


**ATTACHMENT 8**  
**Supplemental PEER Review Summary Reports for**  
**Initially Inaccessible Components**

 <b>Shaw North Carolina, Inc.</b> <b>TECHNICAL REPORT</b>	JO No.:	1457690101
	Doc. No.:	1457690101-R-M-00004-0
	Revision:	0
	Client:	Duke Energy, McGuire Units 1 and 2
	Location:	North Carolina, USA

**NTTF 2.3 SEISMIC PEER REVIEW SUPPLEMENTARY REPORT**  
**McGUIRE NUCLEAR STATION UNITS 1 AND 2**


Prepared for:

Duke Energy Carolinas, LLC

Prepared by: Shaw North Carolina, Inc. and ARES Corporation

May 14, 2013

QA CATEGORY III

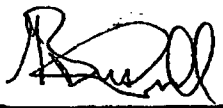
  


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 Peer Reviewer: Paul D. Baughman, P.E.  
 ARES Corporation

5/14/2013

Date


  


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 Peer Reviewer: George Bushnell, P.E.  
 Stone & Webster, Inc. (A CB&I Company)

5/14/2013

Date

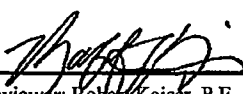
  


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5/14/2013

Date

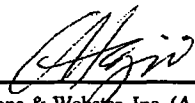
  


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 Duke Energy

5/14/2013

Date


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 Stone & Webster, Inc. (A CB&I  
 Company) Approval: Anthony F. Fazio  
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5/14/2013

Date

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**Revision Description**

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**Acronyms**

ARES	ARES Corporation
AWC	Area Walk-By Checklist
CAP	Corrective Action Program
EPRI	Electric Power Research Institute
IPEEE	Individual Plant Examination of External Events
MNS	McGuire Nuclear Station
NRC	U.S. Nuclear Regulatory Commission
NTTF	Near-Term Task Force
PIP	Problem Investigation Process
SCE	Seismic Capability Engineer
SQUG	Seismic Qualification Utility Group
SSC	Structure, System and Component
SWC	Seismic Walkdown Checklist
SWE	Seismic Walkdown Engineer
SWEL	Seismic Walkdown Equipment List
SWI	Stone & Webster, Inc., a CB&I Company



## 1.0 INTRODUCTION

Electric Power Research Institute (EPRI) Report 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic*, was issued in June 2012. This document provides guidance and procedures to perform seismic walkdowns as required by the U.S. Nuclear Regulatory Commission's (NRC's) 50.54(f) letter regarding Near-Term Task Force (NTTF) Recommendation 2.3: Seismic. The EPRI guidance covers selection of personnel; selection of a sample of structures, systems, and components (SSCs) that represent diversity of component types and ensures inclusion of components from critical systems/functions; conduct of the walkdowns; evaluation of potentially adverse conditions against the plant seismic licensing basis; peer review; Individual Plant Examination of External Events (IPEEE) vulnerabilities; and reporting requirements. It was intended that all U.S. nuclear power plants utilize this guidance document in meeting the requirements of the NRC 50.54(f) letter.

Duke Energy contracted with the Shaw North Carolina, Inc., acting through its affiliated company Stone & Webster, Inc., a CB&I Company (SWI) / ARES Corporation (ARES) Team to perform the NTTF 2.3 peer review at the McGuire Nuclear Station (MNS). A peer review of the NTTF 2.3 seismic walkdowns of Units 1 and 2 was conducted in August 2012 and documented in SWI/ARES Technical Report 1457690101-R-M-00003, *NTTF 2.3 Seismic Peer Review Report, McGuire Nuclear Station Units 1 and 2*. At that time, some items in Unit 1 had not been walked down due to being inaccessible during plant operation. Walkdown of the Unit 1 inaccessible items was deferred to the Unit 1 refueling outage scheduled for the spring of 2013. There were no inaccessible items at Unit 2.

This report documents the supplementary peer review performed in May 2013. The supplementary peer review covered the walkdown of inaccessible items at Unit 1 performed by Duke Energy during the Unit 1 refueling outage. The supplementary peer review also covered the resolution of peer review comments on the licensing basis reviews on Units 1 and 2 from the original peer review in August 2012.

## 2.0 SCOPE

The scope of this supplementary effort was to perform the NTTF 2.3 Seismic Peer Review of the inaccessible items at MNS Unit 1, in accordance with the guidelines in Section 6, *Peer Review*, of EPRI 1025286, and to review resolution of comments from the August 2012 peer review. It is intended that the information contained herein will be utilized by Duke Energy as part of its overall NTTF 2.3 final submittal report to be delivered to the NRC by July 1, 2013.

