

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

November 23, 2012

EA-12-133

Mr. Joseph W. Shea Vice President, Nuclear Licensing Tennessee Valley Authority 1101 Market Street, LP 4B-C Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR POWER PLANT NRC SUPPLEMENTAL INSPECTION REPORT 05000259/2012014, 05000260/2012014, 05000296/2012014

Dear Mr. Shea:

On October 11, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection pursuant to Inspection Procedure 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," at your Browns Ferry Nuclear Power Plant, Units 1, 2, and 3. The enclosed inspection report documents the inspection results which were discussed on October 11, 2012, with Mr. Keith Polson and other members of your staff.

In accordance with the NRC Reactor Oversight Process Action Matrix, this supplemental inspection was performed to follow-up on a white finding with low to moderate safety significance which was issued in the second quarter of 2012. This issue was previously documented and assessed in NRC Inspection Report 05000259,260,296/2012013. The NRC was informed on 8 September, 2012 of your staff's readiness for this inspection.

The objectives of this supplemental inspection were to provide assurance that: (1) the root causes and the contributing causes for the risk-significant issues were understood; (2) the extent of condition and extent of cause of the issues were identified; and (3) corrective actions were or will be sufficient to address and preclude repetition of the root and contributing causes.

Based on the results of this inspection, the NRC has concluded that you have adequately completed a root cause analysis of the issue, and have identified appropriate corrective actions to prevent recurrence of the issue. No findings were identified concerning the root cause evaluation and corrective actions.

The NRC has determined that inspection objectives stated above have been met. As a result, the violation is considered closed. Therefore in accordance with IMC 0305, "Operating Reactor Assessment Program," the performance issue shall not be considered in the Action Matrix after the end of the first quarter 2013.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document 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**/

Eugene F. Guthrie, Chief Special Project, Browns Ferry Division of Reactor Projects

Docket Nos.: 50-259, 50-260 and 50-296 License Nos.: DPR-33, DPR-52, DPR-68

Enclosure: Inspection Report 05000259/20120014, 05000260/2012014, and 05000296/2012014 w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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NAME	DLanyi	CKontz	EGuthrie				
DATE	11/06/2012	11/06/2012	11/23/2012				
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\DRPII\RPB6\BROWNS FERRY\REPORTS\2012\014\BROWNS FERRY 2012 014.DOCX J. Shea

cc w/encl: K. J. Polson Site Vice President Browns Ferry Nuclear Plant Tennessee Valley Authority Electronic Mail Distribution

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State Health Officer Alabama Dept. of Public Health P.O. Box 303017 Montgomery, AL 36130-3017 J. Shea

Letter to Joseph W. Shea from Eugene F. Guthrie dated November 23, 2012

SUBJECT: BROWNS FERRY NUCLEAR POWER PLANT NRC SUPPLEMENTAL INSPECTION REPORT 05000259/2012014, 05000260/2012014, 05000296/2012014

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NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-259, 50-260, 50-296
License Nos.:	DPR-33, DPR-52, DPR-68
Report No.:	05000259/2012014, 05000260/2012014, 05000296/2012014
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:	October 8, 2012, through October 11, 2012
Inspector:	D. Lanyi, Operations Engineer
Approved by:	Eugene F. Guthrie, Chief Special Project, Browns Ferry Division of Reactor Projects

SUMMARY

IR 05000259/2012014, 05000260/2012014, 05000296/2012014; 10/08/2012 – 10/11/2012; Browns Ferry Nuclear Plant, Units 1, 2 and 3; Supplemental Inspection - Inspection Procedure (IP) 95001

This supplemental inspection was conducted by an operation engineer. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4.

Cornerstone: Mitigating Systems

The NRC staff performed this supplemental inspection in accordance with IP 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," to assess the licensee's evaluation associated with a failure to properly implement the requirements of the Plant Modifications and Engineering Change Control Procedure which resulted in inadequate training of Safe Shutdown Instruction Procedures, 0-SSI-25-1,-2,-3, and -26. The NRC staff previously characterized this issue as having (low to moderate) safety significance (white), as documented in NRC IR 05000259,260,296/2012013. The objectives of this inspection were to gather information for the NRC to provide assurance that the corrective actions addressed both the root and the contributing causes, that the corrective actions would prevent recurrence for the risk-significant finding, and that the extent of condition (EoCo) and extent of cause (EoCa) of performance issue was identified. The inspector determined that the corrective actions were adequate to address the identified causes and prevent recurrence. The EoCo and EoCa evaluations were adequate and the corrective actions sufficiently broad.

