James J. Stanley
Plant General Manager

Office 315.349.5205
Fax 315.349.1321
E-mail: James.Stanley@cengllc.com

CENG
a joint venture of
Constellation Energy · EDF

NINE MILE POINT
NUCLEAR STATION

December 20, 2013

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

ATTENTION: Document Control Desk

SUBJECT: Nine Mile Point Nuclear Station Unit 1
Renewed Facility Operating License No. DPR-63
Docket No. 50-220

Licensee Event Report 2013-002, Unanalyzed Condition Caused by Unfused Control Room DC Ammeters

In accordance with 10 CFR 50.73(a)(2)(ii)(B) and 10 CFR 50.73(a)(2)(ix)(A), please find attached Licensee Event Report 2013-002, Unanalyzed Condition Caused by Unfused Control Room DC Ammeters.

There are no regulatory commitments in this submittal.

Should you have questions regarding the information in this submittal, please contact Everett (Chip) Perkins, Director Licensing, at (315) 349-5219.

Very truly yours,

JJS/JBH

Attachment: Licensee Event Report 2013-002, Unanalyzed Condition Caused by Unfused Control Room DC Ammeters

cc: NRC Project Manager
NRC Resident Inspector
NRC Regional Administrator

IE22
NRR

ATTACHMENT

LICENSEE EVENT REPORT 2013-002

UNANALYZED CONDITION CAUSED BY UNFUSED CONTROL ROOM DC AMMETERS

Nine Mile Point Nuclear Station, LLC
December 20, 2013

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)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Nine Mile Point Unit 1	05000220	1 OF 5

4. TITLE

Unanalyzed Condition Caused by Unfused Control Room DC Ammeters

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
10	22	2013	2013	002	00	12	20	2013	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)
Everett Perkins, 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
B	EJ	II	GE	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 October 22, 2013 it was discovered that unfused ammeter indication circuits associated with the Nine Mile Point Unit 1 (NMP1) safety-related Direct Current (DC) buses could short circuit due to a fire in the circuit cable routing. This ground fault equivalent hot short could cause the cable to self-heat and lead to secondary fires. The unanalyzed secondary fires could adversely affect safe shutdown equipment and potentially cause the loss of the ability to safely shutdown as required by 10 CFR 50 Appendix R.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(B) as a condition that resulted in the nuclear plant being in an unanalyzed condition that significantly degraded plant safety, and 10 CFR 50.73(a)(2)(ix)(A) as a condition that as a result of a single cause could have prevented the fulfillment of a safety function for two or more trains or channels in different systems.

The cause of this event is that the equipment design issue was not recognized as an unacceptable configuration. The design issue is associated with an evolving industry understanding of the 10 CFR 50 Appendix R common enclosure scope.

Corrective actions include the isolation of the affected circuits at the DC bus in order to prevent the condition from occurring, and the development, issuance and installation of a plant modification to install fuses on the safety-related DC ammeters at NMP1 to ensure adequate circuit protection to prevent the propagation of fires in additional areas due to overcurrent conditions.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 1	05000220	2013	002	00	2 OF 5

NARRATIVE

I. DESCRIPTION OF EVENT

A. PRE-EVENT PLANT CONDITIONS:

Prior to the event, Nine Mile Point Unit 1 (NMP1) was operating at rated reactor power.

B. EVENT:

On October 22, 2013, it was discovered that four unfused ammeter indication circuits associated with the NMP1 Safety related Direct Current (DC) buses could short circuit due to a fire in the circuit cable routing. This ground fault equivalent hot short could cause the cable to self-heat and lead to secondary fires. The unanalyzed secondary fires could adversely affect safe shutdown equipment and potentially cause the loss of the ability to safely shutdown as required by 10 CFR 50 Appendix R.

Fire patrols were established as a compensatory measure, and fire suppression and detection systems were confirmed functional in the affected areas. Once the four affected circuits were deenergized by lifting of leads at the DC bus, the fire patrols were suspended. Deenergizing the circuits at the DC bus ensures that if a fire in one of the cable routing areas were to occur, secondary fires would not occur due the unfused circuits.

The four unfused safety related ammeter circuits at NMP1 do not affect Nine Mile Point Unit 2.

An event notification was made in accordance with 10 CFR 50.72(b)(3)(ii)(B) for the unfused DC ammeter circuits in the control room resulting in an unanalyzed condition on October 22, 2013 at 1928 (EN# 49464).

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:

Original Contruction and Operation
Original construction standards did not recommend installation of fuses in the associated DC ammeter circuits. IEEE 384, "Standard Criteria for Separation of Class IE Equipment and Circuits," which was the industry standard at the time, did not require an "isolation device" on the ammeter wiring, as long as the circuits were considered "associated" with the safety train. Although the ammeters were considered "instruments," they were bolted to a power conductor leading to the conclusion that they were part of the safety train.

2013 Issuance of NUREG-2128, Electrical Cable Test Results and Analysis During Fire Exposure (ELECTRA-FIRE)
This NUREG consolidated the results of three major test programs exploring electrical functionality of electrical cables under fire conditions. Included was the Nuclear Regulatory Commission (NRC) Direct Current Electrical Shorting in Response to Exposure Fire (DESIREE-FIRE) program. The DESIREE-FIRE test data revealed a newly observed failure mode in which multiple shorts to ground (from ungrounded systems) cause spurious operation in a circuit. This failure mode was identified as "ground fault equivalent hot short".

