



A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
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May 19, 2017

AEP-NRC-2017-29
10 CFR 50.73

Docket No.: 50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Donald C. Cook Nuclear Plant Unit 2
LICENSEE EVENT REPORT 316/2017-001-00
Unit 2 Containment Hydrogen Skimmer Ventilation Fan #1 Inoperable Longer than Allowed by
Technical Specifications

In accordance with 10 CFR 50.73, Licensee Event Report (LER) System, Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant Unit 2, is submitting as an enclosure to this letter the following report:

Licensee Event Report 316/2017-001-00: Unit 2 Containment Hydrogen Skimmer Ventilation Fan #1 Inoperable Longer than Allowed by Technical Specifications

There are no commitments contained in this submittal.

Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Manager, at (269) 466-2649.

Sincerely,

Q. Shane Lies
Site Vice President

MBE/ml

Enclosure: Licensee Event Report 316/2017-001-00: Unit 2 Containment Hydrogen Skimmer Ventilation Fan #1 Inoperable Longer than Allowed by Technical Specifications

IEZZ
NRR

c: R. J. Ancona – MPSC
MDEQ – RMD/RPS
NRC Resident Inspector
C. D. Pederson – NRC Region III
J. K. Rankin – NRC Washington, DC
A. J. Williamson – AEP Ft. Wayne

Enclosure to AEP-NRC-2017-29

Licensee Event Report 316/2017-001-00:
Unit 2 Containment Hydrogen Skimmer Ventilation Fan #1 Inoperable Longer than Allowed by
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LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Donald C. Cook Nuclear Plant Unit 2	2. DOCKET NUMBER 05000316	3. PAGE 1 OF 5
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4. TITLE
Unit 2 Containment Hydrogen Skimmer Ventilation Fan #1 Inoperable Longer than Allowed by Technical Specifications

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	23	2017	2017	- 001	- 00	05	19	2017	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. POWER LEVEL 100	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT Michael K. Scarpello, Regulatory Affairs Manager	TELEPHONE NUMBER (Include Area Code) 269-466-2649
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
D	BB	UDMP	American Warming & Ventilation, Inc.	Y					

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On March 23, 2017, at 0941, Eastern Daylight Time (EDT), with Unit 2 in Mode 1 at 100% power, the Unit 2 Containment Hydrogen Skimmer Ventilation (CEQ) Fan #1 was declared inoperable to perform surveillance testing. During the test, the Unit 2 CEQ Fan #1 Backdraft Damper opening force exceeded the Technical Specification (TS) Surveillance Requirement (SR) limit. Maintenance was performed on the damper and operability of the Unit 2 CEQ Fan #1 was restored at 1724 EDT. A past operability evaluation was performed and determined that the condition likely existed since maintenance was performed to lubricate the damper on February 24, 2017. As a result, the Unit 2 CEQ Fan #1 was inoperable longer than allowed by TS. During this time, the Unit 2 CEQ Fan #2 was declared inoperable to perform surveillance testing on March 2, 2017, from 0938 Eastern Standard Time (EST) until 1326 EST. This resulted in both trains being inoperable simultaneously for a short period of time.

The cause of the elevated force required to open the Unit 2 CEQ Fan #1 Backdraft Damper was determined to be that the lubrication Preventive Maintenance (PM) work order instructions were not adequate and did not provide adequate Post-Maintenance Testing (PMT) instruction. Corrective action is to revise model work order tasks to provide additional details and appropriate PMT. The risk significance of this condition has been determined to not constitute a significant increase in risk.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v)(D).



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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		YEAR	SEQUENTIAL NUMBER	REV NO.
Donald C. Cook Nuclear Plant Unit 2	05000316	2017	- 001	- 00

NARRATIVE

EVENT DESCRIPTION

On March 23, 2017, at 0941 EDT, with Unit 2 in Mode 1 at 100% power, the Unit 2 CEQ [BB] Fan #1 [FAN] was declared inoperable to perform surveillance testing. At 1116 EDT, it was identified that the surveillance failed to meet acceptance criteria due to the Unit 2 CEQ Fan #1 Backdraft Damper [UDMP] opening force exceeding the TS operability limit by approximately 0.5 pounds. There were no automatic or manual safety system responses initiated as a result of this event.

Maintenance and Engineering personnel entered containment to inspect and repair the damper. As-found inspection concluded that the opening force was exceeded due to increased bearing resistance. Maintenance greased and cycled the damper to correct the condition. A partial surveillance was successfully performed following maintenance. On March 23, 2017, at 1724 EDT, Operations reported that all surveillance acceptance criteria were met and the Unit 2 CEQ Fan #1 was declared operable. The Unit 2 CEQ Fan #1 was declared operable and returned to service approximately six hours and eight minutes after the discovery of the failure of Unit 2 CEQ Fan #1 Backdraft Damper.

