UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

January 16, 2009

Mr. William R. Campbell, Jr.
Chief Nuclear Officer and Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC SUPPLEMENTAL INSPECTION REPORT NO. 05000259/2008010 AND REGULATORY PERFORMANCE MEETING SUMMARY

Dear Mr. Campbell:

On December 5, 2008, the U. S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection at your Browns Ferry Nuclear Plant, Unit 1. The enclosed report documents the inspection results, which were discussed on December 5, 2008, with Mr. A. Elms and other members of your staff and at a public exit on January 6, 2009, with Mr. R. West.

This supplemental inspection, was conducted in accordance with Inspection Procedure 95002, "Inspection For One Degraded Cornerstone Or Any Three White Inputs In a Strategic Performance Area," and examined your problem identification, root cause evaluation, extent-of-condition and extent-of-cause determinations, and corrective actions associated with the Initiating Events Cornerstone performance indicator for Unplanned Scrams per 7000 Critical Hours exceeding the Yellow threshold in the fourth quarter of calendar year 2007. This placed Unit 1 in the Degraded Cornerstone Column of the NRC Reactor Oversight Process Action Matrix. This inspection also included an independent NRC review of the extent of condition and extent of cause for these same issues and an assessment of whether any safety culture component caused or significantly contributed to the issues surrounding the unplanned scrams.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The team reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified. The NRC determined that your evaluations adequately determined the areas in need of improvement and your proposed corrective actions are appropriate to resolve the deficiencies related to the Degraded Initiating Events Cornerstone.

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 the 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/

Leonard D. Wert, Jr., Director
Division of Reactor Projects

Docket No.: 50-259
License No.: DPR-33

Enclosure: Inspection Report 05000259/2008010
w/Attachment: Supplemental Information

cc w/encl: (See next page)

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Letter to William R. Campbell, Jr. from Leonard D. Wert, Jr. dated January 16, 2009

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT 05000259/2009, 05000260/2009 AND 05000296/2009

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-259
License No.:	DPR-33
Report No.:	05000259/2008010
Licensee:	Tennessee Valley Authority
Facility :	Browns Ferry Nuclear Plant
Location:	Corner of Shaw and Nuclear Plant Roads Athens, AL 35611
Dates:	December 1 - 5, 2008
Inspectors:	Eugene DiPaolo, Senior Resident Inspector, Region I (Team Leader) David Jones, Senior Reactor Inspector, Region II James Dodson, Senior Project Engineer, Region II (In-office review)
Approved by:	Eugene F. Guthrie, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000259/2008010; 12/1/2008 – 12/5/2008; Browns Ferry Nuclear Plant, Unit 1; Supplemental Inspection IP 95002 for Degraded Initiating Events Cornerstone.

This inspection was conducted by a senior resident inspector, a senior reactor inspector, and a senior project engineer. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Initiating Events

The Nuclear Regulatory Commission (NRC) performed this supplemental inspection to assess the licensee's evaluations associated with the Unit 1 Initiating Events Cornerstone performance indicator (PI) for Unplanned Scrams per 7000 Critical Hours having been in the Yellow performance band. Unit 1 restarted on May 21, 2007, after a 22 year shutdown. Pursuant to NRC letter to Tennessee Valley Authority (TVA), dated December 6, 2007, this PI was to be considered valid with the data reported at the end of the 4th quarter 2007. At that time, this PI was in the Yellow performance band due to the limited number of hours the reactor had been critical and the five unplanned reactor scrams which had occurred. As a result, with the reporting of 4th quarter 2007 PI data, Unit 1 was in the Degraded Cornerstone column of the NRC's Action Matrix.

The inspection team determined that the licensee performed a comprehensive review of each of the reactor scrams individually. Revised root cause evaluations for each of the scrams appropriately evaluated the root and contributing causes, addressed the extent of condition and cause, and assessed safety culture. Corrective actions identified for the scrams, extent of cause, and identified safety culture weakness were found to be sufficient to address the root causes and contributing causes.

