



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

July 13, 2012

10 CFR 50.73

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

Browns Ferry Nuclear Plant, Units 1, 2, and 3  
Facility Operating License Nos. DPR-33, DPR-52, and DPR-68  
NRC Docket Nos. 50-259, 50-260, and 50-296

**Subject: Licensee Event Report 50-259/2012-005-01**

**Reference:** Letter from TVA to NRC, "Licensee Event Report 50-259/2012-005-00," dated May 29, 2012.

In the reference letter dated May 29, 2012, the Tennessee Valley Authority (TVA) submitted a Licensee Event Report (LER) containing details of combustible materials not in compliance with the 20-foot exclusion zone requirements. The LER indicated that additional reviews of the causal analysis were ongoing and, upon completion of the additional reviews, a supplement to the LER would be submitted. The TVA is submitting this supplemental report in accordance with 10 CFR 50.73(a)(2)(ii)(B), as any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety.

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact J. E. Emens, Jr., Nuclear Site Licensing Manager, at (256) 729-2636.

Respectfully,

K. J. Polson  
Vice President

**Enclosure:** Licensee Event Report 50-259/2012-005-01 - Combustible Materials not in Compliance with the 20-Foot Exclusion Zone Requirements

cc: See Page 2

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NRR

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cc (w/ Enclosure):

NRC Regional Administrator - Region II  
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

**ENCLOSURE**

**Browns Ferry Nuclear Plant  
Units 1, 2, and 3**

**Licensee Event Report 50-259/2012-005-01**

**Combustible Materials not in Compliance with the 20-Foot Exclusion Zone  
Requirements**

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**See Attached**

**LICENSEE EVENT REPORT (LER)**

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 FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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> Browns Ferry Nuclear Plant (BFN) Unit 1	<b>2. DOCKET NUMBER</b> 05000259	<b>3. PAGE</b> 1 of 6
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**4. TITLE:** Combustible Materials not in Compliance with the 20-Foot Exclusion Zone 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
12	22	2011	2012	005	01	07	13	2012	BFN Unit 2	05000260
									BFN Unit 3	05000296

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> <i>(Check all that apply)</i>			
<b>10. POWER LEVEL</b>  100	<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)	<small>Specify in Abstract below or in NRC Form 366A</small>

**12. LICENSEE CONTACT FOR THIS LER**

<b>FACILITY NAME</b> Eric Bates, Licensing Engineer	<b>TELEPHONE NUMBER (Include Area Code)</b> 256-614-7180
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**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

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

At Browns Ferry Nuclear Plant (BFN), exclusion red zones are established for compliance with 20-foot separation requirements of Appendix R Section III.G.2.b, i.e., separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards.

On December 22, 2011, during an extent of condition inspection of red floor areas, transient combustibles were identified in exclusion red zones of BFN Units 1, 2, and 3. Additionally, on February 3, 2012, during walkdown of the Reactor Buildings, more combustibles were identified in an exclusion red zone of BFN Unit 2.

On March 28, 2012, it was determined that intervening combustible materials (i.e., cables and insulation) found in the 20-foot exclusion red zones were not in compliance with Appendix R Section III.G.2.b and the associated NRC approved exemption issued for BFN. As a result of the intervening combustible material found in the 20-foot exclusion red zones, the degree of separation is lacking for redundant Appendix R safe shutdown trains.

The cause was the misclassification by Operations personnel of the combustible materials as "in-use materials" in the 20-foot exclusion red zones.

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Browns Ferry Nuclear Plant Unit 1	05000259	2012	-- 005	-- 01	2 of 6

**NARRATIVE**

**I. PLANT CONDITION(S)**

At the time the condition was identified, Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, were in Mode 1 at approximately 100 percent rated thermal power.

**II. DESCRIPTION OF EVENT**

**A. Event**

At BFN, exclusion red zones are established for compliance with the 20-foot separation requirements of Appendix R Section III.G.2.b and the associated NRC approved exemption. Appendix R Section III.G.2.b states the following, "Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area..."

On December 22, 2011, during an extent of condition inspection of the 20-foot exclusion red zones, combustible materials were identified in the exclusion red zones of BFN Units 1, 2, and 3. Additionally, on February 3, 2012, during a walkdown of the Reactor Buildings [NG], more combustible materials were identified in a BFN Unit 2 20-foot exclusion red zone.

