Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-15-139

September 1, 2015

10 CFR 50.54(f)

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

Browns Ferry Nuclear Plant, Unit 3
Renewed Facility Operating License No. DPR-68
NRC Docket No. 50-296

Subject: **Tennessee Valley Authority - Supplemental Response to NRC Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding the Browns Ferry Nuclear Plant, Unit 3 Seismic Walkdown Results of Recommendation 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident**

References:

1. NRC Letter, "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (ML12056A046)

2. TVA Letter to NRC, "Tennessee Valley Authority (TVA) - Response to NRC Request for Information Pursuant to *Title 10 of the Code of Federal Regulations* 50.54(f) Regarding the Browns Ferry Nuclear Plant Seismic Walkdown Results for Recommendation 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated November 27, 2012 (ML13002A487)

On March 12, 2012, the NRC issued Reference 1 to all power reactor licensees and holders of construction permits in active or deferred status. Enclosure 3 of Reference 1 contains specific Requested Actions, Requested Information, and Required Responses associated with Near Term Task Force (NTTF) Recommendation 2.3: Seismic.

In Reference 2, TVA provided the Browns Ferry Nuclear Plant (BFN) seismic walkdown reports in accordance with Reference 1. The BFN seismic walkdown reports documented the plant walkdowns performed to identify and address plant-specific vulnerabilities and verify the adequacies of monitoring and maintenance procedures. In Section 5.1 of Enclosure 3 to Reference 2, TVA identified four pieces of BFN Unit 3 equipment where walkdowns could not be completed due to being inaccessible during reactor power operations.

TVA committed in Reference 2 to complete seismic walkdowns for these four areas in the BFN Unit 3, 2014 Spring refueling outage. TVA has completed these remaining seismic walkdowns.

The purpose of this letter is to provide the results of the completed BFN Unit 3 walkdown inspections performed for the four pieces of equipment identified in Reference 2. Specifically, the Enclosure of this letter provides the updated pages to the Seismic Walkdown Report for BFN, Unit 3. Pages 1 (cover page), 2, 4, 10, 14, 15, 21, 112, 113, 115, 116, 302-311, 532-541, 717, and 883-889 of the Enclosure have been revised to include the results for these walkdowns and these pages supersede those pages submitted in Enclosure 3 to Reference 2. The remaining pages of the Enclosure (Pages 2i, 2ii, 45i-45iii, 55i-55iii, and 881i-881xii) are new and added to the report to document these additional walkdowns. There were no degraded, nonconforming, or unanalyzed conditions that required either immediate or follow-up actions as a result of these seismic walkdowns at BFN Unit 3.

There are no new regulatory commitments contained in this letter.

Should you have any questions regarding this matter, please contact Russell Thompson at (423) 751-2567.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 1st day of September 2015.

Respectfully,

J. W. Shea
Vice President, Nuclear Licensing

Enclosure:

Browns Ferry Nuclear Plant, Unit 3, Fukushima Near-Term Task Force Recommendation 2.3: Seismic Response Report

cc (Enclosure):

NRR Director - NRC Headquarters
NRO Director - NRC Headquarters
NRC JLD Director - NRC Headquarters
NRC Regional Administrator - Region II
NRR Project Manager - Browns Ferry Nuclear Plant
NRC JLD Project Manager - Browns Ferry Nuclear Plant
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

ENCLOSURE

BROWNS FERRY NUCLEAR PLANT, UNIT 3
FUKUSHIMA NEAR-TERM TASK FORCE
RECOMMENDATION 2.3: SEISMIC RESPONSE REPORT

W50 140516 001

BROWNS FERRY NUCLEAR PLANT – UNIT 3 FUKUSHIMA NEAR-TERM TASK FORCE RECOMMENDATION 2.3: SEISMIC RESPONSE REPORT

24-March-2014

WorleyParsons
633 Chestnut St. Suite 400
Chattanooga TN, 37450
Tel: 423-757-8020
Fax: 423-757-5869
www.worleyparsons.com
WorleyParsons Services Pty Ltd
ABN 61 001 279 812

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
0	BFN Unit 3 Seismic Walkdown Report	J. Black	J. Black FOR N. Pressler VIA TELECON	J. Edgar	26-Nov-12		
1	BFN Unit 3 Seismic Walkdown Report	R. Malone	T. Hockenberry	J. Edgar	24-Mar-14	STEPHEN SAMAAN	05/15/2014

Title: Browns Ferry Nuclear Plant – Unit 3 Fukushima Near-Term Task Force Recommendation 2.3: Seismic Response Report		REVISION LOG
Revision No.	**DESCRIPTION OF REVISION**	**Date Approved**
0	Initial Issue	26-Nov-2012

1	Revised to add additional references (outage items)
	Added Sections:
	• Revision Log (page 2i to 2ii)
	• Appendix A: Resumes (pages 45i to 45iii and pages 55i to 55iii): Added resumes for the two additional walkdown engineers performing the outage item walkdowns.
	• Appendix F: AWCs (pages 881i to 881xii): AWCs performed on 26-Feb-14 added.
	Removed Sections:
	• 5.1 Seismic Walkdown Checklists (page 15): Removed paragraph 3.
	• 5.1 Seismic Walkdown Checklists (page 15): Removed outage items listed as inaccessible.
	Revised Sections:
	• Title Page: (page 1) Revised issue date
	• Signature Page: (page 2) Updated name of originator, reviewer, and revised issue date.
	• Executive Summary (page 4): Updated paragraph 3 to reflect the additional area walk-bys performed on 26-Feb-14.
	• Executive Summary (page 4): Updated paragraph 3 updated the time frame that walkdowns were performed to include the walkdowns performed on 26-Feb-14.
	• Executive Summary (page 4): Updated paragraph 4 to reflect the completion of the outage walkdown items performed on 26-Feb-14.
	• 3.2 Seismic Walkdown Engineers (page 10): Two additional walkdown engineers added.
	• 5.1 Seismic Walkdown Checklists (page 14): Updated paragraph 1 to reflect the additional walkdowns performed on 26-Feb-14.
	• 5.1 Seismic Walkdown Checklists (page 14): Updated paragraph 2 to reflect the additional area walk-bys performed on 26-Feb-14.
	• 5.1 Seismic Walkdown Checklists (page 15): Updated the number of anchorage configurations from 47 to 46 in first paragraph.
	• 5.2 Seismic Walkdown Checklists (page 15): Updated the number of SWCs that resulted in a YES status.
	• 5.2 Seismic Walkdown Checklists (page 15): Updated the number of AWCs that resulted in a YES status.
	• Appendix A: Resumes (page 21): Two additional walkdown engineers added to the resume list.
	• Appendix D: SWELs and Areas
	  ○ (pages 112 and 113): Revised SWEL list to include the AWCs on 26-Feb-14.
	  ○ (page 115): Revised AWCs list to include the additional AWCs performed on 26-Feb-14.
		24-Mar-2014

TVA 10534 [8-1995]

Title: Browns Ferry Nuclear Plant – Unit 3 Fukushima Near-Term Task Force Recommendation 2.3: Seismic Response Report		REVISION LOG
Revision No.	**DESCRIPTION OF REVISION**	**Date Approved**
	• Appendix E: SWCs ○ (page 116): Additional signatures and minor wording added for the outage item SWCs. ○ (pages 302 to 311): SWCs outage items previously marked as UNKNOWNS replaced with SWCs completed on 26-Feb-14. ○ (pages 532 to 541): SWCs outage items previously marked as UNKNOWNS replaced with SWCs completed on 26-Feb-14. • Appendix F: AWCs (page 717): Additional signatures and minor wording added for the outage AWCs. • Appendix G: Peer Review Report (pages 883 to 889): Revised peer review report to reflect completion of outage items.	

Table of Contents

1) Executive Summary

As a result of the Fukushima Daiichi Nuclear Power Plant accident, the U.S. Nuclear Regulatory Commission established the Near Term Task Force (NTTF) to conduct a systematic and methodical review of NRC processes and regulations to determine whether the agency should make additional improvements to its regulatory system and to make recommendations to the Commission for its policy direction. The NTTF issued a report (Reference 1) that made a series of recommendations, some of which were to be acted upon "without unnecessary delay". Subsequently, the NRC issued a 50.54(f) Letter (Reference 2) that requests information to assure that these recommendations are addressed by all U.S. nuclear power plants. This report provides guidance for conducting a seismic walkdown as required in the 50.54(f) Letter, Enclosure 3, Recommendation 2.3: Seismic. Every U.S. nuclear power plant is required to perform a seismic walkdown to identify and address degraded, non-conforming or unanalyzed conditions and to verify the current plant configuration with the current seismic licensing basis.

In support of conducting the NTTF-2.3 Seismic Walkdowns, the Electrical Power Research Institute (EPRI) issued a report entitled *Seismic Walkdown Guidance* (Reference 3) to provide instruction for uniform seismic walkdowns of all U.S. nuclear power plants. This document also includes guidance for reporting the findings of the required walkdowns. TVA incorporated this documentation into a procedure and provided training to all team members.

At Unit 3 of the Browns Ferry Nuclear Plant, a total of 120 items, general Seismic Category 1, were selected from the original IPEEE Safe Shutdown Equipment List (SSEL) to fulfill the requirements of the NTTF-2.3 Seismic Walkdowns. The selected equipment was located in various environments and included many different types of equipment from multiple safety systems. A total of 44 areas were included for area walk-bys. The equipment walkdowns and area walk-bys were performed by three teams each consisting of two seismic walkdown engineers and operations personnel, between July 9, 2012 and February 26, 2014.

One hundred twenty (120) equipment walkdowns were completed during the walkdown phase. No potential adverse seismic conditions were found.

2) Seismic Licensing Basis

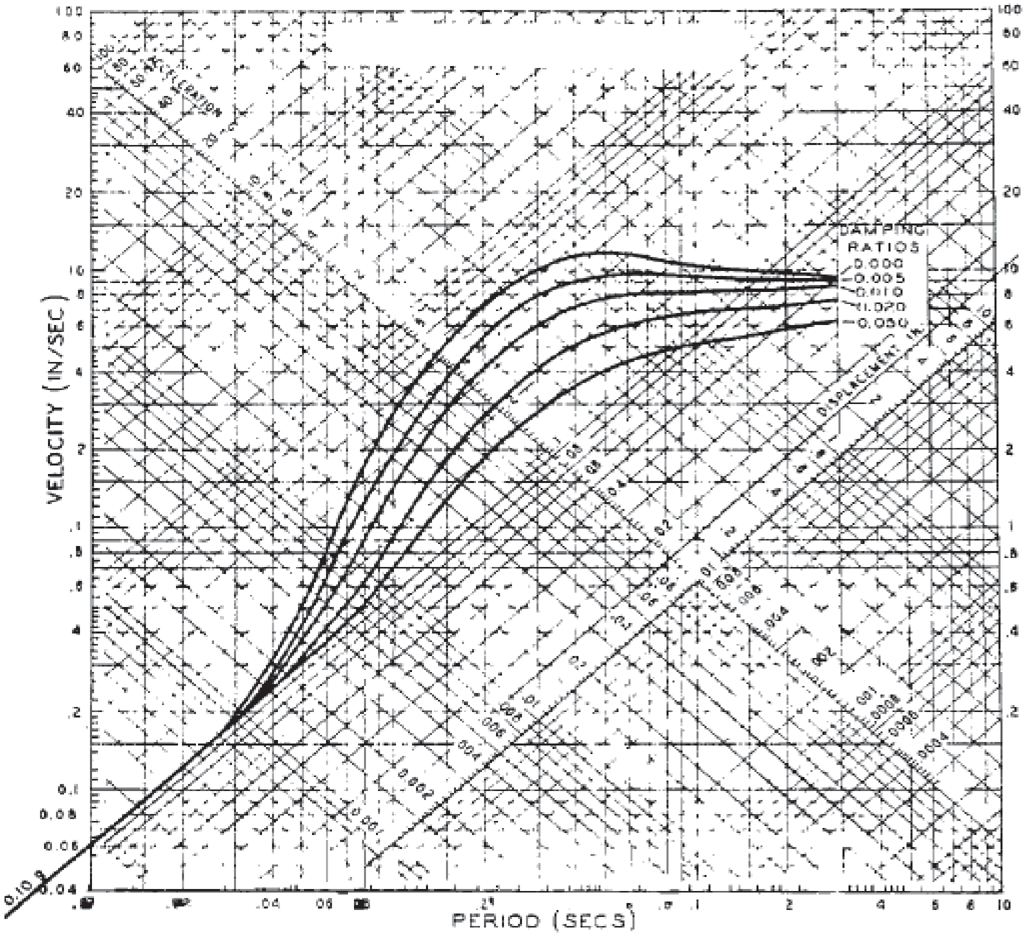
The seismic licensing basis for the Browns Ferry Nuclear Power Plant is derived from Reference 4 – *BFN FSAR.*

2.1 General Plant Description

The Browns Ferry site is located on the north shore of Wheeler Lake at river mile 294 in Limestone County in north Alabama. The site is approximately 10 miles southwest of Athens, Alabama, and 10 miles northwest of the center of Decatur, Alabama. The plant consists of three General Electric (GE) boiling water reactors with mark I containments, each with an electrical output of about 1,100 megawatts. Commercial operation of each unit began on the following dates: Unit 1 on August 1, 1974, Unit 2 on March 1, 1975, and Unit 3 on March 1, 1977.

