure differential issue, a damper will be installed in each EDG Room ventilation supply duct. This damper will isolate the duct work, internal to the Auxiliary Building, from the external effects of a tornado. These dampers are scheduled to be delivered to the site about October 25, 1991. Design and installation details are currently being developed. Installation is expected to be complete by December 31, 1991. The administrative controls currently in place to provide an equalization path for the supply ventilation duct work will remain in effect until their damper installation is completed.

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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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Corrective/Preventive Actions Continued

Modifications were completed on the outside structures to provide additional assurance that the wind forces generated by a tornado can be withstood. These physical changes were completed on August 16, 1991, and are documented in Design Change RFC 12-3085.

An updated report will be provided to identify preventive actions, October 31, 1991 is the expected submittal date.

Analysis of Event

The Diesel Generator appurtenances may not have survived a tornado. This would not have resulted in a significant impact on public health and safety. This is based on the low probability of tornadoes for the areas around the Cook Nuclear Plant. Preliminary results from the Cook Nuclear Plant Probabilistic Risk Assessment indicate that tornadoes resulting in 90 mph winds occur with a frequency of $2.0E-04$ per year for the 125-mile radius around the plant. (In comparison, tornadoes resulting in 360 mph winds occur with a frequency of $8.5E-08$ per year.) When the probability that the tornado causes both a loss-of-offsite-power and loss-of-the-Diesel-Generators is considered, the probability is reduced even further.

The EDG's are considered to be operable for all events except a tornado, a low probability event ($2.0E-04$ /year). The affected components are in a protected location, and it is quite likely that they would not be subjected to the full force of a tornado should one strike the Cook Nuclear Plant. In order for the EDG's to be rendered inoperable, it would be necessary to bend piping, and/or collapse duct work to the extent that adequate air and/or exhaust flow could not be obtained. Although this is considered to be highly unlikely, there are measures that could be taken to restore EDG operability following such an event.

The Cook Nuclear Plant is capable of coping with a station blackout for four hours. Thus, there is time to take corrective action should a tornado sufficiently damage these components and cut off either the air supply or the exhaust gas flow. Such actions would include clearing away debris, and cutting openings in either the piping or duct work to restore the flow path.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS
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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Analysis of Event Continued

In conclusion, this event did not result in a significant impact on public health and safety.

Failed Component Identification

Component Name: Unit 1 AB Diesel Generator Air Intake
Plant I.D.: 1-QT-100-AB (EIIS:DUCT)

Component Name: Unit 1 CD Diesel Generator Air Intake
Plant I.D.: 1-QT-100-CD (EIIS:DUCT)

Component Name: Unit 2 AB Diesel Generator Air Intake
Plant I.D.: 2-QT-100-AB (EIIS:DUCT)

Component Name: Unit 2 CD Diesel Generator Air Intake
Plant I.D.: 2-QT-100-CD (EIIS:DUCT)

Component Name: Unit 1 AB Diesel Generator Exhaust Silencer
Plant I.D.: 1-QT-104-AB (EIIS:DUCT)

Component Name: Unit 1 CD Diesel Generator Exhaust Silencer
Plant I.D.: 1-QT-104-CD (EIIS:DUCT)

Component Name: Unit 2 AB Diesel Generator Exhaust Silencer
Plant I.D.: 2-QT-104-AB (EIIS:DUCT)

Component Name: Unit 2 CD Diesel Generator Exhaust Silencer
Plant I.D.: 2-QT-104-CD (EIIS:DUCT)

Component Name: Unit 1 AB Diesel Generator Rm. Ventilation Supply
Plant I.D.: 1-HV-DGS-1 (EIIS:FAN)

Component Name: Unit 1 CD Diesel Generator Rm. Ventilation Supply
Plant I.D.: 1-HV-DGS-2 (EIIS:FAN)

Component Name: Unit 2 AB Diesel Generator Rm. Ventilation Supply
Plant I.D.: 2-HV-DGS-2 (EIIS:FAN)

Component Name: Unit 2 CD Diesel Generator Rm. Ventilation Supply
Plant I.D.: 2-HV-DGS-2 (EIIS:FAN)

Previous Similar Events

No previous similar events of this nature have occurred.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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 (P-430), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20543, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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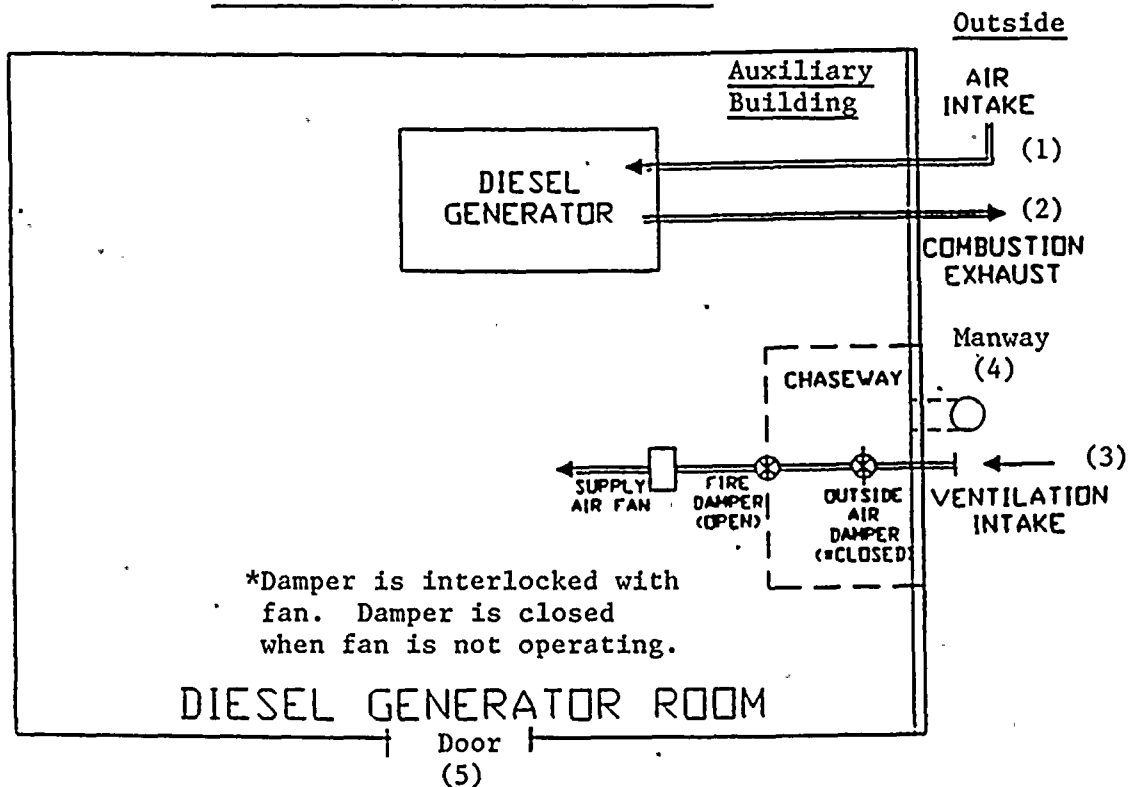
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TEXT (If more space is required, use additional NRC Form 385A's) (17)

SIMPLIFIED DRAWING OF DUCT WORK



- (1) Structural supports added to Air Intake.
- (2) Structural supports added to Exhaust Stack and Silencer.
- (3) Replaced sheet metal duct work with duct work fabricated from plate steel (provisions made for future installation of tornado damper).
- (4) & (5) Opened doors and manways, under Administrative Control, to provide equalization path.