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NINE MILE POINT
NUCLEAR STATION

November 19, 2012

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

ATTENTION: Document Control Desk

SUBJECT: Nine Mile Point Nuclear Station
Unit No. 1; Docket No. 50-220

Licensee Event Report 2012-002, Automatic Reactor Scram due to Automatic Generator Protective Trip

In accordance with 10 CFR 50.73(a)(2)(iv)(A), please find attached Licensee Event Report 2012-002, Automatic Reactor Scram due to Automatic Generator Protective Trip.

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,

Mark D Flaherty

MAP/KJK

Attachment: Licensee Event Report 2012-002, Automatic Reactor Scram due to Automatic Generator Protective Trip

cc:

NRC Project Manager
NRC Resident Inspector
NRC Regional Administrator

IE22
NRR

ATTACHMENT

LICENSEE EVENT REPORT 2012-002

AUTOMATIC REACTOR SCRAM DUE TO AUTOMATIC GENERATOR PROTECTIVE TRIP

Nine Mile Point Nuclear Station, LLC
November 19, 2012

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

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, 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.

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Automatic Reactor Scram due to Automatic Generator Protective Trip

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
									NA	NA
09	20	2012	2012	002	0	11	19	2012	FACILITY NAME: NA	DOCKET NUMBER: NA

9. OPERATING MODE

N

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
John J. Dosa, Director - Licensing	(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
X	TB	CAP	G080	Y	X	TB	EC*	G080	Y

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
NA	NA	NA

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

On September 20, 2012, at 0923, Nine Mile Point Unit 1 (NMP1) experienced an automatic reactor scram due to an automatic generator protective trip. The NMP1 main generator excitation controls failed to maintain reactive load below the trip setpoint when transferred from automatic regulation to manual regulation. Following the reactor scram, the High Pressure Coolant Injection (HPCI) system automatically initiated on low Reactor Pressure Vessel (RPV) water level as designed.

The root cause of this event is that in 2003, a failure to follow the existing administrative procedure guidance for procedure change evaluations resulted in an inadequate review of the procedure change and introduction of a latent error into the amplidyne operating procedure. The procedure change did not address how voltage regulation would be affected when operating with a 10-20 volt boost prior to automatically transferring to manual voltage regulation.

This event is reportable in accordance with 10 CFR 50.73 (a)(2)(iv)(A) as a valid actuation of the reactor protection system and initiation of the high pressure coolant injection system.

Corrective actions include replacement of degraded electronic components of the automatic voltage regulator (AVR) and procedure revisions to operate with the amplidyne output at null (zero volts).

There are no previous LERs for similar AVR failures.

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CONTINUATION SHEET

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NARRATIVE

I. DESCRIPTION OF EVENT

A. PRE-EVENT PLANT CONDITIONS:

Prior to this event, Nine Mile Point Unit 1 (NMP1) was operating and stable at 100 percent power with no inoperable systems affecting this event.

B. EVENT:

On September 20, 2012, at 0923, Nine Mile Point Unit 1 (NMP1) experienced an automatic reactor scram due to an automatic generator protective trip. The NMP1 main generator excitation controls failed to maintain reactive load below the trip setpoint when transferred from automatic regulation to manual regulation. The NMP1 automatic voltage regulator (AVR) is designed to automatically regulate main generator terminal voltage. An amplidyne motor generator is used as the output stage of the regulator and controls exciter voltage, which in turns controls main generator terminal voltage. If the main generator load changes, the resultant change in terminal voltage will cause the automatic regulator to produce an amplidyne control signal to raise or lower (boost or buck, respectively) the main generator exciter field voltage.

The transfer from automatic to manual voltage regulation was being performed due to oscillations on the AVR causing the buck/boost meter to fluctuate. An attempt to null the AVR was made, but was unsuccessful due to the oscillations. When placed in manual regulation, the magnitude of reactive loading taken in to the generator was great enough to activate the loss of excitation protective relaying. A reactor scram resulted from the generator trip because turbine load was above the 45% scram bypass setpoint.

Following the automatic reactor scram, the High Pressure Coolant Injection (HPCI) system automatically initiated on low Reactor Pressure Vessel (RPV) water level as designed. At 0924, RPV water level was restored above the HPCI low level actuation set point, the HPCI initiation signal was reset, and the HPCI system was secured. After the reactor scram and turbine trip, the turbine bypass valves operated properly to control reactor pressure. All control rods fully inserted and all systems functioned as expected.

The HPCI system actuation signal on low RPV level is an expected occurrence following a reactor scram due to water level shrinkage. The HPCI system is an operational mode of the feedwater system and is not an Emergency Core Cooling System (ECCS).

There was no impact on Nine Mile Point Unit 2 (NMP2) from this event.

This event involved the automatic actuation of the Reactor Protection System (RPS), which resulted in a reactor scram, and the automatic initiation of the HPCI system due to reactor low water level. The notification per 10 CFR 50.72(b)(2)(iv)(B) for RPS actuation and 10 CFR 50.72 (b)(3)(iv)(A) for HPCI initiation were completed on September 20, 2012 at 1155 (Event Number 48323).

