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NINE MILE POINT
NUCLEAR STATION

September 10, 2012

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 2012-004, Manual Reactor Scram due to a Loss of Main Turbine Gland Sealing Steam Resulting in Lowering Condenser Vacuum.

In accordance with 10 CFR 50.73(a)(2)(iv)(A), please find attached Licensee Event Report 2012-004, Manual Reactor Scram due to a Loss of Main Turbine Gland Sealing Steam Resulting in Lowering Condenser Vacuum.

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/DEV

Attachment: Licensee Event Report 2012-004, Manual Reactor Scram due to a Loss of Main Turbine Gland Sealing Steam Resulting in Lowering Condenser Vacuum

cc: Regional Administrator, NRC
Project Manager, NRC
Resident Inspector, NRC

IE22
NRR

ATTACHMENT

LICENSEE EVENT REPORT 2012-004

MANUAL REACTOR SCRAM DUE TO A LOSS OF MAIN TURBINE GLAND SEALING STEAM RESULTING IN LOWERING CONDENSER VACUUM

Nine Mile Point Nuclear Station, LLC
September 10, 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)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Nine Mile Point Unit 2	05000410	1 OF 6

4. TITLE

Manual Reactor Scram due to a Loss of Main Turbine Gland Sealing Steam Resulting in Lowering Condenser Vacuum

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
									None	NA
07	12	2012	2012	004	00	09	10	2012	FACILITY NAME: None	DOCKET NUMBER: NA

9. OPERATING MODE

1

10. POWER LEVEL

085

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

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	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
NA	NA	NA	NA	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 July 12, 2012, at 02:20, Nine Mile Point Unit 2 was manually scrammed from approximately 85 percent of rated power due to indications of rising offgas system inlet pressure and lowering main condenser vacuum. These conditions occurred due to a loss of the in-service 'B' clean steam reboiler and a low backup sealing steam supply initiation setpoint that resulted in an inadequate sealing steam supply pressure. The reboiler tripped on a low water level condition due to excess steam demand caused by an incorrectly installed gag on relief valve 2TME-RV135. The relief valve gag implementation plan did not contain an adequate level of detail for installation and testing.

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

The root cause of this event is attributed to inadequate management guidance to ensure that changes in scope during engineering change package development are adequately reviewed and assessed.

Corrective actions include adjusting the gag installed on relief valve 2TME-RV135, changing the initiation setpoint for the backup sealing steam supply, revising the turbine gland sealing system operating procedure, and revising the engineering change management procedure.

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 2	05000410	2012	004	00	2 OF 6

NARRATIVE

I. DESCRIPTION OF EVENT

A. PRE-EVENT PLANT CONDITIONS:

Prior to the event, Nine Mile Point Unit 2 (NMP2) was operating at approximately 96 percent of rated thermal power with no inoperable systems affecting this event.

B. EVENT:

On July 12, 2012 at 02:13, with NMP2 operating at approximately 96 percent power (3,811 MWt), plant operators identified that the indicated offgas system inlet pressure was rising and main condenser vacuum was lowering. In accordance with plant procedures, the operators lowered reactor power to approximately 85 percent by adjusting the reactor recirculation system flow. Offgas system inlet pressure continued to increase, and condenser vacuum continued to degrade, resulting in the operators initiating a manual reactor scram at 02:20. All control rods fully inserted and all systems functioned as expected following the scram. There was no impact on Nine Mile Point Unit 1 from this event.

The immediate cause of the increasing offgas system inlet pressure and flow and the degrading condenser vacuum was the failure of the turbine gland sealing (TME) system to provide an adequate supply of sealing steam to the main turbine gland seals. This occurred because the steam supply to the inservice 'B' clean steam reboiler isolated due to a low water level condition, and the backup sealing steam supply (from the main steam system) was subsequently unable to provide steam at the pressure needed to effectively perform the gland sealing function.

This event involved the manual actuation of the Reactor Protection System, which resulted in a reactor scram. The NRC notification per 10 CFR 50.72(b)(2)(iv)(B) was completed on July 12, 2012, at 04:49 (Event Number 48097).

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

There were no inoperable structures, systems, or components at the time of the scram that contributed to this event.

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 2	05000410	2012	004	00	3 OF 6

NARRATIVE

D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:

July 12, 2012

01:57 The steam supply to the inservice 'B' clean steam reboiler isolates due to a low water level condition.

02:13 Plant operators reduce reactor power to approximately 85 percent by adjusting reactor recirculation system flow, after identifying that indicated offgas system inlet pressure is rising and main condenser vacuum is lowering.

02:20 A manual reactor scram is initiated when offgas system inlet pressure exceeds the procedural limit, and with main condenser vacuum continuing to degrade.

E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:

No other systems or functions were affected.

F. METHOD OF DISCOVERY:

This event was discovered by the operators when indications of rising offgas system inlet pressure and lowering condenser vacuum were observed in the control room.

G. MAJOR OPERATOR ACTION:

Upon discovery of the rising offgas system inlet pressure and degrading condenser vacuum, the operators lowered reactor power to approximately 85 percent by adjusting the reactor recirculation system flow. When indicated offgas system inlet pressure exceeded 19 psia, the reactor was manually scrammed in accordance with plant procedures.