On March 28, 2012, it was determined that intervening combustible materials (i.e., cables [CBL] and insulation [ISL]) found in the 20-foot exclusion red zones were not in compliance with Appendix R Section III.G.2.b and the associated NRC approved exemption issued for BFN. The existing exemption permits limited intervening combustibles in the form of cables in trays, electrical panels [PL], and Thermolag fire wrap material in these areas. The recently identified intervening combustibles were not present when the existing exemption was approved by the NRC. As a result of the intervening combustible material found in the 20-foot exclusion red zones, the degree of separation is lacking for redundant Appendix R safe shutdown trains.

This condition was reported to the NRC on March 29, 2012, at 2020 Central Daylight Time (CDT).

**B. Inoperable Structures, Components, or Systems that Contributed to the Event**

There were no inoperable structures, components, or systems that contributed to this condition.

**C. Dates and Approximate Times of Major Occurrences**

December 22, 2011	Combustible materials were identified in BFN Units 1, 2, and 3 20-foot exclusion red zones.
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**NARRATIVE**

February 3, 2012

Additional combustible materials were identified in a BFN Unit 2 20-foot exclusion red zone.

March 28, 2012

Combustible materials found in the 20-foot exclusion red zones were determined to be in non-compliance with requirements.

March 29, 2012, at 2020 CDT

BFN reported the unanalyzed condition to the NRC.

**D. Other Systems or Secondary Functions Affected**

There were no other systems or secondary functions affected by this condition.

**E. Method of Discovery**

While performing an extent of condition inspection of the 20-foot exclusion red zones, combustible materials were identified. Additionally, during a walkdown of the Reactor Buildings, more combustible materials were identified in a BFN Unit 2 20-foot exclusion red zone.

**F. Operator Actions**

There were no operator actions.

**G. Safety System Responses**

There were no safety system responses.

**III. CAUSE OF THE EVENT**

**A. Immediate Cause**

Combustible materials installed in BFN Units 1, 2, and 3, Reactor Buildings are not in compliance with the Appendix R Section III.G.2.b exemption identified in the BFN Fire Protection Report (FPR).

**B. Root Cause**

The cause was the misclassification by Operations personnel of the combustible materials as in-use materials in the 20-foot exclusion red zones.

**C. Contributing Factors**

There were no contributing factors.

**IV. ANALYSIS OF THE EVENT**

The Tennessee Valley Authority (TVA) is reporting this condition in accordance with 10 CFR 50.73(a)(2)(ii)(B), as any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety.

On December 22, 2011, during an extent of condition inspection of the 20-foot exclusion red zones, combustible materials (i.e., cabling and extension cords) were identified in

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BFN Units 1, 2, and 3. The cabling and extension cords were evaluated and considered to be in-use.

On January 26, 2012, a fire loading evaluation was requested for in-use combustible materials in BFN Units 1, 2, and 3.

Additionally, on February 3, 2012, during a walkdown of the Reactor Buildings, more combustible materials (i.e., insulation) were identified in a BFN Unit 2 20-foot exclusion red zone.

In preparation of the fire loading evaluations, walkdowns conducted on March 28, 2012, determined an evaluation could not be performed on the existing configuration. It was observed that there were various single cables and cable bundles routed outside the open ladder cable trays [TY] that traversed the width of the 20-foot exclusion red zones for each unit. In addition, the following were observed in the 20-foot exclusion red zones: coiled extension cords, foam rubber bumpers installed for worker safety, cables associated with the Extended Power Uprate (EPU) project, a radio antenna cable, and black foam insulation on the emergency equipment cooling water [BI] piping. The cables and wires consisted of communication cables, instrumentation cables, coaxial cables, data cables, and extension cords. The EPU cables are qualified in accordance with Institute of Electrical and Electronics Engineers (IEEE)-383. The other cables were assumed to not be IEEE-383 qualified.

The applicable cables and additional combustible materials were not fully evaluated for compliance with the BFN FPR, Volume 1, Part 2, Section 3.3.1, "Fire Zone Determination." The BFN FPR, Volume 1, Part 2, Section 3.3.1 states: New or temporary equipment that traverses the 20-foot exclusion red zone will be reviewed on a case-by-case basis in accordance with the appropriate procedures to ensure the 20-foot exclusion red zone barrier is not compromised. Immediate actions were taken to remove communication and data cables and insulation on the piping from the 20-foot exclusion red zones. The cables, associated with the EPU project and the radio antenna cable, were not immediately removed from the 20-foot exclusion red zones.

