AmerGen
An Exelon Company

Clinton Power Station
R. R. 3, Box 228
Clinton, IL 61727

10 CFR 50.73
SRRS 5A.108

U-603761
April 12, 2006

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

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Licensee Event Report 2004-002-01

Enclosed is Licensee Event Report (LER) No. 2004-002-01: Mispositioned Standby Liquid Control Air Sparge Valve Results in High Boron Concentration. The report has been revised to change corrective action and make editorial changes. This report is being submitted in accordance with the requirements of 10CFR50.73.

Should you have any questions concerning this report, please contact Mr. William Iliff, Regulatory Assurance Manager, at (217)-937-2800.

Respectfully,

R. S. Bement
Site Vice President
Clinton Power Station

RSF/blf

Enclosures: Licensee Event Report 2004-002-01
Summary of Commitments

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – IEMA Division of Nuclear Safety

JE22

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory 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 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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE
Mispositioned Standby Liquid Control Air Sparge Valve Results in High Boron Concentration

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	05000
04	07	2004	2004	- 002 -	01	04	12	2006	None	05000

9. OPERATING MODE: 1

10. POWER LEVEL: 093

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)	X 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

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
E. E. Tiedemann	(217) 937-2815

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

14. SUPPLEMENTAL REPORT EXPECTED		15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)*	☒ NO				

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

The air sparge valve, a normally locked closed valve, for the Standby Liquid Control (SLC) tank was left open after mixing the chemical added by an Engineering Change (Enriched Boron) during outage C1R09 in February, 2004. Following investigation of SLC tank level lowering, the open valve was identified and closed on April 6, 2004.

A sample of the SLC tank solution was taken on April 7 to verify boron concentration was within the required Technical Specification (TS) limits of TS Figure 3.1.7-1. The results indicated that the boron solution was outside the TS limit. TS 3.1.7 Action B requires restoration, to Operable, of at least one train of SLC within 8 hours. Since the concentration was high on April 7, the Boron concentration was assumed to be in excess of the TS required limit from the time the air sparge valve was closed on April 6, longer than allowed by TS 3.1.7.

The open air sparge valve caused evaporation of water in the SLC storage tank resulting in boron concentration exceeding the TS required upper limit. The causes of the event were a human factor flaw in the sequencing of the procedure steps to close the valve following its use in mixing the solution in the SLC tank, and not fully implementing the locked valve program.

Corrective actions are to correct the human factor flaw in the procedure, and to fully implement the locked valve program.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

PLANT OPERATING CONDITIONS PRIOR TO THE EVENT
Unit: 1 Event Date: 4/7/2004 Event Time: 1522 Central Standard Time
Mode: 1 (POWER OPERATION) Reactor Power: 93 percent

DESCRIPTION OF THE EVENT
On 6/25/04, following considerable challenges to interpreting NUREG 1022, 'Event Reporting Guidelines 10CFR50.72 and 50.73', Station Management determined that this event should be reported under the provisions of 10CFR50.73(a)(2)(i)(B).

In February 2004, during refuel outage C1R09, Standby Liquid Control (SLC) System [BR] air sparge valve [SHV] was opened to aid in mixing enriched boron to the SLC storage tank [TK] for an Engineering Change.

On 2/10/2004 at 1719 hours during Refuel Outage C1R09, the Sodium Pentaborate (Boron) change-out in the Standby Liquid Control tank was completed in accordance with procedure CPS 3314.02, 'Standby Liquid Control Fill and Chemical Changes.' SLC boron concentration was determined to be 12.97 percent and verified to be within the Technical Specification (TS) required limits.

On 3/17/2004, with the plant in Mode 1, monthly TS Surveillance Requirement (SR) 3.1.7.5 was performed to verify boron concentration within the limits of TS Figure 3.1.7-1. The SLC boron concentration was determined to be 12.91 percent, within the limit of 13.8 percent.

On 4/6/2004 at 1457 hours, investigation of SLC tank level lowering was in progress. When the inspection cover on the SLC storage tank was opened, turbulence was observed in the tank. Investigation determined that the air sparge valve, 1C41-F012 was open. This is a normally locked closed valve. Operators restored 1C41-F012 to the locked closed position. All other equipment was found in normal position. Condition Report 213560 was written to document the identified condition.

