

Exelon Generation Company, LLC
Byron Station
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Byron, IL 61010-9794

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10 CFR 50.73

December 23, 2009
LTR: BYRON 2009-0138

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

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Licensee Event Report 2009-001-00, "Drain Procedure for ECCS Suction Line Creates Unanalyzed Condition Due to Inadequate Configuration Requirements"

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee event report system," paragraph (a)(2)(ii)(B) as an unanalyzed condition. This condition involved inadequate controls in a safety system drain procedure that could have potentially created a leakage path outside of containment. The potential safety significance of this condition is being assessed and will be documented in a supplement to this LER.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Mr. David Gudger, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,



Daniel J. Enright
Site Vice President
Byron Station

Enclosure: LER Number 2009-001-00

LICENSEE EVENT REPORT (LER)

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

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 Records and FOIA/Privacy Service Branch (T-5 F52), 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.

1. FACILITY NAME Byron Station, Unit 1	2. DOCKET NUMBER 05000454	3. PAGE 1 of 4
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4. TITLE
Drain Procedure for ECCS Suction Line Creates an Unanalyzed Condition Due to Inadequate Configuration Requirements

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
10	28	2009	2009	001	00	12	23	2009	Byron Station, Unit 2	05000455
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE
1

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)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<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)(C)	<input type="checkbox"/> OTHER
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME David Gudger, Regulatory Assurance Manager	TELEPHONE NUMBER (Include Area Code) (815) 406-2800
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED <input checked="" type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE MONTH: 02, DAY: 15, YEAR: 2010
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 27, 2009, an on-line planned work window began for the Unit 1 Train B Residual Heat Removal (RH) suction line to replace the water as a dose reduction effort and to perform required valve stroke tests on the Sump Isolation Valve (i.e., 1SI8811B). The 1SI8811B valve receives an automatic open signal during a Loss of Coolant Accident (LOCA) to switch the Train B Emergency Core Cooling System pumps' suction to the sump. Byron Operating Procedure (BOP) RH-4, "Draining of the RH System," was initiated to drain the Unit 1 Train B RH suction line. The BOP RH-4 requires the 1SI8811B valve to be closed but it does not require it to be de-energized. On October 28, 2009, at 0027, the drain and vent valves were opened to start the draining evolution. During the draining, a Reactor Operator identified a concern that with the 1SI8811B not de-energized it was still capable of opening in response to a LOCA. This would create a leak path of radioactive sump water outside of Containment into the Auxiliary Building while the drain and vent valves were open. The cause was determined to be an inadequate drain procedure in that it did not require the 1SI8811B to be de-energized while the RH suction line was breached. Corrective actions include revising the procedure and performing an extent of condition assessment. This condition was subsequently determined to be an unanalyzed condition. There were no actual safety consequences since at no time was an SI8811 valve open when the suction line was breached. The potential safety significance is being assessed and will be reported in a supplement to this report.

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NARRATIVE

A. Background

The Emergency Core Cooling System (ECCS) [BQ/BP] has two 100% redundant trains. Each train has three phases of operations: injection, cold leg recirculation, and hot leg recirculation. In the injection phase, borated water from the Refueling Water Storage Tank (RWST) is injected into the Reactor Coolant (RC) [AB] System through the cold legs. When sufficient borated water has been removed from the RWST to maintain the reactor subcritical and the sumps can supply the required net positive suction head to the ECCS pumps, suction is switched to the sumps for cold leg recirculation. This is accomplished, in part, by an RWST low level signal automatically opening the sump isolation valve (i.e., SI8811) for each ECCS train. Though normally the SI8811 remains open during a design basis LOCA, the valve is also considered an isolation valve in the event of a faulted line outside of Containment during the accident should the line need to be isolated.

Technical Specification (TS) 3.5.2, "ECCS- Operating," is applicable in Modes 1 through 4 and allows for one train of ECCS to be inoperable for seven days. To facilitate maintenance activities on the low head subsystem of the ECCS (i.e., Residual Heat Removal (RH) [BP]), Byron Operating Procedure (BOP) RH-4, "Draining the RH System" drains the appropriate section/s of piping, when needed. The BOP RH-4 does not restrict its use to any particular Operating Mode. However, historically, maintenance on the RH system which required draining was performed in a refueling outage. The BOP RH-4 requires the SI8811 valve in the train being drained to be closed but it does not require it to be disabled from automatic opening. Similarly, BOP RH-3, "Filling the RH System," does not require the SI8811 valve to be disabled from automatically opening while refilling the suction line.

In the 2005 timeframe, an on-line dose reduction initiative, to drain and replace the water in the RH suction line after the completion of an outage, was adopted. Also, since the American Society of Mechanical Engineers (ASME) In-Service Testing (IST) stroke testing of the SI8811 valves requires the RH suction line to be drained, Exelon Generating Company, LLC, via an approved IST relief request, moved the IST tests from Refueling Mode conditions to coincide with the drain of the RH piping for the on-line dose reduction initiative.

B. Description of Event

Event Date/Time: October 28, 2009 / 0027

Unit 1 was in Mode 1 – Power Operations

RC System: Normal operating temperature and pressure

No additional structures, systems, or components were inoperable at the start of this event that contributed to the event.