## 3.0 METHODOLOGY

The SWI/ARES methodology conforms to the guidance in Section 6 of EPRI 1025286. The Peer Review Team consisted of three individuals, all of whom have seismic engineering experience as it applies to nuclear power plants. These individuals participated in the peer review of each of the activities. The Peer Review Team for the supplementary peer review consisted of the same individuals that performed the August 2012 peer review.



The peer review process for the Seismic Walkdown Equipment List (SWEL) development and the seismic walkdowns was documented in SWI/ARES Technical Report 1457690101-R-M-00003. Since the SWEL did not change from the time of the August 2012 peer review, it was not part of the supplementary peer review.

The peer review process for the seismic walkdowns and walk-bys of the inaccessible items consisted of conducting a final review of the completed documentation. The other, in-process, steps in the review methodology described in SWI/ARES Technical Report 1457690101-R-M-00003 were not considered necessary since the Duke Energy seismic walkdown engineers (SWEs) were included in the August 2012 peer review of in-process activities.

The peer review process for the licensing basis evaluations and the decisions for entering potentially adverse conditions into the Corrective Action Program (CAP) consisted of reviewing all of the licensing basis reviews resulting from the walkdown of the inaccessible items. The peer review process for the submittal report consisted of reviewing the draft submittal revision prepared by McGuire Design Engineering for licensing review.

#### 4.0 PERSONNEL

The MNS Peer Review Team for the supplementary peer review consisted of the following individuals. As noted above, these are the same individuals who performed the August 2012 peer review.

- **Paul Baughman, P.E.**, ARES Corporation, Team Leader. Mr. Baughman is a licensed structural engineer with over 40 years of experience in seismic engineering for nuclear power stations. Mr. Baughman is a subject matter expert and trainer for the Seismic Qualification Utility Group (SQUG). Mr. Baughman has performed seismic assessment activities for MNS and is familiar with the MNS seismic licensing basis. Mr. Baughman has performed many seismic margin assessments and seismic probabilistic risk assessments, and is familiar with systems modeling and development of safe shutdown equipment lists.
- **George Bushnell, P.E.**, Stone & Webster, Inc. (a CB&I Company). Mr. Bushnell is a licensed mechanical engineer with over 40 years of experience in engineering qualification of electrical and mechanical equipment for nuclear power stations. Mr. Bushnell is a qualified SQUG Seismic Capability Engineer (SCE) and company specialist for design and qualification of ASME III components.
- **Robert Keiser, P.E.**, Duke Energy. Mr. Keiser is a licensed professional engineer in North and South Carolina with over 20 years of experience in the seismic qualification of electrical equipment for Duke Energy's McGuire, Catawba, and Oconee Nuclear Stations. Mr. Keiser received training as a SQUG SCE and was involved with the SQUG effort at Oconee and the IPEEE efforts at all three stations.



## 5.0 SELECTION OF THE SSCs INCLUDED ON THE SWEL

Peer review of the SWEL is described in SWI/ARES Technical Report 1457690101-R-M-00003. Since the SWEL did not change from August 2012, no further peer review was required.

## 6.0 SEISMIC WALKDOWNS AND AREA WALK-BYS

The inaccessible equipment items and areas to be walked down were listed in Appendix C of SWI/ARES Technical Report 1457690101-R-M-00001, *Seismic Walkdown Report for Duke Energy's McGuire Nuclear Station Unit 1*. The walkdowns consist of two parts: equipment-specific seismic walkdowns and area walk-bys. The specific instructions for each part are delineated in EPRI 1025286. The walkdowns were performed by Duke Energy. The walkdowns were documented on Area Walk-By Checklists (AWCs) and Seismic Walkdown Checklists (SWCs), and are included as Attachment 7 in the revised Duke Energy submittal report, *Fukushima Near-Term Task Force (NTTF) Recommendation 2.3: NRC Submittal Report for Seismic Walkdowns, McGuire Unit 1*.

Seismic walkdowns of specific items focused on identifying adverse anchorage conditions, adverse seismic interactions, and other adverse seismic conditions that could challenge the seismic adequacy of a SWEL item.

Anchorage was examined for degraded, nonconforming or unanalyzed conditions. This included visual inspection of the anchorage and verification of anchorage condition. The visual inspections looked for bent, broken, missing or loose hardware; corrosion that is more than mild surface oxidation; visible cracks in the concrete near anchors; and other potentially adverse seismic conditions. This did not apply to line-mounted items.

Anchorage configuration was verified to be consistent with the existing plant documentation for a portion of the equipment with anchorage. The anchorage configuration verification must be done for at least 50% of the non-line-mounted SWEL items. As noted in SWI/ARES Technical Report 1457690101-R-M-00001, the percentage for Unit 1 exceeds the EPRI 1025286 requirement.