The inspection team found that the licensee had performed an adequate common cause review of the five scrams and a safety culture assessment. The licensee concluded that an "unhealthy safety culture," with respect to the decision making, work control, human performance and problem identification and resolution areas, was a common cause to the scrams. This environment was principally associated with the completion of Unit 1 pre-restart and restart activities. Furthermore, the licensee concluded that once this environment was established, it continued to manifest itself during operation and maintenance of the subject systems after restart. The inspection team determined that the licensee had taken adequate interim measures to address the undesirable environment while long term corrective actions were being implemented. The inspection team also determined that the safety culture issues had not involved reluctance by plant personnel to bring potential safety issues to management's attention.

The inspection team performed a review of a licensee self-assessment which reviewed the actions taken to address the five scrams, the extent of condition and cause, the identified corrective actions, and performed an assessment of safety culture. The inspection team assessed that the licensee's review was adequate and that appropriate actions were taken or planned as a result of adverse conditions and weaknesses identified by the self-assessment.

In addition to assessing the licensee's evaluations, the inspection team performed an independent extent of condition and extent of cause review and a focused inspection of the site safety culture. Overall, the inspection team concluded that the licensee's cause and corrective actions established or planned to improve site performance were adequate, that an adequate extent of condition and extent of cause was performed, and that safety culture issues were appropriately identified. Adequate interim measures were taken for CAP implementation issues identified by the licensee's common cause extent of condition evaluation.

Based upon the inspection results, no findings of significance were identified. The inspection team observed some corrective action program procedure implementation deficiencies which were entered into the licensee's corrective action program for resolution.

This inspection completed the NRC reactive inspection activities associated with the Unit 1 Yellow PI for Unplanned Scram per 7000 Critical Hours. The PI returned to the White performance band and Green performance band in the first and second quarters of calendar year 2008, respectively.

A. NRC-Identified and Self-Revealing Findings

None.

B. Licensee-Identified Violations

None.

REPORT DETAILS

01 INSPECTION SCOPE

This supplemental inspection was conducted using Inspection Procedure 95002, "Inspection For One Degraded Cornerstone Or Any Three White Inputs In a Strategic Performance Area," to assess the licensee's actions associated with five unplanned reactor scrams that led to a Degraded Initiating Events Cornerstone for Unit 1. The Degraded Cornerstone was the result of the Performance Indicator (PI) for Unplanned Scrams per 7000 Critical Hours exceeding the Yellow threshold with the reporting of 4th quarter 2007 data. This was the first quarter for which this PI was considered as a valid measurement of Unit 1 performance after a 22-year shutdown. The inspection included four main objectives: 1) to provide assurance that all the root causes and contributing causes are understood for each individual reactor scram and collectively for all five scrams; 2) to independently assess the extent of condition and extent of cause for these issues both individually and collectively; 3) to independently determine whether or not safety culture components either directly caused, or significantly contributed to, the five reactor scrams, and; 4) to provide assurance that licensee corrective actions are sufficient to address the identified causes and prevent recurrence in accordance with regulatory requirements and the licensee's Corrective Action Program (CAP).

The Yellow PI was based on five unplanned reactor scrams that occurred following the May 22, 2007 startup, after an extended shutdown, until the end of the 4th quarter of calendar year 2007. The licensee placed the unplanned reactor scrams in their CAP as Problem Evaluation Reports (PERs) described below:

- PER 125288, Manual reactor scram on May 24, 2007, due to loss of electro-hydraulic control (EHC) fluid during EHC tubing leak repairs;
- PER 126054, Automatic reactor scram on June 9, 2007, due to a main turbine trip from false high level in a Moisture Separator Day Tank;
- PER 128756, Automatic reactor scram on August 11, 2007, due to a false neutron monitoring trip signal caused by a leak from a Recirculation System flow transmitter;
- PER 129791, Manual reactor scram on September 3, 2007, due to an EHC fluid leak caused by fretting damage to EHC piping; and
- PER 131878, Automatic reactor scram on October 12, 2007, due to a turbine trip from false high level in a Moisture Separator Day Tank.

For the root cause evaluations of the five scrams the team evaluated the reports utilizing the inspection requirements of Inspection Procedure 95002. The team assessed the evaluations, as documented in Sections 02.01 - 02.03 below, in the areas of: 1) Problem Identification; 2) Root Cause, Extent of Condition, and Extent of Cause; and 3) Corrective Actions.

The team performed an independent assessment of extent of condition and extent of cause for the scrams. The team found that the licensee performed a common cause review of the five scrams as documented in PER 137614. The team performed an independent in-depth review of the common cause review to assure that it addressed extent of condition and extent of cause, identified timely and appropriate

corrective actions and corrective actions to prevent recurrence in accordance with regulatory and CAP requirements, and established appropriate effectiveness measures.

