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January 28, 2002

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United States Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

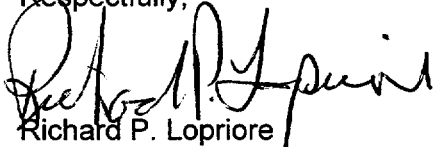
Byron Station, Unit 1  
Facility Operating License No. NPF-37  
NRC Docket No. STN 50-454

Subject: Supplement One to Licensee Event Report (LER) 454-2001-003-00

Enclosed is supplement one to LER 454-2001-003-00. The root cause evaluation for the event was revised subsequent to submittal of the original LER to incorporate additional corrective actions.

Should you have any questions concerning this matter, please contact Mr. William Grundmann, Regulatory Assurance Manager, at (815) 234-5441, extension 2800.

Respectfully,



Richard P. Lopriore  
Site Vice President  
Byron Nuclear Generating Station

RPL/JL/dpk

Enclosure: LER 454-2001-003-01

cc: Regional Administrator, NRC Region III  
NRC Senior Resident Inspector – Byron Station  
NRC Project Manager – NRR – Byron Station  
Office of Nuclear Facility Safety – Illinois Dept. of Nuclear Safety

IE 22

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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)**

<b>1. FACILITY NAME</b> Byron Station, Unit 1						<b>2. DOCKET NUMBER</b> 05000454						<b>3. PAGE</b> 1 OF 7									
<b>4. TITLE</b> Entry into Technical Specification Limiting Condition for Operation 3.0.3 Due to a Leak on a Safety Injection Valve Weld Caused by a Pre-Existing Condition and Failing to Use Correct Work Scope Revision Process																					
<b>5. EVENT DATE</b>						<b>6. LER NUMBER</b>			<b>7. REPORT DATE</b>			<b>8. OTHER FACILITIES INVOLVED</b>									
MO		DAY		YEAR		YEAR		SEQUENTIAL NUMBER	REV NO	MO		DAY		YEAR		FACILITY NAME			DOCKET NUMBER		
09		27		2001		2001		- 003	- 01	01		28		2002		FACILITY NAME			DOCKET NUMBER		
<b>9. OPERATING MODE</b> 1						<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>															
<b>10. POWER LEVEL</b> 100						20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)			50.73(a)(2)(ix)(A)						
						20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)			50.73(a)(2)(x)						
						20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)			73.71(a)(4)						
						20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)			73.71(a)(5)						
						20.2203(a)(2)(ii)			50.36(c)(2)			✓ 50.73(a)(2)(v)(B)			OTHER						
						20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)			Specify in Abstract below or in NRC Form 366A						
						20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)									
						20.2203(a)(2)(v)			✓ 50.73(a)(2)(i)(B)			50.73(a)(2)(vii)									
						20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)									
20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)															
<b>12. LICENSEE CONTACT FOR THIS LER</b>																					
<b>NAME</b> William Grundmann, Regulatory Assurance Manager										<b>TELEPHONE NUMBER (Include Area Code)</b> (815) 234-5441, X2800											
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>																					
CAUSE		SYSTEM		COMPONENT		MANU-FACTURER		REPORTABLE TO EPIX		CAUSE		SYSTEM		COMPONENT		MANU-FACTURER		REPORTABLE TO EPIX			
<b>14. SUPPLEMENTAL REPORT EXPECTED</b>										<b>15. EXPECTED SUBMISSION DATE</b>			MONTH		DAY		YEAR				
YES (If yes, complete EXPECTED SUBMISSION DATE)										✓ NO											

**16. ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

Mechanical Maintenance personnel were performing modification work to add vent piping downstream of the Safety Injection (SI) common suction header vent valve 1SI081. This work was being performed in accordance with a Design Change Package (DCP). In addition to the DCP, although not required, a weld upstream of the 1SI081 valve was selected to be reinforced. Design Engineering did not include the weld buildup as part of the DCP and this was added to the work package by the maintenance work planner after consulting the Site Welding Administrator and the Design Engineer. It is important to note that this weld buildup location was not included in the Clearance Order (CO) Request boundary. While performing the weld buildup on the existing weld upstream of the 1SI081, a pin hole leak developed. This leak was characterized as a small stream about the size of a needle.

This section of piping was outside the CO boundary and could not be isolated under normal plant operating conditions. This leak affected the common suction header for both trains of SI. At 1630 hours, it was determined that both trains of SI were inoperable and Technical Specification Limiting Condition for Operations (LCO) 3.0.3 was entered. The operating shift began ramping Unit 1 offline. The leak was repaired at approximately 25% reactor power and LCO 3.0.3 was exited. The root causes of the event were determined to be not using the appropriate process to add work scope to a modification. Corrective actions included stopping the work practice of reinforcing existing welds outside of the DCP process and training the work planners on the requirements of the DCP process. Due to the minor nature of the leak, the SI system, though technically inoperable, was still available to perform its design function. However, the on-line risk of Unit 1 was considered "yellow" when the common SI suction header was drained to facilitate the weld repair.