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 1	05000220	2013	002	00	3 OF 5

NARRATIVE

2013 Davis Besse Operating Experience (OE) 305419
This OE identified that, during a fire, DC ammeter circuits without protective fusing could short to ground and with the proper polarity it was possible to cause high current in these unfused legs of small diameter cabling with the potential to cause secondary fires. These secondary fires could then result in damage to adjacent cabling.

E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

A postulated control room fire could lead to the shorting event occurring in the ammeter circuits, which subsequently could lead to additional fires in the Auxiliary Control Room and Turbine Building adversely impacting equipment necessary to support safe plant shutdown.

F. METHOD OF DISCOVERY:

On October 22, 2013, review of industry OE regarding the impact of unfused DC ammeter circuits in the control room determined that the described condition was applicable to NMP1.

G. MAJOR OPERATOR ACTION:

Fire patrols were established as a compensatory measure in affected areas of the unit.

H. SAFETY SYSTEM RESPONSES:

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

II. CAUSE OF EVENT:

The cause of this event is that the equipment design issue was not recognized as an unacceptable configuration. The design issue is associated with an evolving industry understanding of the Appendix R common enclosure scope. Specifically, ammeter circuits were not required to be fused in the original design of the plant nor included within the scope of Appendix R evaluation of common enclosure type circuits because the failure mode of 'ground fault equivalent hot shorts' was not known to exist until NUREG-2128, 'ELECTRA-FIRE' was published in 2013.

This event has been entered into the Nine Mile Point Nuclear Station corrective action program as condition report number CR-2013-008747.

III. ANALYSIS OF THE EVENT:

This event is reportable in accordance with 10CFR50.73(a)(2)(ii)(B)) as a condition that resulted in the nuclear plant being in an unanalyzed condition that significantly degraded plant safety, and 10 CFR 50.73(a)(2)(ix)(A) as a condition that as a result of a single cause could have prevented the fulfillment of a safety function for two or more trains or channels in different systems.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 1	05000220	2013	002	00	4 OF 5

NARRATIVE

There were no actual nuclear safety consequences associated with this event. The event was caused by equipment design that did not include fusing of DC ammeter circuits due to not understanding or anticipating a failure mode that had not been not known to exist until NUREG-2128 'ELECTRA-FIRE' was published in 2013. There were no actual fires impacting to any of the four DC ammeter circuits and as a result no actual challenge to the ability of the station to safely shutdown to cold shutdown conditions.

The configuration of the DC ammeter circuits has remained unchanged from original construction at NMP1 and as such is a legacy issue. The original design did not include any protection (i.e. fuses) for the ammeter circuits. The original guidance (Generic Letter 81-12, "Fire Protection Rule," and later Generic Letter 86-10, "Implementation of Fire Protection Requirements") for completing a post-fire Safe Shutdown analysis did not identify the need for the evaluation of DC ammeters as they were not relied upon to bring the unit to a Cold Shutdown state. Hence they were not analyzed for the original Appendix R Safe Shutdown analysis. It is noted that NMP1 was not orginally designed to the Appendix R Safe Shutdown requirements since those requirements were issued following Unit 1 going into operation.

Guidance used as part of the NFPA 805 transition at Unit 1, mainly NEI-00-01, "Guidance for Post-Fire Safe Shutdown Analysis" and RIS-2005-30, "Clarification of Post-Fire Safe-Shutdown Regulatory Requirements" does not identify the need for the evaluation of the ammeter circuits. The methodology described in these documents requires the evaluation of circuits which are part of the required Safe Shutdown train of equipment, as well as any circuits which could cause spurious actuations of equipment – equipment not part of the required train of Safe Shutdown equipment which could affect the units ability to safely shutdown. As these ammeter circuits are indicating circuits only and could not cause spurious actuation of any equipment, they were not required to be evaluated under this guidance and were not evaluated for the upgrade of the Safe Shutdown analysis for the transition the to NFPA 805.

Currently, the safety related DC ammeter circuits have been deenergized at the DC buses preventing this postulated scenario from being able to occur.

Based on the above discussion, it is 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.

This event does not affect the NRC Regulatory Oversight Process (ROP) Index items.

IV. CORRECTIVE ACTIONS:

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

1. The four unfused safety related DC ammeter circuits have been deenergized at the DC buses preventing this postulated scenario from being able to occur.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:

1. A modification will be developed, issued and installed to provide adequate fuse circuit protection to preclude the postulated event from occurring at NMP1.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 1	05000220	2013	002	00	5 OF 5

NARRATIVE

V. ADDITIONAL INFORMATION:

A. FAILED COMPONENTS:

There were no other failed components that contributed to this event.

B. PREVIOUS LERs ON SIMILAR EVENTS:

LER 2013-003 is being submitted for a similar condition at NMP2. Additionally, Edwin I. Hatch Nuclear Plant submitted LER 2013-004 (Revision 1) on November 13, 2013 for an unanalyzed condition postulated with a fire and resulting hot short that has a similar cause. There have been no previous similar LERs for NMP1.

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 FUNCTION IDENTIFIER	IEEE 805 SYSTEM IDENTIFICATION
Ammeter	II	EJ

D. SPECIAL COMMENTS:

None