Per TS SR 3.6.10.3, the opening force of the Unit 2 CEQ Fan #1 Backdraft Damper is surveilled quarterly. The last surveillance was performed on November 30, 2016, and all surveillance acceptance criteria were met. Because the CEQ System is normally in standby, the damper is only cycled during PM activities and the quarterly surveillance. Based on review of the last surveillances, there was no indication or trend that the system would not be able to meet all surveillance requirements during the surveillance performed on March 23, 2017.

The last PM activity performed on the Unit 2 CEQ Fan #1 Backdraft Damper was performed February 24, 2017. The Maintenance group that normally performs this PM activity did not perform the work on February 24, 2017. Interviews were conducted with both the group that normally performs this work and the group who performed the work on February 24, 2017. Based on the interviews, there were notable differences in work practices between the groups related to cycling the dampers following bearing lubrication. Cycling the damper is the PMT for the bearing lubrication PM. Although the work order contains a note that clarifies cycling the damper is approved and acceptable, based on the interviews conducted, the personnel who performed the work on February 24, 2017 were more cautious in cycling the damper numerous times and did not cycle the damper as many times as the Maintenance group that normally performs this task.

The backdraft damper likely failed to meet acceptance criteria due to the lack of cycling following the February 24, 2017, PM before being returned to service. This resulted in the grease not being distributed thoroughly around the bearings resulting in a localized area of over greasing. Too much grease volume (over greasing) in a bearing element is known to cause increased resistance for the bearing to rotate. This increased resistance would result in more force required to open the damper. The elevated force required to open the Unit 2 CEQ Fan #1 Backdraft Damper could potentially lead to a partial opening of the damper upon fan start up that could result in not providing the design required air flow.

The Unit 2 CEQ Fan #1 was considered inoperable from the point of hanging the clearance to perform the PM on February 24, 2017, at 2045 EST, until the corrective maintenance was completed on March 23, 2017, at 1724 EDT, following the failed surveillance. The allowed outage time (AOT) for TS 3.6.10 condition "A" (One CEQ Train Inoperable) is 72 hours. This AOT was exceeded and is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation or condition which was prohibited by TS.



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Donald C. Cook Nuclear Plant Unit 2	05000316	2017	- 001	- 00

On March 2, 2017, from 0938 EST until 1326 EST, Unit 2 CEQ Fan #2 was declared inoperable to perform scheduled quarterly surveillance testing. During this time, both Unit 2 CEQ Fan trains were inoperable which is reportable in accordance with 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented the fulfillment of a safety function of a system that is needed to mitigate the consequences of an accident.

DATES AND APPROXIMATE TIMES OF OCCURRENCES:

November 30, 2016, quarterly surveillance testing for Unit 2 CEQ Fan #1 and Unit 2 CEQ Fan #1 Backdraft Damper was performed satisfactorily.

February 24, 2017, at 2045 EST, Unit 2 CEQ Fan #1 was declared inoperable for performance of PM work order task to inspect and lubricate Unit 2 CEQ Fan #1 and its associated backdraft damper (18 month frequency). The PM WOT was completed and the Unit 2 CEQ Fan #1 was declared operable on February 25, 2017, at 0250 EST.

March 2, 2017, at 0938 EST, Unit 2 CEQ Fan #2 was declared inoperable for performance of quarterly surveillance testing. Surveillance was completed satisfactorily and Unit 2 CEQ Fan #2 was declared operable at 1326 EST.

March 23, 2017, at 0941 EDT, Unit 2 CEQ Fan #1 was declared inoperable for performance of quarterly surveillance testing.

March 23, 2017, at 1116 EDT, Unit 2 CEQ Fan #1 Backdraft Damper failed surveillance acceptance criterion for opening force. Maintenance and Engineering personnel performed a walkdown of the failed equipment; Maintenance personnel greased and cycled the damper, tested the opening force of the damper, and performed a partial surveillance that verified the as-left opening force met the acceptance criterion.

March 23, 2017, at 1724 EDT, Operations declared the Unit 2 CEQ Fan #1 operable.

MANUFACTURER AND MODEL NUMBER (OR OTHER IDENTIFICATION) OF EACH COMPONENT THAT FAILED DURING THE EVENT:

The Unit 2 CEQ Fan #1 Backdraft Damper is an American Warming and Ventilation, Inc. Model DAA-P-7900.

OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

The CEQ system has three safety related functions:

1. Distribute hydrogen to eliminate pocketing in the upper and lower containment compartments
2. Assists ice melt during a Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB)
3. Assists iodine removal by promoting mixing

Failure of the damper to provide a proper flow path will impact all three safety functions of the system.