2.2 Ground Response Spectra

The BFN licensing-basis Operating Basis Earthquake (OBE) and Design Basis Earthquake (DBE) ground motion acceleration response spectra defined in Sections 2.5.4 and 12.2 of the BFN Final Safety Analysis Report (FSAR). The site design ground spectrum is that of a Housner shaped spectrum with horizontal peak ground acceleration (PGA) corresponding to the OBE is 0.10g and the DBE is 0.20g, defined at the top of the sound rock. Vertical ground motion is two-thirds of the horizontal ground motion as specified in the FSAR. Figure 1 shows the Operating Basis Earthquake and Figure 2 shows the Design Basis Earthquake input spectra with various damping.



BROWNS FERRY NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SITE DESIGN SPECTRUM
OPERATIONAL BASIS EARTHQUAKE
HORIZONTAL

FIGURE 2.5-8

AMENDMENT 16

Figure 1 Site Design Spectrum Operating Earthquake

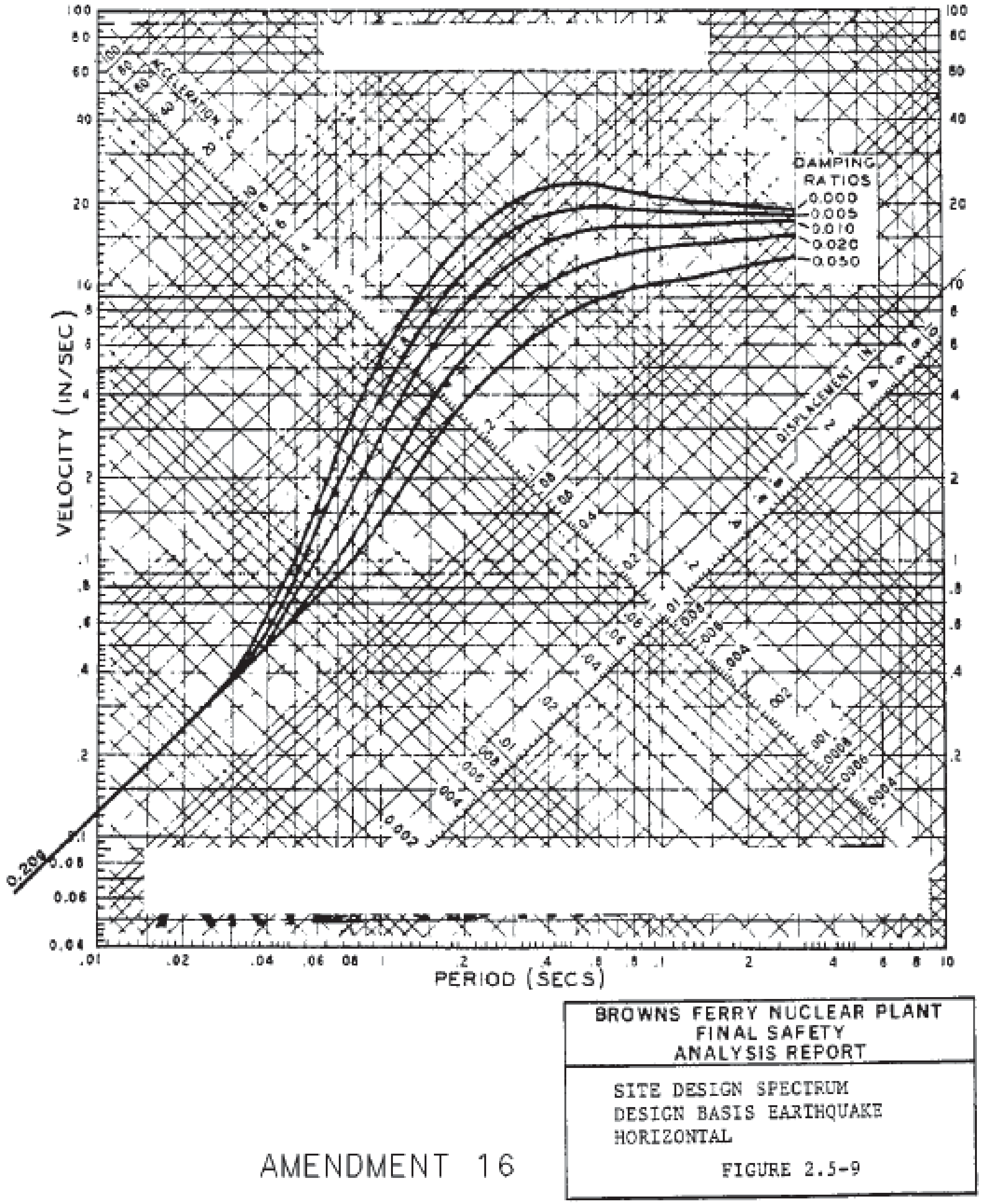


Figure 2 Site Design Spectrum Design Basis Earthquake

2.3 Structures

The design of all structures and facilities (Class I & II) conformed to the applicable general codes or specifications such as Uniform Building Code (UBC); American Institute of Steel Construction (AISC); “Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings”; American Concrete Institute (ACI) “Building Code Requirements for Reinforced Concrete” (ACI 318-71), “Requirements for Reinforced Concrete “ (ACI 318-71), “Requirements for Reinforced Concrete Chimneys” (ACI 907); and American Welding Society (AWS) “Structural Welding Code – Steel” (AWS-D.1.1), among others.

Seismic requirements for Class I structures, features, and systems are contained in TVA General Design Criteria BFN-50-C-7102. The design of Class I structures was based on the following criteria:

- Operating basis earthquake (OBE) considered a horizontal ground acceleration of 0.10g.
- Design basis earthquake (DBE) considered a horizontal ground acceleration of 0.20g
- Vertical ground accelerations associated with the OBE and DBE were defined as 2/3 of the corresponding horizontal response spectra.

Class I structures, equipment and safety related piping were designed such that stress and deformation behavior of structures, piping, and equipment were maintained within the allowable limits when subjected to loads such as dead, live, pressure, and thermal, under normal operating conditions combined with the seismic effects resulting from the response to the OBE. These allowable limits are defined in appropriate design standards such as the ASME Boiler and Pressure Vessel Code; American National Standards Institute (ANSI) Code for Pressure Piping ANSI B31.1.0, Power Piping; ACI 318 Building Code Requirements for Reinforced Concrete; the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. In addition, the stresses that resulted from normal loads and design basis loss-of-coolant accident loads combined with the response to the DBE were limited so that no loss of function occurred and the capability of making a safe and orderly plant shutdown was maintained.

2.4 Equipment

General Electric (GE) designed, fabricated, and supplied the nuclear steam supply system (NSSS), turbine-generators, as well as the nuclear fuel for the plant. GE also provided technical supervision for the installation and startup services of this equipment. In general, the modules were designed to withstand and perform their functions during an OBE and a DBE. This qualification was ascertained by either analytical techniques, vibration testing techniques, or a combination of the two. A seismic specification covering the following procedure was made a part of the purchase order.

All the Class I instrumentation and electrical equipment were designed and tested or analyzed to ensure their capability to perform their required functions during and after the Design Basis Earthquake (DBE). This includes equipment made by General Electric (GE) as well as that purchased by GE. Suppliers of Class I equipment were required to verify the adequacy of their equipment by submitting test, analytical, or operating experience data. Typically, equipment supplied as part of the original design are in compliance with IEEE-344-71 requirements.

In addition, Browns Ferry Nuclear Plant was identified as one of the operating plants to be reviewed for the NRC Unresolved Safety Issue (USI) A-46 requirements. As such, plant-specific verification of the seismic adequacy of selected safe shutdown equipment items (SSEL – Safe Shutdown Equipment List) has been performed as part of the USI A-46 resolution (Ref. 5).

Furthermore, the use of A-46 criteria and methods in accordance with the implementation guidelines provided in References 7 and 8 has been included as an alternate approach for the seismic qualification of new equipment and replacements for existing equipment (Appendix C, Ref. 9).

2.5 Seismic Spatial System Interactions

Browns Ferry has a seismic categorization similar to Regulatory Guide 1.29, using the terminology of Class I and Class II. The term II/I is used to describe physical conditions where Class II components are located above or in proximity to Class I components. Seismic induced spray refers to the possible breach of a fluid pressure boundary due to its own seismic response or its seismic interaction with other plant features. Seismic induced spray is a hazard when there are target Class I components, vulnerable to fluid spray, in the vicinity of the source.

A comprehensive “II/I” seismic interaction verification program was implemented as part of the BFN-1 Restart Project. Seismic spatial interactions (failure, falling, and impact) were evaluated for all Safe Shutdown Equipment List (SSEL) items during the USI A-46 resolution program. Impact-related seismic interactions are further addressed by the TVA BFN Potential Clearance Discrepancy (PCD) evaluation program for piping clearance discrepancies of 3” and under. Seismic-induced spray evaluations were addressed by detailed walkdowns and bounding evaluations in accordance with TVA Design Criteria BFN-50-C-7306.

3) Personnel Qualifications

The personnel qualification for all individuals involved in the execution of the Fukushima Near-Term Task Force Recommendation 2.3: Seismic can be found in this section. Full resumes for the listed individuals can be found in Appendix A of this document.

3.1 Equipment Selection Personnel

The personnel involved in equipment selection and review are:

- Steve Gray, Retired SRO from Browns Ferry with extensive experience providing engineering support through all phases of the operating site.
- Nicholas Pressler, Senior Structural Engineer with 7 years of experience, including 2 years of experience in the nuclear industry.
- Jason Black – Associate Structural engineer with 1.5 years of engineering experience, including 1.5 years in the nuclear power industry.

3.2 Seismic Walkdown Engineers

The personnel involved in performing the seismic walkdowns are:

- Nicholas Pressler
- Patrick McCarraher, Senior Supervising Structural Engineer with over 38 years of engineering experience, including 15 years in the nuclear power industry.
- Jeffry Lawrence, Mechanical Engineer II, E.I.T. with five years of engineering experience, including two in the nuclear power industry.
- Avinash Chunduri, Structural Engineer II with 6 years of engineering experience, including 1.5 years' experience in nuclear power industry.
- George Bongart, Associate Civil Engineer with 9 months engineering experience.
- Jason Black
- James Edgar, Professional engineer in the state of Tennessee with 11 years of engineering experience including 2 years in the nuclear power industry.
- Travis Hockenberry, Professional Engineer in the state of Pennsylvania with 7 years of engineering experience, including 3 years in the nuclear power industry.
- Steven Summers, Professional Engineer in the state of Pennsylvania with 8 years of engineering experience, including 3 years in the nuclear power industry.

3.3 Licensing Basis Reviewers

The personnel involved in performing the licensing basis reviews:

- Steve Samaras, Site engineer at Browns Ferry with extensive experience providing engineering support of the operating site.

3.4 IPEEE Reviewers

The personnel involved in reviewing IPEEE vulnerabilities are:

- Josh Best - Project Mechanical Engineer with 5 years engineering experience, including 4 years in the nuclear power industry.
- Jason Black

3.5 Peer Review Team

The personnel involved in the peer review process are:

- John Dizon, Over 30 years of experience in the field of civil and structural engineering, earthquake engineering, risk assessment and project management.
- Steve Eder, Over 30 years of experience in the field of civil and structural engineering, project management, seismic engineering, and risk management.

John Dizon is the Peer Review Team Leader.

4) Selection of Structures, Systems, and Components (SSCs)

The selection of SSCs for the Recommendation 2.3 Seismic walkdowns followed the guideline provided in Reference 3 – *The Electrical Power Research Institute's (EPRI) Seismic Walkdown Guidance*. The SWELs and list of corresponding Area Walk-Bys for Browns Ferry Unit 3 can be found in Appendix D of this document.

4.1 SWEL Selection

The development of SWEL 1 began with the integrated Safe Shutdown Equipment List (SSEL) that was developed for the resolution of USI A-46 program and the implementation of Individual Plant Examination for External Events (IPEEE) program for Browns Ferry Units 2 and 3 (Refs. 5 and 6, respectively). This list was divided by unit, location, system, and equipment class. After separating the data into these categories, equipment was selected to represent the multiple equipment classes. Many of the suggested equipment classes that were listed in the EPRI guidance were not included in the original SSEL. In order to include all of the recommended classes of equipment, the scope of the selection was expanded to cover all Seismic Category 1 Safety Related equipment.

After a wide variety of environments and equipment classes were satisfied, each entry in the list was assigned to one of the five safety functions that support safe shutdown of the plant. Safety Function "0 - Support Function" was added in addition to the EPRI guidance to include equipment that does not perform one particular safety function but does support all five primary safety functions. These six safety functions are:

0. Support function
1. Reactor reactivity control
2. Reactor coolant pressure control
3. Reactor coolant inventory control
4. Decay heat removal
5. Containment function

The SSEL developed during the USI A-46 program included one path to satisfy the five safety functions listed above. The seismic IPEEE required both a preferred path and an alternate path, so the USI A-46 SSEL was expanded accordingly. In some cases there are multiple systems involved in these safety functions. In these cases SSC's from the redundant systems that were not part of USI A-46 were added to the SWEL 1. For instance, the Standby Liquid Cooling (SLC) system was not inspected during the USI A-46 program, and was added to the SWEL for that reason.

This categorized list is presented in Appendix B as Base List 1. After separating the data into the previously mentioned categories, a sample was selected from Base List 1 to represent all Special Considerations that were required by the EPRI Walkdown

Guidance. Once safety functions were assigned, the equipment was reviewed and compared to plant documentation to locate any new or modified equipment. To account for high risk equipment in the walkdown process, the SWEL was compared to the Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) Rankings and any shared equipment was noted.

