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NL-16-085

August 9, 2016

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop O-P1-17
Washington, D.C. 20555-0001

SUBJECT: Licensee Event Report # 2016-007-00, "Safety System Functional Failure and Common Cause Inoperability of the Emergency Core Cooling System Due to Violation of Containment Sump Debris Barrier Integrity"
Indian Point Unit No. 2
Docket No. 50-247
DPR-26

Dear Sir or Madam:

Pursuant to 10 CFR 50.73(a)(1), Entergy Nuclear Operations Inc. (ENO) hereby provides Licensee Event Report (LER) 2016-007-00. The attached LER identifies an event where there was a Safety System Functional Failure and a common cause inoperability of the Emergency Core Cooling System while in Hot Shutdown due to violation of the design basis for Containment sump debris barrier, which is reportable under 10 CFR 50.73(a)(2)(v) and 10CFR50.73(a)(2)(vii). This condition was recorded in the Entergy Corrective Action Program as Condition Report CR-IP2-2016-04036.

IE22
NRR

There are no new commitments identified in this letter. Should you have any questions regarding this submittal, please contact Mr. Robert Walpole, Manager, Licensing at (914) 254-6710.

Sincerely,



Richard J. Burroni for Lawrence Coyle

RB/cbr

cc: Mr. Daniel H. Dorman, Regional Administrator, NRC Region I
NRC Resident Inspector's Office
Ms. Bridget Frymire, New York State Public Service Commission



U.S. NUCLEAR REGULATORY
COMMISSION

LICENSEE EVENT REPORT (LER)
(See Page 2 for required number of
digits/characters for each block)

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018

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 and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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 Indian Point 2	2. DOCKET NUMBER 05000-247	3. PAGE 1 OF 6
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4. TITLE: Safety System Functional Failure and Common Cause Inoperability of the Emergency Core Cooling System Due to Violation of Containment Sump Debris Barrier Integrity

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
6	10	2016	2016	- 007	- 00	8	9	2016	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 4	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (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)(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 type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. POWER LEVEL 0%	<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 checked="" 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 checked="" 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 Greg Bouderau, Site Project Manager	TELEPHONE NUMBER (Include Area Code) (914) 254-6663
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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	BQ	GATE	E251	Yes					

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 20, 2016, Entergy management was advised by the NRC that during a tour in containment while the unit was in Mode 4, the inspector identified two open barrier gates for the Emergency Core Cooling System (ECCS) sump. Personnel were moving scaffolding from inside the crane wall to areas outside the crane wall through the two open barrier gates. Having both sump barrier gates open violated ECCS operability basis which requires the sump barrier system to be operable in Modes 1-4. The inspector notified the operator touring with him of the observation. The operator subsequently coached the Radiation Protection (RP) door guard to ensure that one of the gates be closed at all times. The apparent cause was a latent organizational weakness associated with the use of procedure OAP-007 (Containment Entry and Egress) which had not been communicated well within the organization. The failure mode was personnel not being aware of all available information. The scaffold supervisor was not aware of his requirement to serve as containment coordinator and provide the required briefing on gate closure. The RP brief was focused on the locked high radiation requirements not gate control. Corrective actions included closing and securing one gate, briefing RP personnel on the event, the lessons learned and management expectations. This event will be included in all 3R19 supplemental supervisors qualifications required reading list. Procedure OAP-007 will be revised to include a checklist for entry briefings to include GS-191 requirements. The event had no significant effect on public health and safety.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Indian Point 2	05000-247	YEAR	SEQUENTIAL NUMBER	REV NO.
		2016	- 007	- 00

NARRATIVE

Note: The Energy Industry Identification System Codes are identified within the brackets {}.

DESCRIPTION OF EVENT

On June 20, 2016, Indian Point management was advised by the NRC that during a tour in containment {NH} while the unit was in Mode 4, the inspector identified two open barrier gates for the Emergency Core Cooling System (ECCS) {BQ} sump. Personnel were removing disassembled scaffolding from inside the crane wall on the 46 foot elevation of containment and moving it through the ECCS sump barrier gates {GATE} to areas outside the crane wall through the two open barrier gates. Having both sump barrier gates open violated ECCS operability basis which requires the sump barrier system to be operable in Modes 1-4. The plant had entered Mode 4 on July 10, 2016, at 23:30 hours. The inspector notified the operator touring with him of the observation. The operator subsequently coached the Radiation Protection (RP) door guard to ensure that one of the gates were closed at all times. No condition report recorded the event at the time. Subsequently, on June 20, 2016, after an NRC inspector advised a site manager the condition was recorded in the Indian Point Energy Center (IPEC) Corrective Action Program (CAP) as Condition Report CR-IP2-2016-04036. On June 21, 2016, CR-IP2-2016-04037 recorded the failure to initiate a CR at the time of the event.