The team performed an independent review to assess the validity of the licensee's conclusions regarding the extent of condition and extent of cause of the five scrams. The team reviewed the licensee's common cause analysis corrective actions for the extent of cause which required an evaluation of each system with the potential to affect nuclear safety. An independent review of two risk significant systems, high pressure coolant injection (HPCI) and emergency diesel generators (EDGs), was performed to assess whether inadequate maintenance impacted these systems. The team reviewed the prioritization of outstanding work orders, cancelled work orders, closed work orders, system health reports, maintenance rework PERs, and interviewed station personnel. The team performed an independent assessment of the corrective actions for extent of condition to determine if outage work was held to the same standard as work performed during routine operation. This was accomplished through interviews of plant personnel and review of documentation associated with outage management observations. The status of metrics to monitor the effectiveness of corrective actions related to risk management were also reviewed.

As part of the independent review, the team performed a review of licensee Self-assessment BFN-SA-08-01. The self-assessment reviewed the actions taken or planned to address the five scrams, the extent of condition and cause, the identified corrective actions, and performed an independent assessment of safety culture. The team evaluated the self-assessment to determine whether or not the licensee identified the causes of the five scrams and recommended appropriate actions to prevent recurrence. Recommendations resulting from adverse conclusions identified by the self- assessment were reviewed to determine if appropriate corrective actions were identified and implemented and/or planned. The team's assessment of extent of condition, extent of cause, and observations are documented in Section 02.04 below.

The five scram root cause evaluations and the common cause evaluation were independently evaluated by the team to determine whether or not the evaluations considered safety culture as a cause or significant contributor to the issues. The team conducted interviews with those individuals who supported the root causes, the common cause evaluations, plant management, and plant staff. The team reviewed the status of corrective actions and corrective actions to prevent recurrence of safety culture issues. The team's assessment of the licensee's safety culture consideration is documented in Section 02.05 below.

02 EVALUATION OF INSPECTION REQUIREMENTS

Yellow Performance Indicator: Unit 1 Unplanned Scrams per 7000 Critical Hours

02.01 Problem Identification

a. Determination of who identified the issues and under what conditions

The licensee determined that all five reactor scrams were self-revealing. Three of the scrams were automatically initiated by the reactor protection system as a result of secondary plant events. For two events, operators manually scrammed the reactor based on secondary plant events. The team did not identify any significant concerns with the identification of the issues.

b. Determination of how long the issues existed and prior opportunities for identification

Revision 1 to each of the five scram root cause evaluations stated when the event was identified and for how long the condition existed. For each of the events, the licensee identified that there were prior opportunities to identify conditions which caused or contributed to the events. This included operating experience, startup maintenance, startup testing, system engineer walkdowns, and through conditions revealed during prior scram events. The team concluded that the licensee's evaluations correctly determined how long the issues existed and the prior opportunities for identification.

c. Determination of the plant-specific risk consequences (as applicable) and compliance concerns associated with the issues both individually and collectively

Revision 1 to each of the five scram root cause evaluations properly addressed plant specific risk consequences. The common cause evaluation reviewed the collective risk consequences. The team noted that individual performance deficiencies associated with the scram events were identified in NRC quarterly integrated inspection reports. The team did not identify any additional risk consequences and compliance issues associated with the scrams. However, the licensee wrote licensee event reports (LERs) for each of the five reactor scrams based on the results of Revision 0 of the root cause evaluations. The team noted that the root cause evaluations had undergone significant changes when they were reperformed with the aid of a contractor who specializes in root cause analysis. The team identified that the licensee did not evaluate whether the LERs should be supplemented based on the results of Revision 1 to the five scram root cause evaluations. PER 158505 was initiated to evaluate the need to resubmit the LERs based on the Revision 1 to the root cause evaluations.

