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May 31, 2018

AEP-NRC-2018-40  
10 CFR 50.73

Docket No.: 50-315

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

Donald C. Cook Nuclear Plant Unit 1  
LICENSEE EVENT REPORT 315/2018-001-00  
Unit 1 East Essential Service Water Pump Inoperable Longer than Allowed by Technical  
Specifications

In accordance with 10 CFR 50.73, Licensee Event Report System, Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant Unit 1, is submitting as an enclosure to this letter the following report:

Licensee Event Report 315/2018-001-00: Unit 1 East Essential Service Water Pump  
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 Director, at (269) 466-2649.

Sincerely,

Joel P. Gebbie  
Chief Nuclear Officer

MBE/ml

Enclosure: Licensee Event Report 315/2018-001-00: Unit 1 East Essential Service Water Pump  
Inoperable Longer than Allowed by Technical Specifications

IE22  
NRR

c: R. J. Ancona – MPSC  
A. W. Dietrich – NRC Washington, DC  
MDEQ – RMD/RPS  
NRC Resident Inspector  
K. S. West – NRC Region III  
A. J. Williamson – AEP Ft. Wayne

Enclosure to AEP-NRC-2018-40

Licensee Event Report 315/2018-001-00:  
Unit 1 East Essential Service Water Pump Inoperable Longer than Allowed by Technical  
Specifications



**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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto: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.

<b>1. FACILITY NAME</b> Donald C. Cook Nuclear Plant Unit 1	<b>2. DOCKET NUMBER</b> 05000315	<b>3. PAGE</b> 1 OF 5
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**4. TITLE**  
Unit 1 East Essential Service Water Pump 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
04	02	2018	2018	001	00	05	31	2018	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

<b>9. OPERATING MODE</b> 1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (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)
<b>10. POWER LEVEL</b> 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 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 Director	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	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	BI	MO	Reliance Elec Co	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b> MONTH: DAY: YEAR:
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**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On April 2, 2018, at 0936 Eastern Daylight Time (EDT), with Unit 1 in Mode 1 at 100 percent power, an abnormal noise was heard coming from the Unit 1 East Essential Service Water (ESW) Pump Motor. Vibration data was taken and determined to be acceptable. On April 4, 2018, an increase in sound level from the motor was identified and the source was investigated. The Unit 1 East ESW Train was declared inoperable on April 5, 2018, at 1230 EDT when it was determined that the station no longer had reasonable expectation that the motor would operate for its mission time due to a degraded upper motor bearing. Corrective action was taken to replace the motor and the Unit 1 East ESW Train was declared operable on April 6, 2018, at 1727 EDT. A past operability evaluation was performed and determined that the Unit 1 East ESW Train had been inoperable since April 2, 2018, at 0936 EDT. As a result, the Unit 1 East ESW Train was inoperable longer than allowed by Technical Specifications. During this time, redundant equipment in the opposite train remained operable.

The cause of the motor bearing degradation was determined to be sub-surface initiated fatigue of the upper bearing outer race due to a manufacturing defect. It was determined the defect was a flaw in a singular bearing and it does not impact other installed ESW pump motors.

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



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

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Donald C. Cook Nuclear Plant Unit 1	05000315	YEAR	SEQUENTIAL NUMBER	REV NO.
		2018	- 001	- 00

**NARRATIVE**

**EVENT DESCRIPTION**

On April 2, 2018, at 0936 Eastern Daylight Time (EDT), with Unit 1 in Mode 1 at 100 percent power, Operations personnel identified an abnormal noise coming from the Unit 1 East Essential Service Water (ESW) [BI] Pump [P] Motor [MO]. Vibration data from the motor was taken and determined to be acceptable. On April 4, 2018, with Unit 1 in Mode 1 at 100 percent power, Operations personnel identified an increase in sound level coming from the Unit 1 East ESW Pump Motor. Vibration data collected on April 4, 2018, at approximately 2020 EDT identified an increase in vibration levels for the new peak that had been identified in data collected on April 2, 2018, from 0.02 inches per second (ips) to 0.06 ips. Following additional vibration monitoring, the Unit 1 East ESW Train was declared inoperable on April 5, 2018, at 1230 EDT and secured when it was determined that vibration data indicated a degraded upper motor bearing and the station no longer had reasonable expectation that the motor would operate for its 30 day mission time. Maintenance personnel subsequently replaced the Unit 1 East ESW Pump Motor and the Unit 1 East ESW Train was declared operable on April 6, 2018, at 1727 EDT. The Unit 1 East ESW Train was inoperable for approximately 29 hours from the time the train was declared inoperable.

The motor was sent to an offsite facility for failure investigation and refurbishment. The apparent cause of this failure was determined to be sub-surface initiated fatigue of the upper bearing outer race due to a manufacturing defect. The flaw was determined to be limited to a singular bearing. Vibration readings on the installed ESW pump motors are all satisfactory and steady.

Engineering performed a past operability evaluation and determined that the Unit 1 East ESW Pump Motor was inoperable beginning on April 2, 2018, at 0936 EDT when operations first identified a change in sound coming from the motor and the new peak was identified in vibration data. The Unit 1 East ESW Train was, therefore, inoperable for approximately 104 hours. This exceeded the Technical Specification 3.7.8 Condition A allowed completion time of 72 hours to restore one inoperable ESW train to operable status and the subsequent Condition B completion time of six hours to be in Mode 3.