For postulated breaks in the Reactor Coolant System (RCS) {AB} there are two recirculation related sumps within the containment, 1) the Recirculation Sump and, 2) the Containment Sump. Both sumps collect liquids discharged into the containment during a design basis accident. As part of the resolution of Generic Safety Issue (GSI)-191 (Assessment of Debris Accumulation on PWR Sump Performance) and Generic Letter 2004-02 (Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors) various flow barrier debris interceptors were installed in the containment to channel the recirculation flow into the reactor cavity sump area, up and out of the Incore Instrumentation Tunnel, through the crane wall and containment sump labyrinth wall via specially designed openings, and into the annulus area outside the crane wall. The recirculation flow will migrate towards the Recirculation Sump or the Containment Sump depending on which pump(s) are operating. Flow channeling barriers are installed on the Reactor Cavity Sump around the Incore Instrumentation Tunnel, on the Recirculation Sump trenches, and at the Containment Sump. Flow channeling barrier gates are installed in the northeast and northwest quadrant openings of the Crane Wall. In addition, flow channeling barrier gates are installed in the north and south entrances to the Recirculation Sump area. There is one dual access gate (gates 17 and 23) to allow access without violating the flow barrier integrity during transient through the flow barrier system.

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Investigation of the event determined that the scaffold work group was the largest group within containment during the time the scaffold job on the 46 foot elevation was being worked. In accordance with procedure OAP-007 (Containment Entry and Egress) the scaffold group was to assume the role of containment coordinator and be responsible for performing a containment entry briefing. However, instead of providing a containment entry briefing, a regular or standard HU pre-job brief was given to the scaffold workers by their contractor supervisor. Because the area being worked was a radiation controlled area the scaffold workers then met with Radiation Protection (RP) personnel at the Health Physics access (HP1) for a Locked High Radiation Area (LHRA) RP pre-job brief. The RP brief included discussion that one of the ECCS barrier gates had to be closed at all times per GSI-191 and OAP-007 requirements. The job also required an RP door guard whose only function was to ensure that anyone entering into the inside crane wall had to have an HP individual with them. There was no ECCS barrier gate monitor assignment as required by OAP-007. As work progressed the scaffold workers left both ECCS barrier gates open to enhance removal of scaffold material to storage. Although the scaffold workers were told during the RP briefing that one ECCS barrier gate must remain closed at all times, it was discovered in interviews with workers that they thought that none of the other gates could be opened while they were using their gate location to remove scaffold.

It was determined that the supplemental scaffold supervisor was not aware of a specific entry procedure that was required to be used prior to a containment entry. A specific OAP-007 procedure containment entry brief was not given to the workers nor were they and their supervisor aware of the procedure. The supplemental scaffold group supervisor stated that in previous containment entries he and his group were never the main group going into containment so they were always briefed by operations or RP and didn't recall using OAP-007. Procedure OAP-007 is specifically written to cover many aspects of containment entries. The procedure contains sections and steps discussing the ECCS barrier gates with diagrams of the crane wall and all of the gates with their locations and numbers. If the procedure had been used in addition to a pre-job and RP brief, the requirements would have been clearer to the workers and this event most likely would not have occurred.

An extent of condition (EOC) review was performed and it determined that both units are similar and both would be vulnerable in an event if there was a direct flow path for accident debris to enter the containment/internal recirculation sump. The condition is bounded by the crane wall gates as these are the only types of gates in the containment installed in the crane wall that protect the ECCS sumps from debris.

NRC FORM 366A
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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 and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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.

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NARRATIVE

CAUSE OF EVENT

The apparent cause was a latent organizational weakness associated with the use of procedure OAP-007 (Containment Entry and Egress) which had not been communicated well within the organization. The failure mode was personnel not being aware of all available information. The scaffold supervisor was not aware of his requirement to serve as containment coordinator and provide the required briefing on gate closure. The RP brief was focused on the locked high radiation requirements not gate control.

CORRECTIVE ACTIONS

The following corrective actions have been or will be performed under the Corrective Action Program (CAP) to address the causes of this event:

- Dual gates were closed and applicable gate secured. The RP door guard was coached on requirement to have at least one gate closed and secured at all times.
- A HU meeting was held and interviews conducted with the work crew, supervisor and RP personnel and the requirements of OAP-007 were reviewed and requirements of the ECCS barrier reinforced.
- A Department Clock Reset/Yellow memo was prepared and the lessons learned on the event and management expectations communicated with Projects organizations, all site departments, and the Fleet.
- The event will be included in all 3R19 supplemental supervisors qualifications required reading list.
- Procedure OAP-007 will be revised to include a checklist for entry briefings to include GS-191 requirements.

EVENT ANALYSIS

The event is reportable under 10CFR50.73(a)(2)(v)(D) as a safety system functional failure as the condition could have prevented adequate post accident core cooling due to DBA debris blockage of the recirculation and/or the containment sump. An ECCS train is inoperable if it is not capable of delivering design flow to the RCS. Individual components are inoperable if they are not capable of performing their design function or supporting systems are not available. Technical Specification (TS) 3.5.2 (ECCS-Operating) requires three ECCS trains to be operable in Modes 1, 2 and 3, and TS 3.5.3 (ECCS-Shutdown) requires one ECCS residual heat removal (RHR) subsystem and one ECCS recirculation subsystem to be operable in Mode 4.

