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

July 30, 2013

EA-13-0118

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

SUBJECT: PUBLIC MEETING SUMMARY - REGULATORY CONFERENCE FOR BROWNS FERRY NUCLEAR PLANT, DOCKET NO. 50-260

Dear Mr. Shea:

This refers to the meeting conducted on July 24, 2013, in Atlanta, GA. The purpose of this meeting, was to allow representatives of Tennessee Valley Authority (TVA), the licensee for Browns Ferry Nuclear Plant, to meet with U. S. Nuclear Regulatory Commission (NRC) personnel to discuss the safety significance of one preliminary Greater Than Green finding associated with one Apparent Violation that was documented in NRC Inspection Report 05000260/2013012 (ML13162A780). This finding involved the failure to properly implement procedure 2-OI-99, Reactor Protection System. Specifically, during restoration of 2B Reactor Protection System (RPS) 480 volt power, the RPS motor generator set tie to battery board 2 breaker on the 2A RPS bus motor generator set was incorrectly opened, causing a Unit 2 reactor scram and main steam isolation valves (MSIV) closure. The licensee discussed the immediate corrective actions they implemented and the actions that will be taken based on the licensee's root cause analysis.

A list of attendees and a copy of the presentation handouts are enclosed.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter will be made 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).

Should you have any questions concerning this meeting, please contact me at (404) 997-4521.

Sincerely,

/RA/

Scott Shaeffer, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos.: 50-260
License Nos.: DPR-52

Enclosures:
1. List of Attendees
2. Presentation Handouts

cc w/encls: (See page 3)

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X PUBLICLY AVAILABLE □ NON-PUBLICLY AVAILABLE □ SENSITIVE X NON-SENSITIVE

ADAMS: □ Yes ACCESSION NUMBER:_____ X SUNSI REVIEW COMPLETE

OFFICE	RII:DRP	RII:DRP					
SIGNATURE	JXH /RA/	SMS /RA/					
NAME	JHeisserer	SShaeffer					
DATE	07/30/2013	07/30/2013					
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\MEETINGS\2013 July 24 Reg Conf Meeting Summary.docx

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Letter to J. Shea from Scott Shaeffer dated July 30, 2013

SUBJECT: PUBLIC MEETING SUMMARY - REGULATORY CONFERENCE FOR BROWNS FERRY NUCLEAR PLANT, DOCKET NO. 50-260

Distribution w/encl:
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RIDSNRRDIRS
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RidsNrrPMBrownsFerry Resource

NRC ATTENDEES

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W. Jones, Deputy Director, DRP, RII
C. Evans, Regional Counsel, RII
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R. Franovich, Branch Chief, DIRS, NRR (by phone)
S. Vaughn, Reactor Operations Engineer, DIRS, NRR (by phone)
L. Casey, Enforcement Specialist, Office of Enforcement (by phone)
D. Dumbacher, Senior Resident Inspector, Browns Ferry (by phone)
L. Pressley, Resident Inspector, Browns Ferry (by phone)
T. Stephen, Resident Inspector, Browns Ferry (by phone)

BROWNS FERRY REGULATORY CONFERENCE
PUBLIC MEETING

Atlanta, GA

July 24, 2013

Attendees

Name (Print)	Title and Organization
Ching Guey	PRA Sr Mgr, TVA
Gareth Parry	Senior Consultant, ERIN Engineering
Ed Viglucci	OGC / TVA

Enclosure 1

BROWNS FERRY REGULATORY CONFERENCE

PUBLIC MEETING

Atlanta, GA
July 24, 2013

Attendees (by phone)

Name (Print)	Title and Organization
Stewart Horn	BREDL/BEST/MATRR
Gretel Johnston	BREDL/BEST/MATRR
Garry Morgan	BREDL/BEST/MATRR
Bradley George	WPLN
Brian Lawson	Huntsville Times

BROWNS FERRY REGULATORY CONFERENCE

PUBLIC MEETIN

Atlanta, GA

Enclosure 1

July 24, 2013

Attendees

Name (Print)	**Title and Organization**
Preston Swafford	Senior Vice President, Nuclear Operations
Jim Morris	Site Vice President, Browns Ferry
Keith Polson	Operations Manager, Browns Ferry
Daniel (Lang) Hughes	Nuclear Licensing Engineer, Browns Ferry
Michael Oliver	Manager, Corporate Nuclear Licensing
Eugene Cobey	Site Licensing Oversight Manager
Peter Wilson	TVA
Kendall Minor	Public
Angela Oliver	TVA CNO and Executive VP

