

Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

January 11, 2010

10 CFR 50.73

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

Browns Ferry Nuclear Plant, Unit 3 Facility Operating License No. DPR-68 NRC Docket No. 50-296

Subject: Licensee Event Report 50-296/2009-002

The enclosed Licensee Event Report (LER) provides details of inoperable High Pressure Coolant Injection System due to excessive water in the steam line drain. The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(v)(D), as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact F. R. Godwin, Site Licensing and Industry Affairs Manager, at (256) 729-2636.

Respectfully,

K. J. Polson Vice President

cc: See page 2

I E22 NACK U.S. Nuclear Regulatory Commission Page 2 January 11, 2010

Enclosure cc (w/ Enclosure):

NRC Regional Administrator - Region II

NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

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

I. PLANT CONDITION(S)

At the time of discovery, Browns Ferry Nuclear (BFN) Plant Units 1, 2 and 3 were at 100 percent power.

II. DESCRIPTION OF EVENT

A. Event:

On November 12, 2009, at 1711 hours Central Standard Time (CST) the Unit 3 High Pressure Coolant Injection (HPCI) [BG] system was declared inoperable due to excessive water in the turbine exhaust line drain pot. BFN Operations personnel entered Technical Specification (TS) 3.5.1, Condition C. TS 3.5.1 Required Actions C.1 and C.2 required the Reactor Core Isolation Cooling (RCIC) [BN] system to be immediately verified by administrative means to be operable, and the HPCI system to be restored to operable status in 14 days.

On November 12, 2009, 1235 hours CST, Unit 3 Operations personnel completed the performance of 3-SR-3.5.1.7 and commenced returning of the HPCI turbine to stand by readiness. At approximately 1235 hours CST, while securing the HPCI turbine, BFN Operations personnel received an alarm indicating high water level in the HPCI turbine exhaust steam drain pot. In accordance with the applicable Alarm Response Procedure, Operations personnel opened the HPCI system condensate level control valve, and subsequently dispatched personnel to the HPCI pump to drain the condensate from the drain pot through the drain pot level switch instrument test drain. Operations personnel removed in excess of 80 gallons of condensate from the HPCI turbine exhaust drain pot to clear the alarm. BFN Chemistry personnel analyzed the condensate and determined it was from the suppression pool. At 1711 hours CST, because Operations personnel could not verify the HPCI exhaust line was fully drained they declared the HPCI system inoperable.

The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(v)(D), as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

B. <u>Inoperable Structures, Components, or Systems that Contributed to the Event:</u>

None.

C. <u>Dates and Approximate Times of Major Occurrences:</u>

November 12, 2009 at 1130 hours CST	Unit 3 Operations personnel completed performance of 3-SR-3.5.1.7 and commenced returning of the HPCI turbine to stand by readiness
November 12, 2009 at 1235 hours CST	Unit 3 Operations personnel receive alarm indicating the turbine exhaust drain tank level is high.
November 12, 2009, at 1711 hours CST	Unit 3 Operations personnel declare Unit 3 HPCI inoperable.
November 12, 2009, at 2136 hours CST	Operations personnel made an Emergency Notification System report in accordance with 10 CFR 50.72(b)(3)(v).

U.S. NUCLEAR REGULATORY COMMISSION NRC FORM 366A (9-2007) LICENSEE EVENT REPORT (LER) DOCKET (2) LER NUMBER (6) PAGE (3) **FACILITY NAME (1)** SEQUENTIAL REVISION YEAR NUMBER NUMBER Browns Ferry Nuclear Plant Unit 3 05000296 3 of 4 2009 -- 002 -- 00

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

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

Operations personnel received a main control room alarm indicating the turbine steam exhaust drain tank level was high.

F. Operator Actions

The Operator opened the HPCI turbine exhaust condensate pot level control valve. An Auxiliary Unit Operator was dispatched to the HPCI pump to manually drain the condensate from the HPCI turbine exhaust drain pot.

G. Safety System Responses

None.

