

Westinghouse Non-Proprietary Class 3

WCAP-17675-NP, Supplement 1  
Revision 0

December 2013

**Ameren Missouri  
Callaway Energy Center  
Supplemental Information for  
Post-Fukushima NTTF 2.3  
Seismic Walkdown Submittal  
Report**



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Revision 0**

**Ameren Missouri Callaway Energy Center  
Supplemental Information for Post-Fukushima NTTF 2.3  
Seismic Walkdown Submittal Report**

**Derek Seaman\***  
Risk Applications & Methods II

**December 2013**

**Reviewer: Jeffrey Bass\***  
Engineering Projects

Reviewer: Randy Wilson  
Ameren Missouri Callaway Energy Center

Reviewer: Curtis Stundebek  
Ameren Missouri Callaway Energy Center

Approved: Dan Sadlon\*, Manager  
Risk Applications & Methods II

\*Electronically approved records are authenticated in the electronic document management system.

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Westinghouse Electric Company LLC  
1000 Westinghouse Drive  
Cranberry Township, PA 16066, USA

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### RECORD OF REVISIONS

Revision	Date	Author	Description
0	12/2013	D. Seaman	Supplement 1 includes the main body of WCAP-17675-NP, Rev. 0 (Reference 35, "Executive Summary" through "References") and new or revised content in the appendices that address the conduct and results of the follow-on walkdown activities performed between March 2013 and August 2013. Revision bars are used in the main body to easily identify the updates. With the exception of Appendices A and B, revision bars are utilized in the appendices to identify the updates relative to the corresponding appendices of WCAP-17675-NP, Rev. 0. Note that Appendices A and B consist of the completed checklists resulting from the follow-on walkdowns only. Editorial and formatting corrections relative to WCAP-17675-NP, Rev. 0 are not identified with individual revision bars in this document.

## EXECUTIVE SUMMARY

On March 11, 2011, the Fukushima Daiichi nuclear power plant suffered a devastating accident as a result of the Tohoku earthquake and subsequent tsunami. In response, the Nuclear Regulatory Commission (NRC) established the Near Term Task Force (NTTF) to evaluate the catastrophe in Japan and determine what action, if any, was necessary to protect U.S. nuclear power plants. Upon review of the details of the accident at Fukushima Daiichi, the NTTF issued a report that made a series of recommendations resulting in the NRC issuing a 50.54(f) letter that requests information from the U.S. nuclear power plants. One such recommendation in the 50.54(f) letter was contained in Enclosure 3 and is titled Recommendation 2.3: Seismic.

To assist the U.S. nuclear power plants with meeting the request for information, the Nuclear Energy Institute (NEI), through the Electric Power Research Institute (EPRI), developed a guidance document that meets the intent of Enclosure 3 to the NRC 50.54(f) letter. The industry guidance document, "Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic," EPRI, Palo Alto, CA: 2012. 1025286, was endorsed by the NRC on May 31, 2012.

Enclosure 3 to the NRC 50.54(f) letter states the following purposes of the NRC request:

- To gather information with respect to Near-Term Task Force Recommendation 2.3, as amended by staff requirements memorandum (SRM) associated with SECY-11-0124 and SECY-11-0137.
- To request licensees to develop a methodology and acceptance criteria for seismic walkdowns to be endorsed by the NRC staff.
- To request licensees to perform seismic walkdowns using the NRC endorsed walkdown methodology.
- To identify and address degraded, nonconforming, or unanalyzed conditions through the corrective action program.
- To verify the adequacy of licensee monitoring and maintenance procedures.

The purpose of this report is to document the conformance of Ameren Missouri Callaway Energy Center to the EPRI Guidance in order to meet the NRC's request for information. The report covers the methods used to develop a representative list of equipment to be walked down, a list of that equipment, methods used during the actual walk downs, observations collected by the walkdown team, and corrective actions taken to address the walkdown team observations. All degraded, nonconforming or unanalyzed conditions are identified and addressed within the corrective action program to ensure compliance with the design basis. Action plans addressing the licensing basis evaluations have either been completed or are in the process of being completed by the site corrective action process.

WCAP-17675-NP, Rev 0 (Reference 35) summarizes the results from the at-power Seismic Walkdowns and Area Walk-Bys performed the week of September 10, 2012. Supplement 1 of WCAP-17675-NP incorporates the results from follow-on walkdowns performed over Spring and Summer 2013 for equipment unavailable during the week of September 10, 2012.



The EPRI Guidance document was used to perform the engineering walkdowns and evaluations described in this report. In accordance with the EPRI Guidance document, the following topics are addressed in the subsequent sections of this report.

- Seismic Licensing Basis
- Personnel Qualifications
- Selection of Systems, Structures, and Components (SSC)
- Seismic Walkdowns and Area Walk-Bys
- Licensing Basis Evaluations
- Peer Review
- IPEEE Vulnerabilities Resolution Report

Enclosure 3 of the NRC 50.54(f) letter stipulated that each licensee submit a final report that includes the following:

1. Information on the plant-specific hazard licensing bases and a description of the protection and mitigation features considered in the licensing basis evaluation.

Callaway's current Seismic Licensing Basis (seismic codes, standards, and methods) is documented in report Section 1.0 and was used as input to seismic walkdown Licensing Basis Evaluations.

2. Information related to the implementation of the walkdown process.

The approach used to implement the Seismic Walkdown Guidance is described in detail in report Sections 3.0 through 5.0. The approach documented within this report is in accordance with the EPRI Technical Report, TR-1025286, and therefore meets the requirements of the 50.54(f) letter.

3. A list of plant-specific vulnerabilities (including any seismic anomalies, outliers, or other findings) identified by the IPEEE and a description of the actions taken to eliminate or reduce them (including their completion dates).

The results of the Individual Plant Examination of External Events program are described in report Section 7.0.

4. Results of the walkdown including key findings and identified degraded, nonconforming, or unanalyzed conditions. Include a detailed description of the actions taken or planned to address these conditions using the guidance in Regulatory Issues Summary 2005-20, Revision, 1, Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Conditions Adverse to Quality or Safety," including entering the condition in the corrective action program.

The summary of the key findings of the Seismic Walkdowns and Area Walk-bys are described in Section 4.0. The licensing basis evaluation of potentially adverse seismic conditions and their resolutions are described in Section 5.0 and Appendix C. Several minor non-seismic housekeeping issues were observed and are presented in Table 4-1. Use of the site's CAP is documented in Section 4.0 and Appendix C. Seventeen (17) Licensing Basis Evaluations were

generated and presented in Appendix C. None of these identified conditions prevent the equipment from performing its intended safety function during or after a design basis seismic event. Results of the Seismic Walkdowns and Area Walk-bys are documented on EPRI TR-1025286 Checklists in Appendix A and Appendix B of this report, respectively.

5. Any planned or newly-installed protection and mitigation features

No planned or newly identified protection or mitigation features have resulted from the efforts to address the 50.54(f) letter.

6. Results and any subsequent actions taken in response to the peer review

A Peer Review Team was assembled and peer reviews were performed in accordance with Section 6: Peer Reviews of the EPRI Guidance document. The Peer Review Team confirmed the Selection of SSCs process, provided real-time feedback to the Seismic Walkdown Engineers during performance of the walkdowns, and confirmed that the licensing basis evaluations carefully compared the actual as-found plant configurations to the current licensing basis documentation. Peer Reviewer activities are described in Section 6. The Peer Review Team determined that the objectives and requirements of the 50.54(f) letter are met, and that the efforts completed and documented within this report are in accordance with the EPRI Guidance document.

Follow-on activities required to complete the efforts to address Enclosure 3 of the 50.54(f) letter include inspection of 10 items that were inaccessible for inspection. These items are identified in Table 3-5. In addition, required supplemental cabinet inspections per FAQ 4.20 are identified in Table 3-6. Documentation of these follow-on inspections and the related evaluations is provided in this supplemental report.