Enclosure 1

Nuclear

Browns Ferry Nuclear Plant
Regulatory Conference

Failure to Properly Implement Procedure 2-OI-99, Reactor Protection System

July 24, 2013

TVA Nuclear

Agenda

Opening Remarks……K. Polson

Event Description and Initial Actions……... L. Hughes

Root Cause Evaluation……...L. Hughes

Significance Determination …..……..…. P. Wilson

Closing Remarks……..... P. Swafford

TVA Nuclear

Opening Remarks

Keith Polson, Site VP Browns Ferry

TVA Nuclear

Opening Remarks

- A self-revealing Apparent Violation of Technical Specification 5.4.1 was identified for TVA's failure to properly implement procedure 2-OI-99, "Reactor Protection System"
  - Specifically, during restoration of the 2B Reactor Protection System (RPS) 480 volt power, the RPS motor generator set tie to battery BD 2 Breaker on the 2A RPS bus motor generator set was incorrectly opened
- TVA agrees with the Apparent Violation
- Provide information regarding the event, root cause evaluation, and corrective actions in progress or taken
- Provide additional insights and perspectives for NRC consideration in the final significance determination

Nuclear

Event Description and Initial Actions

Lang Hughes, Senior Manager, Browns Ferry Operations

TVA Nuclear

Event Description and Initial Actions

- Initial Plant Conditions
  - 18 minutes prior to the scram, the 2B RPS Bus was de-energized due to an unrelated malfunction
  - As a result, a half scram signal was generated
- Event Description
  - While attempting to re-energize the 2B RPS subsystem, the 2A RPS subsystem was inadvertently de-energized
  - This action, in conjunction with the pre-existing half scram, resulted in a full reactor scram and closure of the Main Steam Isolation Valves

TVA Nuclear

Event Description and Initial Actions

- Initial Actions
  - Temporarily removed individual from Senior Reactor Operator functions
  - Conducted a stand down on the event with Operations shift personnel
  - Issued Standing Order SO-183, "Interim Actions for Operator Fundamentals," on December 25, 2012
  - Issued Browns Ferry (BFN) communication to site personnel regarding the "Prompt Investigation Key Points" on January 3, 2013

Nuclear

Root Cause Evaluation

Lang Hughes, Senior Manager, Browns Ferry Operations

TVA Nuclear

Root Cause Evaluation

- Root Cause:

  Failure to fully implement the recommendations of INPO Significant Operating Event Report (SOER) 10-2, "Engaged, Thinking Organizations," and SOER 96-1, "Control Room Supervision, Operational Decision Making, and Teamwork," given that supervisors are routinely assigned to perform plant manipulations

  - Long-standing BFN practice
  - BFN missed the opportunity to change this practice during SOER implementation

TVA Nuclear

Root Cause Evaluation

- Corrective Actions to Prevent Recurrence:
  - Develop and implement a change management plan in accordance with COO-SPP-01.2, "Change Management Program," for transitioning plant manipulations performed by Unit Supervisors/Senior Reactor Operators to Unit Operators and Assistant Unit Operators
  - Most tasks have been transferred to field operators with full implementation following completion of required training by February 2014

Nuclear

Root Cause Evaluation

- Extent of Condition:
  - The condition evaluated was the de-energization and restoration of RPS subsystems
  - The extent of condition was bounded by testing and maintenance activities performed by Operations and Maintenance personnel on all three units
  - No other deficiencies were identified

TVA Nuclear

Root Cause Evaluation

- Extent of Cause:
  - Reviewed and evaluated implementation of the recommendations contained in INPO SOER 10-2 and SOER 96-1
  - Reviewed and evaluated implementation of the recommendations contained in INPO significant event reports for the past 5 years that could result in plant scrams, significant plant transients, or other adverse consequences to the operating units if not effectively implemented
  - No other deficiencies were identified

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Root Cause Evaluation

- Contributing Causes:

  Operating Instruction 2-OI-99 contains both divisions of RPS equipment within the same step, requiring the operator performing the evolution to select which component to manipulate

  - The Operating Instructions have been enhanced for all three units to provide divisional separation within the procedure
  - No other Operating Instructions required enhancement to include divisional separation