H. SAFETY SYSTEM RESPONSES:

Following initiation of the manual scram, all control rods fully inserted. No other operational conditions requiring the response of safety systems occurred as a result of this event.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 2	05000410	2012	004	00	4 OF 6

NARRATIVE

II. CAUSE OF EVENT:

The turbine gland sealing (TME) system is designed to provide clean sealing steam from the clean steam reboilers. Backup sealing steam from the main steam system is provided in the event that the normal sealing steam source fails. The sealing steam prevents steam leakage out through the high-pressure turbine shaft and turbine steam control valves, and prevents air in-leakage through the low-pressure turbine shaft. Normal sealing steam operating pressure is approximately 4 psi.

The immediate cause of the increasing offgas system inlet pressure and flow and the degrading condenser vacuum, leading to the manual reactor scram, was the failure of the turbine gland sealing system to provide an adequate supply of sealing steam. The event was initiated by isolation of the steam supply to the in-service 'B' clean steam reboiler due to a low water level condition. The low water condition resulted from excess steam demand on the 'B' clean steam reboiler due to leakage past relief valve 2TME-RV135 located on the sealing steam piping downstream of the reboiler. A gag that had been incorrectly installed on 2TME-RV135 during the 2012 refueling outage as part of a permanent design change allowed leakage past the relief valve, resulting in a steam demand that exceeded the capacity of the makeup water supply line to the reboiler.

Following the trip of the 'B' clean steam reboiler, the backup sealing steam supply failed to maintain the turbine seals due to a low setpoint on the controller for initiation of the backup supply. The backup sealing steam supply initiated; however, the supply pressure was too low to maintain proper low-pressure turbine sealing. It was determined that, although the normal sealing steam system was being operated at higher than normal operating pressure (approximately 6 psi) to account for degraded 'A' low-pressure turbine seals, the controller for the backup sealing steam supply was set at 2.7 psi. The cause for this deficiency was inadequate guidance provided in the TME system operating procedure off-normal section. The procedure failed to address the impact of raising TME system pressure to account for the degraded low-pressure turbine seals.

The cause of the event is attributed to inadequate management guidance to ensure that changes in scope during engineering change package development are adequately reviewed and assessed. The original scope of the design change regarding relief valve 2TME-RV135 was to perform a review to determine if a setpoint change would be necessary to support operation at extended power uprate conditions; however, the design change scope was subsequently altered to install the gag instead. The revised design change package did not contain an adequate level of detail in the installation instructions for gagging the relief valve, and did not contain adequate testing provisions to verify that the gag was installed properly. These deficiencies resulted in the loss of gland sealing steam to the turbine generator and the subsequent manual reactor scram. This event was entered into the Nine Mile Point Nuclear Station corrective action program as condition report number CR-2012-006615.

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 2	05000410	2012	004	00	5 OF 6

NARRATIVE

III. ANALYSIS OF THE EVENT:

This event involved a valid actuation of the Reactor Protection System which resulted in a reactor scram, and is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A).

There were no actual nuclear safety consequences associated with this event. All control rods fully inserted following initiation of the manual reactor scram. There were no other automatic initiations of safety systems, and immediate actions performed by the operators were adequate and appropriate in placing and maintaining the reactor in a safe shutdown condition. The loss of condenser vacuum is modeled in the probabilistic risk assessment (PRA) and contributes approximately 2 percent to the base core damage frequency. The manual reactor scram was without complications and was not risk significant. Based on this 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.

The NRC performance indicator for Unplanned Scrams per 7,000 Critical Hours is projected to rise to approximately 1.96 and remains green. 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:

The gag installed in relief valve 2TME-RV135 was adjusted to secure the valve disk from opening, and a design change was implemented to increase the initiation setpoint for the backup sealing steam supply to address operation at the higher turbine gland sealing system pressure. Analyses have determined that sufficient margin exists within the turbine gland sealing system to continue operation at the higher operating pressure until repairs can be made to the 'A' low-pressure turbine seals. The turbine gland sealing system was returned to service, and the plant was subsequently returned to power operation (Mode 1) on July 15, 2012.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE:

1. Revise the engineering change package management procedure to address required reviews when scope changes are identified. The revised procedure will also require that implementing departments review the installation and testing sections of design changes to ensure an adequate level of detail.

2. Revise the TME system operating procedure to require the following if the system is to be operated at pressures above the normal operating pressure: (1) prepare and issue an engineering change package (ECP) to reflect revisions to backup sealing steam supply initiation pressure; and (2) develop and implement a plan to monitor system margin and capacity to assure no adverse consequences.

3. A work order has been prepared to inspect/refurbish the 'A' low-pressure turbine seals during the 2014 refueling outage.

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 2	05000410	2012	004	00	6 OF 6

NARRATIVE

V. ADDITIONAL INFORMATION:

A. FAILED COMPONENTS:

There were no failed components that contributed to this event.

B. PREVIOUS LERs ON SIMILAR EVENTS:

LER 2006-001, Automatic Reactor Scram due to a Loss of Main Turbine Gland Sealing Steam, submitted on May 5, 2006, describes an event in which NMP2 automatically scrammed from 86 percent power. The scram was caused by a main turbine trip due to low condenser vacuum that resulted from a failure in the main turbine gland sealing system. A high level condition caused isolation of the steam outlet valve from the inservice 'A' clean steam reboiler, and the backup sealing steam supply (from the main steam system) failed to function due to a disconnected mechanical linkage for the backup system pressure indicating controller. The actions taken following this event would not have prevented the July 12, 2012 event from occurring.

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
Reactor Protection System	N/A	JC
Condenser	COND	SG
Main Turbine	TRB	TA
Main Turbine Gland Sealing System	N/A	TC
Clean Steam Reboiler	RBLR	TC
Relief Valve	RV	TC

D. SPECIAL COMMENTS:

None