All of the necessary NTTF 2.3 walkdown activities have been successfully completed for Callaway Energy Center in accordance with the EPRI Guidance document. The conduct of the walkdown team in assessing the current state of safety related equipment and areas, in concert with the site response to identified observations, confirms the adequacy of the seismic monitoring and maintenance procedures. In total, this submittal report, including follow-on inspections, demonstrates compliance for the Callaway Energy Center to the requirements of EPRI Technical Report 1025286, and therefore meets the intent of Enclosure 3 to the NRC 50.54(f) letter.

## **ACKNOWLEDGMENTS**

We wish to acknowledge the following contributors to this report for all their hard work and effort.

James Cunningham – Ameren Missouri

Richard Denny – Ameren Missouri

Joe Fortman – Ameren Missouri

Dave Hollabaugh – Ameren Missouri

Curtis Stundebek – Ameren Missouri

Randy Wilson – Ameren Missouri

Monzer Allam – Westinghouse

Gary Douglas – Westinghouse

Samer El-Bahey – Stevenson & Associates

Apostolos Karavoussianis – Stevenson & Associates

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## LIST OF ACRONYMS AND ABBREVIATIONS

A/C	Air Conditioning
AAST	Arab Academy of Science & Technology
AB	Main Steam
ACI	American Concrete Institute
AE	Main Feedwater
AFW	Auxiliary Feedwater
AHU	Air Handling Unit
AISC	American Institute of Steel Construction
AL	Auxiliary Feedwater
AMSE	American Society of Mechanical Engineers
ASCE	American Society of Civil Engineers
AUX	Auxiliary Building
AWC	Area Walk-By Checklist
AWS	Area Walkdown Sheet
BB	Reactor Coolant
BG	Chemical & Volume Control System
BIT	Boron Injection Tank
BL	Reactor Makeup Water
BM	Steam Generator Blowdown
BN	Borated Refueling Water Storage
CA	Corrective Action
CAP	Corrective Action Program
CAR	Callaway Action Request
CARS	Callaway Action Request System
CB	Control Building
CC	Communication Corridor
CCP	Centrifugal Charging Pump
CCW	Component Cooling Water
CEC	Callaway Energy Center
CF	Containment Function
CFR	Code of Federal Regulations
CLB	Current Licensing Basis
CR	Condition Report
CRDM	Control Rod Drive Mechanism
CSEE	Civil, Structural, & Environmental Engineering Department
CVCS	Chemical and Volume Control System
DCN	Design Change Notice
DG	Diesel Generator
DHR	Decay Heat Removal
EC	Fuel Pool Cooling & Cleanup
ECCS	Emergency Core Cooling System
ECU	Engineering Consultants Union
EF	Essential Service Water
EG	Component Cooling Water

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**LIST OF ACRONYMS AND ABBREVIATIONS (cont.)**

EJ	Residual Heat Removal
EM	High Pressure Coolant Injection – SI, BIT
EN	Containment Spray
EP	Accumulator Safety Injection
EPRI	Electric Power Research Institute
ESF	Engineered Safety Feature
ESFAS	Engineered Safety Features Actuation System
ESW	Essential Service Water
FAQ	Frequently Asked Question
FC	Auxiliary Turbines
FCV	Flow Control Valve
FRS	Floor Response Spectra
FSAR	Final Safety Analysis Report
FW	Feedwater
GD	Essential Service Water Building HVAC
GF	Miscellaneous Buildings HVAC
GG	Fuel Building Ventilation HVAC
GIP	Generic Improvement Program
GK	Control Building HVAC
GL	Auxiliary Building Ventilation
GM	Diesel Generator Building HVAC
GN	Containment Cooling
GS	Containment Hydrogen Control
GT	Containment Purge
HB	Liquid Radwaste
HCLPF	High Confidence of Low Probability of Failure
HVAC	Heating, Ventilation and Air Conditioning
HX	Heat Exchanger
IC	Reactor Coolant Inventory Control
IE	Internal Event
IPEEE	Individual Plant Evaluation for External Events
JE	Emergency Fuel Oil
KA	Compressed Air
KJ	Standby Diesel Engines
LF	Floor & Equipment Drains
LBE	Licensing Basis Evaluation
LLC	Limited Liability Company
MCB	Main Control Board
MCC	Motor Control Center
MOV	Motor-Operated Valve
NB	Lower Medium Voltage System
NE	Diesel Generator
NF	Load Shedding & Emergency Load Sequencer
NG	Low Voltage System (480)



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**LIST OF ACRONYMS AND ABBREVIATIONS (cont.)**

NK	125 VDC (Class 1E)
NN	Instrument AC Power
NRC	U.S. Nuclear Regulatory Commission
NTTF	Near-Term Task Force
OBE	Operating Basis Earthquake
OQCM	Operational Quality Control Manual
P&ID	Piping & Instrumentation Diagram
PC	Reactor Coolant Pressure Control
PN	Instrument AC Power
POV	Pneumatic-Operated Valve
PRA	Probabilistic Risk Assessment
PVP	Pressure Vessel and Piping
PZR	Pressurizer
RAW	Risk Achievement Worth
RB	Reactor Building
RC	Reactor Reactivity Control
RCDT	Reactor Coolant Drain Tank
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RL	Main Control Board System
RLE	Review Level Earthquake
RP	Miscellaneous Control Panels
RPV	Reactor Pressure Vessel
RWST	Refueling Water Storage Tank
S&A	Stevenson and Associates
SA	Engineered Safety Feature Actuation
SB	Reactor Protection
SCE	Seismic Capable Engineer
SC-I	Seismic Category I
SE	Excore Neutron Monitoring
SFP	Spent Fuel Pool
SG	Steam Generator
SI	Safety Injection
SIP	Safety Injection Pump
SMA	Seismic Margin Assessment
SNC	Southern Nuclear Company
SNUPPS	Standardized Nuclear Unit Power Plant System
SQURTS	Seismic Qualification Reporting and Testing Standardization
SRM	Staff Requirements Memorandum
SRT	Seismic Review Team
SSC	Structures, Systems, and Components

**LIST OF ACRONYMS AND ABBREVIATIONS (cont.)**

SSE	Safe Shutdown Earthquake
SSEL	Safe Shutdown Equipment List
SW	Service Water
SWC	Seismic Walkdown Checklist
SWE	Seismic Walkdown Engineer
SWEL	Seismic Walkdown Equipment List
SWG	Seismic Walkdown Guidance
SWGR	Switchgear
SWT	Seismic Walkdown Team
TDAFP	Turbine-Driven Auxiliary Feedwater Pump
TDAFW	Turbine-Driven Auxiliary Feedwater
TSO	Technical Specification Outage
UHS	Ultimate Heat Sink
VCT	Volume Control Tank
VEGP	Vogtle Electric Generating Plant
WR	Wide Range
YRD	Yard

## 1 SEISMIC LICENSING BASIS

The licensing basis for Seismic Category I (SC-I) equipment at Callaway Energy Center (CEC) is defined in the Final Safety Analysis Report (FSAR) (Reference 1), Section 3.2.1. Seismic classification criteria are set forth in 10 CFR 100 (Reference 2) and supplemented by U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.29 (Reference 3). Damping values for SC-I equipment which are in compliance with Regulatory Guide 1.61 (Reference 4) first-mode natural frequencies, response accelerations, displacements, inertia forces, shear forces, axial forces, and bending moments are listed in FSAR Table 3.7(B) (Reference 1) for different buildings at different elevations for all three Standardized Nuclear Unit Power Plant System (SNUPPS) plants. The site design response spectra for the Safe Shutdown Earthquake (SSE) in the Auxiliary/Control Buildings at elevations 2000', 2016', and 2047.5' are provided in References 5 through 7, respectively. The site design response spectra are in compliance with Regulatory Guide 1.60 (Reference 8) and are also illustrated in Figures 3.7(B)-1 and 3.7(B)-2 in Reference 1, in both the horizontal and vertical directions for the SSE. For the Operating Basis Earthquake (OBE), the design response spectra values were taken as 60 percent of the SSE values. General structures and buildings are designed per the Uniform Building Code 1973 Edition (Reference 9), American Concrete Institute ACI 318-71 (Reference 10), and American Institute of Steel Construction (AISC) Manual, 7th Edition (Reference 11).