Some of the equipment classes that were listed in the EPRI walkdown guidance were not covered in the original SSEL, and therefore are not present in Base List 1. However, in order to include all of the classes of equipment, the scope of the selection was expanded for these seismic walkdowns to include other Seismic Category 1 Safety Related equipment for the classes that were not previously covered.

SWEL 1 represents the full list of equipment that was selected from Base List 1 and from the Category 1 equipment list. SWEL 1 can be found in Appendix D.

Base List 2, presented in Appendix C, is a list of all spent fuel pool systems and equipment. SWEL 2 consists solely of equipment related to the Spent Fuel Pool at the site, including any equipment or system failure that could cause rapid drain-down of the pool and accidental exposures of fuel assemblies. The Spent Fuel Pool system was reviewed with the system engineers and it was determined that there is no path for rapid drain-down to occur. The full list of seismic category 1 SSC's was reviewed and it was determined that there were 5 pieces of equipment related to the spent fuel pool that were seismic category 1 and fit into one of the equipment categories. These pieces of equipment make up SWEL 2.

4.2 SWEL Analysis

The SWEL for Browns Ferry Unit 3 consists of 120 individual pieces of equipment. The SWEL for Browns Ferry Unit 3 adequately addresses all criteria that were required for the selections of SSCs in EPRI Seismic Walkdown Guidance. These criteria include a distribution of environments, systems, safety functions, and classes of equipment.

The following equipment addresses the new and improved equipment criteria for Browns Ferry Unit 3:

UNID	Description
BFN-3-XFA-082-0003AA	BFN-3-XFA-082-0003AA, DG-3B NEUTRAL GRN XFMR
BFN-3-FCV-023-0034	BFN-3-FCV-023-0034, RHR HTX 3A COOL WATER OUTLET
BFN-3-FCV-023-0046	RHR HTX 3B COOL WATER OUTLET

Table 1. New/Improved Equipment

5) Seismic Walkdowns and Area Walk-Bys

Guidance for performing the walkdowns and walk-bys required for Fukushima NTTF Recommendation 2.3 can be found in Reference 3 - *The Electrical Power Research Institute's Seismic Walkdown Guidance.*

The walkdowns and walk-bys were conducted in accordance with these guidelines and each was given a final status. If no potentially adverse seismic conditions were noted or housekeeping and minor maintenance issues were noted during a walkdown or walk-by, a YES status was given to the selected piece of equipment or area. If a potentially adverse seismic condition was noted, a NO status was given and the equipment was entered into the Corrective Action Program (CAP) to begin a functional evaluation. If equipment was inaccessible, or if a portion of an item of equipment was unobservable an UNKNOWN status was given.

5.1 Seismic Walkdown Checklists

One hundred twenty (120) Seismic Walkdown Checklists (SWCs) were completed at Browns Ferry Unit 3. The SWCs completed at Browns Ferry Unit 3 can be found in Appendix E of this document. The types of potentially adverse seismic conditions that were addressed during these walkdowns include:

- Bent, broken, missing, or loose hardware
- Corrosion that is more than moderate
- Visible cracks in surrounding concrete
- Impact of soft targets
- Collapsing equipment
- Line flexibility

Forty-four (44) Area Walk-by Checklists (AWCs) were completed at Browns Ferry Unit 3. These checklists can be found in Appendix F of this document. The types of potentially adverse seismic conditions that were addressed during these walk-bys include:

- Anchorage of equipment
- Degraded conditions of anchorage
- Cable/conduit raceways and HVAC ducts
- Spatial interactions between equipment
- Flooding/spray hazards
- Fire hazards
- Housekeeping and temporary equipment

Anchorage configuration for 46 items of equipment in Browns Ferry Unit 3 was verified by drawings, calculations, and/or the A-46 Screening Evaluation Worksheets (SEWs).

For cabinets and panels that were selected for walkdown, NRC guidance was followed to determine which could and could not be opened for internal inspection. Undue safety hazards, operational hazards, or cabinets that required extensive disassembly were documented and only observable anchorage was included in those walkdowns.

5.2 SWC & AWC Summary

The results documented by the SWCs and AWCs for Browns Ferry Unit 3 are summarized below:

- 120 SWCs resulted in a YES status
- 44 AWCs resulted in a YES status

6) Licensing Basis Evaluations

6.1 Licensing Basis Calculations

When a potentially adverse seismic condition was identified at BFN, the condition was entered into the corrective action program. No licensing basis evaluations were performed by the walkdown team per TVA expectations to communicate any potential operability concerns as soon as they were identified. Due to the nature of this process, no calculations were performed by the walkdown team for licensing basis evaluations before the CAP entry was submitted. All licensing basis determinations were performed by BFN engineering on each CAP entry.

There were no CAP entries that were considered potential seismically adverse conditions. No degraded or non-conforming conditions were found during the walkdown process.

6.2 Potentially Seismically Adverse Conditions

There were no potentially adverse seismic conditions found during the walkdowns of Browns Ferry Unit 3.

7) IPEEE Vulnerabilities Resolution Report

7.1 IPEEE Description

In Generic Letter 88-20, Supplement 4, the US Nuclear Regulatory Commission requested that the utilities for all active nuclear power plants in the United States perform an evaluation of their nuclear power generating facilities to identify any vulnerabilities associated with the occurrence of several plant-specific external events, and to access the impact of these vulnerabilities on the potential for plant core damage or radioactive material release. This program, designated the Individual Plant Examination of External Events (IPEEE), is a corollary program to the Individual Plant Examination (IPE) which focuses on the vulnerabilities associated with the occurrence of external events. Browns Ferry was designated as a 0.3g focused scope plant for the seismic IPEEE.

7.2 IPEEE Findings and Vulnerabilities

The IPEEE Report for the Browns Ferry Nuclear Plant addressed multiple vulnerabilities that were identified during the original IPEEE walkdown process for Units 2 and 3 systems including common systems for all three units. A full list of these vulnerabilities can be found in Reference 6 - *Seismic IPEEE Report for Browns Ferry Nuclear Plant*. A list of the equipment identified during IPEEE is listed below along with actions taken.

UNID	DESCRIPTION	RESOLUTION
BFN-0-OXF-219-TDA	HCLPF capacity below 0.3g	Transformer to be replaced as part of the long-term asbestos material removal program at BFN.
BFN-0-OXF-219-TDB	HCLPF capacity below 0.3g	Transformer to be replaced as part of the long-term asbestos material removal program at BFN.

Table 2. IPEEE Outliers

8) Peer Review

A peer review was performed in accordance with References 2 and 3. The peer review process involved considerable interaction with the review teams, and was performed throughout all phases of the effort including the following:

- Selection of the SSCs included on the SWEL
- In-plant walkdown observations and completed checklists for the Seismic Walkdowns and Area Walk-Bys
- Identified potentially adverse seismic conditions, utilization of the CAP process, and associated licensing basis review considerations
- Submittal report

In summary, the peer review results are confirmatory and fully supportive of the evaluations and findings as described in this report. The completed peer review report is included as Appendix G to this report.

9) References

Reference No.	Document Title	Document Number	Preparer
1	Recommendations for Enhancing Reactor Safety in the 21st Century	N/A	United States Nuclear Regulatory Commission
2	Letter: Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54 (f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Daiichi Accident	N/A	United States Nuclear Regulatory Commission
3	Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic	EPRI 1025286	Electric Power Research Institute
4	BFN FSAR, Revision 4		Tennessee Valley Authority
5	Browns Ferry Nuclear Plant USI A-46 Seismic Evaluation Report	50147-R-001	Tennessee Valley Authority
6	Seismic IPEEE Report Browns Ferry Nuclear Plant	50147-R-002	Tennessee Valley Authority
7	Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment - Revision 3A, December 2001	N/A	Seismic Qualification Utilities Group
8	Implementation Guidelines for Seismic Qualification of New and Replacement Equipment/Parts (NARE) Using the Generic Implementation Procedure (GIP) - Revision 5 October 2002	N/A	Seismic Qualification Utilities Group
9	BFN FSAR	BFN-24.4	Tennessee Valley Authority

10) Appendices

Appendix A: Resumes

Appendix B: Base List 1

Appendix C: Base List 2

Appendix D: SWELs and Areas

Appendix E: SWCs

Appendix F: AWCs

Appendix G: Peer Review Report

Appendix A: Resumes

Resumes included in this Appendix are alphabetized by last name.

- Joshua Best - TVA
- Jason Black – Walkdown Engineer
- George Bongart – Walkdown Engineer
- Avinash Chunduri – Walkdown Engineer
- John Dizon – Facility Risk Consultants
- Steve Eder – Facility Risk Consultants
- James Edgar – Lead Technical Engineer
- Steve Gray – Retired SRO
- Travis Hockenberry – Outage Walkdown Engineer
- Jeffrey Lawrence – Walkdown Engineer
- Patrick McCarraher – Walkdown Engineer
- Nicholas Pressler – Lead Engineer
- Steve Samaras – Site Engineering
- S. Lance Summers – Outage Walkdown Engineer

WorleyParsons

resources & energy

Travis J. Hockenberry, PE

Structural Engineer

Resume

SUMMARY

Structural Engineer with five years of experience with WorleyParsons. Experience includes engineering and design of ductwork, duct support structures, foundations and retrofit, modification, and re-design of existing structures. Experienced in managing multiple responsibilities in engineering delivery including the completion of calculation packages, design sketches, drawing mark-ups, final drawing reviews, budget proposals, and project meetings. Familiar with current code provisions, including but not limited to, AISC Steel Construction Manual, ACI 318 Building Code and Commentary, ASCE 7 Minimum Design Loads for Buildings and Other Structures, and IBC (International Building Code). Familiar with current analysis and design software, which includes STAAD Pro, PCA Column, L-Pile, AutoCAD, SmartPlant Review, and other tools such as Microsoft Excel and MathCAD.

EXPERIENCE

2007 - Present **Structural Engineer II, WorleyParsons, Chattanooga, Tennessee**

Tennessee Valley Authority (TVA) – Sequoyah Nuclear Power Plant, Soddy-Daisy, Tennessee. Qualification of new and existing nuclear fire protection pipe supports for new loading conditions, following appropriate design criteria, code provisions, and NRC requirements. Qualification and specification of both existing and new pipe support components, such as struts, clamps, and anchors. Qualification and design of non-standard welded connections. Pipe supports qualified using computer modeling, utilizing TVA supplied software. Software includes FAPPS (ME150), BASEPLATE II (ME035), MAPPS (ME153), CONAN, and IAP. Creation of supporting calculation packages utilizing MathCAD, Microsoft Excel and Word. Responsible for design input and verification of DCA (Drawing Change Authorization), which serves as the working document for required pipe support configurations and final support drawings to be issued into the TVA database.

Tennessee Valley Authority (TVA) – Watts Bar Nuclear Power Plant Unit 2, 1200 MW Unit, Spring City, Tennessee. Qualification of existing nuclear pipe supports for new loading conditions, following appropriate design criteria, code provisions, and NRC requirements. Design of modifications to existing pipe supports as required in order to meet specifications. Qualification and specification of both existing and new pipe supports components, such as snubbers, struts, clamps, and anchors. Qualification and design of non-standard welded connections. Pipe supports qualified using computer modeling, utilizing TVA supplied software. Software includes FAPPS (ME150), BASEPLATE II (ME035), MAPPS (ME153), CONAN, and IAP. Creation of supporting calculation packages utilizing MathCAD, Microsoft Excel and Word. Responsible for design input and verification of DRA (Drawing Revision Authorization), which serves as the working document for required pipe support modifications and final support drawings to be issued into the TVA database. Other responsibilities include checking and verification of pipe support calculation packages prior to issuance and coordination between multiple offices to ensure quality, completeness, and consistency.

Pacific Gas and Electric Company (PG&E) – Diablo Canyon Nuclear Power Plant, Avila Beach, California. Qualification of existing transformer foundations for seismic loading, following appropriate design criteria, code provisions, and NRC requirements. Design and qualification of transformer anchorage. Creation of supporting design calculation packages and sketches.

Georgia Power Company – Plant Scherer Units 1 and 2 (Booster Fan Outlet Ducts). Computer modeling, analysis, and design of pile cap foundations. Creation of supporting calculation packages and design sketches. Review of final foundation drawings.

CPS Energy – Braunig Peaking Turbines Project. Computer modeling, analysis, and design of both soil and pile supported mat foundations. Analysis and design of small equipment foundations. Analysis and design of transformer containments and firewalls. Analysis and design of tank ring-wall foundations. Computer modeling, analysis, and design of steel pipe bridge and supporting foundations. Creation of supporting calculation packages and design sketches. Interfacing with client at design review meetings, updating project schedule, attending weekly meetings, review of final design drawings, and field support.

Alstom, Pacificorp – Ductwork Pressure Upgrade Study. Computer modeling and analysis of existing ductwork for increased pressure loads. Design of necessary modifications to existing ductwork and supports. Creation of calculation package, design sketches, and final study report issued to client.

Alstom – Salt River Project, SOFA Upgrade for the Navajo Generating Station. Computer modeling of SOFA ductwork and new support steel. Analysis and design of ductwork and verification of results. Analysis of existing structural steel for additional load, which included modeling the existing structural steel. Design of necessary modifications to existing structural steel. Analysis of existing furnace buckstays for new load configuration and design of necessary modifications for inadequate members. Re-design of existing furnace guide for new location and loading. Creation of calculation package and design sketches.

