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CENG<sup>SM</sup>

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Energy



NINE MILE POINT  
NUCLEAR STATION

April 25, 2013

U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**ATTENTION:** Document Control Desk

**SUBJECT:** Nine Mile Point Nuclear Station  
Unit No. 2; Docket No. 50-410

Licensee Event Report 2013-002, Failure of High Pressure Core Spray System  
Pressure Pump due to Motor Winding Failure

In accordance with 10 CFR 50.73, please find attached Licensee Event Report 2013-002, Failure of High Pressure Core Spray System Pressure Pump due to Motor Winding Failure.

There are no regulatory commitments in this submittal.

Should you have questions regarding the information in this submittal, please contact John J. Dosa, Director-Licensing, at (315) 349-5219.

Very truly yours,

MAP/MHS

Attachment: Licensee Event Report 2013-002, Failure of High Pressure Core Spray System Pressure Pump due to Motor Winding Failure

cc: NRC Project Manager  
NRC Resident Inspector  
NRC Regional Administrator

TEZZ  
NRR

**ATTACHMENT**

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**LICENSEE EVENT REPORT 2013-002**

**FAILURE OF HIGH PRESSURE CORE SPRAY SYSTEM PRESSURE  
PUMP DUE TO MOTOR WINDING FAILURE**

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**Nine Mile Point Nuclear Station, LLC  
April 25, 2013**

**LICENSEE EVENT REPORT (LER)**(See reverse for required number of  
digits/characters for each block)

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 Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [infocollects@nrc.gov](mailto:infocollects@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> Nine Mile Point Unit 2	<b>2. DOCKET NUMBER</b> 05000410	<b>3. PAGE</b> 1 of 5
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**4. TITLE**

Failure of High Pressure Core Spray System Pressure Pump due to Motor Winding Failure

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
02	28	2013	2013	002	0	04	25	2013		

<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)(i)(C) <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <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)(iii) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(x)(A) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 73.71(a)(5) <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)(C) <input checked="" type="checkbox"/> OTHER (Part 21) <input type="checkbox"/> 20.2203(a)(2)(vi) <input type="checkbox"/> 50.73(a)(2)(i)(B) <input checked="" type="checkbox"/> 50.73(a)(2)(v)(D) <div style="text-align: right;">Specify in Abstract below or in NRC Form 366A</div>
<b>10. POWER LEVEL</b>  100	

**12. LICENSEE CONTACT FOR THIS LER**

NAME  John J. Dosa, Director-Licensing	TELEPHONE NUMBER (Include Area Code)  (315) 349-5219
----------------------------------------------	------------------------------------------------------------

**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
B	BG	MO	Westing-house	Y					

**14. SUPPLEMENTAL REPORT EXPECTED**☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)      ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

On February 28, 2013 at 1319, Nine Mile Point Unit 2 was operating at 100 percent power when the High Pressure Core Spray (HPCS) system pressure pump failed. At the time of the failure, the HPCS system was inoperable for planned maintenance. The HPCS system pressure pump failure was due to an electrical short caused by a turn-to-turn failure in the motor.

The cause of this event was determined to be a turn-to-turn short in the motor winding, attributed to poor manufacturer quality of the original motor.

Corrective actions include replacement of the failed motor with a rewind motor and development of a new replacement strategy for these types of motors.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(v)(D), as any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. This report constitutes a 10 CFR 21 (Part 21) notification because the motor failure that initiated the event is attributed to a manufacturing deficiency.

There are no previous LERs similar to this event.

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

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**NARRATIVE**

**I. DESCRIPTION OF EVENT**

**A. PRE-EVENT PLANT CONDITIONS:**

Prior to the event, Nine Mile Point Unit 2 (NMP2) was operating at 100 percent rated thermal power, with the High Pressure Core Spray (HPCS) system out of service and inoperable for planned maintenance.

**B. EVENT:**

On February 28, 2013 at 1319, NMP2 was operating at 100 percent power, when the HPCS system pressure pump failed while running the HPCS pump to support testing of the loss of offsite power capability of the Division III Emergency Diesel Generator. At the time of this failure, the HPCS system was inoperable for planned maintenance with a 14 day completion time per Technical Specification (TS) 3.5.1. The failure of the HPCS system pressure pump was due to an electrical short in the motor.

