

Clinton Power Station  
8401 Power Road  
Clinton, IL 61727

U-603976  
August 23, 2010

SRRS 5A.108

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 2010-002-01

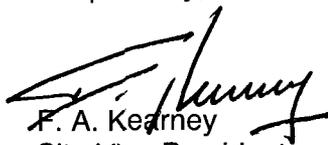
Enclosed is Licensee Event Report (LER) No. 2010-002-01: Excessive Leakage through Feedwater Isolation Valve 1B21F032B. This report is being submitted in accordance with 10 CFR 50.73.

The attached report is revised to update reporting requirements and corrective action and to reference the station corrective action document.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact Mr. D. J. Kemper at (217) 937-2800.

Respectfully,

  
F. A. Kearney  
Site Vice President  
Clinton Power Station

RSF/blf

Enclosures: Licensee Event Report 2010-002-01

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

LEAD  
NRR

**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.

|  |                                     |                          |
|--|-------------------------------------|--------------------------|
| <b>1. FACILITY NAME</b><br>Clinton Power Station, Unit 1 | <b>2. DOCKET NUMBER</b><br>05000461 | <b>3. PAGE</b><br>1 OF 4 |
|--|-------------------------------------|--------------------------|

**4. TITLE**  
Excessive Leakage through Feedwater Isolation Valve 1B21F032B

| 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 |
| 02            | 03  | 2010 | 2010          | - 002 -           | 01      | 08             | 23  | 2010 |                              | 05000         |
|               |     |      |               |                   |         |                |     |      | FACILITY NAME                | DOCKET NUMBER |
|               |     |      |               |                   |         |                |     |      |                              | 05000         |

|  |  |   |  |   |  |  |  |  |  |  |
|--|--|---|--|---|--|--|--|--|--|--|
| <b>9. OPERATING MODE</b><br><br>2          | <b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply) |   |  |   |  |  |  |  |  |  |
| <b>10. POWER LEVEL</b><br><br>3%           | <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 checked="" 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 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 checked="" type="checkbox"/> 50.73(a)(2)(v)(C) | <input type="checkbox"/> OTHER                         |   |  |  |  |  |  |  |
| <input type="checkbox"/> 20.2203(a)(2)(vi) | <input checked="" 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<br>D. J. Kemper, Regulatory Assurance Manager | TELEPHONE NUMBER (Include Area Code)<br>(217) 937-2800 |
|---|--|

**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 |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
| B     | SJ     | ISV       | A391         | Y                  |       |        |           |              |                    |

|  |  |
|--|--|
| <b>14. SUPPLEMENTAL REPORT EXPECTED</b><br><input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | <b>15. EXPECTED SUBMISSION DATE</b><br>MONTH:      DAY:      YEAR: |
|--|--|

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

On February 3, 2010, after entering Mode 2 (Startup) following refueling outage C1R12, it was discovered that a primary containment local leak rate test (LLRT) performed on feedwater check valve, 1B21-F032B, exceeded its acceptance criteria. Technical Specification (TS) Surveillance Requirement (SR) 3.6.1.3.11 requires that the combined leakage rate for both primary containment feedwater penetrations to be less than or equal to 2 gallons per minute (gpm) for the worst of the isolation valves. The measured leakage rate for 1B21-F032B was reported to be 2.5 gpm. This leakage rate is greater than that assumed in the plant safety analysis.

The unit was placed in Mode 4 (Cold Shutdown) to repair the valve and to re-perform the LLRT. After lubricating the valve actuator and stroking the check valve, the LLRT was performed to confirm the valve could meet its safety function for the Feedwater Leakage Control System (FWLCS). Following the satisfactory completion of the LLRT, plant startup was re-commenced on February 4, 2010.

The cause of the 1B21-F032B check valve to fail its leak rate test was age-related degradation of the lubrication causing increased friction in the actuator.

Corrective action for this event includes establishing preventive maintenance activities to lubricate and overhaul the actuators.

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

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**NARRATIVE**

**EVENT DESCRIPTION**

On February 3, 2010, after entering Mode 2 (Startup) following refueling outage C1R12, it was discovered that a primary containment local leak rate test (LLRT) performed on feedwater [SJ] check valve [ISV], 1B21-F032B, exceeded its acceptance criteria. Technical Specification (TS) Surveillance Requirement (SR) 3.6.1.3.11 requires that the combined leakage rate for the primary containment feedwater penetrations to be less than or equal to 2 gallons per minute (gpm) through the worst of the isolation valves. The measured leakage rate for 1B21-F032B was reported to be 2.5 gpm. This leakage rate is greater than that assumed in the plant safety analysis.

The unit was placed in Mode 4 (Cold Shutdown) to repair the valve and to re-perform the LLRT. After lubricating the valve actuator and stroking the check valve, the LLRT was performed to confirm the valve could meet its safety function for the Feedwater Leakage Control System (FWLCS). Following the satisfactory completion of the LLRT, plant startup was re-commenced on February 4, 2010.