Georgia Power Company – Plant Scherer Unit 4. Design steel support structure and pile cap foundations for ductwork. Responsibilities include computer modeling of support structure and ductwork. Analysis and design of support structure and verification of modeling results. Determination of pile loads. Analysis and design of pile cap foundations. Preparation of design sketches.

Tennessee Valley Authority (TVA) – Bull Run Fossil Plant. Retrofit of existing handling facility weather enclosure. Responsibilities include computer modeling of existing weather enclosure. Verify need for modification to existing structure and propose and design modification to meet code requirements. Prepare design calculations and drawings.

TVA – Cumberland Fossil Plant. LPA screen assembly and hopper addition. Responsibilities include verification of existing structural steel for additional load due to ash hopper and large particle ash (LPA) screen assembly. Design necessary modifications and prepare calculation package.

TVA – Allen, Colbert, Cumberland, Widows Creek, and Paradise Fossil Plants. Foundation design and analysis. Responsibilities include analysis and design of concrete foundations for ammonia handling weather enclosures. Preparation of design calculations and design sketches.

TVA – Cherokee Hydroelectric. Switchyard transformer replacement, bus support upgrade, and foundation modifications. Responsibilities include analysis and design of steel bus support structure, including modeling of structure and determination of loading. Verification and analysis of existing concrete foundations for new loading. Design of replacement foundations and modifications to existing foundations. Preparation of design calculations and design sketches.

2005 - 2007 **Graduate Research Assistant, The Pennsylvania State University, State College, Pennsylvania**

Conducted research on the shear behavior of fiber reinforced concrete beams. Design and fabrication of 42 reinforced concrete beams with variations in geometry and reinforcement detail. Research aimed at determining the effects of combining steel fiber reinforcement with conventional transverse reinforcement.

Teaching Assistant, The Pennsylvania State University, State College, Pennsylvania

Prepared and presented lectures and tutorials for Steel and Concrete Member Design. Assisted students with course work as well as exam preparation. Prepared lab exercises for civil engineering surveying. Responsible for four sections of approximately 25 students.

2004 - 2005 **Undergraduate Research Assistant, The Pennsylvania State University, State College, Pennsylvania**

Conducted research on the flexural behavior of fiber reinforced concrete. Designed and machined custom loading setup for specialized four-point bending tests. Fabricated and tested 120 concrete specimens, which included four-point bending, compression, and split tensile tests. Analyzed data obtained from testing. Co-authored publication, resulting from the research.

EDUCATION

M.S., Civil Engineering, The Pennsylvania State University, University Park, Pennsylvania, 2007

B.S., Civil Engineering, The Pennsylvania State University, University Park, Pennsylvania, 2005

REGISTRATIONS/AFFILIATIONS

Member of AISC, American Institute of Steel Construction

Professional Engineer, State of Pennsylvania (PE078696)

PUBLICATIONS/PRESENTATIONS

“Evaluation of Shear Capacity of Hooked Steel Fiber Reinforced Concrete Beams with Stirrups,” Master’s Thesis in Civil Engineering, The Pennsylvania State University, University Park, , 2007.

Co-author, “Enhanced Performance of Fiber Reinforced Concrete with Low Volume Fractions,” Indo-U.S. Conference Proceedings, Chennai, India, 2005.

WorleyParsons
resources & energy

S. Lance Summers, P.E.
Structural Engineer

Resume

SUMMARY

Structural Engineer with over seven years of engineering experience, including four years with WorleyParsons. Primary responsibilities included the overall structural design and coordination for all types of power plant design and retrofit projects. Tasks included structural steel design, ductwork design, qualifying existing steel for upgraded loads/new code, foundation design, and providing erection/fabrication technical support for power generating stations. Skilled in creating and analyzing STAAD models for ductwork, structural steel, mat foundations, as well as creatively utilizing other software such as Excel, MathCAD, Smart Plant, and similar programs to expedite design. Also active in client interface with participation in project meetings and budget proposals. In addition, responsibilities include the inspection of ductwork, structural steel, and chimneys as part of the Chattanooga Condition Assesment Team. Familiar with AISC Steel Manual (ASD and LRFD), ACI 318-05, IBC 2000, and ASCE 7-05.

EXPERIENCE

2009 - Present **Structural Engineer , WorleyParsons, Chattanooga, Tennessee**

Tennessee Valley Authority (TVA) – Sequoyah Nuclear Power Plant, Soddy-Daisy, Tennessee. Qualification of new and existing nuclear fire protection pipe supports for new loading conditions, following appropriate design criteria, code provisions, and NRC requirements. Qualification and specification of both existing and new pipe support components, such as struts, clamps, and anchors. Qualification and design of non-standard welded connections. Pipe supports qualified using computer modeling, utilizing TVA supplied software. Software includes FAPPS (ME150), BASEPLATE II (ME035), MAPPS (ME153), CONAN, and IAP. Creation of supporting calculation packages utilizing MathCAD, Microsoft Excel and Word. Responsible for design input and verification of DCA (Drawing Change Authorization), which serves as the working document for required pipe support configurations and final support drawings to be issued into the TVA database.

Tennessee Valley Authority (TVA) – Browns Ferry Nuclear Power Plant, Athens, Alabama. Qualification of existing nuclear pipe supports for new loading conditions associated with the replacement of motors on two minimum flow valves, following appropriate design criteria, code provisions, and NRC requirements. Qualification and specification of existing pipe support components, such as struts, clamps, and anchors. Qualification and design of non-standard welded connections. Pipe supports qualified using computer modeling, utilizing TVA supplied software. Software includes FAPPS (ME150), BASEPLATE II (ME035), MAPPS (ME153), CONAN, and IAP. Creation of supporting calculation packages utilizing MathCAD, Microsoft Excel and Word. Responsible for design input and verification of DCA (Drawing Change Authorization), which serves as the working document for required pipe support configurations and final support drawings to be issued into the TVA database.

Tennessee Valley Authority (TVA) – Watts Bar Nuclear (WBN) Power Plant Unit 2, 1200 MW Unit, Spring City, Tennessee. Served as a team lead for a group of five engineers supporting the WBN Unit 2 pipe support project. Responsibilities include, but not limited to, the qualification of existing nuclear pipe supports for new loading conditions following the appropriate design criteria, code provisions, and NRC requirements. Qualification of existing and new pipe support components, such as snubbers, struts, clamps, and springs. Qualification and design of non-standard welded connections. The task utilized computer modeling via TVA-supplied software. The software includes FAPPS (ME150), BASEPLATE II (ME035), MAPPS (ME153), CONAN, and IAP. MathCAD, Excel, and Word. Software used in the creation of support calculation packages. Responsible for the review of Drawing Revision Authorization (DRA) to ensure accurate support drawings for issuance into the TVA database. Additional responsibilities included the review and verification of pipe support calculations prior to issuance and coordination between multiple offices to ensure quality, completeness, and consistency.

TVA – Widows Creek Fossil Unit 8 Opacity Reduction Study. Served as the structural task lead for a cost study of the addition of various air quality control measures (baghouse/precipitator) to Widows Creek Unit 8. The task included preliminary structural engineering of new ductwork, structural support steel, foundations, as well as the retrofit of the existing ductwork and structures. The work involved site visits to walkdown existing structures to find ways to interface with existing equipment and route ductwork through the existing structure. Interface with mechanical leads to provide the necessary ductwork cross-section and to ensure an efficient flow path to achieve a minimal pressure drop. Worked closely with the estimating department in order to produce an accurate cost estimate for four different retrofitting options.

Southern Company – Scherer Unit 1-4, Flue Gas Desulphurization (FGD)/Selective Catalytic Reduction (SCR) Project, Juliet, Georgia. Responsible for the design of an electrical utility bridge for Units 1 and 2. The process included the layout of the utility bridge using SmartPlant Review and the design of the structure utilizing STAAD Pro. The task included the design of anchor bolts and the design of spread footings to support the structure.

RC Cape May Holdings, LLC. – BL England Unit 2 Emissions Control Project, Beesley's Point, New Jersey. Primary responsibilities included the analysis and design of pile foundations to support the new SCR structure. The task included using SmartPlant Review to coordinate the layout of augercast piles in order to avoid existing interferences and obstructions. STAAD Pro 2007 finite element analysis used to analyze the pipe cap foundation. ACI 318-05 was utilized to provide the proper reinforcement for the pile cap as well as ensure that the anchor bolts met the requirements of Appendix D.

2007 - 2009 Structural Engineer Associate, WorleyParsons, Chattanooga, Tennessee

CPS Peaking – Turbine Project, Braunig Plant, Texas. Primary responsibilities included the computer modeling, anlaysis, and design of soil supported mat foundations. Analysis and design of small equipment foundations including oil containment areas. Interfaced with the mechanical department in order to provide pipe supports and the associated foundations to support the chilled water and natural gas piping systems throughout the plant.

Southern Company – Scherer Unit 1-4, FGD/SCR Project, Juliet, Georgia – Primary responsibilities included the retrofit of existing ductwork and support structures due to increased loading caused by an upgraded pressure load associated with the addition of a mercury baghouse, FGD, and SCR. STAAD used to analyze the ductwork and support structures while PCA Column and LPile were used to evaluate the existing caissons and piers. Retrofit modifications were made to qualify the structures for the increased shear, uplift, and compressive forces that were caused by the upgraded pressure.

Mitsubishi Power Systems Americas – Termocandelaria, Simple Cycle Plant Dual Fuel Conversion, Cartegena, Colombia. Primary responsibilities included the computer modeling, analysis, and design of soil supported mat foundations. Analysis and design of small equipment foundations including oil containment areas. Provided pipe supports and foundations to assist mechanical/electrical engineers in the balance-of-plant design. Produced calculations for cast-in-place and post-installed equipment anchorage to concrete. Other duties included the design of concrete and masonry structures that were needed due to fire rating requirements. Work also included coordinating work with other disciplines to produce deliverables, providing project manager with regular updates, and producing estimates and NWIs for additional work added to the Structural Engineering Scope.

Southern Company – Plant Scherer Unit 3 Mercury Baghouse, Juliet, Georgia. Primary responsibilities included performing the design and analysis of large ductwork and their support structures, as well as providing fabrication/erection support to the client. Other duties included creating and analyzing models for existing steel, ductwork, and working with designers to facilitate the generation of drawing deliverables, and meeting schedule requirements.

Condition Assessment Services Team Member, WorleyParsons, Chattanooga, Tennessee

In addition to structural engineering responsibilities, additional responsibilities include condition assessment inspections at fossil power plants. The tasks include traveling to the site and performing inspections, documenting the existing conditions of the respective component during the inspection, and providing a formalized post-inspection report which documents the findings and makes recommendations on any needed modifications to the structure. Typical inspections include air and flue gas ductwork, circulating cooling water tunnels, chimneys and stacks, and other miscellaneous structural systems.

2004 - 2007 **Project Engineer – C.W. Matthews Contracting Co., Marietta, Georgia**

GDOT – McFarland Rd/SR 400 Interchange Project. Primary responsibilities included the design and implementation of erosion control plans, traffic control plans, and staging plans. In addition, responsibilities included working with Department of Transportation (DOT) representatives to alter/change plan design in order to account for situations in the field or in order to have a minimal impact of the traveling public. Responsibilities also included the coordination and scheduling of work and subcontractors.

GDOT – SR20/SR400 Interchange Improvement Project. Primary responsibilities included the coordination and scheduling of work done by subcontractors and inspection of the work upon completion. In addition, responsibilities included working with DOT representatives to redesign plan in order to accommodate existing field conditions and to produce a more buildable design which was safer for the constructors as well as the traveling public. This included stormwater drainage plans, traffic control plans, and staging plans.

EDUCATION

B.S., Civil Engineering Technology, Southern Polytechnic State University, Marietta, Georgia, 2003.