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Root Cause Evaluation

- Contributing Causes (Continued):
  - Abnormal Operating Instruction (AOI) 2-AOI-99, "Reactor Protection System (RPS)," does not contain steps for restoring the RPS buses
    - The AOIs were revised for all three units to add sections for RPS bus restoration
  - There is a lack of clear guidance for exiting AOIs
    - Guidance was issued that fully addresses exiting AOIs

Nuclear

Root Cause Evaluation

- Integrated Improvement Plan
  - Performed a Significant Event and Condition Review to determine whether the causes for this event were bounded by the fundamental problems or resulted from ineffective Integrated Improvement Plan actions
  - The results of this review reinforced the need for a new fundamental problem related to training that had previously been identified

Nuclear

Significance Determination

Pete Wilson, Manager, Site Licensing Oversight

TVA Nuclear

Significance Determination

- Description of TVA's overall approach
  - To evaluate the increase in risk due to the performance deficiency, TVA calculated the change in core damage frequency (Δ CDF) and change in large early release frequency (Δ LERF)
  - Δ CDF and Δ LERF are the figures of merit described in NRC's Inspection Manual Chapter 0609, "Significance Determination Process"
  - Used BFN peer-reviewed Probabilistic Risk Assessment (PRA) Level 1 and Level 2 models
  - The impact of the performance deficiency is modeled as a change in the frequency of loss of condenser vacuum

Significance Determination

- Calculation of Δ CDF
  - Δ CDF is approximated by multiplying the change in initiating event (IE) frequency and the conditional core damage probability (CCDP)
  - CCDP represents the margin to core damage given the occurrence of an IE and is basically a characterization of the ability of the plant to cope with an event

TVA Nuclear

Significance Determination

- Calculation of CCDP
  - Assumed main condenser vacuum is lost (surrogate for Main Steam Isolation Valve closure) at the start of the event
  - Credited reopening of Main Steam Isolation Valves when High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems fail after four hours from the start of the event
  - Average test and maintenance model used

TVA Nuclear

Significance Determination

- The CCDP for this performance deficiency was calculated to be 3.6E-6
- Comparison with the NRC's calculated CCDP
  - Numerical results are similar
  - Dominant accident sequences are similar

TVA Nuclear

Significance Determination

- Calculation of the change in IE frequency
  - Modeling considerations
    - The performance deficiency on its own would not directly lead to a scram, but would only result in a half scram condition
    - A reactor scram requires a coincidental half-scram condition
    - In the scram that occurred, the pre-existing half scram was due to an unrelated failure
    - The change in IE frequency should reflect the likelihood of the pre-existing half scram condition

TVA Nuclear

Significance Determination

- Calculation of the change in IE frequency (continued)
  - Historical review of the use of 2-OI-99
    - Procedure has been in use for over 10 years
    - Operators frequently used this procedure for test and maintenance activities

TVA Nuclear

Significance Determination

- Calculation of the change in IE frequency (continued)
  - Estimate of change in IE frequency based on results of the historical review
    - The change in frequency of the IE for which the performance deficiency is a contributing cause is estimated based on 1 event in 10 years
    - Used a Jeffrey's non-informative prior to estimate the change in IE frequency
    - Change in IE frequency is estimated to be 0.15 per year

TVA Nuclear

Significance Determination

- Calculation of the change in IE frequency (continued)
  - TVA's estimate of the change in IE frequency is conservative because it ignores the experience from the other BFN units using the same procedure
- Δ CDF Results
  - Δ CDF for this performance deficiency is 3.6E-6 multiplied by 0.15 per year or 5.4E-7 per year

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Significance Determination

- Calculation of Δ LERF
  - Δ LERF is approximated by multiplying the change in IE frequency and the conditional large early release probability (CLERP)
  - CLERP represents the probabilistic margin to a large early release given the occurrence of an IE and failures of mitigating equipment
  - The change in the IE frequency is the same

TVA Nuclear

Significance Determination

- Δ LERF Results
  - TVA calculated the CLERP for this performance deficiency using the BFN peer-reviewed Level 2 PRA model
    - The calculated CLERP is 3.7E-7
  - The change in IE frequency is 0.15 per year
  - Δ LERF for this performance deficiency is 3.7E-7 multiplied by 0.15 per year or 5.6E-8 per year

TVA Nuclear

Significance Determination

- Summary of results from TVA's Significance Determination
  - Δ CDF = 5.4E-7 per year
  - Δ LERF = 5.6E-8 per year
- Therefore, TVA offers for NRC consideration that the significance of this performance deficiency can reasonably be considered very low

Closing Remarks

Preston Swafford, TVA Chief Nuclear Officer