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

a. Determination that systematic methods were used to identify root causes and contributing causes

Revision 1 to the five scram root cause evaluations utilized systematic methods to identify root causes and contributing causes. The team found that all evaluations utilized at least the management oversight and risk tree (MORT) analysis. In addition, other systematic methods were utilized. Below is a listing of the methods utilized for each PER:

- PER 125288 - MORT analysis, event and causal factor charting, and barrier analysis;
- PER 126054 - MORT analysis, event and casual factor charting, Kepner Tregoe (KT) analysis, fault tree analysis, and barrier analysis;
- PER 128756 - MORT analysis, event and causal factor charting, KT analysis, and barrier analysis;
- PER 129791 - MORT analysis; and
- PER 131878 - MORT analysis, event and casual factor charting, KT analysis, fault tree analysis, and barrier analysis.

The team determined that the licensee effectively utilized systematic methods in their revised root cause evaluations to determine the root and contributing causes for each scram.

b. Determination that the level of detail of the root cause evaluation was commensurate with the significance of the issues

The team determined that the level of detail in the five scram root cause evaluations was commensurate with the significance of the issues. However, the team noted that all five scram root cause evaluations were revised by the licensee with the assistance of a contractor specializing in root cause analysis because of a lack of rigor in the original root cause analyses. For example, Revision 0 to the root cause evaluation for PER 129791 identified the cause of the scram was due to "fretting" of the EHC fluid piping. The piping fretting was the result of metal-to-metal contact due to a missing wooden support hanger. The revised root cause analysis further determined that the preventive maintenance walkdown instruction, used to inspect the EHC system as part of the system return-to-service process, was inadequate in scope and detail. The preventive maintenance instruction did not require and provide detailed instructions for the inspection of the EHC system and the wooden support hangers. In addition, the five revised scram root cause evaluations identified additional root causes and contributing causes. For example, in total, the original evaluations identified six root causes and four contributing causes, whereas the revised evaluations identified 15 root causes and 16 contributing causes.

c. Determination that the root cause evaluation considered prior occurrences of the issues and knowledge of prior operating experience

The five revised scram root cause evaluations considered prior occurrences of the issues. The evaluations included a review of applicable events on internal TVA and industry operating experience databases. The team concluded that the licensee properly considered prior occurrences of the issues and knowledge of prior operating experience.

d. Determination that the root cause evaluation addressed extent of condition and extent of cause of the issues

The five revised scram root cause evaluations included proper consideration of the extent of condition and extent of cause of the issues. This included whether other units, systems, equipment, programs or conditions could be affected.

The team determined that the extent of condition or extent of causes associated with the five scram root cause evaluations were adequate.

02.03 Corrective Actions

a. Determination that appropriate corrective actions were specified for each root or contributing cause

Comprehensive corrective actions and corrective actions to prevent recurrence were specified for each root cause and contributing cause for the five scrams. The team reviewed the planned corrective actions to determine if they were specific, measurable, and timely. The team did not identify any significant concerns with the licensee's corrective action determination. However, the team noted that, although some corrective actions were implemented following each individual scram event, the revised root cause evaluations identified additional corrective actions. For example, in total, the original evaluations identified 13 corrective actions to prevent recurrence and 50 corrective actions, whereas the revised evaluations identified 27 corrective actions to prevent recurrence and 145 corrective actions. As a result, some actions that were identified in the revised root cause evaluations were not implemented on Unit 3 during the spring 2008 refueling outage.

b. Determination that corrective actions were prioritized with consideration for risk significance and regulatory compliance

The five revised scram root cause evaluations properly prioritized corrective actions based upon risk significance and regulatory compliance. Interim actions were established when necessary prior to completion of proposed corrective actions.

c. Determination that a schedule has been established for implementing and completing the corrective actions

The five revised scram root cause evaluations established assignments and schedules for implementing corrective actions. Corrective actions associated with the root cause evaluations were captured in the licensee's CAP with sufficient detail to ensure that they were tracked and completed commensurate with their significance and priority.

The team determined that the licensee established a schedule for implementing and completing corrective actions. However, the team's review of completed corrective actions for PER 125288 identified an incomplete implementation of a corrective action. The action to revise Procedure SPP-6.1, "Work Order Initiation," was incomplete because the revision did not incorporate all of the changes identified in the corrective action plan. The team determined that the incomplete incorporation of the corrective actions into the procedure, as required by their CAP procedures, constituted a violation of Title 10 Code of Federal Regulations, Part 50, Appendix B, Criteria V, "Procedures," which was determined to be of minor significance and therefore is not subject to enforcement action in accordance with the NRC's Enforcement Policy. The licensee initiated PER 158446 to address this deficiency.

d. Determination that quantitative or qualitative measures of success were established for determining the effectiveness of the corrective actions to prevent recurrence

For the five revised scram root cause evaluations, the licensee established measures to validate the effectiveness of the corrective action plans. The measures included a combination of quantitative and/or qualitative factors. The team concluded that the licensee's proposed monitoring to determine the effectiveness of corrective actions to prevent recurrence, where required by their CAP, was adequate.

