



10 CFR 50.73

NMP1L3157  
May 18, 2017

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

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

Subject: NMP1 Licensee Event Report 2017-002, Manual Reactor Scram Due to Pressure Oscillations

In accordance with the reporting requirements contained in 10 CFR 50.73(a)(2)(iv)(A), please find enclosed NMP1 Licensee Event Report (LER) 2017-002, Manual Reactor Scram Due to Pressure Oscillations.

There are no regulatory commitments contained in this letter.

Should you have any questions regarding the information in this submittal, please contact Dennis Moore, Site Regulatory Assurance Manager, at (315) 349-5219.

Respectfully,

A handwritten signature in black ink, appearing to read "Robert E. Kreider Jr.", written over a horizontal line.

Robert E. Kreider Jr.  
Plant Manager, Nine Mile Point Nuclear Station  
Exelon Generation Company, LLC

REK/RSP

Enclosure: NMP1 Licensee Event Report 2017-002, Manual Reactor Scram Due to Pressure Oscillations

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

IEZZ  
NRR

**Enclosure**

NMP1 Licensee Event 2017-002,  
Manual Reactor Scram Due to Pressure Oscillations

Nine Mile Point Nuclear Station, Unit 1  
Renewed Facility Operating License No. DPR-63

**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, 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.

**1. FACILITY NAME**

Nine Mile Point Unit 1

**2. DOCKET NUMBER**

05000220

**3. PAGE**

1 OF 6

**4. TITLE**

Manual Reactor Scram Due to Pressure Oscillations

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
3	20	17	2017	02	00	5	18	17	NA	NA
9. OPERATING MODE			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
1			<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 checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)		
10. POWER LEVEL  004			<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 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

Dennis Moore, Site Regulatory Assurance Manager

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	JJ	V	GE	Y	B	JJ	RLY	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 March 20, 2017 at 02:27, Nine Mile Point Unit 1 performed a manual scram of the reactor due to pressure oscillations. This event is reportable under 10 CFR 50.72 (b)(2)(iv)(B) and 10 CFR 50.73(a)(2)(iv)(A) as any event or condition that resulted in a manual or automatic actuation of any of the systems listed in 10 CFR 50.73(a)(2)(iv)(B).

The Unit was offline and reactor shutdown was in-progress at the time of the scram. The cause of the scram was manual scram. The scram was required at approximately 4% reactor power when pressure oscillations occurred exceeding the procedurally required limit. The apparent cause of this event was Mechanical Pressure Regulator (MPR) oscillations caused by a combination of the fouling of the MPR's pressure sensing bellows line and a bypass relay linkage passing through a worn bushing which created a friction induced sticktion of the linkage.

The event described in this LER is documented in the plant's corrective action program.

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

(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/>)

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Nine Mile Point Unit 1	05000220	2017	- 002	- 00

**NARRATIVE****I. DESCRIPTION OF EVENT****A. PRE-EVENT PLANT CONDITIONS:**

Prior to the event, Nine Mile Point Unit 1 (NMP1) was offline and reactor shutdown was in-progress. Reactor power was approximately 4%.

**B. EVENT:**

On March 20, 2017 at 0227, during a scheduled reactor shutdown in support of the 2017 refueling outage, Operators at Nine Mile Point Unit 1 inserted a manual scram due to pressure oscillations exceeding procedural limits. NMP1 was offline with the scheduled reactor shutdown in-progress at the time of the scram. At approximately 4% reactor power, Control Room Operators recognized mechanical pressure regulator (MPR) oscillations causing pressure changes and turbine bypass valve movement. When pressure oscillations exceeded the procedurally required limit the Reactor Operator at The Controls manually inserted the reactor scram.

Nine Mile Point Unit 2 (NMP2) was and remained at 100% throughout the event.

Operations performed the ENS notification (#52624) required by 10 CFR 50.72(b)(2)(iv)(B) for the manual reactor scram due to pressure oscillations. This notification met the 4 hour reporting requirements. This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv)(A).

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

None

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Nine Mile Point Unit 1	05000220	2017	- 002	- 00

**NARRATIVE****D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:**March 19, 2017

19:25 – Operations transfers Reactor Pressure Control from the Turbine Mechanical Hydraulic Control System's Electronic Pressure Regulator (EPR) to the Mechanical Pressure Regulator (MPR) in support of reactor shutdown for 2017 refueling outage.