NRC FORM 366A (11-2015)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB: NO. 3150-0104	EXPIRES: 10/31/2018
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The licensing and design basis of the ECCS per UFSAR Section 6.2.2 (ECCS System Design and Operation) credits flow channeling barriers installed in containment in response to the resolution of GL-2004-02. The two flow barrier gates that were used for removing scaffolding were not closed and secured to prevent it from being forced open during a DBA. The unsecured gates were not in accordance with design and not a sufficient robust barrier to prevent debris from entering the recirculation and containment sumps had a DBA occurred while in Mode 4. The condition is also reportable under 10CFR50.73(a)(2)(vii) (common cause inoperability of independent trains or channels) as the condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to (D) mitigate the consequences of an accident. The NRC inspector tour occurred during the time the unit was in Mode 4. The unit entered Mode 4 on June 10, 2016, at 23:30 hours. However, no CR was initiated for this condition at that time. CR-IP2-2016-04037 recorded that condition that while performing a walkdown with an NRC inspector on June 11, 2016, the NRC raised a question about an activity in the field and no condition report was initiated.

PAST SIMILAR EVENTS

A review was performed of the past three years of Licensee Event Reports (LERs) for events that involved SSFFs and/or common cause inoperability of an Engineered Safety Feature System that had a similar cause. No LERs were identified at Unit 2.

A review of all reported events during the past three years at both units identified one LER at Unit 3 that was similar. Unit 3 LER-2013-002 reported on April 29, 2013, a Safety System Functional Failure and Common Cause Inoperability of the Emergency Core Cooling System due to violation of containment sump debris barrier integrity. The LER reported that on March 4, 2013, during shutdown for a refueling outage, Radiation Protection (RP) personnel entered the reactor containment building to install plastic RP fencing for the Reactor Coolant Drain Tank (RCDT). After receiving clearance at Mode 4 to enter the Inner Crane Wall (ICW) to install fencing around the RCDT and post it as a Locked High Radiation Area (LHRA). The RP work crew assumed they could enter the ICW area through any sump barrier gate for the Emergency Core Cooling System (ECCS). The RP work crew chose to use a single gate access point due to its proximity to the RCDT.

Subsequently, a RP Technician identified that personnel had not entered the area using the double access gate and had brought in plastic fencing which was inappropriate material for the sump area. The apparent causes were an inadequate pre-job brief and inadequate procedure for Containment Entry and Egress (OAP-007, 0-RP-RWP-405) due to poor change management. The pre-job brief failed to cover the requirement to use the dual sump barrier gate access point when in Modes 1-4, nor did it address the type of fencing allowed. Corrective actions included revision of Procedure OAP-007 to clearly state that within the procedure's attachments that only the sump barrier dual access gate for 46 foot Containment ICW entries shall be used in Modes 1-4.

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(11-2015)

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The revision specified the use of the double entry gate and that one gate is to remain shut and secured at all times. Securing the gates at unit 3 which uses a slide latch does not state the use of a gate monitor. The step for Unit 2 includes statements that the gates be secured with a padlock or nut and bolt closure from the outside. This condition requires posting of a gate monitor to allow exit.

SAFETY SIGNIFICANCE

This event had no significant effect on the health and safety of the public. There were no actual safety consequences for the event because there were no accidents or transients during the time of the event. The analysis performed in response to GL-2004-02 included debris transport analysis conservatisms for transport of debris to both the IR sump and the Containment sump in excess of quantities that would be generated. Establishing normal RHR cooling to the RCS has RCS temperature below 350 degrees F and pressure less than 400 psig.

In Mode 4 the reactor is not critical and reactivity is stable. In Mode 4 there is significantly less energy in the RCS to generate debris. At the time the actual RCS pressure (pressurizer pressure) was approximately 355 psig. An evaluation of a LOCA during Mode 3 and 4 operation was performed by Westinghouse (WCAP-12476) that showed a direct reduction in break probability for Mode 4. The evaluation concluded that Mode 4 LOCAs are not a significant contributor to shutdown risk. During this event the entire flow barrier was not disabled because only two debris barrier gates were unsecured and only for the time scaffold workers were allowed to perform assigned work. The exact time the gates were open cannot be determined as the barrier gates have no electronic timing devices. However, the scaffold workers were assigned three entries with stay time limitations for heat stress of 45 minutes each for a total job time of 135 minutes. The scaffold work assignment took place in Mode 4. The unit entered Mode 4 on June 10, 2016, at 23:30 hours. For the first two of three entries, the scaffold workers had to go inside the crane wall and disassemble erected scaffolding. Per the scaffold supervisor at least one door was closed during scaffold disassembly. Therefore approximately 60 minutes were left for moving disassembled scaffolding from inside the crane wall through the open gates to the outside crane wall storage areas. Therefore most debris would have been intercepted by the flow barrier system. Also, the barrier gates swing into the crane wall so that DBA flow and forces would tend to close the gate when pressure is applied (e.g., DBA debris loads) therefore limit flow barrier bypass and sump debris loading.