REGISTRATIONS/AFFILIATIONS

Registered Professional Engineer, Civil, Pennsylvania, No. PE077046, 2009

Member, American Institute of Steel Construction (AISC)

Confined Space and Fall Protection Trained

SPECIFIC TECHNICAL EXPERTISE/SPECIALIST COURSES

Computer Skills

STAADPro V8i	AutoCAD®
MathCAD	SmartPlant Review
LPile Plus 5.0	SmartPlant Foundation
Microsoft Office Applications	PCA Column

Brown Ferry Unit 3 Seismic Walkdown Equipment List				Created By: [signature] For Jason Black via Telecon					Approved By: Steve Gray per Telecom RAM 11-21-12				
Item #	Equip. Class (0 - 21)	UNID	Description	Unit	Bldg.	Elev.	Sys.	Seismic Cat 1 Yes/No	Safety Function	Risk Rankings	New or Replaced	Anch. Verified	AWC
3072	15	BFN-0-BATA-248-0003	250V Unit Battery No. 3	0	CB	593	248	YES	1,2,3,4,5	YES		NO	031
3001	0	BFN-0-STN-067-0928	EECW SOUTH HDR STRAINER D	0	INTAKE	565	067	YES	3,4,5	YES		NO	033
3071	15	BFN-3-BATA-248-0003EB	SHUTDOWN BDS 250VDC BATTERY SB-3EB	3	DG	583	248	YES	1,2,3,4,5	YES		YES	055
3073	15	BFN-3-BATB-254-0000A	125 VDC DIESEL SYSTEM BATTERY 3A	3	DG	565	254	YES	1,2,3,4,5	NO		YES	058
3074	15	BFN-3-BATB-254-0000B	125 VDC DIESEL SYSTEM BATTERY 3B	3	DG	565	254	YES	1,2,3,4,5	NO		YES	053
3075	15	BFN-3-BATB-254-0000C	125 VDC DIESEL SYSTEM BATTERY 3C	3	DG	565	254	YES	1,2,3,4,5	NO		YES	093
3076	15	BFN-3-BATB-254-0000D	125 VDC DIESEL SYSTEM BATTERY 3D	3	DG	565	254	YES	1,2,3,4,5	NO		YES	094
3012	3	BFN-3-BDAA-211-0003EA	4KV SHUTDOWN BOARD 3EA	3	DG	583	211	YES	1,2,3,4,5	NO		NO	112
3013	3	BFN-3-BDAA-211-0003EB	4KV SHUTDOWN BD 3EB	3	DG	565	211	YES	1,2,3,4,5	NO		NO	117
3014	3	BFN-3-BDAA-211-0003EC	4KV SHUTDOWN BD 3EC	3	DG	583	211	YES	1,2,3,4,5	NO		NO	112
3015	3	BFN-3-BDAA-211-0003ED	4KV SHUTDOWN BD 3ED	3	DG	565	211	YES	1,2,3,4,5	NO		NO	117
3004	1	BFN-3-BDBB-219-0003EA	480V DIESEL AUX BD 3EA	3	DG	583	219	YES	1,2,3,4,5	YES		YES	116
3005	1	BFN-3-BDBB-219-0003EB	480V DIESEL AUX BD 3EB	3	DG	583	219	YES	1,2,3,4,5	YES		YES	116
3010	2	BFN-3-BDBB-231-0003A	480V SHUTDOWN BD 3A	3	RB	621	231	YES	1,2,3,4,5	YES		NO	123
3011	2	BFN-3-BDBB-231-0003B	480V SHUTDOWN BD 3B	3	RB	621	231	YES	1,2,3,4,5	YES		NO	124
3008	1	BFN-3-BDBB-268-0003A	480V RMOV BD 3A	3	RB	621	268	YES	1,2,3,4,5	YES		NO	026
3007	1	BFN-3-BDBB-268-0003D	480V RMOV BD 3D	3	RB	593	268	YES	1,2,3,4,5	YES		YES	113
3009	1	BFN-3-BDBB-268-0003E	480V RMOV BD 3E	3	RB	621	268	YES	1,2,3,4,5	YES		YES	114
3006	1	BFN-3-BDDD-281-0003B	250V RMOV BD 3B	3	RB	593	281	YES	1,2,3,4,5	YES		NO	027
3069	14	BFN-3-BDGG-254-0003A	125 VDC DSL SYS BAT BOARD A	3	DG	565	254	YES	1,2,3,4,5	NO		YES	058
3068	14	BFN-3-BDGG-254-0003B	125 VDC DSL SYS BAT BOARD B	3	DG	565	254	YES	1,2,3,4,5	NO		NO	053
3070	14	BFN-3-BDGG-254-0003D	125 VDC DSL SYS BAT BOARD D	3	DG	565	254	YES	1,2,3,4,5	NO		YES	094
3077	16	BFN-3-CHGA-248-0003EB	SHUTDOWN BDS 250VDC BATTERY CHARGER SB-3EB	3	DG	583	248	YES	1,2,3,4,5	NO		NO	056
3078	16	BFN-3-CHGB-254-0000AA	DG3A 125 VDC DSL SYS BTRY CHGR A	3	DG	565	254	YES	1,2,3,4,5	NO		YES	057
3079	16	BFN-3-CHGB-254-0000BA	DG3B 125 VDC DSL SYS BTRY CHGR A	3	DG	565	254	YES	1,2,3,4,5	NO		NO	053
3080	16	BFN-3-CHGB-254-0000CB	DG3C 125 VDC DSL SYS BTRY CHGR B	3	DG	565	254	YES	1,2,3,4,5	NO		YES	093
3081	16	BFN-3-CHGB-254-0000DB	DG3D 125 VDC DSL SYS BTRY CHGR B	3	DG	565	254	YES	1,2,3,4,5	NO		YES	094
3059	11	BFN-3-CHR-031-1943	WATER CHILLER 3A	3	CB	606	031	YES	2,3,4,5	NO		NO	122
3060	11	BFN-3-CHR-031-1951	WATER CHILLER 3B	3	CB	606	031	YES	2,3,4,5	NO		NO	122
3050	9	BFN-3-FAN-030-0230	DG ROOM 3A EXHAUST FAN "A"	3	DG	583	030	YES	3,4,5	NO		YES	054
3111	9	BFN-3-FAN-030-0231	DG ROOM 3A EXHAUST FAN "B"	3	DG	583	030	YES	3,4,5	NO		YES	054
3051	9	BFN-3-FAN-030-0232	DG ROOM 3B EXHAUST FAN "A"	3	DG	583	030	YES	3,4,5	NO		YES	051
3052	9	BFN-3-FAN-030-0233	DG ROOM 3B EXHAUST FAN "B"	3	DG	583	030	YES	3,4,5	NO		YES	051
3055	10	BFN-3-FCO-030-0230A	FAN A DISCHARGE DAMPER	3	DG	583	030	YES	3,4,5	NO		NO	054
3056	10	BFN-3-FCO-030-0230B	FAN RM 3A INLET DAMPER	3	DG	565	030	YES	3,4,5	NO		NO	058
3057	10	BFN-3-FCO-030-0233A	FAN B DISCHARGE DAMPER	3	DG	583	030	YES	3,4,5	NO		NO	051
3058	10	BFN-3-FCO-030-0233B	FAN RM 3B INLET DAMPER	3	DG	565	030	YES	3,4,5	NO		NO	053
3123	7	BFN-3-FCV-001-0014	MSIV "A" INBOARD ISOLATION VALVE	3	RB	565	001	YES	2	NO		NO	129
3124	7	BFN-3-FCV-001-0015	MSIV "A" OUTBOARD ISOLATION VALVE	3	RB	565	001	YES	2	NO		NO	130
3046	8	BFN-3-FCV-023-0034	RHR HTX 3A COOL WATER OUTLET	3	RB	565	023	YES	4,5	YES	YES	NO	045
3047	8	BFN-3-FCV-023-0046	RHR HTX 3B COOL WATER OUTLET	3	RB	565	023	YES	4,5	YES	YES	NO	045
3002	0	BFN-3-FCV-063-0008A	SLC INJECTION VALVE A	3	RB	639	063	YES	1	NO		NO	028
3003	0	BFN-3-FCV-063-0008B	SLC INJECTION VALVE B	3	RB	639	063	YES	1	NO		NO	028
3040	7	BFN-3-FCV-064-0032	SUPP CHAMBER EXHAUST INBD ISOL VLV	3	RB	565	064	YES	5	NO		NO	042
3039	7	BFN-3-FCV-064-0033	SUPP CHAMBER EXHAUST OUTBD ISOL VLV	3	RB	565	064	YES	5	NO		NO	042
3033	7	BFN-3-FCV-067-0050	EECW NORTH HDR SUP VLV TO RBCCW HTXS	3	RB	593	067	YES	3,4,5	NO		NO	049

Item #	Equip. Class (0 - 21)	UNID	Description	Unit	Bldg.	Elev.	Sys.	Seismic Cat 1 Yes/No	Safety Function	Risk Rankings	New or Replaced	Anch. Verified	AWC
3034	7	BFN-3-FCV-067-0051	EECW SOUTH HDR SUP VLV TO RBCCW HTX	3	RB	565	067	YES	3,4,5	NO		NO	045
3042	8	BFN-3-FCV-071-0017	RCIC SUPPR POOL INBD SUCTION VLV	3	RB	519	071	YES	3	YES		NO	092
3043	8	BFN-3-FCV-071-0018	RCIC SUPP POOL OUTBD SUCTION VLV	3	RB	519	071	YES	3	YES		NO	092
3041	8	BFN-3-FCV-071-0019	RCIC CNDS TANK SUCTION VLV	3	RB	519	071	YES	3	YES		NO	092
3044	8	BFN-3-FCV-074-0007	RHR SYSTEM 1 MINIMUM FLOW VLV	3	RB	519	074	YES	3,4	YES		NO	103
3045	8	BFN-3-FCV-074-0030	RHR LOOP II MIN FLOW BYPASS VLV	3	RB	519	074	YES	3,4	YES		NO	097
3114	8	BFN-3-FCV-078-0062	POOL MAKEUP FROM RHR OUTBOARD VALVE	3	RB	621	078	YES	SWEL 2	NO		NO	106
3035	7	BFN-3-FCV-085-0037C	WEST SCRAM DISCH VOL DRAIN CONT VLV	3	RB	565	085	YES	1	NO		NO	042
3036	7	BFN-3-FCV-085-0037D	WEST SCRAM DISCH VOL DRAIN CONT VLV	3	RB	565	085	YES	1	NO		NO	042
3037	7	BFN-3-FCV-085-0037E	EAST SCRAM DISCH VOL DRAIN CONT VLV	3	RB	565	085	YES	1	NO		NO	046
3038	7	BFN-3-FCV-085-0037F	EAST SCRAM DISCH VOL DRAIN CONT VLV	3	RB	565	085	YES	1	NO		NO	046
3112	8	BFN-3-FSV-084-0008B	SUPPRESS CHAMBER N2 SUPPLY TRAIN A DIV I	3	RB	565	084	YES	5	NO		NO	045
3113	8	BFN-3-FSV-084-0048	CAD A CROSSTIE TO DW CA FLOW SOL VLV	3	RB	565	084	YES	5	NO		NO	045
3048	8	BFN-3-FSV-085-0037A	CRD SCRAM DISCH VOL DR & VENT PILOT VLV A	3	RB	565	085	YES	1	NO		NO	043
3049	8	BFN-3-FSV-085-0037B	CRD SCRAM DISCH VOL DR & VENT PILOT VLV B	3	RB	565	085	YES	1	NO		NO	043
3084	17	BFN-3-GEN-082-0003A	DIESEL GENERATOR 3A	3	DG	565	082	YES	3,4,5	YES		YES	058
3085	17	BFN-3-GEN-082-0003B	DIESEL GENERATOR 3B	3	DG	565	082	YES	3,4,5	YES		YES	053
3086	17	BFN-3-GEN-082-0003C	DIESEL GENERATOR 3C	3	DG	565	082	YES	3,4,5	YES		YES	093
3087	17	BFN-3-GEN-082-0003D	DIESEL GENERATOR 3D	3	DG	565	082	YES	3,4,5	YES		YES	094
3102	21	BFN-3-HEX-074-0028	RHR PUMP SEAL HEAT EXCHANGER B	3	RB	519	074	YES	3,4,5	NO		NO	102
3103	21	BFN-3-HEX-074-0039	RHR PUMP SEAL HEAT EXCHANGER D	3	RB	519	074	YES	3,4,5	NO		NO	102
3082	16	BFN-3-INVT-256-0001	DIV I ECCS ATU INVERTER UNIT	3	RB	593	256	YES	1,2,3,4,5	NO		NO	027
3083	16	BFN-3-INVT-256-0002	DIV II ECCS ATU INVERTER UNIT	3	RB	621	256	YES	1,2,3,4,5	NO		YES	026
3088	18	BFN-3-LPNL-925-0005A	REACTOR PROTECTION & NSS PNL	3	RB	593	925	YES	1,2	NO		YES	050
3089	18	BFN-3-LPNL-925-0005B	REACTOR PROTECTION & NSS PNL	3	RB	593	925	YES	1,2	NO		YES	050
3090	18	BFN-3-LPNL-925-0005D	REACTOR PROTECTION & NSS PNL	3	RB	593	925	YES	1,2	NO		YES	050
3091	18	BFN-3-LPNL-925-0006A	REACTOR PROTECTION & NSS PNL	3	RB	593	925	YES	1,2	NO		YES	049
3092	18	BFN-3-LPNL-925-0006D	REACTOR PROTECTION & NSS PNL	3	RB	593	925	YES	1,2	NO		YES	049
3093	18	BFN-3-LPNL-925-0247A	CAD DRYWELL & SUPPRESSION CHAMBER VENT	3	RB	621	925	YES	1	NO		NO	047
3117	20	BFN-3-LS-078-0001D	SKIMMER SURGE TANK LEVEL LOW LOW ISOL	3	RB	639	078	YES	SWEL 2	NO		NO	098
3116	20	BFN-3-LS-078-0001E	SKIMMER SURGE TANK LEVEL LOW LOW ISOL	3	RB	639	078	YES	SWEL 2	NO		NO	098
3115	20	BFN-3-LS-078-0001F	SKIMMER SURGE TANK LEVEL LOW LOW ISOL	3	RB	639	078	YES	SWEL 2	NO		NO	098
3118	20	BFN-3-LS-078-0001G	SKIMMER SURGE TANK LEVEL LOW LOW ISOL	3	RB	639	078	YES	SWEL 2	NO		NO	098
3063	13	BFN-3-MGEN-268-0003DA	480/480 MG SET 3DA	3	RB	621	268	YES	3	NO		YES	029
3061	13	BFN-3-MGEN-268-0003DN	480/480 MG SET 3DN	3	RB	621	268	YES	3	NO		YES	048
3064	13	BFN-3-MGEN-268-0003EA	LPCI MG SET 3EA	3	RB	621	268	YES	3	NO		YES	048
3062	13	BFN-3-MGEN-268-0003EN	LPCI MG SET 3EN	3	RB	621	268	YES	3	NO		YES	029
3125	7	BFN-3-PCV-001-0005	MAIN STEAM LINE A RELIEF VLV	3	RB	585	001	YES	2	NO		NO	131
3126	7	BFN-3-PCV-001-0042	MAIN STEAM LINE D RELIEF VLV	3	RB	585	001	YES	2	NO		NO	131
3028	5	BFN-3-PMP-063-0006A	STANDBY LIQ CONT PMP A	3	RB	639	063	YES	1	NO		YES	028
3027	5	BFN-3-PMP-063-0006B	STANDBY LIQ CONT PMP B	3	RB	639	063	YES	1	NO		YES	028
3025	5	BFN-3-PMP-073-0029	HPCI BOOSTER PUMP	3	RB	519	073	YES	3	NO		NO	101
3024	5	BFN-3-PMP-073-0054	HPCI TURBINE MAIN PUMP	3	RB	519	073	YES	3	YES		NO	101
3029	6	BFN-3-PMP-074-0028	RESIDUAL HEAT REMOVAL PUMP 3B	3	RB	519	074	YES	3,4	NO		YES	102
3030	6	BFN-3-PMP-074-0039	RESIDUAL HEAT REMOVAL PUMP 3D	3	RB	519	074	YES	3,4	NO		YES	102
3031	6	BFN-3-PMP-075-0005	CORE SPRAY PMP 3A	3	RB	519	075	YES	3	NO		YES	092
3032	6	BFN-3-PMP-075-0014	CORE SPRAY PMP 3C	3	RB	519	075	YES	3	NO		YES	092
3095	20	BFN-3-PNLA-009-0005	REACTOR CONTROL PANEL	3	CB	617	009	YES	1	NO		NO	121