During the time the Unit 1 East ESW Train was inoperable, redundant equipment in the opposite train remained operable to fulfill required safety functions. Because Unit 2 was shut down at the time of this event, Unit 2 Train A Systems were not available to support cross-tie functions to Unit 1 during this event.



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Donald C. Cook Nuclear Plant Unit 1	05000315	2018	- 001	- 00

**DATES AND APPROXIMATE TIMES OF OCCURRENCES**

April 2, 2018, at 0936 EDT, Operations personnel identified an audible indication on the Unit 1 East ESW Pump Motor and requested Predictive Maintenance personnel to take vibration data. A new vibration peak of 0.02 ips at 281 Hertz was identified. The amplitude of this peak was within established acceptable vibration limits and the change was considered to be a normal variation in vibration data.

April 4, 2018, Operations personnel identified an increase in the sound level coming from the Unit 1 East ESW Pump Motor. At approximately 2020 EDT, vibration data identified that the amplitude of the vibration peak seen on April 2, 2018, had increased to 0.06 ips. The amplitude remained within acceptable vibration limits.

April 5, 2018, at approximately 0500, additional vibration data was collected. Two data points had reached the alert level, but were still within acceptable vibration levels.

April 5, 2018, at 1230 EDT, further information was obtained that indicated a problem with the upper motor bearing. Operations personnel declared the Unit 1 East ESW Train inoperable and removed it from service when it was determined that the station no longer had reasonable expectation that the Unit 1 East ESW Pump Motor would be able to operate for its 30 day mission time.

April 6, 2018, at 1727 EDT, Unit 1 East ESW Pump Motor replacement was completed and the Unit 1 East ESW Train was declared operable.

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

The Unit 1 East ESW Pump Motor is a Reliance Electric Co., Model CV685Z.

**OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED**

The ESW System provides a heat sink for the removal of process and operating heat from safety-related components during a Design Basis Accident (DBA) or transient. During normal operation, and a normal shutdown, the ESW System also provides this function for various safety-related and non-safety related components. The supported systems include Auxiliary Feedwater [BA], Component Cooling Water [CC], Containment Spray [BE], Control Room Ventilation [VI], and Emergency Diesel Generators [EK].



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**CAUSE OF THE EVENT**

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

The cause for the Unit 1 East ESW Pump Motor upper bearing failure was determined to be sub-surface initiated fatigue of the upper bearing outer race due to a manufacturing defect.

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

This failure was determined to not be related to a human performance related cause.

**ASSESSMENT OF SAFETY CONSEQUENCES**

**NUCLEAR SAFETY**

There was no actual or potential nuclear safety hazard resulting from the Unit 1 East ESW Pump Motor being inoperable longer than allowed by Technical Specifications. The Unit 1 East ESW Pump Motor continued to run from April 2, 2018, until it was secured on April 5, 2018. During the time the Unit 1 East ESW Train was inoperable, redundant equipment in the opposite train remained operable to fulfill required safety functions.

**INDUSTRIAL SAFETY**

There was no actual or potential industrial safety hazard resulting from the Unit 1 East ESW Pump Motor being inoperable longer than allowed by Technical Specifications.

**RADIOLOGICAL SAFETY**

There was no actual or potential radiological safety hazard resulting from the Unit 1 East ESW Pump Motor being inoperable longer than allowed by Technical Specifications.

**PROBABILISTIC RISK ASSESSMENT (PRA)**

The component affected in this event was the Unit 1 East ESW Pump. This event included both a period of time where the pump was inoperable and a period of time where the pump was out of service due to maintenance. Engineering evaluation determined that the pump was inoperable from Monday (4/2/18) to Friday (4/6/18) due to not being able to meet the design basis 30-day mission time, but the pump would have been able to meet the PRA 24-hour mission time until the pump was secured to perform maintenance. The maintenance was performed on the pump from Thursday (4/5/18) at 1230 to Friday (4/6/18) at 1727. This maintenance resulted in the pump being unavailable for approximately 29 hours,



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during which time it would not have been able to perform its PRA-credited function. Since Unit 2 was shut down at the time of the event, only one train of Unit 2's systems was available to support crosstie functions. Both the Fire and Internal Events PRA models were run with the Unit 1 East ESW Pump out of service in addition to the associated Unit 2 Train A equipment and it was determined that this event can be categorized as Very Low Safety Significance.

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

The Unit 1 West ESW Train and the supported Unit 1 Train B systems were operable and available to perform the same functions as the Unit 1 East ESW Train during the time that it was considered inoperable from April 2, 2018, at 0936 EDT until April 6, 2018, at 1727 EDT. Unit 2 Train B systems were also available to provide cross-tie functions to Unit 1 during this time.

**CORRECTIVE ACTIONS**

**COMPLETED CORRECTIVE ACTIONS**

The Unit 1 East ESW Pump Motor was replaced on 4/06/18.

**PREVIOUS SIMILAR EVENTS**

LERs for CNP Unit 1 and Unit 2 were reviewed for the previous five years and found no similar events.