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<b>LICENSEE EVENT REPORT (LER)</b> TEXT CONTINUATION				Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the information and Records Management Branch (t-6 f33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office Of Management And Budget, Washington, DC 20503. If 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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Byron Station, Unit 1		STN 05000454		YEAR	SEQUENTIAL NUMBER
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(If more space is required, use additional copies of NRC Form 366A)(17)

**A. Plant Conditions Prior to Event:**

Event Date / Time: September 27, 2001 / 1330 hours

Unit 1 – Mode 1 – Power Operations, Reactor Power – 100%

Reactor Coolant System [AB]: Normal operating temperature and pressure

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

**B. Description of Event:**

An equipment modification package was developed addressing the Safety Injection [BQ] (SI) venting system on May 31, 2001. The purpose of this modification was to add an additional valve and piping downstream of the 1SI081 vent valve so that the Operators would not have to climb on ladders to vent the SI system. The work was scheduled for the week of September 24, 2001.

Upon reviewing the Design Change Package (DCP) for this modification, the maintenance department non-licensed Work Planner (WP) believed it would be prudent to enhance the sock-o-let weld on the 1SI081 vent valve during this design change. The Site Welding Administrator and Design Engineer had indicated to the WP that this improvement to the weld is not required but would be considered a good practice. On July 6, 2001, the WP added this work to the scope of the planned modification work. This additional work included a weld buildup from the current one-to-one leg length ratio to a two-to-one ratio on the sock-o-let weld for the 1SI081 valve.

This change to the work scope was not made via the formal Field Change Request (FCR) process utilized for making revisions to DCPs. The WP believed it was acceptable not to use the FCR process since this weld upgrade was not considered a critical design parameter. In addition, the WP did not include this part of the work in the request for removal from service (i.e., Clearance Request (CR)) because he knew this line could not be isolated and that "water back" welding of this nature is usually performed on in-service systems.

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**B. Description of Event (continued):**

On August 10, 2001, the work package preparation began. During the preparation, a work package hold point for an Operations Department Clearance Order (CO) Coordinator review should have been identified but it was not included in the work package. The Operations CO Coordinator prepares the method of removing the appropriate parts of the system from service in order to perform the work. Additionally, a production risk evaluation was not completed by the WP for this work. It was later determined during the investigation that even if a production risk evaluation was performed it would have screened out due to a flaw in the procedure. The Production Risk System matrix for Byron Station did not include the SI system.

On September 6, 2001, the three-week prior to the scheduled work walkdown was performed by a maintenance senior mechanic. The CO was not reviewed during this walkdown as it was not yet available. On September 21, 2001, this work package was received by the maintenance supervisor assigned to the work. This maintenance supervisor was different than the one responsible for the three-week walkdown and did not receive a detailed turnover from the supervisor performing the three-week walkdown nor did he review the work package in sufficient detail. Additionally, no maintenance risk evaluation was performed as required by the Conduct of Maintenance Manual.

On September 26, 2001, the CO was hung on the 1SI081 valve, denoting it as an isolation point. The work was scheduled to begin the next day. The maintenance supervisor still had not recognized that the weld buildup on the 1SI081 valve was outside the boundaries of the CO. On September 27, 2001, the appropriate pre-job briefings were conducted. After the pre-job briefings, the crew went directly to the field to begin work. The supervisor mistakenly assumed all work would be performed within the CO boundaries and therefore, marked "NA" in the step for Operations Department authorization.

The welding process on the 1SI081 valve was started at 1300 hours on September 27, 2001. The SI system pressure was at approximately 50 pounds per square inch. After building up the weld approximately two thirds of the way around the pipe, the existing weld started to leak a small amount of water. The leak was characterized as a small stream about the size of a needle. The maintenance crew notified their supervisor at 1345 hours; he in turn notified the Work Execution Center (WEC). An Operations representative investigated and determined that the leak was on the upstream side of the valve, which is part of the SI pumps' common suction line. The Operations representative reviewed the CO with the WEC supervisor and determined that the leak was outside the CO boundary. The Shift Manager was then notified at approximately 1530 hours.