No.	AWC No.	Unit	Bldg.	El.	Location	Walkdown Date
033	0-YD-EL565-033	0	INTAKE	565	RHRSW Pump Room D	7/27/2012
031	3-CB-EL593-031	3	CB	593	Battery Room 3	7/27/2012
052	3-CB-EL593-052	3	CB	593	Aux Instrument Room	8/1/2012
122	3-CB-EL606-122	3	CB	606	Chiller Room (Spreading Room)	8/14/2012
121	3-CB-EL617-121	3	CB	617	Main Control Room	8/14/2012
053	3-DG-EL565-053	3	DG	565	3B Diesel Generator Room	8/1/2012
057	3-DG-EL565-057	3	DG	565	Electrical Tunnel	8/1/2012
058	3-DG-EL565-058	3	DG	565	Diesel Generator Room A	8/1/2012
093	3-DG-EL565-093	3	DG	565	Diesel Generator Room C	8/8/2012
094	3-DG-EL565-094	3	DG	565	Diesel Generator Room D	8/8/2012
117	3-DG-EL565-117	3	DG	565	Electric Board Room 3EB	8/13/2012
051	3-DG-EL583-051	3	DG	583	Fan Room B	8/1/2012
054	3-DG-EL583-054	3	DG	583	Fan Room A	8/1/2012
055	3-DG-EL583-055	3	DG	583	EB Battery Room	8/1/2012
056	3-DG-EL583-056	3	DG	583	EB Battery Room Area	8/1/2012
112	3-DG-EL583-112	3	DG	583	Electric Board Rm 3EA	8/13/2012
116	3-DG-EL583-116	3	DG	583	480V Diesel Shutdown Board Room	8/13/2012
092	3-RB-EL519-092	3	RB	519	NW Quad	8/8/2012
101	3-RB-EL519-101	3	RB	519	HPCI Room	8/9/2012
102	3-RB-EL519-102	3	RB	519	RHR Pump Room	8/9/2012
128	3-RB-EL519-128	3	RB	519	Under Torus	10/18/2012
097	3-RB-EL541-097	3	RB	541	SE Quad	8/9/2012
103	3-RB-EL541-103	3	RB	541	SW Quad	8/9/2012
042	3-RB-EL565-042	3	RB	565	West SDV Area	7/31/2012
043	3-RB-EL565-043	3	RB	565	Scram Dump Valves	7/31/2012
045	3-RB-EL565-045	3	RB	565	South Wall	7/31/2012
046	3-RB-EL565-046	3	RB	565	SDV Cage East	7/31/2012
027	3-RB-EL593-027	3	RB	593	Electrical Board Room 3B	7/26/2012
047	3-RB-EL593-047	3	RB	621	S-U, R16-R18 Area	7/31/2012
049	3-RB-EL593-049	3	RB	593	RBCCW Heat Exchanger Area	7/31/2012
113	3-RB-EL593-113	3	RB	593	T/R20 Area	8/10/2012
026	3-RB-EL621-026	3	RB	621	Electric Board Room 3A	7/26/2012
029	3-RB-EL621-029	3	RB	621	S-U, R20-R21 Area	7/26/2012
048	3-RB-EL621-048	3	RB	621	S-U, R16-R20 Area	7/31/2012
050	3-RB-EL621-050	3	RB	593	P-S, R17-R20 Area	7/31/2012
114	3-RB-EL621-114	3	RB	621	U/R17 Area	8/10/2012
123	3-RB-EL621-123	3	RB	621	480V Shutdown Board Room 3A	8/14/2012
124	3-RB-EL621-124	3	RB	621	480V Shutdown Board Room 3B	8/14/2012
028	3-RB-EL639-028	3	RB	639	SLC Area	7/26/2012
098	3-RB-EL639-098	3	RB	639	SLC Area By Stairs	8/9/2012
106	3-RB-EL639-106	3	RB	621	S-T, R15-R18	8/9/2012
129	3-RB-EL563-129	3	RB	563	Drywell Area EL 563	2/26/2014
130	3-RB-EL565-130	3	RB	565	Steam Tunnel	2/26/2014
131	3-RB-EL585-131	3	RB	585	Drywell Area EL 585	2/26/2014

Appendix E: SWCs

The following signatures are provided for the engineers responsible for the Seismic Walkdown Checklists in Browns Ferry Unit 3 for all pre-outage inspections.

Name	Signature	Date
Jason Black	Jason Black	11-15-12
George Bongart	George Bongart	11-14-12
Avinash Chunduri	[illegible]	11-15-12
James Edgar	[illegible]	11-15-12
Jeffrey Lawrence	Jeff Lawrence	11-15-12
Patrick McCarraher	Patrick McCarraher	11-15-12
Nicholas Pressler	[illegible]	11-15-12

The following signatures are provided for the engineers responsible for the Seismic Walkdown Checklists in Browns Ferry Unit 3 for all outage inspections.

Name	Signature	Date
Travis Hockenberry	[illegible]	3/3/14
Steven Summers	[illegible]	3/3/2014

Status: Y ☒ N ☐ U ☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0014** Equipment Class[3] 7

Equipment Description MSIV "A" INBOARD ISOLATION VALVE

Location: Bldg. U3 RB Floor El. 563 Room, Area 129, Drywell EL 563'-2"

Manufacturer, Model, Etc. (optional but recommended)

Instructions for Completing Checklist

This checklist may be used to document the results of the Seismic Walkdown of an item of equipment on the SWEL. The space below each of the following questions may be used to record the results of judgments and findings. Additional space is provided at the end of this checklist for documenting other comments. Note: Y = Yes, N = No, U = Unknown, N/A = Not Applicable

Anchorage

1. Is the anchorage configuration verification required (i.e., is the item one of the 50% of SWEL items requiring such verification)? Y ☐ N ☒

2. Is the anchorage free of bent, broken, missing or loose hardware? Y ☐ N ☐ U ☐ N/A ☒

[3]Enter the equipment class name from Appendix B, Classes of Equipment.

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0014** Equipment Class[3] 7

Equipment Description MSIV "A" INBOARD ISOLATION VALVE

Anchorage (Continued)

3. Is the anchorage free of corrosion that is more than mild surface oxidation? Y ☐ N ☐ U ☐ N/A ☒

4. Is the anchorage free of visible cracks in the concrete near the anchors? Y ☐ N ☐ U ☐ N/A ☒

5. Is the anchorage configuration consistent with plant documentation? (Note: This question only applies if the item is one of the 50% for which an anchorage configuration verification is required.) Y ☐ N ☐ U ☐ N/A ☒

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0014** Equipment Class[3] 7

Equipment Description MSIV "A" INBOARD ISOLATION VALVE

6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Y ☒ N ☐ U ☐

Interaction Effects

7. Are soft targets free from impact by nearby equipment or structures? Y☒ N☐ U☐ N/A☐

8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Y☒ N☐ U☐ N/A☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0014** Equipment Class[3] 7

Equipment Description MSIV "A" INBOARD ISOLATION VALVE

Interaction Effects (Continued)

9. Do attached lines have adequate flexibility to avoid damage? Y☒ N☐ U☐ N/A☐

10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Y☒ N☐ U☐

Other Adverse Conditions

11. Have you looked for and found no other seismic conditions that could adversely affect the safety functions of the equipment? Y☒ N☐ U☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0014** Equipment Class[3] 7

Equipment Description MSIV "A" INBOARD ISOLATION VALVE

Comments (Additional pages may be added as necessary)

Evaluated by: Lance Summers Date:2/26/14

Travis Hockenberry 2/26/14

Status: Y ☒ N ☐ U ☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0015** Equipment Class[3] 7

Equipment Description MSIV "A" OUTBOARD ISOLATION VALVE

Location: Bldg. U3 RB Floor El. 565 Room, Area 130, Steam Tunnel

Manufacturer, Model, Etc. (optional but recommended)

Instructions for Completing Checklist

This checklist may be used to document the results of the Seismic Walkdown of an item of equipment on the SWEL. The space below each of the following questions may be used to record the results of judgments and findings. Additional space is provided at the end of this checklist for documenting other comments. Note: Y = Yes, N = No, U = Unknown, N/A = Not Applicable

Anchorage

1. Is the anchorage configuration verification required (i.e., is the item one of the 50% of SWEL items requiring such verification)? Y ☐ N ☒

2. Is the anchorage free of bent, broken, missing or loose hardware? Y ☐ N ☐ U ☐ N/A ☒

[3]Enter the equipment class name from Appendix B, Classes of Equipment.

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0015** Equipment Class[3] 7

Equipment Description MSIV "A" OUTBOARD ISOLATION VALVE

Anchorage (Continued)

3. Is the anchorage free of corrosion that is more than mild surface oxidation? Y ☐ N ☐ U ☐ N/A ☒

4. Is the anchorage free of visible cracks in the concrete near the anchors? Y ☐ N ☐ U ☐ N/A ☒

5. Is the anchorage configuration consistent with plant documentation? (Note: This question only applies if the item is one of the 50% for which an anchorage configuration verification is required.) Y ☐ N ☐ U ☐ N/A ☒

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0015** Equipment Class[3] 7

Equipment Description MSIV "A" OUTBOARD ISOLATION VALVE

6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Y ☒ N ☐ U ☐

Interaction Effects

7. Are soft targets free from impact by nearby equipment or structures? Y☒ N☐ U☐ N/A☐

8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Y☒ N☐ U☐ N/A☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0015** Equipment Class[3] 7

Equipment Description MSIV "A" OUTBOARD ISOLATION VALVE

Interaction Effects (Continued)

9. Do attached lines have adequate flexibility to avoid damage? Y☒ N☐ U☐ N/A☐

10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Y☒ N☐ U☐

Other Adverse Conditions

11. Have you looked for and found no other seismic conditions that could adversely affect the safety functions of the equipment? Y☒ N☐ U☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-FCV-001-0015** Equipment Class[3] 7

Equipment Description MSIV "A" OUTBOARD ISOLATION VALVE

Comments (Additional pages may be added as necessary)

Evaluated by: Travis Hockenberry Date:2/26/14

Lance Summers 2/26/14

Status: Y ☒ N ☐ U ☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0005** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE A RELIEF VLV

Location: Bldg. U3 RB Drywell AZ 135º Room, Area 131, Floor EL 584'-11"

Manufacturer, Model, Etc. (optional but recommended)

Instructions for Completing Checklist

This checklist may be used to document the results of the Seismic Walkdown of an item of equipment on the SWEL. The space below each of the following questions may be used to record the results of judgments and findings. Additional space is provided at the end of this checklist for documenting other comments. Note: Y = Yes, N = No, U = Unknown, N/A = Not Applicable

Anchorage

1. Is the anchorage configuration verification required (i.e., is the item one of the 50% of SWEL items requiring such verification)? Y ☐ N ☒

2. Is the anchorage free of bent, broken, missing or loose hardware? Y ☐ N ☐ U ☐ N/A ☒

[3]Enter the equipment class name from Appendix B, Classes of Equipment.

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0005** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE A RELIEF VLV

Anchorage (Continued)

3. Is the anchorage free of corrosion that is more than mild surface oxidation? Y ☐ N ☐ U ☐ N/A ☒

4. Is the anchorage free of visible cracks in the concrete near the anchors? Y ☐ N ☐ U ☐ N/A ☒

5. Is the anchorage configuration consistent with plant documentation? (Note: This question only applies if the item is one of the 50% for which an anchorage configuration verification is required.) Y ☐ N ☐ U ☐ N/A ☒

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0005** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE A RELIEF VLV

6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Y ☒ N ☐ U ☐

Interaction Effects

7. Are soft targets free from impact by nearby equipment or structures? Y☒ N☐ U☐ N/A☐

8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Y☒ N☐ U☐ N/A☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0005** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE A RELIEF VLV

Interaction Effects (Continued)

9. Do attached lines have adequate flexibility to avoid damage? Y☒ N☐ U☐ N/A☐

10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Y☒ N☐ U☐

Other Adverse Conditions

11. Have you looked for and found no other seismic conditions that could adversely affect the safety functions of the equipment? Y☒ N☐ U☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0005** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE A RELIEF VLV

Comments (Additional pages may be added as necessary)

Valve partially disassembled by maintenance personnel due to outage.