As defined in FSAR Section 3.7(B), seismic loadings are considered for earthquakes of two magnitudes: SSE and OBE. The SSE is defined as the maximum vibratory ground motion at the plant site that can be reasonably predicted from geologic and seismic evidence. The OBE is that earthquake which, considering the local geology and seismology, can be reasonably expected to occur during the plant life. The seismic responses of the major Seismic Category I structures (containment, auxiliary/control, diesel generator, and fuel building) were originally generated for four sites (Callaway, Wolf Creek, Sterling, and Tyrone). Seismic design envelopes were developed by use of the most restrictive site conditions imposed by any one of the four original sites or by generic design criteria which are conservative for each of the sites. With the cancellation of the Tyrone plant, however, the four-site enveloping approach was modified, for work not yet completed, to include only the remaining three sites. The seismic design envelopes were not revised to reflect the cancellation of the Sterling plant; therefore, since the design of all power block structures, systems, and components is based on the responses for three or four sites, the power block design is conservative for the remaining two sites including Callaway.

Radwaste systems and structures are designated as non-Seismic Category I (FSAR Section 3.2.1). In accordance with Regulatory Guide 1.143 (Reference 12), a simplified seismic analysis is performed for portions of the gaseous radwaste system (which by design are intended to store and delay the release of gaseous radioactive waste) including isolation valves, equipment, interconnecting piping, and components located between the upstream and downstream valves used to isolate these components from the rest of the system. In addition, a simplified seismic analysis is performed for structures housing radioactive waste management systems in accordance with Regulatory Guide 1.143.

Non-safety-related structures, systems, and components that must be designed to retain structural integrity during and after an SSE, but do not have to function, are seismically analyzed to ensure that faulted stress limits are not exceeded. These items (for example, piping and piping supports for non-safety-related piping located over safety-related items) whose continued function is not required are non-seismic Category I and are not controlled by a 10 CFR 50 Quality Assurance Program (not Q-listed). The non-Seismic Category I Systems Quality Assurance Program is described in Section 17.D of the SNUPPS Quality Assurance Programs for Design and Construction (Reference 13).

## **2 PERSONNEL QUALIFICATIONS**

### **2.1 EQUIPMENT SELECTION PERSONNEL**

The Seismic Walkdown Equipment List (SWEL) development was performed by Westinghouse Electric Company personnel, Terry M. Keller and Derek Seaman. Ms. Keller is a Principal Engineer in the Risk Applications and Methods Group of Westinghouse's Engineering, Equipment and Major Projects Division. Terry has over 20 years of experience in the nuclear energy industry. While at Westinghouse Terry has also worked in the Containment and Radiological Analysis Group where she performed offsite dose analyses and steam generator tube rupture margin-to-overfill analyses. In addition to dose evaluations, Terry's previous experience includes performance of transient analyses. Mr. Seaman is a Senior Engineer in the Risk Applications and Methods Group of Westinghouse's Engineering, Equipment and Major Projects Division. Derek has over 6 years of experience in Westinghouse in the nuclear engineering area. Derek has rotated through various plant outage positions including reload engineering analyses and project management of fuel reload campaigns. Derek has evaluated power increase proposals from a safety analysis perspective and has designed and implemented quality assurance systems in the nuclear engineering area. Résumés are provided in Appendix H. The development of the SWEL began in July 2012 and was completed on September 6, 2012.

### **2.2 SEISMIC WALKDOWN ENGINEERS**

The Seismic Walkdown Teams (SWTs) consisted of Seismic Walkdown Engineers (SWEs) from Stevenson and Associates (S&A) and Callaway Energy Center (CEC). S&A is recognized internationally as a leading seismic consultant to the nuclear industry and as a regular contributor to the advancement of earthquake engineering knowledge through funded research projects. The professional staff has expertise and capabilities in earthquake engineering, structural dynamics, and structural design. S&A has performed seismic evaluations of U.S. nuclear power plants, using either seismic probabilistic risk assessment (PRA) or seismic margin assessment, to address U.S. NRC Individual Plant Evaluation for External Events (IPEEE) for over 35 U.S. and European plants. S&A conducted seismic PRA analyses for all of the U.S. Army depots that are demilitarizing their stores of nerve gas ordnance.

The SWT for Callaway consisted of Messrs. Apostolos Karavoussianis (S&A), Samer El-Bahey (S&A), Curtis Stundebek (CEC), and Randall Wilson (CEC) (résumés are provided in Appendix H). In addition to serving as members of the SWTs, Messrs. Stundebek and Wilson led the support from CEC for walkdowns as well as the interface with plant operators. Other CEC professional staff provided support and guidance and these persons are acknowledged within this report.

With respect to the supplemental walkdowns Messrs. Stundebek and Wilson performed all supplemental inspections with the exception of NK01 and NK41 which were inspected by Mr. Wilson and Tim Solberg (résumés provided in Appendix H).

Apostolos Karavoussianis: Mr. Karavoussianis is a senior consultant in the S&A Phoenix office. He has performed seismic walkdowns of structures and components at numerous facilities for the GIP A-46 and IPEEE programs. He has prepared, reviewed, and approved seismic evaluations for electrical and mechanical equipment. Mr. Karavoussianis is a qualified Seismic Capable Engineer (SCE).

Samer El-Bahey, Ph.D.: Dr. El-Bahey is a Senior Engineer in the S&A Phoenix office with specialization in the dynamic analysis and design of structures and equipment for seismic, blast, fluid, and wind loads. He has performed seismic walkdowns and fragility analyses of structures and components for use in probabilistic risk assessments. Dr. El-Bahey has performed the seismic analyses of braced steel frames, concrete foundations, masonry walls, large storage tanks, and electrical and mechanical equipment anchorages. In addition, Dr. El-Bahey has executed the walkdown and analysis of tank structures and their associated leak path piping to assess loss of inventory in the event of beyond-design-basis seismic events using manual and finite element methods. Dr. El-Bahey has a Ph.D. and a Master's of Science in Structural Engineering from the State University of New York at Buffalo. Mr. El-Bahey has completed the 2-day NTTF Walkdown training course.

Randall Wilson, PE: Mr. Wilson is a Consulting Engineer in the Callaway Civil/Mechanical Design Engineering Department. He has performed seismic and dynamic related walkdowns on numerous occasions at the CEC. He is Callaway site Subject Matter Expert for seismic equipment qualification and an active member of SQRSTS. Mr. Wilson is a Registered Engineer in the State of Missouri and completed the 2-day EPRI Seismic Walkdown Guidance Course.

Curtis Stundebek, PE: Mr. Stundebek is a Career Engineer in the Civil/Mechanical Design Engineering Department at Callaway. He is involved in specification for seismic equipment qualification and review of seismic equipment qualification reports. He has also been involved in the seismic design of plant equipment and structures and has completed numerous walkdowns for seismic related design issues. Mr. Stundebek performs periodic inspections of all Callaway structures included in the Maintenance Rule program. He is the Responsible Engineer for the Callaway Containment In-Service Inspection programs. Mr. Stundebek is a Registered Engineer in the State of Missouri and completed the 2-day EPRI Seismic Walkdown Guidance Course.

Tim Solberg: Mr. Solberg has participated in various civil, structural, and seismic engineering tasks while at Wolf Creek. He has developed experience in civil/structural design and supports in addition to seismic analyses and evaluations of plant systems and components. He has supported the Fukushima NTTF 2.3 Seismic walkdowns at Wolf Creek as well as provided support for its 2.1 seismic effort. Mr. Solberg has completed the 2-day EPRI Seismic Walkdown Guidance Course.

## **2.3 LICENSING BASIS REVIEWERS**

The Licensing Basis Reviewers for CEC consisted of Mr. Apostolos Karavoussianis and Dr. Samer El-Bahey from the SWT with assistance from Messrs. Randall Wilson and Curtis Stundebek of the CEC. Their qualifications are provided under Section 2.2. Messrs. Wilson and Stundebek provided the licensing basis review for the supplemental walkdowns.