Given the licensee's acceptable performance in addressing the issue, the white finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in IMC 0305, Operating Reactor Assessment Program. Inspectors will review the licensee's implementation of corrective actions during as appropriate during completion of the baseline inspection program.

Findings

No findings were identified

REPORT DETAILS

4. OTHER ACTIVITIES

4OA4 Supplemental Inspection (95001)

.01 Inspection Scope

The NRC performed this supplemental inspection to assess the licensee's evaluation of a White finding, which was also a violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and was directly related to the cross-cutting aspect of Work Coordination in the Work Control component of the Human Performance area because the licensee did not adequately incorporate actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. This inspection was conducted in accordance with Inspection Procedure 95001, "Inspection For One Or Two White Inputs In a Strategic Performance Area." The inspection objectives were to:

- Provide assurance that the root and contributing causes of risk-significant issues were understood;
- Provide assurance that the extent of condition and extent of cause of risk-significant issues were identified;
- Provide assurance that the licensee's corrective actions for risk-significant issues were or will be sufficient to address the root and contributing causes and to preclude repetition.

During the week of February 13-17, 2012, NRC inspectors conducted a follow-up inspection of the corrective actions associated with the 95002 supplemental inspection completed in October 2010. During review of the Safe Shutdown Instruction (SSI) procedures, the inspectors identified multiple examples of the licensee's failure to meet the requirements of 10CFR50 App B Criterion V, "Instructions, Procedures and Drawings" for accomplishing activities in accordance with procedures. The inspectors noted that the licensee failed to properly implement NPG-SPP-09.3 "Plant Modifications and Engineering Change Control", resulting in the failure to adequately identify and perform required training for implementation of the SSI procedures for fire areas 25-1, 25-2, 25-3 and 26.

The NRC inspectors documented a White violation for failure to implement appropriate Safe Shutdown Instructions NRC Inspection Report 05000259/2012007, 05000260/2012007, 0500296/2012007. The licensee issued Problem Evaluation Request (PER) 507721. A Root Cause Analysis (RCA) was then performed.

The inspectors reviewed the licensee's root cause analysis in addition to other evaluations conducted in support and as a result of the root cause analysis. The inspectors reviewed corrective actions that were taken or planned to address the identified causes. The inspectors also held discussions with licensee personnel to ensure that the root and contributing causes and the contribution of safety culture components were understood and corrective actions taken or planned were appropriate to address the causes and preclude repetition.

.02 Evaluation of the Inspection Requirements

02.01 Problem Identification

a. Inspection Procedure 95001 requires that the inspectors determine that the licensee's evaluation documented who identified the issue (i.e., licensee-identified, self-revealing, or NRC-identified) and under what conditions the issue was identified.

On February 15, 2012, the NRC identified a number of concerns associated with Safe Shutdown Instruction quality and licensed operator training on the Safe Shutdown Instructions. The NRC ultimately identified the failure to conduct a training needs analysis for the new SSIs was a White violation, placing the facility in the Regulatory Response Column of the Reactor Oversight Process Action Matrix.

The inspector verified that this information was documented in the licensee's evaluations.

c. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's evaluation of the issue documents how long the issue existed and prior opportunities for identification.

The licensee determined that the sequence of events leading up to the issue can first be traced to March 29, 2011. On that date, a "Pull Forward Team" (PFT) was formed to identify changes necessary to the SSIs due to new Fire Areas, as part of the effort to reduce the regulatory risk associated with the existing fire protection program. There were multiple opportunities for the licensee to identify the issue prior to NRC identification. Specifically:

- In October 2011, a new series of procedures related to project management was in progress. TVA-SPP-34.0 procedure was being integrated into a series of project sub-tier procedures, to more effectively provide governance and direction for overall TVA project management. The licensee failed to ensure that those changes were incorporated into ongoing projects at Browns Ferry.
- The week of November 14, 2011, the NRC reviewed risk reductions associated with Safe Shutdown Instructions, specifically SSIs 0-SSI-25-1, 25-2, 25-3 and 26. As a result of the review, an inspector questioned the adequacy of the new SSIs and the training for the SSIs. Procedure Change Requests (PCRs), but no Service Requests, were written to address the procedure concern.