Evaluated by: Lance Summers Date:2/26/14

Travis Hockenberry 2/26/14

Status: Y ☒ N ☐ U ☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0042** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE D RELIEF VLV

Location: Bldg. U3 RB Drywell AZ 225° Room, Area 131, Floor EL 584'-11"

Manufacturer, Model, Etc. (optional but recommended)

Instructions for Completing Checklist

This checklist may be used to document the results of the Seismic Walkdown of an item of equipment on the SWEL. The space below each of the following questions may be used to record the results of judgments and findings. Additional space is provided at the end of this checklist for documenting other comments. Note: Y = Yes, N = No, U = Unknown, N/A = Not Applicable

Anchorage

1. Is the anchorage configuration verification required (i.e., is the item one of the 50% of SWEL items requiring such verification)? Y ☐ N ☒

2. Is the anchorage free of bent, broken, missing or loose hardware? Y ☐ N ☐ U ☐ N/A ☒

[3]Enter the equipment class name from Appendix B, Classes of Equipment.

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0042** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE D RELIEF VLV

Anchorage (Continued)

3. Is the anchorage free of corrosion that is more than mild surface oxidation? Y ☐ N ☐ U ☐ N/A ☒

4. Is the anchorage free of visible cracks in the concrete near the anchors? Y ☐ N ☐ U ☐ N/A ☒

5. Is the anchorage configuration consistent with plant documentation? (Note: This question only applies if the item is one of the 50% for which an anchorage configuration verification is required.) Y ☐ N ☐ U ☐ N/A ☒

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0042** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE D RELIEF VLV

6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Y ☒ N ☐ U ☐

Interaction Effects

7. Are soft targets free from impact by nearby equipment or structures? Y☒ N☐ U☐ N/A☐

8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Y☒ N☐ U☐ N/A☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0042** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE D RELIEF VLV

Interaction Effects (Continued)

9. Do attached lines have adequate flexibility to avoid damage? Y☒ N☐ U☐ N/A☐

10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Y☒ N☐ U☐

Other Adverse Conditions

11. Have you looked for and found no other seismic conditions that could adversely affect the safety functions of the equipment? Y☒ N☐ U☐

Seismic Walkdown Checklist (SWC)

Equipment ID No. **BFN-3-PCV-001-0042** Equipment Class[3] 7

Equipment Description MAIN STEAM LINE D RELIEF VLV

Comments (Additional pages may be added as necessary)

Valve partially disassembled by maintenance personnel due to outage.

Evaluated by: Travis Hockenberry Date:2/26/14

Lance Summers 2/26/14

Appendix F: AWCs

The following signatures are provided for the engineers responsible for the Area Walk-By Checklists in Browns Ferry Unit 3 for all pre-outage inspections.

Name	Signature	Date
Jason Black	Jason Black	11-15-12
George Bongart	George Bongart	11-14-12
Avinash Chunduri	[illegible]	11-15-12
James Edgar	[illegible]	11-15-12
Jeffrey Lawrence	[illegible]	11-15-12
Patrick McCarraher	Patrick McCarraher	11-15-12
Nicholas Pressler	[illegible]	11-15-12

The following signatures are provided for the engineers responsible for the Area Walk-By Checklists in Browns Ferry Unit 3 for all outage inspections.

Name	Signature	Date
Travis Hockenberry	[illegible]	3/3/14
Steven Summers	[illegible]	3/3/2014

Status: Y ☒ N ☐ U ☐

3-RB-EL563-129

Area Walk-By Checklist (AWC)

Location: Bldg. RB Room, Area[4] Drywell Area EL 563'-2"

Instructions for Completing Checklist

This checklist may be used to document the results of the Area Walk-By near one or more SWEL items. The space below each of the following questions may be used to record the results of judgments and findings. Additional space is provided at the end of this checklist for documenting other comments.
Note: Y = Yes, N = No, U = Unknown, N/A = Not Applicable

1. Does anchorage of equipment in the area appear to be free of potentially adverse seismic conditions (if visible without necessarily opening cabinets)? Y ☒ N ☐ U ☐ N/A ☐

2. Does anchorage of equipment in the area appear to be free of significant degraded conditions? Y ☒ N ☐ U ☐ N/A ☐

[4]If the room in which the SWEL item is located is very large (e.g., Turbine Hall), the area selected should be described. This selected area should be based on judgment, e.g., on the order of about 35 feet from the SWEL item.

3-RB-EL563-129

Area Walk-By Checklist (AWC)

Location: Bldg. RB   Room, Area[4] Drywell Area EL 563'-2"

3. Based on a visual inspection from the floor, do the cable/conduit raceways and HVAC ducting appear to be free of potentially adverse seismic conditions (e.g., condition of supports is adequate and fill conditions of cable trays appear to be inside acceptable limits)?   Y ☒ N ☐ U ☐ N/A ☐

4. Does it appear that the area is free of potentially adverse seismic spatial interactions with other equipment in the area (e.g., ceiling tiles and lighting)?   Y ☒ N ☐ U ☐ N/A ☐

5. Does it appear that the area is free of potentially adverse seismic interactions that could cause flooding or spray in the area?   Y ☒ N ☐ U ☐ N/A ☐

3-RB-EL563-129

Area Walk-By Checklist (AWC)

Location: Bldg. RB Room, Area[4] Drywell Area EL 563'-2"

6. Does it appear that the area is free of potentially adverse seismic interactions that could cause a fire in the area? Y ☒ N ☐ U ☐ N/A ☐

7. Does it appear that the area is free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding)? Y ☒ N ☐ U ☐ N/A ☐

   Scaffolding and maintenance tools present but good housekeeping practice were observed.

8. Have you looked for and found no other seismic conditions that could adversely affect the safety functions of the equipment in the area? Y ☒ N ☐ U ☐

3-RB-EL563-129

Area Walk-By Checklist (AWC)

Location: Bldg. RB Room, Area[4] Drywell Area EL 563'-2"

Comments (Additional pages may be added as necessary)

Equipment associated with this Area Walk-by Checklist:

BFN-3-FCV-001-0014

Evaluated by:Travis Hockenberry Date: 2/26/14

Lance Summers 2/26/14

Status: Y ☒ N ☐ U ☐

3-RB-EL565-130

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 565 Room, Area[4] Steam Tunnel

Instructions for Completing Checklist

This checklist may be used to document the results of the Area Walk-By near one or more SWEL items. The space below each of the following questions may be used to record the results of judgments and findings. Additional space is provided at the end of this checklist for documenting other comments.
Note: Y = Yes, N = No, U = Unknown, N/A = Not Applicable

1. Does anchorage of equipment in the area appear to be free of potentially adverse seismic conditions (if visible without necessarily opening cabinets)? Y ☒ N ☐ U ☐ N/A ☐

2. Does anchorage of equipment in the area appear to be free of significant degraded conditions? Y ☒ N ☐ U ☐ N/A ☐

[4]If the room in which the SWEL item is located is very large (e.g., Turbine Hall), the area selected should be described. This selected area should be based on judgment, e.g., on the order of about 35 feet from the SWEL item.

3-RB-EL565-130

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 565 Room, Area[4] Steam Tunnel

3. Based on a visual inspection from the floor, do the cable/conduit raceways and HVAC ducting appear to be free of potentially adverse seismic conditions (e.g., condition of supports is adequate and fill conditions of cable trays appear to be inside acceptable limits)? Y ☒ N ☐ U ☐ N/A ☐

4. Does it appear that the area is free of potentially adverse seismic spatial interactions with other equipment in the area (e.g., ceiling tiles and lighting)? Y ☒ N ☐ U ☐ N/A ☐

5. Does it appear that the area is free of potentially adverse seismic interactions that could cause flooding or spray in the area? Y ☒ N ☐ U ☐ N/A ☐

3-RB-EL565-130

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 565 Room, Area[4] Steam Tunnel

6. Does it appear that the area is free of potentially adverse seismic interactions that could cause a fire in the area? Y ☒ N ☐ U ☐ N/A ☐

7. Does it appear that the area is free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding)? Y ☒ N ☐ U ☐ N/A ☐

   Scaffolding and maintenance tools present but good housekeeping practice were observed.

8. Have you looked for and found no other seismic conditions that could adversely affect the safety functions of the equipment in the area? Y ☒ N ☐ U ☐

3-RB-EL565-130

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 565 Room, Area[4] Steam Tunnel

Comments (Additional pages may be added as necessary)

Equipment associated with this Area Walk-by Checklist:

BFN-3-FCV-001-0015

Evaluated by:Travis Hockenberry Date: 2/26/14

Lance Summers 2/26/14

Status: Y ☒ N ☐ U ☐

3-RB-EL585-131

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 585 Room, Area[4] Drywell Area EL 585

Instructions for Completing Checklist

This checklist may be used to document the results of the Area Walk-By near one or more SWEL items. The space below each of the following questions may be used to record the results of judgments and findings. Additional space is provided at the end of this checklist for documenting other comments.
Note: Y = Yes, N = No, U = Unknown, N/A = Not Applicable

1. Does anchorage of equipment in the area appear to be free of potentially adverse seismic conditions (if visible without necessarily opening cabinets)? Y ☒ N ☐ U ☐ N/A ☐

2. Does anchorage of equipment in the area appear to be free of significant degraded conditions? Y ☒ N ☐ U ☐ N/A ☐

[4] If the room in which the SWEL item is located is very large (e.g., Turbine Hall), the area selected should be described. This selected area should be based on judgment, e.g., on the order of about 35 feet from the SWEL item.

3-RB-EL585-131

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 585 Room, Area[4] Drywell Area EL 585

3. Based on a visual inspection from the floor, do the cable/conduit raceways and HVAC ducting appear to be free of potentially adverse seismic conditions (e.g., condition of supports is adequate and fill conditions of cable trays appear to be inside acceptable limits)? Y ☒ N ☐ U ☐ N/A ☐

4. Does it appear that the area is free of potentially adverse seismic spatial interactions with other equipment in the area (e.g., ceiling tiles and lighting)? Y ☒ N ☐ U ☐ N/A ☐

5. Does it appear that the area is free of potentially adverse seismic interactions that could cause flooding or spray in the area? Y ☒ N ☐ U ☐ N/A ☐

3-RB-EL585-131

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 585 Room, Area[4] Drywell Area EL 585

6. Does it appear that the area is free of potentially adverse seismic interactions that could cause a fire in the area? Y ☒ N ☐ U ☐ N/A ☐

7. Does it appear that the area is free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding)? Y ☒ N ☐ U ☐ N/A ☐

Scaffolding and maintenance tools present but good housekeeping practice were observed.

8. Have you looked for and found no other seismic conditions that could adversely affect the safety functions of the equipment in the area? Y ☒ N ☐ U ☐

3-RB-EL585-131

Area Walk-By Checklist (AWC)

Location: Bldg. RB Floor El. 585 Room, Area[4] Drywell Area EL 585

Comments (Additional pages may be added as necessary)

Equipment associated with this Area Walk-by Checklist:

BFN-3-PCV-001-0005

BFN-3-PCV-001-0042

Evaluated by: Travis Hockenberry Date: 2/26/14

Lance Summers 2/26/14

NTTF 2.3/BFN-03, R1
March 18, 2014

PEER REVIEW REPORT
Browns Ferry Nuclear Plant Unit 3
Near-Term Task Force 2.3 Seismic Walkdowns

A peer review of the Tennessee Valley Authority (TVA) Browns Ferry Nuclear Plant - Unit 3 (BFN3) seismic walkdowns for Near-Term Task Force (NTTF) Recommendation 2.3: Seismic was performed in accordance with the U.S. Nuclear Regulatory Commission (NRC) 50.54 (f) letter (listed as Reference 2 in the BFN3 Seismic Response Report) and the guidance provided in Electric Power Research Institute (EPRI) Report 1025286 (listed as Reference 3 in the Seismic Response Report).

A highly interactive process was utilized by the peer review team. This involved ongoing open dialog consultation with project participants throughout training, equipment selection, equipment walkdowns, area walkbys, review of potentially adverse seismic conditions and corrective action program documentation, and final report preparation.

In summary, the peer review team is in full concurrence with the final results as documented in the BFN3 Seismic Response Report, and we conclude that all of the project requirements have been met and adequately documented. The following sections summarize the details of the peer review process for the major elements of the project.

TRAINING

The walkdown teams are described in Section 3 of the BFN3 Seismic Response Report. All of the walkdown team members successfully completed the EPRI developed training on NTTF Recommendation 2.3 - Seismic Walkdown Guidance. All of the individual team members meet the qualification requirements as defined in EPRI Report 1025286. In addition to this training, per our recommendations, all walkdown team members received additional training. The purpose of the additional training was two-fold. First, additional technical training was provided on equipment anchorage and seismic interaction evaluations, as an enhancement to the anchorage and interaction issues overview provided in the EPRI training course. Second, background information was provided on the site-specific seismic programs implemented by TVA at BFN. This provided team members with historical background on the scope and findings of prior seismic reviews, as well as to deepened their understanding of the seismic licensing basis for BFN.