## **2.4 IPEEE REVIEWERS**

The IPEEE Reviewers consisted of a combination of the Equipment Selection Personnel and the SWT. Ms. Terry Keller and Mr. Derek Seaman of Westinghouse (qualifications listed in Section 2.1 and Appendix H) identified equipment subject to IPEEE enhancements for incorporation in SWEL 1. Mr. Apostolos Karavoussianis and Dr. Samer El-Bahey of S&A (qualifications listed in Section 2.2)

performed the identification of actions taken to eliminate or reduce the IPEEE vulnerabilities previously identified.

## **2.5 PEER REVIEW TEAM**

The peer reviewers for the initial submittal for CEC are Messrs. Todd Bacon of S&A, Monzer Allam of Westinghouse, and Steve Sherfey of Westinghouse. Mr. Bacon is also designated the Peer Review Team Leader. For the submittal report the peer reviewers are Monzor Allam and Gary Douglas, both of Westinghouse. Since Mr. Bacon is no longer available, Mr. Allam is designated as the supplemental report Peer Review Team Leader. None of the Peer Review Team was involved in the seismic walkdown inspection process as to maintain their independence from the project.

Mr. Bacon participated in all aspects of the peer review requirements for the original version of this WCAP report only. Mr. Allam participated in the peer review for the SWEL, the LBE, and both the initial and supplemental reports. Mr. Sherfey participated in the peer review activities for the seismic walkdowns in Mr. Allam's absence for the original version of this WCAP report only.

Mr. Bacon is a civil engineer with over thirty years of experience. He has been also trained to the EPRI Seismic Walkdown Engineer (SWE) training. Mr. Allam is a civil engineer with over fifteen years of experience in structural analysis and design. Mr. Sherfey is a civil engineer with thirty seven years of experience, is licensed in Missouri, is an author of two ASME papers on seismic/structural analysis, and is a member of the ASME PVP Seismic Engineering Technical Committee. Mr. Douglas is a nuclear engineer with 15 years of nuclear engineering experience and 10 years of aerospace engineering experience. Résumés are provided in Appendix H. All peer review activities were performed by at least two engineers consistent with the requirements of the program.

### 3 SELECTION OF SSCS

#### 3.1 SWEL DEVELOPMENT OVERVIEW

This section describes the process used by Westinghouse to select the structures, systems, and components (SSCs) that were included in the Callaway Nuclear Power Plant Seismic Walkdown Equipment List (SWEL). The Seismic Walkdown Equipment List is composed of a sample of Seismic Category I (SC-I) equipment required to meet the objectives of the 10 CFR 50.54(f) Letter (Reference 14). The process described in “Section 3: Selection of SSCs” of “Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic,” EPRI, Palo Alto, CA: 2012. 1025286 (Reference 15) was used as guidance to develop the Callaway SWEL.

The SWEL consists of two groups of items:

- SWEL 1 – Items needed to safely shut down the reactor and maintain containment integrity
- SWEL 2 – Items related to the spent fuel pool (SFP).

The SSCs from these two groups were then combined into a single SWEL to be used during the seismic walkdowns and area walk-bys.

The following steps, based on the integrated project schedule, outline the process used to produce the SWEL:

- Project Kickoff Meeting
- Obtain customer inputs
  - Original Callaway IPEEE
  - Containment function equipment
  - List of SC-I equipment for the site
  - Modifications since IPEEE
  - Recently modified/upgraded equipment
  - Seismic vulnerabilities from Corrective Action Program
  - Risk-significant components
  - SFP equipment
- Assemble preliminary Base List 1
  - Perform Screen No. 1 – Seismic Category I (non-SC-I SSCs screen out)
  - Perform Screen No. 2 – Regular Inspections (Structure, Piping, Penetrations screen out)
  - Perform Screen No. 3 – Support for the five Safety Functions (see Section 3.2.1)
- Assemble preliminary Base List 2
  - Perform Screen No. 1 – Seismic Category I (non-SC-I SSCs screen out)
  - Perform Screen No. 2 – Appropriate for walkdown
- Site visit
  - Confirm preliminary Base Lists 1 and 2
  - Finalize Base Lists 1 and 2
  - Start selection of SWEL



- Select SWEL 1 (from Base List 1)
  - Perform Screen No. 4 –
    - System variety
    - Equipment type variety
    - Environment variety
    - Risk importance considerations
    - Major new or replacement equipment
    - Recently modified/upgraded (zone of influence effects)
    - IPEEE seismic vulnerability findings
  - Consider equipment accessibility
- Select SWEL 2
  - Perform Screen No. 3 (from Base List 2) –
    - System variety
    - Equipment type variety
    - Environment variety
    - Major new or replacement equipment
    - Recently modified/upgraded (zone of influence effects)
  - Perform Screen No. 4 – Rapid Drain-Down assessment
  - Consider equipment accessibility
- Confirm SWEL (SWEL 1 + SWEL 2) with Seismic Walkdown Engineers (SWEs)
- Obtain Callaway Operations approval of SWEL
- SWEL Peer Review

Weekly status meetings with the utility were established to control progress.

A SWEL development site visit was held August 20 through August 22, 2012, to confirm the Base List and perform the screens and reviews necessary for selecting equipment to the Callaway SWEL. The agenda followed during the site visit included:

- Discuss high-level approach to SWEL Development
- Review Base List 1 for accuracy and completeness
- Populate the SWEL 1 Screen No. 4 Sample selection attributes
- Select the SWEL 1 items
- Review Base List 2 for accuracy and completeness
- Populate the SWEL 2 Screen No. 3 Sample selection attributes
- Select the SWEL 2 items
- Identify items for follow-up
- Summary out-briefing

The following personnel participated in this site visit:

<b>Attendee</b>	<b>Company</b>	<b>Position</b>
Joseph Fortman	Ameren Missouri	Callaway Site Lead
Rick Denny	Ameren Missouri	Operations
Randy Wilson	Ameren Missouri	Design Engineering
Curtis Stundebek	Ameren Missouri	Design Engineering
Jeffrey Bass	Westinghouse	Project Manager
Terry Keller	Westinghouse	SWEL Development Lead
Derek Seaman	Westinghouse	SWEL Developer
Monzer Allam	Westinghouse	SWEL Peer Reviewer

In advance of the walkdowns and area walk-bys, the completed SWEL was reviewed and signed by Callaway Operations (Appendix G), and forwarded to the Seismic Walkdown Engineers for review and compilation of the walkdown packages.

The completed SWEL was peer-reviewed on September 6, 2012, by a team of peer reviewers that included a Westinghouse Engineer (Monzer Allam), Stevenson & Associates Engineer (Todd Bacon), and Callaway Engineer (Jim Cunningham).

### **3.2 SWEL 1 – SAMPLE OF REQUIRED ITEMS FOR THE FIVE SAFETY FUNCTIONS**

Callaway was classified as a 0.3g focused-scope plant in NUREG-1407 (Reference 34, Table 3.1). In the Callaway IPEEE (Reference 16), the methodology chosen for the analysis of seismic events was the Seismic Margin Assessment (SMA) Methodology based on the EPRI methodology described in EPRI NP-6041-SL (Reference 17), which was the methodology acceptable to the NRC for performing seismic analysis. In addition to the standard SMA methodology tasks, the Callaway SMA included a focused-scope relay evaluation performed to identify any relays associated with safe shutdown equipment that were classified as low ruggedness in EPRI NP-7148-SL (Reference 18).

The Callaway IPEEE Safe Shutdown Equipment List (SSEL) (Table 3.1.2-1 in Reference 16) was used as the starting point for selecting SSCs for inclusion in Base List 1. (Please note that plant component identification numbers as used in this report may refer to designations from the subject IPEEE report or actual plant identification tags, which are equivalent for the purpose of this document.) Subsections 3.1.2.2 through 3.1.2.4 of the Callaway IPEEE (Reference 16) provided justification that the five safety functions required as part of the SWEL development process guidance (Reference 15) had been addressed during the development of the Callaway IPEEE SSEL.

### 3.2.1 Base List 1

The recommended Seismic Walkdown Guidance (Reference 15) screens were applied to the IPEEE SSEL, which was the starting point for the list of equipment, to assign appropriate SSCs to Base List 1.