 PER 470323 was written to determine whether the level of Training for the recent (2011) SSI revisions was appropriate and if recent changes to procedures governing Change Management (transition from BP-242 to COO-SPP-01.2) would result in a consideration for a different level of training. The corrective action plan for PER 470323 was developed to perform the evaluations, but when the action was closed on January 26, 2012, only the second question was answered.

The inspector concluded that the licensee's evaluation adequately identified how long the issue existed and prior opportunities for identification of the failure.

a. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's evaluation documents the plant-specific risk consequences, as applicable, and compliance concerns associated with the issues.

The demonstrated inability of operators to successfully execute the revised SSIs five months after procedure revision became effective did have a reasonable potential to reduce defense in depth as applied to the maintenance of the integrity and independence of fission product barriers. Redundant and diverse safety systems, including trained operators conducting operations in accordance with approved station procedures which were developed under an approved quality control program are integral to maintaining defense in depth.

The inspector concluded that the licensee adequately documented the risk consequences and compliance concerns associated with the issues.

b. Findings

No findings were identified.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

a. Inspection Procedure 95001 requires that the inspection staff determine that the licensee evaluated the problem using a systematic methodology to identify the root and contributing causes.

The licensee used an Event and Causal Factor Analysis (E&CFA), a Barrier and Associated Causal Factors Analysis, and an Organizational and Programmatic Contributors Review to identify causal factors and root causes.

The inspector concluded that the licensee evaluated the issues using systematic methodologies to identify root and contributing causes.

b. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

The licensee determined that there were three root causes.

- 1. Inadequate PM oversight for a pulled forward DCN resulted in the failure to understand the implications of the accelerated schedule.
- 2. Inadequate emphasis on the importance of regulatory compliance has contributed to a culture which lacks urgency in the identification and timely resolution of issues associated with non-compliant and potentially non-conforming conditions.
- Decision making associated with the Systematic Approach to Training (SAT) was not used appropriately to analyze, design, develop, implement, and evaluate operator training of sufficient quality to produce operators capable of executing new and revised SSI procedures.

The inspector questioned whether the third cause had been adequately evaluated. It appeared that this area could have been evaluated to a deeper level to determine why this decision-making was not appropriate. However after further review of the RCA and after discussion with the RCA team, it became clear that this was the appropriate level for a root cause. The E&CFA did attempt to break down this failure more, but the analysis became circular in that the cause was really due to a culture of faulted SAT based decision-making.

The inspector determined that the evaluation was conducted to a sufficient level of detail.

c. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience.

The licensee's RCA included an evaluation of internal and external operating experience. As a result of this review, the licensee concluded that there was adequate operating experience both internally and externally that could have prevented this issue if it had been used properly. PER 534755 was generated to capture this deficiency. Corrective action for this issue addressed the use of OE by Project Management and created procedure TVA-SPP-34.016, Project Lessons Learned (October 1, 2011). Included are the use of OE and lessons learned in project development and implementation.

The inspector determined that the evaluation was conducted to a sufficient level of detail and appropriate corrective actions were been put in place.

d. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root cause evaluation addressed the extent of condition and the extent of cause of the problem.

The licensee conducted an adequate extent of condition review. They looked at deficient training for all DCNs initiated since May 2010. This was broadened to all training for all groups. Only minor deficiencies were found. However, during this review the team identified a possible vulnerability in the maintenance and technical training programs associated with other new procedures and procedure changes that are not

related to a DCN. A review of procedure changes not related to DCNs impacting operations and other departments revealed vulnerability related to non-Operations groups implementation of the procedure change process in that procedure changes are not reviewed for training needs until the procedure has been issued.

Instructors outside of Operations Training indicated that they only see these procedures when they are issued. At this point, the procedure is available for use which results in the potential to inappropriately bypass training reviews prior to implementation. The team did not find examples where this vulnerability has resulted in actual occurrences. SR 599495 was initiated to enhance maintenance and technical programs to close the vulnerability.

- The extent of cause included project management controls for all plant modifications. The licensee determined that the problem extended to corporate processes and management controls of fast tracked DCNs. The Corrective Action to Prevent Recurrence (CAPR) for this root cause also extends to the Pull Forward DCN process. Therefore the CAPR is adequate in this respect.
- 2. The extent of cause includes program, processes, and human performance that do not have the proper emphasis on identified concerns regardless of the source of concern. To evaluate this extent of cause, the licensee separated it into two parts.
 - The extent that regulatory concerns are not treated appropriately
 - The extent that other concerns are not treated appropriately

This root cause does extend to other plant processes, equipment, and human performance. CAPR-003 issued a station directive that established standards and expectations associated with regulatory interactions. This directly addressed the timeliness issues found during the root cause analysis. Additionally, lessons learned were communicated to the site via CAPR-004 that included the significance and importance of compliance with regulations. This culture change initiative was reviewed and found to still be in progress. It is a major corrective action associated with the upcoming 95003 inspection and will be evaluated during that inspection.