On October 27, 2009, a planned work window began for the Unit 1 Train B RH suction line to replace the existing water for dose reduction purposes, perform IST stroke tests on the Unit 1 Train B SI8811 (i.e., 1SI8811B) valve and to perform maintenance on the Train B RH pump's motor. Appropriate TS Action Conditions were entered and BOP RH-4 was initiated to drain the Unit 1 Train B RH suction line.

On October 28, 2009, at approximately 0027, the vent and drain valves for the Unit 1 Train B RH suction line were positioned open and draining commenced. At approximately 0130, an on-shift licensed Reactor Operator (RO) questioned the adequacy of the BOP RH-4 controls. Specifically, the RO noticed the procedure positioned the 1SI8811B closed but it remained energized. In this configuration, the valve would be capable of automatically opening if a Loss of Coolant Accident (LOCA) were to occur. In the event of a LOCA during the draining evolution, and a subsequent switchover to cold leg recirculation occurred, a leak path would exist from the Unit 1 B sump through the open drain and vent valves into the Auxiliary Building.

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Further discussions ensued with other Operators concerning the issue raised which culminated in the Shift Manager, at approximately 0400, directing the 1SI8811B valve to be de-energized closed. However, by this time the draining was completed and the vent and drain valves re-closed. The RO initiated an Issue Report (IR) to place his concern into the Corrective Action Program (CAP) to address future RH suction line drain evolutions. At 1524 the same day, the 1SI8811B IST stroke tests and other work activities on the RH pump motor were also completed.

Based on initial response to the IR written, Operations Management de-energized the 1SI8811B during the re-fill evolution. At 2241 the Unit 1 B RH system suction piping fill was completed and the Unit 1 Train B RH returned to operable status.

Review of the Operations IR concluded that having the RH vent and drain valves open while the SI8811 valve is capable of automatic opening is an unanalyzed condition. This condition potentially has more than minor safety significance during the time this condition existed for approximately 3.5 hours.

Use of procedures BOP RH-4 and BOP RH-3 was suspended pending a root cause evaluation and appropriate corrective actions. The investigation revealed there were five other occurrences in which the RH suction vent and drain valves were open while the SI8811 valve was capable of automatically operating during Operating Modes 1 through 4. These occurrences were:

- Unit 1 RH Train B April 6, 2005
- Unit 1 RH Train A April 19, 2005
- Unit 2 RH Train B October 15, 2005
- Unit 2 RH Train A October 16, 2005
- Unit 2 RH Train B December 7, 2006

The exact duration of these previous conditions could not be determined, but is estimated to be similar to the current event. Other RH work windows occurred that required draining of the RH suction line, however due to the nature of the maintenance activities, the SI8811 valve was de-energized closed as part of the work control process.

This condition is being reported in accordance with 10 CFR 50.73 (a)(2)(ii)(B) for being in an unanalyzed condition that significantly degraded plant safety. Other 10 CFR 50.73 reporting requirements may apply after the safety significance evaluation is completed. These will be included, as appropriate, in a supplement to this report.

C. Cause of the Event

The cause of this condition was an inadequate procedure in that when executed in Operating Modes 1 through 4, the BOP RH-4 did not provide necessary requirements to ensure a flow path from Containment into the Auxiliary Building environment did not exist if an automatic SI8811 opening signal coincident with a LOCA occurred during the draining evolution. The lack of procedural controls in this procedure existed since original startup of the units. The cause of the inadequacy could not be determined.

Several contributing causes were also identified; these include:

The Work Control Process does not have an effective means to ensure rigorous technical human performance techniques are applied to the implementation of improvement initiatives.

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The Improved Technical Specifications and Bases implementation in February 1999 did not contain sufficient detail on this unique penetration configuration and its closed system outside of Containment as a barrier.

Licensed Operators received less than adequate training on the importance of maintaining a closed system intact as an isolation barrier.

D. Safety Significance

There were no actual safety consequences to this condition. At no time, in Modes 1 through 4, was a SI8811 valve in an open condition with the RH suction line breached.

If a LOCA were to have occurred requiring the initiation of the ECCS during the short timeframe the RH vent and drain valves were open, then the SI8811 valve would have opened upon a RWST low level signal and radioactive sump water would have had a leakage path outside of Containment and into the Auxiliary Building. The significance of this condition is being assessed and will be updated in a supplement to this report.

E. Corrective Actions

Procedures BOP RH-4 and BOP RH-3 will be revised to ensure the SI8811 valve is de-energized closed in Modes 1 through 4 while the RH vent and drain valves are open.

An extent of condition assessment was conducted for other containment penetrations with an isolation valve that receive an automatic open signal to mitigate a DBA. No further issues were identified. In addition, an extent of cause review will be done to assess the adequacy of other activities moved from a refueling outage condition to on-line condition.

Appropriate Work Control processes will be assessed to determine the adequacy of technical rigor being applied to improvement initiatives of this nature.

Training will be provided to Licensed Operators and Engineers concerning lessons learned from this event. In addition, the Licensed Operator Training program will be assessed to determine adequacy of training in terms of this penetration configuration and the application of TS requirements for procedure revisions that change the mode of performance of an activity.

The TS Bases has been enhanced regarding the configuration of the Containment Penetration containing the SI8811 valves.

F. Previous Occurrences

Other than the previous occurrences mentioned in Section B, there have been no similar events identified at Byron Station in previous three years.