20:01 – Operations commences reactor shutdown

March 20, 2017

00:01 – With the reactor at approximately 24% power the Main Turbine was taken offline.

00:38 – In support of surveillance testing the first of two turbine overspeed tests was performed. Reactor power was 18.8% at the time of the overspeed trip. Throughout the overspeed trip test the MPR responded as expected and reactor pressure oscillations were well within procedural limits.

02:06 – The second turbine overspeed test, "Back-up Overspeed Trip Test", was performed. Reactor power was at approximately 13.5% at the time of the second overspeed trip. The MPR response resulted in 2.0 to 2.5 psig reactor pressure oscillations.

02:10 – Operators entered the special operating procedure for Pressure Regulator Malfunction, due to reactor pressure oscillations of 2-3 psig.

02:27.– Operators inserted a manual scram of the reactor due to pressure oscillations exceeding procedural limits.

**E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED:**

None

**F. METHOD OF DISCOVERY:**

Control Room Operations were closely monitoring the MPR and its associated critical parameters during and after turbine overspeed testing. The pressure oscillations and turbine bypass valve movement was promptly identified and Control Room Operations quickly verified that the indications were not the result of any ongoing field work.

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CONTINUATION SHEET**

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Nine Mile Point Unit 1	05000220	2017	- 002	- 00

**NARRATIVE****G. MAJOR OPERATOR ACTION:**

Based on the monitoring of plant conditions and in accordance with station procedures Control Room Operators performed a manual scram of the reactor.

**H. SAFETY SYSTEM RESPONSES:**

All safety systems responded as expected.

**II. CAUSE OF THE EVENT:**

The apparent cause of this event was a partial blockage within the MPR sensing line coupled with hysteresis found within the cylinder stroke of the Mechanical Hydraulic Control (MHC) Bypass Relay.

Crud collecting in the MPR pressure sensing bellows line resulted in overdamped feedback signals to the MPR. Overspeed testing performed at 13.5% power caused large pressure swings in the sensing lines, resulting in transport of crud through the pressure sensing bellows line. The over damped feedback caused the MPR to exhibit limit cycle behavior (pressure oscillations).

Additionally, there was hysteresis within the MHC Bypass Relay caused as the bypass relay linkage passed through a worn bushing resulting in a friction induced sticktion.

The partial blockage within the MPR sensing line and the Bypass Relay hysteresis, when combined with normal pressure oscillations at low power levels, lead to reactor pressure swings outside the procedurally acceptable limits.

**III. ANALYSIS OF THE EVENT:**

This event is reportable under 10 CFR 50.72 (b)(2)(iv)(B) and 10 CFR 50.73(a)(2)(iv)(A) as any event or condition that resulted in a manual or automatic actuation of any of the systems listed in 10 CFR 50.73(a)(2)(iv)(B). Due to pressure oscillations exceeding the procedurally required limit, the RPS system was manually actuated, resulting in a reactor scram. There were no nuclear safety consequences or concerns associated with this event. All safety systems and balance of plant equipment responded as expected.

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

1. The pressure sensing bellows line was replaced and the associated piping was flushed
2. The bypass relay was repaired.

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

1. Implementation of a two year preventive maintenance activity for routine flushing and filling of the pressure sensing bellows line and associated piping with contingencies to replace when required.
2. Revision of associated procedures to include steps to flush and backfill sensing lines.
3. Revised the Turbine Trip Tests procedure to ensure turbine overspeed testing is completed above 21 percent power to minimize the possibility of pressure oscillations as a result of the overspeed test.

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

Mechanical Hydraulic Control (MHC) Bypass Relay  
Mechanical Pressure Regulator (MPR)  
Pressure sensing bellows line

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

99-04 – “Reactor Scram Due to Mechanical Pressure Regulator Suppressor Valve Failure and Mode Switch Position not in Conformance with Technical Specifications”. The cause of the reactor scram was the failure of the MPR pressure suppressor valve (a J. A. Campbell Company Micro-Bean Valve). The vendor treated the valve with excessive corrosion inhibitor which led to an internal blockage in the MPR feedback loop.

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**NARRATIVE**

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

Component	IEEE 803	IEEE 805
Mechanical Pressure regulator (MPR)	RG	JJ
Electric Pressure Regulator	RG	JJ
Mechanical Hydraulic Control Bypass Relay	RLY	JJ
Main Turbine	TRB	JJ
Reactor Vessel	RPV	AD
Suppressor Valve	V	JJ

**B. SPECIAL COMMENTS:**

None