



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

January 16, 2018

Mr. Joseph W. Shea  
Vice President, Nuclear Regulatory  
Affairs and Support Services  
Tennessee Valley Authority  
1101 Market Street, LP 4A  
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT – U. S. NUCLEAR REGULATORY  
COMMISSION EVALUATION OF CHANGES, TESTS, AND EXPERIMENTS  
AND PERMANENT PLANT MODIFICATIONS INSPECTION REPORT  
05000259/2017007, 05000260/2017007 AND 05000296/2017007

Dear Mr. Shea:

On December 7, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Unit 1, 2 and 3 facilities, and discussed the results of this inspection with members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

The NRC inspectors did not identify any findings or violations of more than minor significance.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if any, will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Shakur A. Walker, Chief  
Engineering Branch 1  
Division of Reactor Safety

Docket Nos.: 05000259, 05000260, 05000296  
License Nos.: DPR-33, DPR-52, DPR-68

Enclosure:  
Inspection Report 05000259/2017007,  
05000260/2017007 and 05000296/2017007  
w/Attachment: Supplemental Information

cc: Distribution via Listserv

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ACCESSION NUMBER: \_\_\_\_\_

☒ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

OFFICE	RII:DRS	NRO	RII:DCO	RII:DRS	RII:DRS	RII: DRP	RII:DRS
SIGNATURE	<b>RNP1</b>	<b>MAR1 EMAIL</b>	<b>MES1 EMAIL</b>	<b>NSM EMAIL</b>	<b>SAW4</b>	<b>ADM2</b>	<b>SAW4</b>
NAME	R. PATTERSON	M. RILEY	M. SCHWIEG	N. MORGAN	S. WALKER	A. MASTERS	S. WALKER
DATE	1/ 11 /2018	1/8/2018	1/9/2018	1/9/2018	1/11/18	1/16/18	1/16/18
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: S:\DRS NEWIENG BRANCH 1\BRANCH INSPECTION FILES\2017-2018-  
2019 CYCLE INSPECTION FOLDER FOR ALL SITES\50.59 INSPECTIONS\BROWNS FERRY\BFN 50.59 MODS INSPECTION  
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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-259, 50-260, 50-296

License Nos.: DPR-33, DPR-52, DPR-68

Report Nos.: 05000259/2017007, 05000260/2017007, 05000296/2017007

Licensee: Tennessee Valley Authority (TVA)

Facility: Browns Ferry Nuclear Plant, Units 1, 2, and 3

Location: Corner of Shaw and Nuclear Plant Roads  
Athens, AL 35611

Dates: December 4 – 7, 2017

Inspectors: R. Patterson, Reactor Inspector (Team Leader)  
M. Riley, Reactor Inspector  
M. Schwieg, Reactor Inspector  
N. Morgan, Reactor Inspector (Trainee)

Approved by: Shakur A. Walker, Chief  
Engineering Branch 1  
Division of Reactor Safety

Enclosure

## **SUMMARY**

Inspection Report (IR) 05000259/2017007, 05000260/2017007, 05000296/2017007; 12/04-08/2017; Browns Ferry Nuclear Plant, Units 1, 2, and 3; NRC Evaluations of Changes, Tests, and Experiments.

This report covers a one week, on-site inspection by three regional inspectors. No findings or violations were identified. The Nuclear Regulatory Commission's (NRC's) program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5, dated February 2014.

## REPORT DETAILS

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R17 Evaluations of Changes, Tests, and Experiments (71111.17T)

##### a. Inspection Scope

Evaluations of Changes, Tests, and Experiments: The team reviewed six safety evaluations performed pursuant to Title 10, *Code of Federal Regulations* (CFR) 50.59, "Changes, tests, and experiments," to determine if the evaluations were adequate and that prior NRC approval was obtained as appropriate. The team also reviewed 14 screenings and/or applicability determinations where licensee personnel had determined that a 10 CFR 50.59 evaluation was not necessary. The team reviewed these documents to determine if:

- The changes, tests, or experiments performed were evaluated in accordance with 10 CFR 50.59 and that sufficient documentation existed to confirm that a license amendment was not required;
- The safety issues requiring the changes, tests or experiments were resolved;
- The licensee conclusions for evaluations of changes, tests, or experiments were correct and consistent with 10 CFR 50.59; and
- The design and licensing basis documentation used to support the change was updated to reflect the change.

The team used, in part, Nuclear Energy Institute (NEI) 96-07, "Guidelines for 10 CFR 50.59 Evaluations," Revision 1, to determine acceptability of the completed evaluations and screenings. The NEI document was endorsed by the NRC in Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," dated November 2000.