On 4/6/2004 at 1611 hours, a prompt investigation was initiated for the SLC air sparge valve out of position. Chemistry management decided to assess the impact the decreased volume would have on the acceptability region of TS Figure 3.1.7-1. When the current tank level was compared to the last SLC Boron weight percent, it was determined that the concentration should be in the acceptable range, and thus well within the TS limits, based on a comparison between the current tank volume and the last weight-percent Boron sample (March).

At the time the air sparge valve was found in the incorrect position on April 6, there were no triggers to sample for Boron concentration since TS SR 3.1.7.5 was current.

On 4/7/2004, after more discussion, it was determined that since the cause of the tank level lowering was the result of water evaporation, the expectation that weight-percent volume would remain unchanged was erroneous. Under most conditions, weight-percent Boron remains unchanged compared to tank level, since simply draining water out of the tank does not change the

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

concentration of chemical per unit volume. Evaporating water, however, will change the concentration of chemical per unit volume.

On 4/7/2004 at 1522 hours, the result of the SLC Boron sample was 14.08 percent concentration by weight and greater than the maximum value of 13.8 percent allowed by TS. Both SLC subsystems were declared inoperable but available. Limiting Condition for Operation (LCO) 3.1.7 Action A.1 was entered for each subsystem. This action required restoration of each subsystem to operable status within 7 days. In addition, LCO 3.1.7 Action B.1 was entered. This action required restoration of one SLC subsystem to operable status within 8 hours. Water was then added to the SLC tank.

The decision to sample the Boron solution the day after the air sparge valve was closed was influenced by a realization that evaporation was causing the lowering of the tank level during the previous several weeks. When the SLC tank was sampled on April 7, 2004 and found to be outside the TS limits, TS 3.1.7 was properly entered, since TS entry is based on the time of discovery.

On 4/7/2004 at 1947 hours, SLC Boron concentration was determined to be 13.00 percent concentration by weight. Both SLC subsystems were declared operable and LCO 3.1.7 actions were exited.

On 6/25/2004, Station Management determined that since the concentration was high on April 7, the Boron concentration was assumed to be in excess of the TS required limit from the time the air sparge valve was closed on April 6 which was longer than allowed by TS 3.1.7.

CAUSE OF THE EVENT

The root cause is a human factor flaw in the sequencing of the procedure steps to close the valve following its use to mix the solution in the SLC tank. The restoration step for a critical valve was placed in a contingent step instead of in a stand-alone step in a restoration section of the procedure that would always be performed.

A contributing cause is implementation of a locked valve program that did not comply with the requirements in procedure OP-AA-108-103, 'Locked Equipment Program.' The locked valve program was developed from a superceded site-specific procedure and was reviewed for fatal flaws only when adopting the Exelon procedure, instead of evaluating content. There were no changes identified, and therefore no actions were initiated to bring the station into compliance.

SAFETY ANALYSIS

This event is reportable under the provisions of 10CFR50.73(a)(2)(i)(B) due to operation prohibited by TS.

There were no actual safety consequences associated with this event. The basis for the upper boron concentration limit on TS Figure 3.1.7-1 is precipitation of the boron solution. For this event, the SLC tank and contents were shown to be above the temperature limit for precipitation during the entire time at the high concentration. Therefore, the SLC system was capable of performing its safety function throughout this event. No safety system functional failures occurred during this event.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

CORRECTIVE ACTIONS
A restoration step for closing the air sparge valve has been added as a stand-alone step at the end of procedure CPS 3314.02, in Revision 13c, to correct the procedure flaw.

The Clinton Power Station locked valve program has been revised and implemented in accordance with the controls specified in procedure OP-AA-108-103, including use of a locked equipment log.

The air sparge valve is unique in that the locked valve lineup had no redundant or backup barriers to prevent mispositioning. No other systems were affected. As an extent of condition review, the locked valve lineup (except for valves inaccessible during operation) was performed. Over 700 valves were checked and no other instances of mispositioned valves were found. In addition, complete valve lineups were performed for selected safety-related systems and no mispositioned valves were found.

PREVIOUS OCCURRENCES
None.

COMPONENT FAILURE DATA
None.

SUMMARY OF COMMITMENTS
CPS Letter U-603761

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITMENT TYPE	
	ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
This document has no Regulatory Commitments.		