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**B. Description of Event (continued):**

The Regulatory Assurance, Engineering, and Operations Departments were consulted regarding the operability status of the piping given this small leak. The conclusion was that the piping subsystem was inoperable. Both trains of SI were declared inoperable at 1630 hours and Technical Specification (TS) Limiting Condition for Operations (LCO) 3.0.3 was entered. A controlled shutdown of Unit 1 began at 1834 hours. At 1839 hours both SI pumps were removed from service and the common suction header was drained to allow an American Society of Mechanical Engineers Code repair of the weld. The repair was executed at 2117 hours and was successfully tested. Unit 1 was at approximately 25% power. LCO 3.0.3 was exited at 2308 hours and the Unit subsequently returned to full power. Entry into LCO 3.0.3 and the initiation of a unit shutdown is considered a condition reportable to the NRC in accordance with 10 CFR 50.73(a)(2)(i)(b). The repair of the common SI pump suction line is considered a condition that could have prevented the fulfillment of a safety system and is also reportable to the NRC in accordance with 10 CFR 50.73(a)(2)(v).

**C. Cause of Event:**

The following root causes of this event were identified:

The existing sock-o-let weld on the 1SI081 valve had a pre-existing defect that, when coupled with the decision to reinforce this weld on-line, resulted in a leakage path from the SI system common pump suction header to the Auxiliary Building general area. The internal weld defect was determined to be porosity. Since the weld was performed during original plant construction, the exact cause of the porosity is unknown.

The WP mistakenly believed this additional work could be added to the work scope without using the FCR process or creating a separate work task. Had one of these processes been used, a more rigorous review of the work would have taken place and the work would have likely not been approved.

Other contributing causes identified:

A recent change to the electronic work preparation software did not carryover the ability to automatically assist the WP to insert work hold points. The WP must remember to manually insert hold points. Due to inattention to detail, the WP did not manually insert a hold point for this work for the Operations CO Coordinator.

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**C. Cause of Event (continued):**

The Conduct of Maintenance Manual expectation to perform a maintenance risk evaluation was not conducted by the executing work supervisor due to poor implementation and communication of this process to maintenance supervisors.

No formal turnover is required between supervisors when the three-week walkdown supervisor and the work supervisor are different. This contributed to the work supervisor being unfamiliar with the details of the work scope and his inappropriate decision to mark "NA" the Operations Department Authorization step in the work package.

**D. Safety Analysis:**

The small leak would not have prevented the ability of the SI pumps to perform their function; therefore, the pumps were available and there was no increase in the risk of core damage or large early release from containment. However, during the time from 1839 hours, when both SI pumps were disabled by placing their control switches in the pull to lock position and the suction header drained for the weld repair, to 2239 hours when the header was re-pressurized, the online station risk status was determined to be "Yellow". This event constitutes a safety system functional failure.

**E. Corrective Actions:**

**1. Immediate Corrective Actions:**

A Maintenance Memorandum to the Mechanical Maintenance Department was issued stating that any welding to be completed outside of a CO boundary on an operable system would require a review by the Maintenance Manager or his designee prior to starting work.

All existing welding packages for the remainder of the SI venting modifications were reviewed and revised to remove any weld re-enforcements to existing welds. All work in the packages were verified to be downstream of the CO isolation boundary.

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**E. Corrective Actions (continued):**

**2. Corrective Action to Prevent Recurrence:**

Byron Station has stopped the practice of reinforcing existing welds unless directed by Engineering using the DCP process.

The Work Planning Department will issue a Maintenance Directive instructing the Work Planners to create an additional task for any work that is in addition to a Design Change Modification if not already covered by a FCR.

Training will be provided to the Work Planning Department personnel on the requirements of the FCR and DCP processes.

**3. Additional Corrective Actions:**

The Work Planning Department has initiated an enhanced electronic software hold point feature for Work Planners.

The Mechanical Maintenance Department will develop and evaluate a formal process, similar to the other maintenance departments, for work turnover for which the walkdown supervisor and the executing supervisor are different.

The Mechanical Maintenance Department will develop supervisor continuing training on the Maintenance Risk Program to ensure compliance to the Maintenance Risk Program similar to the other Maintenance Departments and will use this event as a case study.

The involved work planners and supervisors have been counseled on their work performance.

The Corporate Welding Administrator will add appropriate cautions to the Water-back welding procedure.

Awareness sessions will be given on the Production Risk and Maintenance Risk Programs to all Maintenance Departments.

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**E. Corrective Actions (continued):**

The Maintenance Departments will include a module in their continuing training program on the Production Risk and Maintenance Risk Programs.

The Site Engineering Department will present a review of this event and the consequences to the department during a Site Engineering Monthly Communication Meeting.

The Site Engineering Department will issue a document outlining expectations concerning the method of issuing and controlling recommendations or good practices to Maintenance.

The Production Risk matrix was re-evaluated and determined not to be flawed. The SI system was determined not to be a Production Risk system.

**F. Previous Occurrences:**

Condition Report B1998-02239, "2CV01PB Vent Line Cut In," May 2, 1998.