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NARRATIVE

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

There were no inoperable components or systems that contributed to this event.

D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES

All times below are approximate and occurred on 9/20/2012;

0922 - The operator observes oscillations on the AVR causing the buck/boost meter to fluctuate. The operator attempts to null the AVR, but was unsuccessful due to the oscillations.

0923 - The AVR is removed from service, the generator trips and the reactor scrams.

0923 - HPCI mode of operation initiates on low reactor water level.

0924 - Reactor water level is restored above the low water level set point and HPCI system secured.

E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

None

F. METHOD OF DISCOVERY:

This event was discovered by the operators when the annunciators for generator trip and RPS initiation of the reactor scram alarmed in the control room.

G. MAJOR OPERATOR ACTION:

On September 20, 2012, at 0922, the operator observed oscillations on the AVR causing the buck/boost meter to fluctuate. The operator attempted to null the AVR, but was unsuccessful due to the oscillations.

After the scram, the operators verified all rods fully inserted. No other actions were required to support shutting down the reactor.

H. SAFETY SYSTEM RESPONSES:

All safety systems responded per design. There was no loss of offsite power to the onsite emergency buses, the HPCI system initiated as designed, and the ECCS systems were available, but not called upon to support the safe shutdown of the reactor.

II. CAUSE OF THE EVENT:

The root cause of this event is that in 2003, a failure to follow the existing administrative procedure guidance for procedure change evaluations resulted in an inadequate review of the procedure change

and introduction of a latent error into the amplidyne operating procedure. The Design Engineering organization was not afforded a cross disciplinary review of the procedure to ensure the change in operating strategy was aligned with the design standards for the system. The procedure change had been implemented in an attempt to increase current flow through the amplidyne commutator brushes to reduce wear. The impact of operating with a 10-20 volt boost amplidyne output was not fully understood by personnel making the change. The procedure change did not address how voltage regulation would be affected when operating with a 10-20 volt boost prior to automatically or manually transferring to manual voltage regulation without nulling the amplidyne output.

The contributing equipment cause was due to degraded sub-components in the AVR control circuit. The following degraded sub-components initiated the buck/boost meter oscillations and MVAR swings.

- Degraded capacitor on the AVR card
- Erratic output of potentiometers A3P and A2P
- High resistance contact on the 90R control switch

The NMP2 generator control system uses an Alterrex Excitation System which contains an Auto-tracking section that maintains the Manual Voltage Regulator within 2 volts of the Automatic Voltage Regulator; thus, NMP2 is not susceptible to the type of failure that occurred at NMP1.

This event was entered into the Nine Mile Point Nuclear Station (NMPNS) corrective action program (CR-2012-008673).

III. ANALYSIS OF THE EVENT:

This event is reportable in accordance with 10 CFR 50.73 (a)(2)(iv)(A), as an event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph 10 CFR 50.73 (a)(2)(iv)(B). Both the RPS and HPCI system (an operating mode of the feedwater system) were actuated during this event. Both systems are listed in 10 CFR 50.73 (a)(2)(iv)(B).

Except for the failure of the AVR, there were no equipment failures associated with this event. All other plant systems performed per design. Plant parameters, other than the reactor water level, remained within normal values throughout the event. There was no loss of offsite power to the onsite emergency buses, HPCI initiated as designed, and the ECCS systems were available, but not called upon to support the safe shutdown of the reactor.

Had a design basis accident occurred coincident with this event, plant systems would have responded per design to mitigate the accident. Based on the above considerations, the safety significance of this event is very low, and the event did not pose a threat to the health and safety of the public or plant personnel.

This event affects the NRC Regulatory Oversight Process (ROP) Index for Unplanned Scrams. Due to this scram, the Unplanned Scrams Index value will be 1.6 compared to the Green-to-White threshold value of greater than 3. This reduction will not result in entry into the "Increased Regulatory (White) Response Band."

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NARRATIVE

IV. CORRECTIVE ACTIONS:

A. ACTION TAKEN TO RETURN AFFECTED SYSTEMS TO PRE-EVENT NORMAL STATUS:

1. The degraded sub-components of the AVR were replaced. The plant was returned to full power on September 26, 2012. The voltage regulator was operated in manual and performance monitored, prior to returning the AVR to service.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:

1. The operating procedure was revised to operate the amplidyne at null (zero volts) position.

2. The NMP1 AVR is scheduled for replacement in the NMP1 2015 refueling outage.

V. ADDITIONAL INFORMATION:

A. FAILED COMPONENTS:

Sub-components in the AVR control circuit found degraded:
- capacitor on the AVR card
- potentiometers A3P and A2P
- 90R control switch

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
Capacitor on AVR card	CAP	TB
Voltage Regulator	EC*	TB
Main Generator Exciter	EXC	TB
Main Generator System	N/A	TB
Main Generator Output Power System	N/A	EL
High Pressure Coolant Injection System	N/A	BJ
Reactor Protection System	N/A	JC

D. SPECIAL COMMENTS:

None