Screen No. 1 screened out equipment that was not identified as active SC-I components in the Callaway site equipment database. Only the SC-I components have a defined seismic licensing basis to evaluate against the as-installed configuration. Of the 711 SSCs initially considered, 704 passed Screen No. 1.

Screen No. 2 screened out SSCs that regularly undergo inspections to confirm that their configuration continues to be consistent with the established plant licensing basis. SSCs such as structures, containment penetrations, and piping components were filtered out. Manual valves, check valves, flow orifices, fire dampers, and relief valves were also excluded in accordance with the guidance, since they are considered either in-line components or equipment that is regularly inspected. Of the 704 items remaining after Screen No. 1, 664 passed Screen No. 2.

Screen No. 3 screened out components that provide no support for any of the five safety functions. As part of the Reference 15 guidance, the SSCs selected to be included in Base List 1 need to support at least one of the following five safety functions:

- Reactor Reactivity Control (RC)
- Reactor Coolant Pressure Control (PC)
- Reactor Coolant Inventory Control (IC)
- Decay Heat Removal (DHR)
- Containment Function (CF)

The first four (4) safety functions are associated with bringing the reactor to a safe shutdown condition, and the fifth safety function is associated with maintaining containment integrity. SSCs corresponding to the ultimate heat sink (UHS) represent additional decay heat removal capabilities. UHS equipment at Callaway was identified by a review of the Callaway FSAR, Section 9.2 (Reference 1), and the References 19 and 20 Design Basis Documents (DBDs). The identified UHS components that passed Screens No. 1 and No. 2 were added to Base List 1. Containment function equipment for Callaway is incorporated throughout the IPEEE SSEL (Table 3.1.2-1 in Reference 16). As part of the SWEL development site visit, Callaway Operations and Engineering personnel reviewed each component in Base List 1 to determine the safety function(s) supported.

The resulting Base List 1 contains 629 SSCs and is tabulated in Appendix E.

### 3.2.2 SWEL 1

With Base List 1 established, the SSC selection process entered Screen No. 4 of the Reference 15 guidance (i.e., Sample Considerations). Screen No. 4 is intended to result in a SWEL 1 that sufficiently represents a broad spectrum of plant SSCs based on plant systems, equipment types, environments, and component enhancements, upgrades, and replacements. In addition, the development of SWEL 1 had to consider the components that Callaway deemed as risk-significant to the safe operation of the plant.

During the SWEL development site visit, Callaway Operations personnel identified that Train A would be available for inspection the week of September 10, 2012 during the at-power seismic walkdowns and area walk-bys. Thus, the components selected for the walkdowns were mainly focused on those that were identified as being part of Train A.

Screen No. 4 was applied as described below.

### System Variety

SWEL 1 selections began with a review by system. The Callaway system acronyms are defined in Table 3-1.

<b>Table 3-1 System Descriptions</b>	
<b>System</b>	<b>Description</b>
AB	Main Steam
AE	Main Feedwater
AL	Auxiliary Feedwater
BB	Reactor Coolant
BG	Chemical & Volume Control System
BL	Reactor Makeup Water
BM	Steam Generator Blowdown
BN	Borated Refueling Water Storage
EC	Fuel Pool Cooling & Cleanup
EF	Essential Service Water
EG	Component Cooling Water
EJ	Residual Heat Removal
EM	High Pressure Coolant Injection - SI, BIT
EN	Containment Spray
EP	Accumulator Safety Injection
FC	Auxiliary Turbines
GD	Essential Service Water Building HVAC
GF	Miscellaneous Buildings HVAC
GG	Fuel Building Ventilation HVAC
GK	Control Building HVAC
GL	Auxiliary Building Ventilation

<b>Table 3-1 System Descriptions (cont.)</b>	
<b>System</b>	<b>Description</b>
GM	Diesel Generator Building HVAC
GN	Containment Cooling
GS	Containment Hydrogen Control
GT	Containment Purge
HB	Liquid Radwaste
JE	Emergency Fuel Oil
KA	Compressed Air
KJ	Standby Diesel Engines
LF	Floor & Equipment Drains
NB	Lower Medium Voltage System
NE	Diesel Generator
NF	Load Shedding & Emergency Load Sequencer
NG	Low Voltage System (480)
NK	125 VDC (Class 1E)
NN	Instrument AC Power (Class 1E)
PN	Instrument AC Power
RL	Main Control Board
RP	Miscellaneous Control Panels
SA	Engineered Safety Feature Actuation – SA1
SB	Reactor Protection
SE	Excore Neutron Monitoring

Various equipment types within each system were selected. At least one SSC was selected per system with the exception of systems EC and GG (which are represented in SWEL 2), system GD (the components are not easily accessible), and systems GF, HB, and LF, which have a low number of items available for selection. The equipment types available for selection from the unrepresented systems and their support functions were adequately represented by multiple equipment selections from several other systems.

### **Equipment Type Variety**

Following the selections of SWEL 1 items based on system variety, Base List 1 was re-evaluated to ensure all available equipment types were represented in SWEL 1. Additional SWEL 1 selections were made to ensure at least one item from each equipment type category listed in EPRI NP-6041-SL (Reference 17) was represented. Equipment type categories 11/Chillers, 12/Air Compressors, and 13/Motor Generators were not represented because the site has no SC-I chillers, air compressors, or motor generators.

### **Environment Variety**

Equipment environments were considered by performing a review of the Callaway FSAR (Reference 1) Table 3.11(B)-1. All equipment environments were represented in SWEL 1.

### **IPEEE Vulnerability Enhancement**

A listing of the seismic walkdown findings and resolutions from the IPEEE (Reference 16, Table 3.1.4-1) was reviewed. The issues, and their subsequent resolutions, are as follows:

- Spray shields on motor control centers (MCCs) NG03C, NG04C, NG05E, NG06E, NG07F, and NG08F were in contact with adjacent walls, which would cause an impact with the wall during an earthquake.
  - The MCCs were modified by attaching them to the adjacent wall by angle braces attached to the spray shields.
- The charging pumps (CCPs) (Component IDs PBG04, PBG05A and PBG05B), safety injection pumps (SIPs) (Component IDs PEM01A and PEM01B), and the auxiliary feedwater (AFW) pumps (Component IDs PAL01A, PAL01B, and PAL02) have openings for shear pins and the seismic qualification packages for these pumps appear to take credit for the pins. Shear pins are not installed in the AFW pumps and drivers, and the B train SIP/CCP drivers.
  - Documentation found that shear pins were not required for the SIP/CCPs.
  - Shear pins have been installed on the AFW pumps.
  - The AFW pump drivers do not require shear pins; high-strength bolts are sufficient.
- The fire sprinkler piping and risers in the diesel generator (DG) rooms are rod-hung with lateral stability, which could result in the piping falling on the DGs (Component IDs KKJ01A and KKJ01B) during an earthquake.
  - The fire piping was assessed during the II/I hazards analysis as being able to withstand the Safe Shutdown Earthquake. Additional review indicated that there is enough interference to prevent the piping from falling on the DGs.

- Hand-held fire extinguishers throughout the plant are mounted on relatively shallow hooks. During an earthquake, they could rock off the hooks and fall to the floor. This may result in a missile hazard due to the bottle or neck fracturing.
  - Fire extinguishers in containment have been removed to eliminate the concern. Drop tests were performed and verified that the fire extinguishers would be able to withstand a fall from the current mounting height. Several extinguishers were remounted to meet the required drop height.
- Carts, file cabinets, and other unsecured items behind the Control Room were identified as having the potential to shift during an earthquake and impact safety-related cabinets.
  - A sign was posted on the wall in the vicinity of the Control Room safety-related cabinets (Component IDs NF039A, NF039B, NF039C, SA036A, SA036B, SA036C, SA036D, and SA036E) stating that no loose equipment shall be stored along the wall. All loose equipment at the time of the sign posting was removed.
- Chain hoists above safety-related equipment have the potential to travel during an earthquake, resulting in the chains impacting soft targets such as cables, instrumentation lines, relief valves, and oil bubblers.
  - RFR 8191 addressed this issue and specified that the chain hoists must be parked away from equipment with the hook fully raised.
- Fluorescent light fixtures were found to have their “S” hooks open and not crimped closed. These could fall during an earthquake.
  - Walkdowns found no light fixtures that could damage safety-related equipment if they fell.
- The sensing line for the Reactor Coolant System (RCS) Pressurizer Pressure Channel 1 Transmitter (Component ID BBPT0455) was not in its support.
  - The sensing line was returned to its support under a work request.
- The floor grate behind the DG A Starting Air Compressor was loose and could damage the sensing lines passing through it during an earthquake.
  - The floor grate was clipped to the floor by means of a work request.
- Cabinet RP147A was identified to be missing an anchorage bolt. There were also missing retaining screws on some of the modules inside the cabinet.
  - The missing bolt and screws were installed by means of a work request.