III. CAUSE OF THE EVENT

A. Immediate Cause

The immediate cause of HPCI inoperability was high water level in the HPCI turbine exhaust drain pot.

B. Root Cause

The root cause for HPCI inoperability was siphoning of water from the suppression pool. The siphoning resulted in water flowing back from the suppression pool to the HPCI drain pot via the HPCI drain pot drain line.

C. Contributing Factors

The original design of the HPCI exhaust drain piping was intended to rely on gravity for the flow of condensate from the HPCI turbine exhaust drain pot to the suppression pool. However, the piping configuration rises in elevation from the turbine exhaust drain pot to the suppression pool. The drain line penetrates the top of the torus and terminates below the suppression pool water line; thus, requiring check valves to prevent the siphoning of water out of the suppression pool. The drain path afforded by the drain line is functional only during turbine operation. Some of the later vintage plants do not utilize the drain line.

IV. ANALYSIS OF THE EVENT

The HPCI exhaust steam line contains a steam pot and steam trap drain line arrangement that is connected to the low point of the HPCI turbine exhaust line. The drain pot collects condensate present in the steam and discharges it through the steam trap to the suppression pool through a two inch line (HPCI system turbine exhaust drain line) or bypasses flow to the gland steam condenser through a one inch line. The check valves installed in the HPCI turbine exhaust drain line valves should prevent suppression pool water from flowing into the turbine.

A drain pot level control valve controls the condensate level in the drain pot sending the majority of the condensate to the gland seal condenser. The HPCI turbine exhaust drain pot level control valve automatically opens on receipt of a high drain pot level signal via two HPCI turbine exhaust drain line

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FACILITY NAME (1)		05000296		LER NUMBER (6	PAGE (3)					
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Browns Ferry Nuclear Plant Unit 3			2009	002	00	4 of 4				

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

pot level switches. In this event, suppression pool water flowed back to the HPCl turbine exhaust drain pot following HPCl system operation.

V. ASSESSMENT OF SAFETY CONSEQUENCES

The safety consequences of this event were not significant. BFN TS 3.5.1, Required Action C.2, allows continued power operation for up to 14 days with the HPCI system inoperable as long as the RCIC system is operable. In this condition, the other required Emergency Core Cooling Systems were operable and remained capable of mitigating design basis accidents and transients assumed in the UFSAR. In addition, the RCIC system was verified operable during this time and would have automatically provided makeup water to the reactor if required, at most reactor operating pressures. Therefore, TVA concludes that there was no significant reduction in the protection of the public by this event.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Immediate corrective actions included closing and administratively controlling two series valves in the turbine exhaust drain line between the turbine exhaust drain pot and the suppression pool. This isolates the suppression pool from the turbine exhaust drain pot. The HPCI turbine was placed in service as a post maintenance test for isolating the suppression pool from the turbine exhaust drain pot. No issues were found with the HPCI system performance during and following the post maintenance testing.

B. Corrective Actions to Prevent Recurrence - The corrective actions to prevent recurrence are being managed by BFN's corrective action program.

TVA is planning to permanently remove the HPCI turbine exhaust drain line from service.

VII. ADDITIONAL INFORMATION

A. Failed Components

None.

B. PREVIOUS LERS ON SIMILAR EVENTS

None.

C. Additional Information

Corrective action document for this report is Problem Evaluation Report 207915.

D. Safety System Functional Failure Consideration:

This event is classified as a safety system functional failure according to NEI 99-02.

E. Scram With Complications Consideration:

This event was not a complicated scram according to NEI 99-02.

VIII. COMMITMENTS

None ...



Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

January 8, 2010

10 CFR 50.73

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

> Browns Ferry Nuclear Plant, Unit 3 Facility Operating License No. DPR-68 NRC Docket No. 50-296

Subject: Licensee Event Report 50-296/2009-002

The enclosed Licensee Event Report (LER) provides details of inoperable High Pressure Coolant Injection System due to excessive water in the steam line drain. The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(v)(D), as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact F. R. Godwin, Site Licensing and Industry Affairs Manager, at (256) 729-2636.