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		YEAR	SEQUENTIAL NUMBER	REV NO.
Donald C. Cook Nuclear Plant Unit 2	05000316	2017	- 001	- 00

CAUSE OF THE EVENT

THE CAUSE OF EACH COMPONENT OR SYSTEM FAILURE OR PERSONNEL ERROR, IF KNOWN:

The apparent cause of the Unit 2 CEQ Fan #1 Backdraft Damper failure was determined to be the lubrication PM WOT instructions were not adequate and did not provide adequate PMT to ensure the damper could meet the Surveillance and TS required criteria for opening force after completion.

THE CAUSE(S) AND CIRCUMSTANCES FOR EACH HUMAN PERFORMANCE RELATED CAUSE:

This event was not attributed to human error because the Maintenance Technicians performed the PM task in accordance with written instructions.

ASSESSMENT OF SAFETY CONSEQUENCES

NUCLEAR SAFETY

The failure of the Unit 2 CEQ Fan #1 Backdraft Damper to meet surveillance acceptance criteria did not result in an actual nuclear safety impact.

The CEQ System is a standby system that actuates post-accident to assure the rapid return of air from the upper to lower containment compartment. Circulation of air from upper to lower containment promotes mixing to prevent hydrogen buildup and assists in minimizing post-accident containment pressure and temperature. Returning air to the lower compartment subsequently provides airflow for recirculation through the Ice Condenser. CEQ Ventilation, in conjunction with the Ice Condenser, Containment Spray and Residual Heat Removal is credited in the LOCA and MSLB analysis to provide the required heat removal to maintain Containment within design values.

CEQ consists of two separate, 100% capable trains. Each train includes a fan, backdraft damper, two upper compartment headers and a hydrogen skimmer header isolation valve. The fan provides the motive force to circulate air from the upper compartment to the lower compartment. The backdraft damper prevents backflow during initial blowdown and during operation of the redundant train. The Unit 2 CEQ Fan #2 was operable and available during the time that Fan #1 was inoperable except for the period on March 2, 2017, from 0938 EST to 1326 EST.

INDUSTRIAL SAFETY

There was no actual or potential industrial safety hazard resulting from this event.

RADIOLOGICAL SAFETY

There was no actual or potential radiological safety hazard resulting from this event.



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Donald C. Cook Nuclear Plant Unit 2	05000316	2017	- 001	- 00

PROBABILISTIC RISK ASSESSMENT (PRA)

The goal of PRA is to model plant response to accident scenarios in order to determine Core Damage Frequency and Large Early Release Frequency. The components affected in this event assist in the distribution of hydrogen post-accident to prevent pocket formation, assist in melting the ice during a LOCA or MSLB, and assist in the removal of iodine following an accident to reduce containment atmosphere activity. The CEQ fans that were inoperable during this event are not explicitly modeled within the PRA. Thermal-hydraulic analysis shows that the fans are not necessary to reach a safe shutdown state post-accident, and therefore are not credited within the PRA. For this reason, the inoperability of the CEQ fans and backdraft damper had no impact on site PRA risk.

AVAILABILITY OF SYSTEMS OR COMPONENTS THAT COULD HAVE PERFORMED THE SAME FUNCTION AS THE COMPONENTS AND SYSTEMS THAT FAILED DURING THE EVENT:

The Distributed Ignition System [BB] was available to prevent hydrogen pocket formation during this event.

CORRECTIVE ACTIONS:

IMMEDIATE CORRECTIVE ACTIONS:

On March 23, 2017, Maintenance personnel greased and cycled the damper and tested the opening force of the damper to verify the as-left opening force met the surveillance acceptance criterion. Operations personnel reported the acceptance criteria were met at 1724 EDT, the damper/fan was declared Operable and TS 3.6.10 condition "A" was exited. System Engineering personnel reviewed the most recent test data for the other three trains of CEQ and validated all backdraft dampers had satisfactorily met the acceptance criteria since the last performance of the lubrication PM.

CORRECTIVE ACTIONS TO REDUCE THE PROBABILITY OF SIMILAR EVENTS OCCURRING IN THE FUTURE:

Corrective action to reduce the probability of similar occurrence in the future is to revise the model PM WOTs for CEQ fan and damper inspection and lubrication to include additional details and appropriate PMT.

PREVIOUS SIMILAR EVENTS:

An Operating Experience search was performed in the corrective action program for similar failures of CEQ fan backdraft dampers exceeding the maximum opening force requirement.

In 2004, the Unit 2 CEQ Fan #1 Backdraft Damper failed the quarterly surveillance for damper opening force. The damper bearings were lubed, cycled and subsequently passed the surveillance.

A review of CNP LERs for the past three years was also performed and did not identify any previously reported similar events.