3. The licensee determined extent of cause to be evaluated was inadequate decision making in all activities on the site. With regard to decision making in general, the Integrated Improvement Plan (IIP) had already identified a fundamental problem with decision making. The IIP is supposed to ensure implementation of the corrective actions to address this issue. Station activities preparatory to the IP 95003 inspection will prove correction and sustainability.

The inspector concluded that the licensee's evaluation of the extent of condition and extent of cause was adequate.

e. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components as described in IMC 0305.

Each aspect of the Human Performance Area was found to be deficient in some way. Many Human Performance aspects were root causes or significant contributors to the events analyzed in the RCA. The station recognizes that the overall Human Performance culture is weak and is addressing the cultural elements identified through the following root cause analyses:

- PER 516455: "Identified by 95003 Recovery Team: Operational Focus/Decision Making."
- PER 516437: "Identified by 95003 Recovery Team: Management and Leadership Standards."
- PER 516458: "Identified by 95003 Recovery Team: Work Management Issues."

These three root causes represent three of the fifteen fundamental problem areas the station is focusing on in response to the NRC Red Finding and resultant 95003 inspection preparation. The licensee identified eight deficient aspects of the Human Performance cross cutting area, four deficient aspects in the Problem Identification and Resolution aspect, and three deficient aspects in the Other Safety Culture Aspect. Each of these aspects was explored in detail.

The inspector concluded that the licensee's evaluation of the Safety Culture was adequate.

f. Findings

No findings were identified.

02.03 Corrective Actions

a. Inspection Procedure 95001 requires that the inspection staff determine that appropriate corrective actions are specified for each root and contributing cause or that the licensee has an adequate evaluation for why no corrective actions are necessary.

The licensee took immediate corrective actions to ensure all SSIs were correct and to ensure that the operators were properly trained on their use. Additionally, the licensee took immediate actions to adjust their processes to require a Training Needs Analysis for every DCN issued.

The licensee identified one Direct Cause, three Root Causes, and 4 Contributing Causes. Each cause, with the exception of the Direct Cause, has multiple actions specified. The Direct Cause was attributed to the Operations Training Manager's improper decision to not perform a Training Needs Analysis. The licensee determined that the actions associated with Root Cause-3 and Contributing Cause-1 were adequate to ensure correction. The inspectors reviewed the actions and have determined that the actions were adequate.

The licensee identified that Root Cause-1 was due to improper project management oversight. The licensee proposed four CAPRs to revise the program in order to provide

more direction on how to manage a Pull Forward Project. Additionally, four corrective actions were put in place to ensure each TVA Nuclear site reviews all corporate managed projects to ensure that they remain in compliance with their standards.

The licensee identified that Root Cause-2 was due to a culture which lacks urgency in the identification and timely resolution of issues associated with non-compliant and potentially non-conforming conditions. Two CAPRs were issued. One was to develop and issue a station directive that establishes standards and expectations for compliance with, and timeliness and rigor in the implementation of regulatory requirements, require that feedback from regulatory interactions be captured and provided to Licensing to identify the need for follow up and communication to affected organizations, and to reinforce a low threshold for generating SRs to capture questions from and responses to the regulator. The second was to develop a presentation to get that information to the plant. Four other corrective actions were developed to ensure the staff was fully aware of their responsibilities in this area.

The licensee identified that Root Cause-3 was due decision-making associated with the SAT process. Two CAPRs were issued to correct the licensee's training program to ensure Training Needs Analyses are done for any DCN or any new (revision 0) procedures. Additionally, a third CAPR was issued to establish initial and continuing training to provide expected behaviors for leaders and craft that that support their roles and responsibilities in each of the following areas:

- Operational Focus
- Nuclear Safety/Eight Safety Culture Principles/Safety Conscious Work Environment
- Risk Awareness/Focus Conservative Decision-Making, including the use of HU tools
- Systematic and Rigorous Methods for Decision-Making

There were six corrective actions associated with this root cause to ensure that everyone was briefed and understood their responsibilities.