**V. ASSESSMENT OF SAFETY CONSEQUENCES**

The identified cables are not associated with components credited with safe shutdown. Thus, the concern is the added combustible fuel load they represent within the 20-foot exclusion red zones and the potential for these materials to propagate a fire from one fire zone to the adjacent fire zone. Since the event was reported to the NRC, nearly all in-situ combustibles identified in the applicable 20-foot exclusion red zones have been removed from the areas. The only remaining combustible materials are the cables associated with the EPU project, which are IEEE-383 qualified, and the radio antenna cable which is fire retardant with a non-halogenated jacket material. The cables associated with the EPU project will be rerouted within conduit to conform to the original exemption configuration.

An assessment of the as-found combustible load within the 20-foot exclusion red zones and the available fire protection features (suppression, detection, fire loading, and room configuration) concluded that the existing configuration of the 20-foot exclusion red zone

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barrier is sufficient to prevent propagation across the 20-foot exclusion red zones and that one train of credited fire safe shutdown equipment in the 20-foot exclusion red zones will not be affected by a potential fire. As such, the condition will not affect the ability to achieve and maintain safe shutdown in the event of an Appendix R fire.

Continuous fire watches were originally established when the condition was identified, but in accordance with BFN FPR Section 9.3.11.G.1.a, the continuous fire watch is not required when fire suppression and detection are operable on both sides of the affected separation barrier. Since the fire suppression and detection on both sides of the affected separation barriers (i.e., 20-foot exclusion red zones) are operable, the continuous fire watches were removed. Operability of the fire suppression and detection on both sides of the barriers continues to be tracked to ensure compliance with the requirements of BFN FPR Section 9.3.11.G.1.a until the non-conforming condition is resolved. Since the original exemption and revised exemption were granted, the fire suppression system and detection system have been upgraded. The fire suppression and detection system upgrades included bringing the systems into compliance with the applicable National Fire Protection Association standards, improving area coverage and sprinklers, and replacing various system components. The upgrades have a positive impact on Appendix R requirements and thus improve the ability of the systems to provide equivalent or increased protection relative to the system configuration at the time the original exemption and revised exemption were granted.

Therefore, TVA concluded that there was no significant reduction to the health and safety of the public.

**VI. CORRECTIVE ACTIONS** - The corrective actions are being managed by TVA's corrective action program.

**A. Immediate Corrective Actions**

1. Continuous fire watches were established until a functional evaluation was completed.
2. Combustible material was removed and camera cables were re-routed in BFN Units 1, 2, and 3.
3. Personnel were trained on combustibles in fire zones.

**B. Corrective Actions**

1. Resolve the non-conformance associated with the antenna cable routing in BFN Units 1, 2, and 3, Reactor Buildings.
2. Route cables associated with the EPU project in conduit within the 20-foot exclusion red zones. The cables have been routed in conduit within the 20-foot exclusion red zones for BFN Unit 3. The cables will be routed in conduit within the 20-foot exclusion red zones for BFN Unit 2 during BFN Unit 2 refueling outage 17.
3. Procedure revisions were implemented to ensure all materials being placed in the 20-foot exclusion red zones are properly evaluated.



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4. Distributed an Operations Excellence communications document to all Operations and Fire Operations personnel on the definition of "in-use" transient combustibles.
5. Revised procedure NPG-SPP-18.4.7, "Control of Transient Combustibles," to clarify the definition of "in-use".
6. Provide a briefing to Senior Reactor Operators and Fire Operations personnel on the definition of "in-use" specified in the revision to NPG-SPP-18.4.7.

**VII. ADDITIONAL INFORMATION**

**A. Failed Components**

There were no failed components.

**B. Previous Similar Events**

A previous similar event was identified in the Browns Ferry Nuclear Plant - NRC Integrated Inspection Report 05000259/2011004, 05000260/2011004, and 05000296/2011004, dated November 14, 2011, as non-cited violation 05000259/2011004-01, Failure to Control Transient Combustible Materials in the Unit 1 Reactor Building.

Similar Problem Evaluation Reports (PERs) associated with this condition are PERs 481060, 481099, 481100, 481103, 482404, 482406, 482430, 496575, 496580, 496581, and 501976.

**C. Additional Information**

The corrective action documents for this report are PERs 529001 and 558964.

**D. Safety System Functional Failure Consideration**

In accordance with NEI 99-02, this condition is not considered a safety system functional failure.

**E. Scram With Complications Consideration**

This condition did not include a scram.

**VIII. COMMITMENTS**

There are no commitments.