- The Essential Service Water return from DG B piping has rigid restraints that do not appear to allow for differential building motion.
  - Review of documentation found that the restraint location was input incorrectly in the stress run code, resulting in movement of the wrong anchor.
  - Engineering judgment was that there is sufficient margin in the existing design to accommodate the restraint location input error.
- The Main Steam and Feedwater Isolation Actuation System Cabinet (Component ID SA075A) and the Engineering Safety Feature Actuation System Cabinet (Component ID SA066A) are very close together but are not connected. Clearance between the two cabinets is approximately 1/2 inch at the top, but 1/8 to 5/32 inch where the bolt heads project. This could result in impact during an earthquake.
  - Calculations found that the cabinet motion is less than the measured gap. Further review found that the as-tested frequencies are less than the calculated frequencies, resulting in larger motion than calculated.
  - Engineering determined that cabinet impact is acceptable and no further action was required.
- Component Cooling Water (CCW) Heat Exchanger (Component IDs EEG01A and EEG01B) anchor bolts do not have 10-bolt-diameter edge distance nor are they 10 bolt diameters apart.
  - A high confidence of low probability of failure (HCLPF) calculation was performed and resulted in a value of 0.41g, which is above the 0.3g Review Level Earthquake.
- Diesel Generator Control Panels (Component IDs KJ121 and KJ122) are mounted on grout pads that are smaller than the panel depth, resulting in the panels being cantilevered over the grout pad.
  - An HCLPF calculation was performed and resulted in a value of 0.49g, which is above the 0.3g Review Level Earthquake.

All the components discussed above were considered for selection to SWEL 1 (i.e., Screens No. 1 through No. 4 were performed). Of those, the following components, enhanced due to vulnerabilities as identified above, have been selected to SWEL 1 and annotated with the IPEEE walkdown information to assess current conditions: NG04C, NG07F, PAL01A, PAL02, EEG01A, and KJ121.

#### **Major New and Replacement Equipment (including recent modifications)**

During the SWEL development site visit, Callaway Operations and Engineering personnel identified 26 equipment items that underwent major modifications since the IPEEE, including those that have been modified or upgraded within approximately the last year.



Determination of the 26 items included consideration of components modified as a result of corrective actions. Callaway performed a keyword search of the Corrective Action Program database, Callaway Action Request System (CARS), to identify any recent potential seismic-related corrective actions (CAs). Several transmitted files were pre-reviewed by the SWEL developers to screen out non-seismic-related CAs and those that did not entail major modifications. The remaining list of CAs was reviewed with Callaway Operations and Engineering.

From the 26 identified components having major modifications, the sampling of 10 components selected to be included in SWEL 1 are listed in Table 3-2 along with a description of the modification.

<b>Table 3-2 Major New and Replacement Equipment (Including Recent Modifications)</b>		
<b>Equipment ID</b>	<b>Equipment Description</b>	<b>Modification</b>
ABHV0014	Loop-1 Main Steam Isolation Valve	Actuator replacement
ABPV001	Steam Generator A Atmospheric Relief Valve	Controller moved
AEFV039	EBB01A Feedwater Isolation Valve	Valve operator and controls replacement
CGN03A	Containment Hydrogen Mixing Fan	Motor terminal box replaced with larger size terminal box (CARS #201004800)
EEG01A	Component Cool Water Heat Exchanger	Head replacement (CARS #200906211)
EKJ03A	Intercooler Heat Exchanger	Replacement equipment, anchorage changed
EKJ04A	Lube Oil Cooler	Replacement equipment, anchorage changed
EKJ06A	Diesel Jacket Water Heat Exchanger	Replacement equipment, anchorage changed
PBG04	Normal Charging CCP	Positive placement pump replaced with normal charging pump
RP081A	Subcooling Monitoring Cabinet	Replacement PS1 power supply, as a recent modification (CARS #200600836)

### **Risk Significance**

In order to identify risk-significant SSCs, the Callaway Internal Events (IE) Probabilistic Risk Assessment (PRA) model (Reference 21) was used. The associated Risk Achievement Worth (RAW) values for basic events in the IE PRA model were linked to individual SSC IDs. RAW values greater than 2.0 were deemed risk-significant and their linked components were considered for SWEL 1 selection. Of the 65 risk-significant SSCs in Base List 1, 18 were selected to SWEL 1.

The output from Screen No. 4 constitutes the selection of SSCs to SWEL 1. SWEL 1 is summarized in Appendix F, providing detail for each SSC selected. Appendix G contains the formal version of the SWEL, including changes to the initial SWEL as a result of the SWEL Peer Review.

### 3.3 SWEL 2 – SPENT FUEL POOL RELATED ITEMS

The process for selecting a sample of the SSCs associated with the spent fuel pool for the SWEL 2 included the following recommended Seismic Walkdown Guidance screens depicted in Figure 1-2 in Reference 15:

- Screen No. 1 – Seismic Category I
- Screen No. 2 – Equipment or Systems
- Screen No. 3 – Sample Considerations
- Screen No. 4 – Rapid Draindown

#### 3.3.1 Base List 2

Spent fuel pool related items from the Callaway IPEEE SSEL (Table 3.1.2-1 in Reference 16) and from the SC-I equipment identified in the site's equipment database were used as the starting point for selecting SSCs for inclusion in Base List 2. (Please note that plant component identification numbers as used in this report may refer to designations from the subject IPEEE report or actual plant identification tags, which are equivalent for the purpose of this document.) Screens Nos. 1 and 2 were applied.

Screen No. 1 screened out none of the equipment. All items were designated Seismic Category I.

Screen No. 2 screened out structures and equipment that are integral with piping or undergo regular inspection, and inaccessible components (i.e., submerged in the SFP).

During the SWEL development site visit, the development of Base List 2 was completed. It consists of equipment in the Fuel Pool Cooling & Cleanup (EC) system and Fuel Building Ventilation HVAC (GG) system. Base List 2 consists of 11 components and is captured in Table 3-3.

Table 3-3 Callaway Base List 2		
System	Equipment ID	Description
EC	EEC01A	FUEL POOL COOLING HEAT EXCHANGER
EC	EEC01B	FUEL POOL COOLING HEAT EXCHANGER
GG	SGG04A	SFP PUMP ROOM COOLER A
GG	SGG04B	SFP PUMP ROOM COOLER B
EC	PEC01A	FUEL POOL COOLING PUMP
EC	PECO1B	FUEL POOL COOLING PUMP
EC	ECHV011	FUEL POOL HEAT EXCHANGER SHELL SIDE OUTLET ISO
EC	ECHV012	FUEL POOL HEAT EXCHANGER SHELL SIDE OUTLET ISO
EC	ECFT0017	FUEL POOL COOLING PUMP DISCHARGE FLOW TRANSMITTER
EC	ECFT0018	FUEL POOL COOLING PUMP DISCHARGE FLOW TRANSMITTER
EC	ECLIT0039	SPENT FUEL POOL LEVEL TRANSMITTER

### 3.3.2 Rapid Draindown

Screen No. 4 considered potential Rapid Draindown items.