02.04 Independent Assessment of Extent of Condition and Extent of Cause

The team determined that the licensee's common cause evaluation of the five scrams (PER 137614) was of sufficient breadth to identify additional issues similar to those which caused the five scrams. This evaluation also included review of safety culture to identify common issues. Three common causes of the scrams were identified. The team noted that the licensee identified corrective actions and corrective actions to prevent recurrence for the one common cause that the licensee determined was applicable to the current Browns Ferry organization. The other two common causes were associated with the Browns Ferry pre-start and restart testing organization and were to be applied to the applicable programs and processes at Watts Bar since construction activities had resumed on Watts Bar Unit 2. Section 02.05 discusses issues identified by the common cause evaluation relating to safety culture.

The team identified an example of an ineffective extent of condition corrective action for a common cause. The common cause was "the less than adequate risk management by working level personnel and management decision makers" which had led to numerous problems in implementing pre-restart work. One desired extent of condition corrective action was to conduct a systematic evaluation of each Unit 1 system with the potential to affect nuclear safety during the upcoming Unit 1 refueling outage. However, the specified extent of condition corrective action did not include a review of pre-restart activities on the systems potentially affecting nuclear safety to determine if issues similar to those that had caused the five scrams existed on those systems. However, the team was able to confirm that other corrective actions, associated with the self assessment, were sufficient to address this issue.

The team reviewed other actions the licensee had taken to review restart work and modification activities. The team found that a review of risk significant systems was being performed as a result of actions taken to address recommendations identified in Self-Assessment BFN-SA-08-01. This review, which was still in progress at the time of the inspection, performed a systematic evaluation of eight Unit 1 risk significant systems (EDGs, control rod drive system, reactor core isolation cooling, HPCI, residual heat removal system, residual heat removal service water/emergency equipment cooling water, 480 volt circuit breakers, and feedwater). This evaluation included a review of the adequacy of design changes and post modification testing performed during the restart. The team considered these actions adequate to address the common cause extent of condition even though they were not specified as corrective actions from PER 137614. The team observed that the licensee had not formally assessed the applicability of some

of the results to other systems. The licensee entered this observation into their CAP as PER 158644.

The team identified CAP procedure implementation deficiencies during the team's review of completed work orders (WO) for the HPCI and EDG systems. During the review of the journeyman's logs in completed work packages, the team identified instances where the licensee corrected or addressed conditions during performance of maintenance but failed to initiate PERs for those conditions as required by the licensee's CAP. Two of these instances were related to Unit 1 restart (excessive pipe dope inside a HPCI flow instrument (WO 08-710329) and insufficient thread and sealant engagement for a HPCI steam flow instrument (WO 08-714197)) and another instance (licensee questioned a wiring configuration, later verified to be correct (WO 08-711354)) was associated with post-Unit 1 restart. The licensee initiated PERs 158557, 158459, and 158472 for failure to initiate PERs during the performance of the specific work orders and PER 158645 to address the issue collectively. In addition, the team reviewed a sample of maintenance related PERs that were coded "Trending" (139583, 54489, 146160/161, 158594). During the review the team identified that the PERs were improperly screened as "trend" versus "evaluate". The licensee initiated PERs 158502, 158503, 158504 for the individual deficiencies and PER 158647 to address the screening issue collectively. The team determined that several of these issues, associated with CAP procedure implementation, constituted violations of Title 10 Code of Federal Regulations, Part 50, Appendix B, Criteria V, "Procedures," which were determined to be of minor significance and therefore are not subject to enforcement action in accordance with the NRC's Enforcement Policy. The team noted that the licensee has previously identified similar weaknesses in their CAP implementation and was implementing changes to improve the program.