**Time line of events**

|           |      |  |
|-----------|------|--|
| 1/18/2010 | 0100 | Local Leak Rate Test performed for 1B21F032B with 2.5 gpm leakage rate   |
| 2/2/2010  | 2138 | Plant entered Mode 2 (Startup)   |
| 2/3/2010  | 0730 | Issue Report 1025446 written for failed LLRT not identified, discovered by Engineering reviewer  |
| 2/3/2010  | 1100 | Operations notified of condition; Control Room declared 1B21-F032B inoperable and initiated action in accordance with TS 3.6.1.3 to close the feedwater inlet shutoff valve, 1B21F065B, to isolate the affected penetration. |
| 2/3/2010  | 1136 | 1B21-F065B closed and breaker turned off to comply with TS 3.6.1.3, Condition C Required Actions   |
| 2/3/2010  | 1447 | FWLCS declared inoperable in accordance with TS LCO 3.6.1.9; entered 30-day action to restore FWLCS to an operable condition.  |
| 2/3/2010  | 1930 | Plant entered Mode 3 (Hot Shutdown)  |
| 2/4/2010  | 0521 | Plant entered Mode 4 (Cold Shutdown)   |
| 2/4/2010  | 1000 | Lubricated actuator and stroked valve  |
| 2/4/2010  | 1330 | Performed LLRT   |
| 2/4/2010  | 1533 | Entered Mode 2; recommenced plant startup  |

This issue was entered into the corrective action program as issue report (IR) number 1025446.

**CAUSE OF EVENT**

The cause of the 1B21-F032B check valve to fail its leak rate test was age-related degradation of the lubrication causing increased friction in the actuator. The actuator had not been re-lubricated since initial installation during a refueling outage that ended in May 1999. No preventive maintenance activities existed to lubricate or overhaul the actuator.

**SAFETY ANALYSIS**

This event is reportable under the provisions of: 10 CFR 50.73(a)(2)(i)(B) due to a condition prohibited by the plant Technical Specifications; 10 CFR 50.73(a)(2)(ii) due to a degraded or unanalyzed condition; and 10 CFR 50.73(a)(2)(v) due to a condition that could have prevented fulfillment of the safety function of the feedwater

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**NARRATIVE**

containment isolation valves to ensure offsite doses are not exceeded following a design basis loss of coolant accident (DBA LOCA).

The feedwater isolation valves and the FWLCS provide a sealing system to ensure that following a design basis accident loss of coolant accident (DBA LOCA), offsite doses are not exceeded. The 2 gpm leakage limit in TS SR 3.6.1.3.11 has been shown by testing and analysis to bound the condition following a DBA LOCA where, for a limited time, both air and water are postulated to leak through this pathway. The leakage rate of each primary containment feedwater penetration is assumed to be the maximum pathway leakage, i.e., the worst of the two isolation valves in each penetration.

Once the condition was identified, prompt actions were taken to ensure that the affected penetration was isolated to comply with TS. Once the plant was in Mode 4, corrective actions were taken to repair and re-test the valve to ensure leakage rates were restored to within acceptance limits.

No actual leakage path existed. The motor operated feedwater containment isolation valve, 1B21-F065B, had been in the closed position prior to plant startup. Once the condition was identified, 1B21-F065B was verified to be in the closed position, and the power was removed from its operator.

**CORRECTIVE ACTIONS**

The valve was repaired by lubricating the valve actuator. Following completion of repairs, the valve was stroked. An LLRT was completed at 1330 on February 4, 2010 with satisfactory results (0.15 gpm). Mode 2 was entered at 1533 on February 4, 2010.

A service request has been approved for preventive maintenance activities to rebuild the 1B21-F032 actuators every 12 years and to lubricate and exercise the valve linkage every refueling outage.

**PREVIOUS OCCURRENCES**

This is the first failure of the 1B21-F032B since the installation and implementation of a Feedwater Leakage Control system in 2000. In refueling outage C1R11, which occurred in January 2008, a similar testing failure occurred on valve 1B21-F032A with a leak rate result of 3.75 gpm. Following the LLRT failure, the internals of the valve were inspected and found to be satisfactory. Observation of a valve stroke with the valve partially disassembled revealed uneven and un-repeatable side to side movement of the actuator. The disc was cleaned and the actuator was re-lubricated resulting in proper seating of the valve. This event was not reported, and no causal analysis was performed. The testing failure of valve 1B21-F032A is being reported under this LER.

The following LERs occurred prior to the installation of a Feedwater Leakage Control system:

LER 92-003 dated March 31, 1992 – Local Leak Rate Test Failure of Feedwater Containment Isolation Valves Results in Total Leakage Rates in Excess of Technical Specification and 10CFR50 Appendix J Limits.

LER 95-002-01 dated June 6, 1995 – Local Leak Rate Test Failures of Feedwater Containment Isolation Valves Results in Total Leakage Rates Greater than Technical Specification and 10CFR50, Appendix J Limits.

**LICENSEE EVENT REPORT (LER)  
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**NARRATIVE**

LER 96-013-01 dated July 24, 1997 – Inadequate Actuator Design and Failure to Recognize Limitations of Resilient Seat Design Result in Local Leak Rate Test Failures of Feedwater Containment Isolation Valves and Total Leakage Rates Greater than Technical Specification and 10CFR50, Appendix J Limits.

**COMPONENT FAILURE DATA**

Feedwater valves 1B21-F032A and 1B21-F032B are 20-inch, air assisted, non-slam tilting disc check valves, manufactured by Anchor Darling Valve Company.