Many seismic programs were implemented at BFN starting from about 1985, and these programs addressed all structures, systems, and components. The seismic licensing basis for mechanical and electrical equipment components is a combination of Unresolved Safety Issue (USI) A-46, rigorous analysis, and IEEE 344 qualification packages. The additional plant-specific training material provided for the team members included the following:

- Description of BFN seismic design basis 0.20g Housner-shaped ground motion response spectrum
- Scope and overview of the various seismic programs implemented as part of the Nuclear Performance Plan (NPP, NUREG 1232) for BFN:
  - Large-bore piping and supports
  - Small-bore piping and supports
  - Torus piping (both internal and external)
  - Control rod drive (CRD) piping and supports
  - Instrument tubing
  - Cable trays and supports
  - Electrical conduit and supports
  - HVAC ductwork and supports
  - Drywell steel platforms
  - Miscellaneous steel
  - Torus structure (including internal)
  - Mechanical and electrical equipment
  - Effect of the failures of seismic Class II features on seismic Class I systems
  - Secondary containment penetrations
  - Seismic ground motion
  - Dynamic analysis of Class I structures
  - Generation of amplified response spectra (ARS)Programmatic control of safety-related design modifications
- Scope and overview of the additional special seismic programs completed for BFN:
  - II/I spray program
  - MSIV leakage
- Discussion of USI A-46 implementation and the results of the program:
  - Safe Shutdown Equipment List (SSEL)
  - 100% walkdown and anchorage evaluation
  - Seismic Evaluation Work Sheets (SEWS)
  - Includes seismic interaction proximity and falling evaluations
  - Area walkdowns used for conduit and cable trays, including limited analytical reviews
  - All outliers resolved by further evaluations, work orders, or modifications
- The Seismic Individual Plant Examination for External Events (IPEEE) program was performed in parallel with the USI A-46 program at BFN. Presentations included:
  - Expanded Safe Shutdown Equipment List
  - Summary of BFN seismic IPEEE walkdown results
  - Results, governing HCLPF capacities, and planned upgrades
- Plant procedures that overlap with the NTTF 2.3 seismic walkdowns:
  - Temporary Equipment -- NPG-SPP-09.17 & TI-471
  - Scaffolding -- MMTP-102
  - Seismic Interaction Commodity Clearance Requirements -- MAI-4.10

SELECTION OF ITEMS ON THE SEISMIC WALKDOWN EQUIPMENT LIST (SWEL)

The completed SWEL as described in Section 4 of the BFN3 Seismic Response Report is in full compliance with the guidelines in EPRI Report 1025286.

The SWEL 1 represents a diverse sample of selected equipment and support systems required to perform the five safety functions of reactor reactivity control, reactor coolant pressure control, reactor coolant inventory control, decay heat removal, and containment function. The SWEL 1 includes, as appropriate, various types of systems, classes of equipment, and equipment environments. The SWEL 1 includes new and replacement equipment.

The BFN IPEEE review was performed using the EPRI margins methodology and that success path based SSEL associated with BFN3 was used as a starting point for SWEL 1. No seismic PRA has been performed for BFN3 so no information regarding dominant contributors to seismic risk was available. SWEL 1 was compared to the Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) Rankings, and any shared equipment was noted.

The SWEL 2 represents selected equipment related to the spent fuel pool system, including those that could cause rapid drain-down of the pool and accidental exposures of the fuel assemblies.

There was considerable interaction between the peer review team, the walkdown team, and the equipment selection team during the course of the evaluation. The final SWEL, as documented in Section 4 and in Appendix D of the BFN3 Seismic Response Report, is a culmination of this interaction. Examples of peer review comments that were adequately addressed and resolved during the SWEL development process include the following:

- During the development of the preliminary SWEL, minor clarifications to the designation of certain equipment classes were made, such as those of equipment classes 14 - Distribution Panels and 20 - Instrumentation and Control Panels. Furthermore, it was noted that there were no equipment items selected inside the Drywell. As such, representative MSIV’s and MSRV’s are added to the final SWEL.
- To enhance reactivity control and coolant inventory control safety functions, selected components of the Standby Liquid Control (SLC) and the HPCI & RCIC systems were added to the SWEL.
- In order to include representative equipment items covering the 21 classes of equipment listed in Table B-1 of the EPRI Report 1025286, items of equipment were added to the SWEL that were not part of the USI A-46 & IPEEE reviews. It was noted that this was unnecessary yet conservative, so the items remained on the SWEL.
- It is noted that the final SWEL adequately includes equipment in each major building structure and encompasses mild to more severe environments.

SEISMIC EQUIPMENT WALKDOWNS AND AREA WALKBYS

The peer review team spent considerable time interfacing with the walkdown team members during the BFN3 seismic equipment walkdowns and area walkbys. This included responding to questions regarding the scope and content of the reviews. This also included in-plant observations of the teams during the reviews as well as independent in-plant reviews of individual equipment components. Walkdown observations and results were reviewed and discussed on a weekly basis with the walkdown team members. Particular emphasis was given to any items preliminarily identified as potential adverse seismic conditions (see discussion in the next section). In the end, the peer review addressed more than 50% of the completed walkdown documentation forms.

It is noted that the in-plant activity and 50% documentation review is above and beyond the peer review requirements as defined in EPRI Report 1025286. As a result of this effort, we are highly confident that the teams conducted the reviews in a thorough and competent manner, and that the reviews are fully in compliance with the intent of the NRC 50.54 (f) letter.

Examples of walkdown team observations and seismic issues discussed and resolved during the course of the peer review process for the BFN3 equipment seismic walkdowns and area walkbys include the following:

- For many items of equipment, the seismic licensing basis for equipment anchorage was the USI A-46 review Screening Evaluation Work Sheet (SEWS) documentation or anchorage calculation. On 480V Diesel Auxiliary Board 3EB, the walkdown team noted one missing bolt. This issue was previously documented in the USI A-46 Screening Evaluation Work Sheet (SEWS) and seismically verified as-is, so no further action was required. On Water Chiller 3A, the walkdown team identified that 1 of 8 bolts was missing. They found that this configuration was qualified as-is by the design calculation.
- During the area walkby in the RBCCW Heat Exchanger Area, missing washers were noted on a saddle support. It was agreed that the bolts and nuts appeared to be in good condition and that the missing washers do not affect the structural integrity of the supports.
- The walkdown teams noted instances of cracks and previously repaired cracks, and each of the identified cases was evaluated and resolved. On the 480V RMOV Board 3D, it was noted that there was evidence of previous cracking in the grout that was repaired, and the team concluded that this was not a potential adverse seismic condition. On Diesel Generator Room 3A Exhaust Fans A and B, minor cracking was noted on one side of a grout pad and judged to be insignificant. On Diesel Generator Room 3B Exhaust Fan A, the walkdown team noted that the grout is chipped near one anchor. The grout is otherwise in good condition, the crack does not pass through the bolt, and the concrete under the grout is not damaged, so the configuration was judged to be adequate as-is. We concur with these evaluations.

  On the Standby Diesel Generator 3A Engine, a minor chip in the concrete near one bolt was judged to be insignificant. On the Standby Diesel Generator 3B Engine, a similar chip was observed and judged to be insignificant. Also on this engine, a small crack in the concrete was identified that passes through one of the anchor bolts. The crack width is less than 5mm so the configuration was accepted as-is. On the Diesel Generator 3B Starting Air Receiver Tanks, a minor concrete chip was noted and determined to be insignificant. We concur with these evaluations of cracks in concrete.
- The walkdown team noted instances of visible corrosion and each case was discussed and evaluated in more detail. On the LPCI MG Set 3EA and 3DN, mild surface rust was observed on anchorage and judged to be insignificant. On Residual Heat Removal Pump 3B, the minor corrosion observed on one bolt was concluded to be only surface rust and judged to be insignificant. On Core Spray Pumps 3A and 3C, minor paint chipping observed was determined to be insignificant. The Control Bay Floor Elevation

606 ft. Cable Spreading Room Chiller Area was noted to be a moist environment but no conditions were observed that exceed mild surface rust so it was judged to not be a potential adverse seismic condition. We concur with these evaluations.

- The walkdown teams were alert for potential seismic proximity interactions involving vulnerable targets. On the RHR Heat Exchanger 3B Cool Water Outlet Valve 3-FCV-023-0046, it was observed that its hand-wheel is close to adjacent piping with coped insulation. This configuration was judged to be acceptable since both the large diameter pipe and the valve/operator are very stiff and rugged. On RCIC Condensate Tank Suction Valve 3-FCV-071-0019, an instrument line in contact with an anchor bolt on a base plate for nearby pipe support was not considered to be a potential adverse seismic condition.

  On LPCI MG Set 3DN, it was noted that there was a temporary crane on wheels in contact with the motor generator. The motor generator is rugged and the crane was stable against overturning. The crane has since been moved away from the generator to eliminate any potential seismic interaction. In the Auxiliary Instrument Room, the 4"gap between panel 9-81 and an adjacent panel was judged sufficient to preclude any seismic interaction.

  In the NW Quad Room, HVAC ducting above Core Spray Pump 3A is in contact with conduit from the pump. This was judged to not be a significant interaction and was acceptable as-is. In the same area, it was observed that check valve 075-0570A is close to an elevated steel platform support member. This was not considered a concern because the platform is rigid and the valve is inherently rugged.

  In the Reactor Building Floor Elevation 593 ft. Area at column lines T / R20, it was noted that an MCC was modified to preclude interaction with a floor drain line. In the Reactor Building Floor Elevation 621 ft. Area at column lines P / R17 - S / R20, the small vertical clearance between fire protection sprinkler heads and an HVAC duct was judged to be adequate because both commodities are rigid in the vertical direction. On the same floor at column lines U / R17, a cable tray was identified that is in proximity to a MCC panel. The team noted that a vertical beam next to the tray served as an interfering structure to prevent any credible seismic interaction.

  We concur with these proximity evaluations.

- The walkdown teams checked for adequate flexibility of conduit and tubing attached to SWEL equipment. On 120/208-120/208 VAC Regulating Transformer for I&C Bus A, rigid conduit were observed connecting this cabinet with an adjacent item. The configuration was judged to be adequate because both cabinets are rigidly attached to the same concrete wall and thus relative movements during a seismic event will be negligible. We concur with this assessment.

- The walkdown teams diligently reviewed overhead lighting as potential seismic interaction falling sources. Fluorescent lights held in place with only compression fittings were accepted for items of equipment and in areas where the zone of influence did not contain sensitive safety-related targets. Examples include overhead lighting in the vicinity of 480V Shutdown Board Transformers 3A and 3B.

- During the equipment walkdowns and area walkbys, the teams diligently identified and assessed miscellaneous items and temporary equipment as possible seismic interaction sources. Stanchions for chained equipment barriers in the vicinity of Local Panels 25-6A and 25-6D were judged to be acceptable as-is due to their low mass and large base which prevents overturning. In the Control Bay Floor Elevation 606 ft. Cable Spreading Room Chiller Area, an unrestrained portable eyewash station was deemed adequate because it was sufficiently distant from any sensitive equipment. In Diesel Generator Fan Room B, the team identified that a coaxed cable was missing straps, and concluded that the cable was sufficiently distant from any sensitive equipment.

In the SE Quad Room, the walkdown team noted that a ladder was not secured to the wall. This was determined to be insignificant because there were no sensitive equipment nearby. In 480V Shutdown Board Room 3A, the team noted that a ladder in the area up against a wall could possibly make minor contact with a switchgear panel. The ladder was relocated by operations staff. In addition, there were 3 loose breakers on the floor in the same area. These had sufficient distance from the panel yet were also relocated by operations staff.

In the Reactor Building Floor Elevation 593 ft. Area at column lines U / R17, the team noted that an arc flash protection suit lying on the ground behind the MCC did not pose a significant adverse seismic condition. In the Reactor Building Floor Elevation 621 ft. Area defined by column lines P / R17 - S / R20, the team identified an unrestrained equipment cart. Because the cart was not in close proximity to any critical equipment it was judged to not be a potential adverse seismic condition.

We concur with these temporary equipment assessments.

In the end, the peer review team is in concurrence with the Seismic Walkdown Checklists (SWCs) and Area Walkby Checklists (AWCs) as presented in Appendices E and F, respectively, of the BFN3 Seismic Response Report.

POTENTIAL ADVERSE SEISMIC CONDITIONS

The peer review team spent considerable time with the walkdown teams addressing preliminary potential adverse seismic conditions identified during walkdowns. It is noted that there were very many questions early in the walkdown review process on the conservative side of issues, and these kinds of questions diminished towards the end of the project as the judgment of the teams significantly improved. Most of these early concerns were in regards to potential seismic interaction effects. In most cases, these issues were resolved by review of prior evaluations or the TVA procedures and guidance already in place at the plant.

In the end, the peer review team is in concurrence with the conclusions derived from the detailed reviews and evaluations of these conditions. There were no potential adverse seismic conditions identified during the BFN3 seismic walkdowns.

SUBMITTAL REPORT

The peer review team has reviewed the BFN3 submittal report in detail, including the additional walkdown evaluations performed during the February 2014 refueling outage, and we are in full concurrence with the documented observations and findings. The report is in compliance with the guidance in EPRI Report 1025286, and meets the requirements and objectives of the NRC 50.54 (f) letter. R1

In our opinion, the above seismic walkdowns reflect the adequate seismic design criteria as well as sufficiently rigorous seismic-related construction and maintenance procedures that TVA has in place at BFN3. The walkdown demonstrates that the current plant configuration is in compliance with the current seismic licensing basis. Furthermore, the walkdown demonstrates that that TVA has maintained or improved the seismic IPEEE HCLPF capacity of the plant.

Sincerely,

John O. Dizon, P.E.
Lead Peer Reviewer

Stephen J. Eder, P.E.
Peer Reviewer