02.05 Safety Culture Consideration

Each of the five revised scram root cause evaluations individually considered whether safety culture components caused or significantly contributed to any of the performance issues identified. In each of the root causes, safety culture was determined to be a contributor to the events. Corrective actions were identified for each safety culture aspect that was determined to be a weakness, significant contributor, or root cause.

The common cause analysis (PER 137614) included a safety culture assessment for the five scrams collectively. The inspectors verified that the licensee had assessed all the 13 different safety culture components listed in Section 06.07 of NRC's Inspection Manual Chapter 0305, "Operating Reactor Assessment Program." Two common safety culture causes were determined to have contributed to the less than optimum safety culture which caused the problems leading to the five reactor scrams. One cause was at the root cause level and the other was at the contributing cause level as follows:

- Root Cause Level: An "unhealthy safety culture" with respect to the decision making, work control, human performance and problem identification and resolution cross-cutting areas were common causes to the scrams. These items were principally associated with the completion of pre-restart and restart Unit 1 activities. Once the "unhealthy safety culture" was established during pre-restart and restart activities, it continued to manifest itself during operation and maintenance of the subject systems.

This “unhealthy safety culture” significantly contributed to the work environment leading to the five reactor scrams.

- Contributing Cause Level: Weaknesses in resources, self and independent assessments, safety conscious work environment, accountability, and continuous learning environment, while less significant, moderately contributed to the less than optimum safety culture which caused the problems leading to the five reactor scrams.

The common cause analysis identified additional corrective actions and corrective actions to prevent recurrence for safety culture issues that were not previously addressed in the original five scram root cause evaluations.

In addition, the team found that Self-Assessment BFN-SA-08-01 performed an independent review of whether safety culture was considered in the root cause evaluations of the scrams, as well as, a root cause evaluation related to a cross cutting issue associated with the CAP. The self-assessment concluded that safety culture components were considered and were significant contributors to the scrams. The team did not identify any significant concerns with the licensee’s common cause evaluation and corrective actions. However, the team found that some of the actions were not completed at the time of the inspection. For example, a common cause corrective action to provide risk management training, including nuclear safety culture, for managers, supervisors, and workers was not completed. However, the team found that other completed corrective actions, associated with the five individual scram root cause evaluations, provided similar training that was considered an acceptable interim action. In addition, the team noted that the licensee planned to conduct an independent safety culture survey in Spring 2009 with corrective actions, if any, to be developed by July 2009.

The team also determined that the safety culture issues had not involved safety conscious work environment issues. The team determined, consistent with other inspection results, that plant personnel at Brown Ferry were not reluctant to bring potential safety issues to management’s attention.

03 MANAGEMENT MEETINGS

a. Preliminary Exit Meeting Summary

The team presented the preliminary results of the supplemental inspection to Mr. A. Elms and other members of licensee management and staff on December 5, 2008. The team confirmed that any proprietary information provided or examined during the inspection was returned.

b. Public Exit and Regulatory Performance Meeting Summary

On January 6, 2009, a combined public exit and regulatory performance meeting was conduct with Browns Ferry management. During the meeting, the results from this supplemental inspection, including the adequacy of the licensee’s corrective actions taken and planned to address the root and contributing causes and safety culture issues,

associated with the Yellow PI, were discussed with Mr. R. West and other members of licensee management and staff. The inspection results, as presented in this inspection report Summary of Findings, constituted the NRC's presentation for the Regulatory Performance Summary meeting. The licensee acknowledged the NRC's results and observations and provided a brief overview of their major activities associated with their corrective actions for the Yellow PI. No handouts were used during the meeting.

Mr. D. Jernigan, Senior Vice President – Operations, and Mr. R. West, Site Vice President – Browns Ferry Nuclear, were the senior TVA corporate and site officials in attendance. The following members of the media attended the meeting: Karen Middleton, Athens News Courier; Ken Conley, Fox 54, Huntsville; Brian Lawson, Huntsville Times; Brad Schrade, The (Nashville) Tennessean; Holly Hollman, Decatur Daily; and, Trevor Stokes, The (Florence) Times Daily. The meeting was also attended by other members of the licensee staff and members of the public.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

S. Berry, System Engineering Manager
S. Bono, Engineering Manager
T. Cosby, TVA Nuclear Power Group, Organizational and Culture Initiatives
S. Douglas, General Manager of Site Operations
A. Elms, Assistant General Manager Operations
D. Feldman, Interim Operations Manager
E. Frevold Design Engineering Manager
D. Langley, Site Licensing Manager
R. Marsh, Operations Shift Manager
D. Matherly, Turn-around-Team Performance Improvement Manager
M. Purcell, TVA Licensing Manager
E. Quinn, Performance Improvement Supervisor
R. Rogers, Maintenance & Modifications Manager
P. Sawyer, Radiation Protection Manager
E. Scillian, Operations Training Manager
T. Shultz, Engineering Balance of Plant Supervisor
R. Stowe, Operations Support Superintendent
R. West, Site Vice President

NRC Personnel

T. Ross, NRC Senior Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None.

Closed

None.