Potential Rapid Draindown items are those pieces of equipment that could fail during a seismic event and cause lowering of the spent fuel pool water level to the top of the fuel assemblies within 72 hours after the earthquake. As noted on page 1-4 of the Seismic Walkdown Guidance (Reference 15), all structures, systems, and components (not just Seismic Category I) need to be considered. The Seismic Walkdown Guidance (page 3-8) specifies the following:

*“Determine whether there are SFP penetrations below about 10 feet above the top of the fuel assemblies. If there are no such penetrations, then no rapid drain-down items would be added to SWEL 2.”*

This 10-foot criterion is cited numerous places in Section 9.1 of the Callaway FSAR (Reference 1). FSAR Section 9.1.2.2 (page 9.1-10) states the following:

*“The concrete structures for the refueling pool, spent fuel pool, cask loading pit, and fuel transfer canal are designed in accordance with the criteria for Seismic Category I structures. As such, they are designed to maintain leak tight integrity to prevent the loss of cooling water from the pool. In the event of a loss of integrity of the watertight gate, while one of the small pools is drained, a minimum of 10 feet of water is maintained above the top of the fuel. In addition, all piping penetrations into the pool are designed to preclude draining the pool down to an unacceptable limit, as described in Section 9.1.3.”*

FSAR Section 9.1.3.1.1 states the following regarding the Fuel Pool Cooling and Cleanup System:

*“System piping is arranged so that loss of piping integrity or operator error does not result in draining of the spent fuel pool below a minimum depth above the stored fuel to ensure sufficient cooling media for cooling the stored spent fuel (Regulatory Guide 1.13).”*

Pool connections to the spent fuel pool, fuel transfer canal, and wet cask pit have been verified by a review of SFP piping & instrumentation diagrams (P&IDs) (References 22 and 23), piping isometrics and other drawings (References 24 through 27), and FSAR Sections 9.1.2 and 9.1.3. The fuel pool cooling P&ID (Reference 22) shows several connections to the pool with anti-siphoning holes present per the diagram notes. The current design drawings (including piping isometrics) were reviewed and support the assertions in the FSAR concerning pool draindown protection. The reviews identified no Rapid Draindown items.

The lines in the pit and the canal can be dismissed because the pit and canal are normally isolated from the pool by SC-I gates. The gates are considered part of the SFP structure and, therefore per the Reference 15 guidance, the gates screen out from the SWEL. Level instrument sensing connections are considered too small to rapidly drain down the pool within 72 hours and have no apparent power source to do so.

The fuel handling building has a high capacity overhead crane for moving spent fuel shipping casks. The normal operating practice for the crane is to park the crane in an area outside the perimeter of the SFP when not in use. At times, the crane is secured to the rails adding additional restraint from falling. Since the time the crane spends over the pool is relatively insignificant, and the crane is parked in a safe portion of the rail length when not in use, the crane was screened out as having the potential to fall into the SFP and displace sufficient inventory to be deemed a drain down concern.

Based on documentation and review, there are no Rapid Drain-Down items for input to SWEL 2.

### **3.3.3 SWEL 2**

In order to complete the SWEL 2 development, Screen No. 3 was applied to the items in Base List 2 (Table 3-3).

#### **System Variety**

SWEL 2 selections began with a review by system. Various equipment types within each system were selected. At least one item was selected from the represented systems: EC and GG.

#### **Equipment Type Variety**

Base List 2 was re-evaluated to ensure the available equipment types were represented in SWEL 2. Of the five available equipment types, at least one component representing each equipment type was selected.

#### **Environment Variety**

Equipment environments were considered by performing a review of FSAR (Reference 1) Table 3.11(B)-1. Hot/humid and cool/dry environment types were represented in SWEL 2.

#### **Major new and replacement equipment (including recent modifications)**

No spent fuel pool-related major modifications were identified during the SWEL development site visit.

SWEL 2 is defined as the equipment coming out of Screen No. 3 (six items), plus the equipment coming out of Screen No. 4 (no items). The SWEL 2 list is provided in Table 3-4. The components excluded from the SWEL 2 selection list were excluded based on equipment redundancy and inaccessibility for walkdown (i.e., Train A components were selected since Train B would not be accessible during the walkdown).

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Table 3-4 SWEL 2							
SWEL 2 Item Number	Walkdown Equipment ID	Description	Building <sup>(1)</sup>	Screen No. 3 – Sample Selection Attributes			
				System Variety	Major New or Replacement Equipment	Equipment Type Variety	Environment Variety <sup>(2)</sup>
1	EEC01A	FUEL POOL COOLING HEAT EXCHANGER	FB	EC		Heat Exchangers (21)	Hot/humid
2	SGG04A	SFP PUMP ROOM COOLER A	FB	GG		AHU (10)	Hot/humid
3	PEC01A	FUEL POOL COOLING PUMP	FB	EC		Pump (5)	Hot/humid
4	ECHV011	FUEL POOL HEAT EXCHANGER SHELL SIDE OUTLET ISO	FB	EC		MOV (8)	Hot/humid
5	ECFT0017	FUEL POOL COOLING PUMP DISCHARGE FLOW TRANSMITTER	FB	EC		Inst. Racks (18)	Hot/humid
6	ECLIT0039	SPENT FUEL POOL LEVEL TRANSMITTER	CB/CC	EC		Inst. Racks (18)	Cool/dry
<b>Notes:</b> 1. Fuel Building (FB), Control Building (CB), Communication Corridor (CC) 2. Environment: Hot > 110°F; Cool < 95°F; Humid > 90%; Dry <= 70%							

### 3.4 ADDITIONAL INSPECTIONS

#### 3.4.1 Inaccessible Items

There were 10 items that were inaccessible during the scheduled Callaway at-power walkdown dates (the week of September 10, 2012) and they are identified in Table 3-5 below. The guidance allows for items to be deferred to a later date if inspection poses a safety concern. Items with electrical safety challenges or items within containment were deferred to ensure safety when inspecting. The items in Table 3-5 were subsequently inspected during the follow-on walkdowns performed on between March 2013 and August 2013.

<b>Table 3-5 Callaway Equipment Inaccessible During the Scheduled Walkdown</b>			
<b>SWEL 1 Item No.</b>	<b>Equipment ID</b>	<b>Description</b>	<b>Building</b>
5	AELT0501	STM GEN A WIDE RANGE	RB
6	AELT0518	STM GEN LEVEL A NARROW RANGE	RB
9	BBPT0455	PRESSURIZER PRESSURE	RB
19	CGN03A	CONTAINMENT HYDROGEN MIXING FAN	RB
39	EPHV8808A	ACCUMULATOR TANK A OUTLET ISO VALVE	RB
54	NB02	4.16 KV BUS #2	CB
57	NG02	480 VAC	CB
62	NK01	125 VDC BUS SWITCHBOARD	CB
65	NK41	DIST 125 VDC	CB
86	SENY032AB	PREAMP SR CHAN 2	AUX

#### 3.4.2 Supplemental Inspections

During the performance of the at-power seismic walkdowns, the industry was made aware that the NRC staff had clarified their position on the opening of electrical cabinets to inspect for other adverse seismic conditions (EPRI/NRC guidance - FAQ 4.20). During the seismic walkdown inspections, the SWT was able to open 8 cabinets (including control room cabinets) of the remaining 24 items that would have required further investigation per the EPRI/NRC guidance.

Supplemental inspections (“flashlight inspections” of the cabinet internals) of 13 electrical cabinets that were not opened during the at-power seismic walkdown per FAQ 4.20 were completed during the follow-on walkdowns. The anchorages for these items were external and satisfactorily inspected (with the exception of XNG05) during the at-power seismic walkdown process; however, no “flashlight inspection” of the internals was conducted at that time. The list of electrical cabinets that required supplemental inspection is included in Table 3-6.