Respectfully,

K. J. Polson Vice President

cc: See page 2

U.S Nuclear Regulatory Commission

Page 2 January 8, 2010

Enclosure

cs (w/ Enclosure):

NRC Regional Administrator - Region II

NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

U.S. Nuclear Regulatory Commission Page 3 January 8, 2010

FRG:JEE:SWA:LAJ Enclosure bcc (Enclosure):

- G. P. Arent, EQB 1B-WBN
- D. Green, LP 4K-C
- D. E. Jernigan, LP 3R-C
- R. M. Krich, LP 3R-C
- J. H. McCarthy, NAB 1A-BFN
- K. J. Polson, NAB 2A-BFN
- J. J. Randich, POB 2C-BFN
- P. D. Swafford, LP 3R-C
- L. E. Thibault, LP 3R-C
- E. J. Vigluicci, WT 6A-K
- INPO: LEREvents@inpo.org
- NSRB Support, LP 5M-C
- EDMS, WT CA-K

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Browns Ferry Nuclear Plant Unit 3	05000296	2009	002	00	2 of 4		
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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

I. PLANT CONDITION(S)

At the time of discovery, Browns Ferry Nuclear (BFN) Plant Units 1, 2 and 3 were at 100 percent power.

II. DESCRIPTION OF EVENT

A. Event:

On November 12, 2009, at 1711 hours Central Standard Time (CST) the Unit 3 High Pressure Coolant Injection (HPCI) [BG] system was declared inoperable due to excessive water in the turbine exhaust line drain pot. BFN Operations personnel entered Technical Specification (TS) 3.5.1, Condition C. TS 3.5.1 Required Actions C.1 and C.2 required the Reactor Core Isolation Cooling (RCIC) [BN] system to be immediately verified by administrative means to be operable, and the HPCI system to be restored to operable status in 14 days.

On November 12, 2009, 1235 hours CST, Unit 3 Operations personnel completed the performance of 3-SR-3.5.1.7 and commenced returning of the HPCI turbine to stand by readiness. At approximately 1235 hours CST, while securing the HPCI turbine, BFN Operations personnel received an alarm indicating high water level in the HPCI turbine exhaust steam drain pot. In accordance with the applicable Alarm Response Procedure, Operations personnel opened the HPCI system condensate level control valve and subsequent dispatched personnel to the HPCI pump to drain the condensate from the drain pot though the drain pot level switch instrument test drain. Operations personnel removed in excess of 80 gallons of condensate from the HPCI turbine exhaust drain pot to clear the alarm. BFN Chemistry personnel analyzed the condensate and determined it was from the suppression pool. At 1711 hours CST, because Operations personnel could not verify the HPCI exhaust line was fully drained they declared the HPCI system inoperable.

The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(v)(D), as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an

Inoperable Structures, Components, or Systems that Contributed to the Event: None.

C. Dates and Approximate Times of Major Occurrences:

November 12, 2009 at 1130 hours CST

November 12, 2009 at/1235 hour

Unit 3 Operations personnel completed performance of 3-SR-3.5.1.7 and commenced returning of the HPCI turbine to stand by readiness.

Unit 3 Operations personnel receive alarm indicating the turbine exhaust drain tank level is hiah.

Unit 3 Operations personnel declare Unit 3 HPCI inoperable.

Operations personnel made an Emergency Notification System report in accordance with 10 CFR 50.72(b)(3)(v).

November 12, 2009, at 1711 hours CST

ember 12, 2009, at 2136 hours CST

NRC FORM 366A (9-2007)

SAME

FACILITY NAME (1)	DOCKET (2)	l	LER NUMBER (6	5)	PAGE (3)		
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rowns Ferry Nuclear Plant Unit 3	05000296	2009	002	00	3 of 4		
					•		

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

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

Operations personnel received a main control room alarm indicating the turbine steam exhaust drain tank level was high.