Discussed

None.

Attachment

LIST OF DOCUMENTS REVIEWED

Procedures
PIDP-1, PER Initiation, Rev. 0000
PIDP, PIDP-2, PER Supervisory Review, Rev. 0000
PIDP-3, Operability and Reportability Reviews of PERs, Rev. 0000
PIDP-4, Corrective Action Program Screening and Oversight, Rev. 0001
PIDP-5, Apparent Cause Evaluations, Rev. 0001
PIDP-6, Root Cause Analysis, Revision 0001
PIDP-7, PER Actions, Rev. 0000
PIDP-8, PER Operating Experience and Generic Reviews, Rev. 0001
PIDP-9. PER Closure, Rev. 0000
PIDP-10, PER Effectiveness Reviews, Rev. 0000
PIDP-11, PER Trending, Rev. 0000
PIDP-13, Corrective Action Program Basis, Rev. 0000
PIDP-14, CAP Health Monitor, Rev. 0000
SPP-1.6, NPG Self-Assessment and Benchmarking Program, Rev. 0016
SPP-3.1, Corrective Action Program, Rev. 0015
SPP-3.9, Operating Experience Program, Rev. 0001
SPP-6.1, Work Order Process Initiation, Rev. 0006
SPP-6.2, Preventive Maintenance, Rev. 005
SPP-7.1, On Line Work Management, Rev. 0011
0-TI-270, BFN Unit 0 Refueling Test Program, Rev. 0010
Maintenance Preventive Instruction, MPI-0-047-INS 001, Inspection Procedure for EHC System Tubing and Tube Supports, Rev. 0000
1-ARP-9-7C, BFN Unit 1 Alarm Response Procedure, Rev. 0018
MAI-1.3,BFN Unit 0 General Requirements for Modifications, Rev. 0022
MAI-4.4A, BFN Unit 0 Instrument Line Installation, Rev. 0021
MCI-0-000-TUB001, BFN Unit 0 Compression Fitting Disassembly, Inspection, Rework and Reassembly, Rev. 0021

Training Documents
OPL 171.238, “Operational Focus and Systematic Decision Making Processes,”
PPT 100.101, Generic Procedure Changes, Rev. 0,
MTS 128.000, Initial Tube Fitting Training, Rev. 5
MTS 128.000, Initial Tube Fitting Training, Rev. 4
MTS 128.000, Initial Tube Fitting Training, Rev. 3
MST 101.001, Oversight and Involvement of the Nuclear Supervisor, Rev. 1
MST 101.002, Oversight Skills for the Nuclear Supervisor, Rev. 0
MMQ 006.126, Installation and Maintenance of Compression Fittings, Rev. 0

Work Orders
WO 07-717812-000
WO 08-711453-001
WO 08-711453-002
WO 08-711453-003
WO 07-724677-000
WO 08-711354-000

WO 08-710329-000
WO 08-711354-000
WO 08-714197-000
WO 08-717686-000
WO 07-727306-000
WO 07-723756-000
WO 07-716464-000
WO 08-716537-000
WO 07-726753-000
WO 08-716793-000
WO 07-726455-000
WO 07-726414-000
WO 07-724563-000
WO 07-727113-000

Corrective Action Documents
PER 150077, Indicators for Temporary Leak Repairs Red for July '08 Report
PER 146161, Leaking VFD Heat Exchanger
PER 139583, Rework on 3A CRD Pump
PER 154489, Weld Data Sheet Errors
PER 155158, B Diesel Generator – Excessive Oil Leak from Engine Oil Exhaust Piping