This inspection constituted six samples of evaluations and 14 samples of screenings and/or applicability determinations as defined in Inspection Procedure (IP) 71111.17-05.

##### b. Findings

No findings were identified.

#### 4OA6 Meetings, Including Exit

On December 7, 2017, the team presented inspection results to Mr. DL. Hughes and other members of the licensee's staff. The team verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel**

D. Hughes, General Manager of Site Operations  
R. Filipek, Design Engineering Manager  
J. Kent, Director of Plant Support  
J. Paul, Site Licensing Manager  
J. Garner, Licensing  
P. Rescheske, Corporate Licensing  
C. Mitchell, Design Engineering

#### **NRC personnel**

D. Dumbacher, Senior Resident Inspector, BFN  
A. Ruh, Resident Inspector, BFN  
S. Walker, Branch Chief, DRS

## **LIST OF DOCUMENTS REVIEWED**

### **10 CFR 50.59 Evaluations**

EC 70834, EECW Spurious Operation Resolutions  
EC 71168, Replace Obsolete Foxboro Network Switch  
EC 71988, HPCI Vacuum Breakers  
EC 72226, Adjust Setpoints for 1/2/3-PS-32-70  
EC 67324, Modify FWCS Software  
EC 72342, Modify EHC Software

### **10 CFR 50.59 Screenings**

EC 71407, Replace MOV Magnesium Rotor Motor with Aluminum Rotor Motor  
EC 70294, Replace Magnesium Rotors in the Drywell  
EC 71176, Revise MOV Calculations to Correct Torque Reduction Factors for Motors  
EC 71646, Change Trip Function of DG Overcurrent Relay 51V  
EC 71460, Remove the RCIC Testable Check and Replace with Normal Check Valve  
EC 71532, Revise the Appendix R Manual Action for EECW Pump B3 in FA-16  
EC 71265, Reconfigure Valve Controls to Prevent Spurious Operation  
EC 70855, Remove the RCIC Testable Check and Replace with Normal Check Valve  
EC 71128, Addition of the Line Stop For Isolation 1-FCV-71-19  
EC 70527, Replace Static O-ring Pressure Switch  
EC 70577, Replace Flowserve Anchor Darling Gate Valve  
EC 70120, Install Quick Disconnects at Nitrogen Accumulator Charging Fittings  
EC 70184, Replace 0-TIC-031-0027 Temperature Indication Controller  
EC 71214, Remove 2-HS-074-0057B & Respective Red and Green Indicating Lights

### **Procedures**

1-AOI-32A-1, Loss of Drywell Control Air, Rev. 11  
1-ARP-9-3E, Panel 9-3 XA-55-3E, Rev. 32  
1-OI-85, Control Rod Drive System, Rev. 42  
NEDP-9, Seismic Structural Qualification, Rev. 13  
0-SSI-16, Fire Safe Shutdown Instructions, Rev. 37  
3-SR-3.6.1.3.5, HPCI System Motor Operated Valve Operability, Rev. 33  
NPG-SPP-09.3, Plant Modifications and Engineering Change Control, Rev. 26  
NPG-SPP-09.4, 10 CFR 50.59 Evaluations of Changes, Tests, and Experiments, Rev. 11  
3-SR-3.5.1.1(RCIC), Maintenance of Filled RCIC Discharge Piping, Rev. 6  
BFN-27-303, Structural Qualification Appendix C, Rev. 0

### **Calculation**

EDN2046950051, Reactor Feedwater Level Control System Quality Assurance Calculation Documentation, Rev. 13  
MDQ0000012016000566, Main Steam Isolation Valve (MSIV) Component Level Review, Rev. 0  
NDQ0031920075, Control Room and Offsite Doses due to a LOCA, Rev. 29  
EDQ099920030048, Appendix R Manual Action Requirements, Rev. 17  
EDQ002482003002, 4.16kV and 480V Busload and Voltage Drop and Short Circuit Calculation, Rev. 18  
CDQ0008520050004, Seismic Evaluation of the CRD Hydraulic Control Unit, Rev. 0  
MDQ0073870190, HPCI Piping Pressure Drop, Rev. 24  
EDQ099920030048, Appendix R Manual Action Requirements Calculation, Rev. 22