This event did not affect Nine Mile Point Unit 1.

An event notification was made in accordance with 10 CFR 50.72(b)(3)(v)(D) on February 28, 2013 at 1701 (Event Number 48794).

**C. INOPERABLE STRUCTURES, COMPONENTS, OR SYSTEMS THAT CONTRIBUTED TO THE EVENT:**

There were no other inoperable structures, components, or systems that contributed to the event.

**D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:**

February 28, 2013

- |      |                                                                                                                                                                                                         |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0400 | To support maintenance on the HPCS pump room unit cooler, the HPCS system was declared inoperable and entered TS 3.5.1, Condition B.2, requiring HPCS to be restored to operable status within 14 days. |
| 1248 | Started the Division III Emergency Diesel Generator.                                                                                                                                                    |
| 1317 | Started the HPCS system pressure pump.                                                                                                                                                                  |
| 1319 | Control Room received an alarm indicating the HPCS system pressure pump failed.                                                                                                                         |
| 1324 | Operators reported the HPCS system pressure pump is not running, and the HPCS pump room smells of smoke. The HPCS system pump is running with no issues identified.                                     |
| 1340 | Operators secured the HPCS system pump.                                                                                                                                                                 |
| 1423 | Operators secured the Division III Emergency Diesel Generator.                                                                                                                                          |

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## NARRATIVE

March 6, 2013

1047 Declared HPCS system operable following replacement of HPCS system pressure pump motor 2CSH\*M2.

## E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

No other systems or functions were affected.

## F. METHOD OF DISCOVERY:

On February 28, 2013 at 1319 Operators received an alarm indicating the HPCS system pressure pump failed.

## G. MAJOR OPERATOR ACTION:

Operators verified the HPCS system pressure pump was not running and the HPCS pump was running normally. There were no indications of fire, although operators reported that the HPCS pump room smelled of smoke. Operators secured the HPCS pump, restored offsite power to the Division III Emergency Switchgear and secured the Division III Emergency Diesel Generator.

## H. SAFETY SYSTEM RESPONSES:

No operational conditions requiring the response of safety systems occurred as a result of this event.

## II. CAUSE OF THE EVENT:

The HPCS system pressure pump is designed to keep a positive pressure on the HPCS system pump discharge piping. On the day of the event, testing was being performed to verify the Division III Emergency Diesel Generator (EDG2) would respond properly to a loss of offsite power. The HPCS system had already been declared inoperable due to planned maintenance on the HPCS pump room unit cooler. Part of the EDG2 test requires running the HPCS pump. During the performance of the test, after the HPCS pump was running, the HPCS system pressure pump failed. Subsequent troubleshooting determined the motor for the HPCS system pressure pump had shorted out. The motor and pump were not mechanically bound and turned normally by hand.

The motor was sent to an offsite vendor for additional testing to determine the cause of the failure. The vendor indicated that the motor winding failed phase-to-phase resistance testing. A visual inspection of the stator showed the winding had failed, with one section of the coils burnt and loose copper present in the winding. The vendor indicated that a turn-to-turn failure had occurred in the motor. The cause of the motor failure was determined to be poor manufacturer quality of the original motor.

This motor was one of 4 originally installed in April 1987, and had been in service for 26 years. The 4 motors installed in the plant, and 1 spare, had an Equipment Qualification (EQ) qualified life of 40 years. The motors were scheduled to be replaced at 40 years. In addition to the failed HPCS system pressure pump, two of the other motors had failed prematurely prior to this event. In all 3 motor failures, the cause was determined to be the result of a turn-to-turn failure. The motor vendor has noted that the standard for production of these motors

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## NARRATIVE

has improved over the past 30 years including improved Foreign Material Exclusion practices. All motors, including the spare, have been replaced with rewound motors, manufactured to the current production techniques.

The motor for the HPCS system pressure pump was replaced with a rewound motor, tested, and the HPCS system was declared operable on March 6, 2013 at 1047.