The four contributing causes identified were mostly site cultural issues. The actions associated with those were to ensure that people understand expectations and responsibilities. A major focus of the corrective actions is to correct a number of site cultural flaws (see Section O2.02.e). The inspector determined that the corrective actions identified are appropriate for the root and contributing causes identified.

Inspection Procedure 95001 requires that the inspection staff determine that the licensee prioritized corrective actions with consideration of risk significance and regulatory compliance.

The licensee's immediate corrective actions focused on ensuring their capability to use their procedures to mitigate a fire and to ensure there were no other similar issues that were ongoing. The licensee's corrective actions to address the root and contributing causes were prioritized in accordance with site risk and then available resources. At the time of the inspection, almost all of the actions had been implemented. The only remaining actions were longer term actions that required significant coordination across

the TVA nuclear fleet. The inspector concluded that the corrective actions were prioritized with consideration of risk significance and regulatory compliance.

c. Inspection Procedure 95001 requires that the inspection staff determine that the licensee established a schedule for implementing and completing the corrective actions.

The licensee established due dates for the corrective actions and they were documented in the RCA. The inspector concluded that an appropriate schedule had been established for implementing and completing the corrective actions.

d. Inspection Procedure 95001 requires that the inspection staff determine that the licensee developed quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to preclude repetition.

The corrective action plan will be monitored by CARB as required by NPG-SPP-03.1.7, PER Actions. This procedure requires CARB approval to extend action due dates. This requirement places the appropriate level of monitoring and review of the corrective action plan to ensure completion. An Effectiveness Review Plan has been developed. It contains both qualitative and quantitative criteria to determine success. The licensee plans to perform this review six months after the last action is closed. The last action is currently scheduled to close in January 2013. The inspector concluded that measures of success had been adequately developed.

e. Inspection Procedure 95001 requires that the inspection staff determine that the licensee's planned or taken corrective actions adequately address a Notice of Violation that was the basis for the supplemental inspection, if applicable.

The actions taken and planned adequately address the White violation Failure to Properly Implement the Requirements of the Plant Modifications and Engineering Change Control Procedure as described in NRC Inspection Report 05000259/2012007, 05000260/2012007, 0500296/2012007.

f. Findings

No findings were identified.

40A6 Meetings

Exit Meeting Summary

On October 11, 2012, the inspector presented the inspection results to Mr. Keith Polson and other members of the licensee staff. The licensee acknowledged the information presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. The proprietary information identified was returned to the licensee.

ATTACHMENT: Supplemental Information

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

E. Colbey, Licensing

J. Miller, Performance Improvement

M. Oliver, Licensing

K. Polson, Site Vice President

T. Scott, Performance Improvement

P. Summers, Safety & Licensing

C. Vaughn, Operations Training

LIST OF ITEMS OPENED AND CLOSED

<u>Closed</u>

05000259,260,296/2012007-01 VIO

Failure to Properly Implement the Requirements of the Plant Modifications and Engineering Change Control Procedure.

LIST OF DOCUMENTS REVIEWED

<u>Problem Evaluation Request</u>: 507721, 534755, 614448

Procedures:

0-SSI-25-1, Intake Pumping Station EI. 550, Cable Tunnel to Fire Door 440, RHRSW Pump Room B, RHRSW Pump Room D, Revision 0018 0-SSI-25-2, RHRSW Pump Room A, Revision 0012 0-SSI-25-3, RHRSW Pump Room C, Revision 0016 0-SSI-26, Turbine Bldg Side Cable Tunnel to Door 440, and Radwaste Building, Revision 0013 TVA-SPP-34.0, Project Management, Revision 0002 TVA-SPP-34.011, Project Development and Integration, Revision 2 TVA-SPP-34.012, Project Baseline Management, Revision 1 TVA-SPP-34.013, Risk and Contingency Management, Revision 1 TVA-SPP-34.015, Project Communications and Reporting, Revision 1 NPG-SPP-09.3, Plant Modifications and Engineering Change Control, Revision 9 NPG-SPP-17.2, Analysis Phase, Revision 6 NPG-SPP-0.12, Administration of Site Technical Procedures, Revision 7

<u>Miscellaneous</u>: Calculation EDQ099920030048, Unit 1, 2, and 3 Appendix R Manual Action Requirements, Revision 6

Attachment