The area adjacent to and surrounding the SWEL item was inspected for nearby SSCs that could be seismic interaction hazards due to proximity, failure, and falling, or insufficient flexibility of attached lines and cables. Detailed guidance on seismic spatial interactions is given in Appendix D of EPRI 1025286.

The SWEL item was also examined to see if there were any other potentially adverse seismic conditions besides anchorage and seismic interaction. These could include other degraded conditions, loose or missing subcomponent fasteners, unusual large or heavy subcomponents, doors or panels not latched or fastened, or any other condition which might be seismically adverse. Where possible, cabinets and enclosures were opened for examination of internals.

Area walk-bys consisted of examining the general area surrounding the specific SWEL items for potentially adverse seismic conditions. The area examined included either the entire room enclosing the SWEL item or at least 35 feet in any direction. The examination looked for degraded anchorage conditions of equipment in the area; significantly degraded equipment; poorly supported cable/conduit





raceways, HVAC ducting, or piping; and unsecured temporary equipment that could cause seismic interactions (seismic housekeeping concerns). The area walk-by included looking for potential seismic interactions from flooding, spray, or fire. These potential seismic interactions are described in Section 4 of EPRI 1025286.

The Duke Energy engineers who performed the walkdowns of the inaccessible items were:

- **Bryan Meyer** – Duke Energy, Walkdown Team Lead
- **Mike Langel** – Duke Energy, Walkdown Team Member

These individuals participated in the previous NTTF 2.3 seismic walkdowns. Their qualifications were documented in the submittal report. The Peer Review Team reviewed the qualifications and verified that they meet the requirements for an SWE in EPRI 1025286. All were verified to have attended the EPRI Seismic Walkdown Training Course. The August 2012 peer review included review of in-process AWCs and SWCs. Group meetings were held with the SWEs to address the peer review comments. The Duke Energy personnel who performed the walkdowns of the inaccessible items attended those meetings. The Peer Review Team concluded that the walkdown personnel had adequate experience and training to perform walkdown and walk-by activities in compliance with the EPRI Seismic Walkdown Guidance.

The Peer Review Team reviewed 100% of the final SWCs and AWCs of the inaccessible items. This is more than the 10% sample that the EPRI guidance requires. The review is summarized in Appendix A of this report. The table in Appendix A lists the seven SWCs and five AWCs reviewed.

The Peer Review Team concluded that the walkdowns of the inaccessible items were conducted in accordance with the EPRI guidance.

## 7.0 LICENSING BASIS REVIEWS

All potentially adverse conditions require a licensing basis review in accordance with the EPRI guidance. For MNS, the licensing basis reviews were performed by Duke Energy Design Engineering personnel. Messrs. Meyer and Langel performed licensing basis reviews. These individuals meet the personnel requirements in EPRI 1025286.

The walkdown of the inaccessible items identified two potentially adverse seismic conditions. These were added to Table 4-1 of the submittal report. As with the accessible items, each potentially adverse condition identified by the walkdown team was entered into the CAP via the Problem Investigation Process (PIP) to enable tracking to closure. The items were entered into two PIPs: M-13-02743 and M-13-03770. The Duke Energy Licensing Basis Reviewer stated that the licensing basis reviews were documented in the PIPs associated with the potentially adverse conditions, and neither condition was found to violate the MNS seismic licensing basis.

The potentially adverse seismic conditions identified by the walkdown of the inaccessible items are listed in Table 4-1 of the Duke Energy submittal report. The peer reviewers verified that the two potentially adverse seismic conditions had licensing basis reviews documented in the PIPs. The Peer



Review Team reviewed the licensing basis evaluations for the potentially adverse seismic conditions and concluded that they were conducted in accordance with the EPRI guidance

The peer reviewers also reviewed the licensing basis reviews for the items with comments provided to Duke Energy during the August 2012 peer review. The Peer Review Team concluded that the comments were acceptably resolved for both Units 1 and 2.

## **8.0 DECISIONS ON ENTERING POTENTIALLY ADVERSE SEISMIC CONDITIONS INTO THE CAP PROCESS**

Each potentially adverse seismic condition identified by the seismic walkdown of the inaccessible items were entered in the CAP for further evaluation. The Peer Review Team review of the seismic walkdowns determined that the identifications of adverse seismic conditions were conservatively made. Thus, the decision to enter them into the CAP was likewise conservative.

The licensing basis reviews determined neither of the potentially adverse seismic conditions violated the MNS licensing basis. Therefore, it was not necessary to perform extent of condition evaluations.

The Peer Review Team concludes that the decisions on entering potentially adverse conditions in the CAP process were in accordance with the EPRI guidance.

## **9.0 SUBMITTAL REPORT**

The Peer Review Team reviewed a draft of the revised submittal report for MNS Unit 1 provided by Mr. Meyer. The report contains the required sections and discussions. The Peer Review Team had no technical comments on the draft revised submittal report. The Peer Review Team concludes that the revised submittal report is in accordance with the EPRI guidance.