This event was entered into the Nine Mile Point Nuclear Station, LLC (NMPNS) corrective action program as condition report CR-2013-001633.

## III. ANALYSIS OF THE EVENT:

This event is reportable in accordance with 10 CFR 50.73(a)(2)(v)(D) as an event that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. The design function of the HPCS system pressure pump is to maintain a positive pressure on the HPCS pump main discharge header to prevent voids from forming. HPCS is a single train system, and with the HPCS system pressure pump inoperable, the HPCS system is inoperable. The motor failure that caused the HPCS system to become inoperable is attributed to a manufacturing deficiency, and is reportable in accordance with 10 CFR Part 21.

The HPCS system started and ran normally when powered from EDG2. Per the NMP2 Updated Safety Analysis Report (USAR), when the HPCS system water leg (system pressure) pump is inoperable, the static pressure head from the Condensate Storage Tank (CST) provides sufficient pressure to ensure the system piping is full to the outer isolation valve and system high-point vent. The system piping was verified to be in a full condition because the high point vent low level annunciator was verified clear, the system pressure remained stable at 50 psig at the HPCS pump discharge, and the CST level was approximately 40 feet.

The HPCS system is an Emergency Core Cooling System (ECCS) designed to pump water into the reactor vessel over a wide range of pressures. For a small break Loss of Coolant Accident (LOCA) that does not result in rapid reactor depressurization, the system maintains reactor water level and coolant inventory. For large breaks, the HPCS system cools the core by a spray. The Reactor Core Isolation Cooling (RCIC) system is not part of the ECCS. It is designed to assure that sufficient reactor water inventory is maintained in the reactor vessel to permit adequate core cooling in the event that the reactor is isolated from the main condenser. The RCIC system, like the HPCS system, can operate over a large pressure range (165 – 1215 psia). During an accident with the RPV at high pressure, either the HPCS system or the RCIC system can be used to provide makeup flow to the reactor. If the HPCS system was to fail, and RCIC capacity is insufficient to maintain reactor vessel level, the Automatic Depressurization System (ADS) automatically initiates depressurization of the reactor to permit low-pressure ECCS to provide makeup coolant. When the low-pressure ECCS operates in conjunction with the ADS, the effective core cooling capability of the low-pressure ECCS is extended to all break sizes. The low-pressure ECCS consists of the Low-Pressure Core Spray (LPCS) system and the Low-Pressure Coolant Injection (LPCI) system.

The ADS and both the LPCS and the LPCI systems were operable during the event. Based on the above considerations, it has been concluded that the safety significance of this event is low, and the event did not pose a threat to the health and safety of the public or plant personnel.

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This event affects the NRC Reactor Oversight Process (ROP) Performance Indicators (PIs) for NMP2 Safety System Functional Failures (SSFF). The SSFF PI will increase from 2 to 3 and remains green. The green to white threshold for this PI is 6. No other NRC performance indicators were impacted by this event.

**IV. CORRECTIVE ACTIONS:****A. ACTION TAKEN TO RETURN AFFECTED SYSTEMS TO PRE-EVENT NORMAL STATUS:**

1. Replaced failed pump motor with a rewind motor.

**B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:**

1. Of the five original identical motors procured as EQ qualified, the four in-service motors have been replaced with rewind motors. The spare fifth motor will be rewind.
2. A new replacement strategy will be developed for these five EQ qualified motors.

**V. ADDITIONAL INFORMATION:****A. FAILED COMPONENTS:**

HPCS system pressure pump motor, 2CSH\*M2, 10 Horsepower, 575 V.

Manufacturer: Westinghouse

Model: 215T

**B. PREVIOUS LERs ON SIMILAR EVENTS:**

None

**C. THE ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) COMPONENT FUNCTION IDENTIFIER AND SYSTEM NAME OF EACH COMPONENT OR SYSTEM REFERRED TO IN THIS LER:**

COMPONENT	IEEE 803 COMPONENT IDENTIFIER	IEEE 805 SYSTEM IDENTIFICATION
Motor	MO	BG
High Pressure Core Spray System	N/A	BG
Emergency Diesel Generator System	N/A	EK

**D. SPECIAL COMMENTS:**

None