F. Operator Actions

The Operator opened the HPCI turbine exhaust condensate pot level control valve. An Auxiliary Unit Operator was dispatched to the HPCI pump to manually drain the condensate from the HPCI turbine exhaust drain pot.

G. Safety System Responses

None.

III. CAUSE OF THE EVENT

A. Immediate Cause

The immediate cause of HPCI inoperability was high water level in the HPCI turbine exhaust drain pot.

B. Root Cause

The root cause for HPCI inoperability was siphoning of water from the suppression pool. The siphoning resulted in water flowing back from the suppression pool to the HPCI drain pot via the HPCI drain pot drain line.

C. Contributing Factors

The original design of the HPCI exhaust drain piping was intended to rely on gravity for the flow of condensate from the HPCI turbine exhaust drain pot to the suppression pool. However, the piping configuration rises in elevation from the turbine exhaust drain pot to the suppression pool. The drain line penetrates the top of the torus and terminates below the suppression pool water line: thus, requiring check valves to prevent the siphoning of water out of the suppression pool, The drain path afforded by the drain line is functional only during turbine operation/ Φη søme@ later vintage plants_the drain line is not utilized.

IV. ANALYSIS OF THE EVENT do not use the D. L.

The HPCI exhaust steam line contains a steam pot and steam trap drain line arrangement that is connected to the low point of the HPCI turbine exhaust line. The drain pot collects condensate present in the steam and discharges it through the steam trap to the suppression pool through a two inch line (HPCI system turbine exhaust drain line) or bypasses flow to the gland steam condenser through a one inch line. The check valves installed in the HPCI turbine exhaust drain line valves should prevent suppression pool water from flowing into the turbine.

A drain pot level control valve controls the condensate level in the drain pot sending the majority of the condensate to the gland seal condenser. The HPCI turbine exhaust drain pot level control valve automatically opens on receipt of a high drain pot level signal via two HPCI turbine exhaust drain line

U.S. NUCLEAR REGULATORY COMMISSION NRC FORM 366A (9-2007)LICENSEE EVENT REPORT (LER) FACILITY NAME (1) DOCKET (2) LER NUMBER (6) PAGE (3) **SEQUENTIAL** REVISION YEAR NUMBER NUMBER **Browns Ferry Nuclear Plant Unit 3** 05000296 2009 -- 002 -- 00 4 of 4

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

pot level switches. In this event, suppression pool water flowed back to the HPCI turbine exhaust drain pot following HPCI system operation.

V. ASSESSMENT OF SAFETY CONSEQUENCES

The safety consequences of this event were not significant. BFN TS 3.5.1, Required Action C.2, allows continued power operation for up to 14 days with the HPCI system inoperable as long as the RCIC system is operable. In this condition, the other required Emergency Core Cooling Systems were operable and remained capable of mitigating design basis accidents and transients assumed in the UFSAR. In addition, the RCIC system was verified operable during this time and would have automatically provided makeup water to the reactor if required, at most reactor operating pressures. Therefore, TVA concludes that there was no significant reduction in the protection of the public by this event.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Immediate corrective actions included closing and administratively controlling two series valves in the turbine exhaust drain line between the turbine exhaust drain pot and the suppression pool. This isolates the suppression pool from the turbine exhaust drain pot. The HPCI turbine was placed in service as a post maintenance test for isolating the suppression pool from the turbine exhaust drain pot. No issues were found with the HPCI system performance during and following the post maintenance testing.

B. Corrective Actions to Prevent Recurrence - The corrective actions to prevent recurrence are being managed by BFN's corrective action program.

TVA is planning to permanently remove the HPCI turbine exhaust drain line from service.

VII. ADDITIONAL INFORMATION

A. Failed Components

None.

B. PREVIOUS LERS ON SIMILAR EVENTS

None.

C. Additional Information

Corrective action document for this report is Problem Evaluation Report 207915.

D. Safety System Functional Failure Consideration:

This event is classified as a safety system functional failure according to NEI 99-02.

E. Scram With Complications Consideration:

This event was not a complicated scram according to NEI 99-02.

VIII. COMMITMENTS

None.