## **10.0 CONCLUSIONS**

The conclusion of the supplemental peer review is that the MNS NTTF 2.3 seismic walkdown for the inaccessible items has been conducted in accordance with the guidance in EPRI 1025286. Comments made during the August 2012 peer review have been addressed satisfactorily for both Units 1 and 2.

## **11.0 REFERENCES**

Duke Energy Submittal Report, *Fukushima Near-Term Task Force (NTTF) Recommendation 2.3: NRC Submittal Report for Seismic Walkdowns, McGuire Unit 1*, Revision 1, DRAFT, April 9, 2013.

EPRI 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic*, June 2012, Electric Power Research Institute, Palo Alto, CA.



Letter, E. Leeds and M. Johnson (NRC) to All Power Reactor Licensees et al., "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," Enclosure 2.3, "Recommendation 2.3: Seismic," dated March 12, 2012.

SWI/ARES Technical Report 1457690101-R-M-00001-1, *Seismic Walkdown Report for Duke Energy's McGuire Nuclear Station Unit 1*, Revision 1, November 5, 2012.

SWI/ARES Technical Report 1457690101-R-M-00003-0, *NTTF 2.3 Seismic Peer Review Report, McGuire Nuclear Station Units 1 and 2*, Revision 0, November 15, 2012.



**APPENDIX A**

**SUMMARY OF PEER REVIEW OF  
FINAL SWCs AND AWCs FOR INACCESSIBLE ITEMS**



Walkdown Team Members: Bryan D. Meyer, Duke Energy Mike F. Langel, Duke Energy

Summary of Peer Review of Final SWCs and AWCs for Inaccessible Items. (2 sheets)

EDB ID	Equipment Class	50% Anchorage	Non 50% Anchorage	Line Mounted	Overall Status	Team	Comments
INC-32B	07	-	-	X	Y	Meyer/ Langel	Reactor Coolant: Pressurizer PORV No adverse conditions noted
INC-34A	07	-	-	X	Y	Meyer/ Langel	Reactor Coolant: Pressurizer PORV No adverse conditions noted
Pressurizer Cavity Reactor Bldg	-	-	-	-	Y	Meyer/ Langel	Area Walkdown (Pressurizer cavity El. 725) 1. Walkdown centered around PORVs 2. No adverse condition noted 3. Degraded piping insulation noted; Work Request generated (PIP M-13-02743)
INI-430A	08	-	-	X	Y	Meyer/ Langel	Nitrogen supply to PORV No adverse condition noted
1A CLA Room Reactor Bldg	-	-	-	-	Y	Meyer/ Langel	Area Walkdown (CLA room El. 760) 1. Walkdown centered around INI-430A 2. No seismically adverse condition noted
INI-431B	08	-	-	X	Y	Meyer/ Langel	Nitrogen supply to PORV No adverse condition noted
1B CLA Room Reactor Bldg	-	-	-	-	Y	Meyer/ Langel	Area Walkdown (CLA room El. 760) 1. Walkdown centered around INI-431B 2. No seismically adverse conditions noted 3. Loose tubing support bracket noted in area; Work Request initiated (PIP M-13-2743 resolved potential seismic interaction concern)
IND-1B	08	-	-	X	Y	Meyer/ Langel	RHR pump hotleg (suction) isolation No seismically adverse condition noted
B-C Lower Containment Reactor Bldg	-	-	-	-	Y	Meyer/ Langel	Area Walkdown (El. 725) 1. Walkdown centered around RHR pump IND-1B 2. No seismically adverse conditions noted



**Summary of Peer Review of Final SWCs and AWCs for Inaccessible Items. (2 sheets)**

EDB ID	Equipment Class	50% Anchorage	Non 50% Anchorage	Line Mounted	Overall Status	Team	Comments
1ND-2AC	08	-	-	X	Y	Meyer/ Langel	RHR pump hotleg (suction) isolation No seismically adverse condition noted Lead shielding on valve and adjacent piping in accordance with TSR-13-128
B-C VL Fan Room Reactor Bldg	-	-	-	-	Y	Meyer/ Langel	Area Walkdown (Fan Room El. 745) 1. Walkdown centered around RHR pump 1ND-2A 2. No seismically adverse conditions noted
1ETB	03	X	-	-	Y	Meyer/ Langel	No adverse condition noted Minor concrete cracks previously resolved via PIP-M-12-6803 Unattached overhead light fixture support noted, Work Request generated (PIP-M-13-03770 resolved potential seismic interaction concern as multiply-supported linear system) Documents referenced; photos provided Comment provided with respect to internal inspection of component

Notes:

1. Walkdown observations adequately documented.
2. Appropriate explanatory discussion, references, and/or photographs provided as required.