Licensee Event Reports
50-259/2007-002, Manual Scram due to an Unisolable EHC leak
50-259/2007-005, Automatic Reactor Scram due to Turbine Trip as a Result of Invalid High Level in Moisture Separator Drain Tank
50-259/2007-007, Automatic Reactor Scram from a Neutron Monitoring Trip Signal
50-259/2007-2008, Manual Reactor Scram due to an Electro-Hydraulic Control System Leak
50-259/2007-2009, Invalid High Level in Moisture Separator Results in Turbine Trip and Reactor Scram

Corrective Action Documents Initiated due to 95002 Inspection Activities

Problem Evaluation Report (PER)158502, Maintenance Rework PER Improperly Classified
PER 158503, PER 146101 closed to another PER without updating problem description
PER 148504, PER 154489 improperly classified as D level vice C level
PER 158459, Performance of WO 08-710328 revealed condition adverse to quality with no PER generated
PER 158472, Performance of WO 08-714197 revealed condition adverse to quality with no PER generated
PER 158524, PER action 125288-003 closed with no action to track actions on Unit 2
PER 158520, PER action 129791-018 closed with intended CATPR still remaining open due to need to perform walkdown of EHC system per procedure prerequisite
PER 158474, During Unit 1 recovery, a field engineer signed off steps for tube bending that should have been signed by a quality control inspector
PER 158446, PER action 125288-015 closed without SPP-6.1 revised as required by action
PER 158505, Need to revise licensee event reports not considered following reperformance of root cause analyses associated with fire Unit 1 scrams

PER 158557, Performance of WO 08-711354 identified condition adverse to quality with no PER generated
PER 158594, PER 150077 closed with reference to an incorrect PER number
PER 158643, Common cause PER 137614 failed to reference other corrective actions taken in PER 150005 to address extend of cause
PER 158644, PER 150065 required an evaluation of 8 systems, but failed to evaluate the deficiencies from a cumulative aspect and determine if additional actions should be taken
PER 158645, During the NRC 95002 inspection, three examples of failing to generate a PER for deficiencies found during the course of performing work were identified
PER 158647, During the NRC 95002 inspection, three PERS were found that were inappropriately screened

Miscellaneous
Lesson Plan Gen. 121.000, CAP Job Familiarization Guideline
Unit 1 Fall 2008 Outage Observations
Unit 3 Spring 2008 Outage Observations
System Status Report, 2nd period FY 08
Unit 2 HPCI System Open Work Order List
Emergency Diesel Generator System, Open Work Order List
Unit 1HPCI System Closed, Work Order List
Emergency Diesel Generator System Closed Work Order List
Unit 1 HPCI System Canceled Work Order List
Unit 1 HPCI System Open PERS
Emergency Diesel Generator System Open PERS
Plant Leak Test
Control Room Disabled Annunciators List
Safety Culture Roll-up of Corrective Actions Summary
Safety Culture Consolidated Action Tracking Summary
Top 10 equipment list
EWR 08 MEB 006 087, Evaluate the Normal Control Valve on Unit 1 for Scram Risk Experienced on Unit 1 High Level Dump Valves and Document Analysis in Engineering Work Request or Other Approved Acceptable Document, 7/11/08
BFN-M&M-S-09-001, Post U1 Restart Impacts of Worker Practices and Verifications during Unit 1 Recovery, 10/22/2008
BFN-SA-08-01, 2008 Browns Ferry Mock 95002 Assessment Report, 8/7/2008
TVA-BFN Problem Identification and Resolution Audit, Emergency Diesel Generator System Review, PER 150065-004
TVA-BFN Problem Identification and Resolution Audit, Reactor core Isolation Cooling System Review, PER 150065-008

TVA-BFN 95002 Audit, 480V Circuit Breakers Program Review, PER 150065-006
95002 Assessment for the Residual Heat Removal System, PER 150065-009
95002 Assessment for Control Rod Drive System
95002 Assessment for the HPCI System

ACRONYMS

ADAMS	Agencywide Documents Access Management System
CAP	Corrective Action Program
EDG	Emergency Diesel Generator
EHC	Electro-hydraulic Control
HPCI	High Pressure Coolant Injection
KT	Kepner Tregoe
LER	Licensee Event Report
MORT	Management Oversight and Risk Tree
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PERS	Problem Evaluation Reports
PI	Performance Indicator
TVA	Tennessee Valley Authority
WO	Work Order