EDQ099920030037, Appendix R Computerized Separation Analysis, Rev. 41  
 ED-Q0999-2003-0048, Unit 1, 2, and 3 Appendix R Manual Action Requirements, Rev. 17  
 CDQ3073910422, Pipe Stress Analysis of Problem No. N 1-373-8R, Rev. 11  
 MDQ3073920409, MOV 3-FCV-073-0016 Operator requirement and capabilities, Rev. 14  
 EDQ2067950033, 2-P-67-50 and -51 Setpoint and Scaling Calculation, Rev. 6  
 CDQ3073910422- "Pipe Stress Analysis of Problem No. N1-373-8R", Rev. 11  
 MDQ3073920409, MOV 3-FCV-073-0016 Operator Requirements and Capabilities, Rev. 14  
 MDQ2068910073, MOV 2-FCV-068-0003, Operator Requirements and Capabilities, Rev. 11  
 MDQ107320020058, MOV 1-FCV-073-0002, Operator Requirements and Capabilities, Rev. 5  
 MDQ106820020028, MOV 1-FCV-068-0003, Operator Requirements and Capabilities, Rev. 4  
 MDQ106820020041, MOV 1-FCV-068-0079, Operator Requirements and Capabilities, Rev. 5  
 CDQ100920030138, Seismic Qualification of Control Panel 1-9-3, Rev. 17  
 CDQ107120030304, Pipe Stress Analysis of Stress Problem No. N1-171-5R, Rev. 7  
 003N0524, Support Bracket Certified Stress Report, Rev. 2  
 NEDC-33824P, BF Steam Dryer Replacement Stress Analysis, Rev. 0

#### General Design Criteria Documents

BFN-50-7068, Reactor Water Recirculation System, Rev. 14  
 BFN-50-7003, Reactor Feedwater System, Rev. 19  
 BFN-50-7046D, Primary Containment Isolation System, Rev. 16  
 BFN-50-7001, Main Steam System, Rev. 29  
 BFN-50-7032, Control Air System, Rev. 17  
 BFN-50-C-7106, Brown Ferry Nuclear Plant Equipment Seismic/ Structural Qualification (ESQ),  
 Rev. 8  
 1-47E813-1, Flow Diagram Reactor Core Isolation Cooling System, Rev. 41  
 2-47E813-1, Flow Diagram Reactor Core Isolation Cooling System, Rev. 60

#### Drawings

1-47E801-2, Flow Diagram Main Steam, Rev. 33  
 1-47E801-1, Flow Diagram Main Steam, Rev. 25  
 3-45E767-8, Wiring Diagram Diesel Generators Schematic Diagram, Rev. 23  
 0-45E765-5, 4160V Shutdown Auxiliary Power Schematic Diagram, Rev. 60  
 0-45E766-23, 4160V Shutdown Auxiliary Power Schematic Diagram, Rev. 54  
 1-47E820, Flow Diagram Control Rod Drive Hydraulic System, Rev. 11  
 1-47E820-2, Flow Diagram Control Rod Drive Hydraulic System, Rev. 14  
 3-47E408-2, Mechanical Motor Operated Valves Internal Dimensions for PPM, Rev. 0  
 3-730E157-1, Steam Dryer, Rev. 3

#### CRs (Condition Reports)

935404	1127173	867502
711171	975080	162116
1144963	244677	598749

#### Work Orders

11412917	112214191	113239593
114129206	112314069	116125360
118065750	112214073	116756425



Miscellaneous Documents

2P-067-0050, Setpoint and Scaling document, Rev. 4

DCN70834, EECW Spurious Operation Resolutions, Rev. A

BFN-VTD-G080-0755, General Electric Illustrated Parts Manual for the Hydraulic Control Unit, Rev. 9

DCN70120, Install quick disconnects (QDs) at nitrogen accumulator charging fittings, Rev. A

BFN-50-C-7106, Browns Ferry Nuclear Plant Equipment Seismic Structural Qualification, Rev. 8

DCN71532, Revise the Appendix R Manual Action required for EECW pmp B3 in FA-16, Rev. A

DCN70527, Replace Obsolete Static O-ring (SOR) Pressure Switch, Rev. A

DCN70577, BFN-3-FCV-073-0016, HPCI Turbine Steam Supply Valve. Rev. A

Independent Third Party Review (ITPR) of Software changes per DCN 72343, Rev. B

EDN0047010001, Electrohydraulic Control System (DEH) Software Verification & Validation Documentation, Rev. 6

TVA-DOSO, Description of System Operation, Rev. F

DCN72342, Modify EHC Software to install condenser vacuum pressure transmitters, Rev. A

BFN-VTD-F180-3060, I-Series (P0973GA/GB/HB/HC) Industrial Switches, Hardware and Software Configuration Instructions, Rev. 0

DCN 71168 - Unit 1 Foxboro I/A Network Switch Upgrade Results Package - Network Switch V&V Test, Rev. 0

2-47E812-1, Flow Diagram High Pressure Coolant Injection System

Slanted Hood Dryer Diagram

Condition Reports (NCRs) generated as a result of the inspection

135655

135608

1367217