<b>Table 3-6 Callaway Supplemental Cabinet Inspections</b>			
<b>SWEL 1 Item Number</b>	<b>Equipment ID</b>	<b>Description</b>	<b>Building</b>
22	EF155	ESW CONTROL PANEL	ESW
52	KJ121	GAUGE PANEL	DGB
58	NG02A	480 VAC	CB
59	NG04C	480 VAC	AUX
60	NG07	LC 480 VAC	UHS
61	NG07F	480 VAC	UHS
65	NK21	125 VDC NO 1	CB
66	NK23	125 VDC NO 3	CB
68	NN13	7.5 KVA	CB
79	RP289	DC DISTRIBUTION	AUX
80	RP315	125V DC DIST PANEL	ESW
87	SENY060A	EXCORE NEUTRON DETECTOR	AUX
101	XNG05	FEED MCC NG05E	ESW
56	NF039A *	CONT SHED/SEQ CH 1 LOGIC	CB
76	RL025 *	TURBOGENERATOR AND FW MCB	CB
77	RP081A *	SUBCOOLING MONITOR CABINET	CB
81	SA036A *	ESFAS CH 1 TERM	CB
82	SA036D *	ESFAS CH1 LOGIC CABINET	CB
83	SB037 *	W PROCESS ANALOG PROTECTION SET CAB-03	CB
84	SB078 *	RPV LEVEL INSTR SYS PROC PROT SYS	CB
85	SE054A *	W NUC INSTM NIS 1	CB
<b>Note:</b> * Item was inspected internally during the at-power seismic walkdowns but the external anchorages were inaccessible and were subsequently re-inspected during the follow-on walkdowns.			

With respect to these supplemental inspections, FAQ 4.20 states:

*In addition, electrical cabinets on the SWEL that have doors that can be unlatched should be opened during the Seismic Walkdowns whether or not it is necessary to look inside to check the anchorage. This additional requirement applies only to those classes of electrical equipment that have doors that can be unlatched; it does not apply to panels or structures that require removal of fasteners (e.g., with a screwdriver or wrench) to gain access to the interior.*

Consistent with the guidance described above, Table 3-7 identifies those components (with external anchorages that were inspected during the walkdowns) that were not included in the table for supplemental inspections above (Table 3-6) because they require the removal of fasteners in order to access the insides of the cabinet.

<b>Table 3-7 Callaway Cabinets Not Included in the Supplemental Inspections</b>			
<b>SWEL 1 Item Number</b>	<b>Equipment ID</b>	<b>Description</b>	<b>Building</b>
99	XNG01	CLASS 1E LOAD CENTER TRANSFORMER	CB
100	XNG03	CLASS 1E LOAD CENTER TRANSFORMER	CB
102	XPN07A	120 V INSTRUMENT AC TRANSFORMER	CB

### 3.5 COMPOSITE SWEL

The completed SWEL, including the SWEL revisions necessary based on the SWEL Peer Review, is provided in Appendix G.



## **4 SEISMIC WALKDOWNS AND AREA WALK-BYS**

### **4.1 BACKGROUND**

Seismic walkdowns and area walk-bys were performed in accordance with the requirements of Section 4 of EPRI TR-1025286 (Reference 15). The walkdowns were conducted by the SWTs, each SWT consisting of the SWEs mentioned in Section 2.2 of this report. The SWEs utilized engineering judgment based on experience and training indicated in Section 2.2, supplemented by existing plant documentation and analyses, where applicable, to identify potentially adverse seismic conditions. For items on the SWEL, these potential seismic conditions included any adverse anchorage conditions, adverse seismic spatial interactions, or other adverse seismic conditions. The results of the walkdown and any pertinent observations were documented for each item on the SWEL using the Seismic Walkdown Checklists (SWCs) included in Appendix A. In addition to potentially adverse seismic conditions, observations described in the SWCs include features that, after discussion between the SWEs, were determined to be adequate.

Area walk-bys were conducted by the SWTs in each area of the plant that contains an item on the SWEL. The area walk-bys identified potentially adverse seismic conditions associated with other SSCs located in the vicinity of the SWEL item (up to a minimum radius of 35 ft from the component). The area walk-by examinations identified any adverse anchorage conditions, significantly degraded equipment in the area, potential seismic interactions, adverse assessments of cable/conduit raceways and HVAC ducting, potential interactions that could cause flooding/spray or fire in the area, and other adverse housekeeping items, including temporary installations. The results of the walk-by and any pertinent observations were documented for each inspected area using Area Walk-By Checklists (AWCs), which are included in Appendix B. Observations described on the AWCs include potentially adverse seismic conditions as well as conditions that were discussed during the walk-by and determined to be adequate at that time.

The SWT was assisted by other individuals present on the walkdown, including members of CEC Operations and Engineering. The SWTs consisted of Apostolos Karavoussianis (S&A), Samer El-Bahey (S&A), Curtis Stundebek (CEC), Randall Wilson (CEC), and Tim Solberg (WCNOC). In addition to being members of the SRTs, Curtis Stundebek and Randall Wilson led the support from CEC for walkdowns as well as the interface with plant operators. Other CEC professional staff provided support and guidance and these persons are acknowledged within this report. These accompanying individuals facilitated access to equipment and provided additional information regarding plant procedures and safety-related functions of SWEL items and nearby equipment and systems that could cause adverse seismic interaction. Any issue that could not be resolved by consensus of the SWEs during the walkdowns and easily determined to be acceptable was identified as a potentially adverse seismic condition on the SWC or AWC (as applicable). The conditions identified were evaluated with respect to the current licensing basis (CLB). These evaluations are listed and described in Appendix C.

### **4.2 PREPARATION FOR SEISMIC WALKDOWNS**

In preparation for the seismic walkdowns and area walk-bys, the SWTs obtained the SWEL and selected a minimum of 50 percent of the SWEL items that have anchorages (excluding line-mounted equipment) for anchorage configuration verification. A total of 80 components were identified as potentially having anchorage and 51 were chosen to meet or exceed the 50 percent anchorage configuration verification

requirement (thus, 64 percent of eligible equipment was verified against plant documentation). CEC design drawings, seismic qualification calculations, and vendor/supplier documents were reviewed and later taken to the field to verify that the as-installed configurations were consistent with the CLB established by these documents. The SWTs also obtained CEC equipment layout drawings to establish a detailed walkdown schedule.

To prepare for potential interaction with masonry block walls, the SWT reviewed the equipment layout drawings associated with the SWEL and located masonry walls in the proximity. The Control Building 2000' and 2016' elevations were found to have block walls adjacent to SWEL items and area walk-by items. The SWTs obtained and reviewed CEC calculation SLNRC 80-34 (Reference 28) for the Control Building masonry walls. The calculations indicated that all in-scope walls were designed and analyzed for non-collapse under SSE accelerations, which enabled the SWTs to conclude that the SWEL items were free of seismic spatial interaction due to masonry block wall collapse. However, the SWTs still assessed SWEL and area walk-by equipment for seismic spatial interaction due to differential movement between the equipment and the masonry block walls. Also, details of ceiling tiles were obtained to investigate their seismic interaction with equipment in the Control Room. Per plant documentation, all ceiling tiles within the Control Room Area were Seismic Category II/I and considered to be adequate.

Additional documentation obtained and reviewed to supplement the walkdowns included the in-structure floor response spectra for the SSE in addition to SSE structural damping criteria per FSAR Table 3.7(B) (Reference 1), the CEC Operational Quality Control Manual (OQCM) (Reference 29), the CEC Bolting Manual (Reference 30), the Staging and Storage of Materials, Equipment & Tools Manual (MDP-ZZ-0STOR) (Reference 31), and the CEC lighting details (Reference 32). The CEC IPEEE Report (Reference 16) was also obtained and reviewed. This document is discussed in further detail in Section 7 of this report.

### **4.3 WALKDOWN RESULTS**

The SWT conducted the seismic walkdowns for CEC from September 10 through 14, 2012. Follow-on walkdowns were conducted for components not originally inspected due to having either inaccessible internal anchorages, being located inside containment, or requiring additional interior inspection related to FAQ 4.20 and were performed between March 2013 and August 2013. Detailed walkdown results are recorded on the SWCs and AWCs shown in Appendices A and B, respectively. A summary of the final walkdown statistics follows:

- The total number of SWEL equipment items is 108 (102 in SWEL 1 and 6 in SWEL 2). The number of at-power walkdown equipment items is 101.
- Out of the 101 walked-down items, 3 had inaccessible anchorages and were later inspected during the supplemental walkdowns; nevertheless AWCs were performed for these items.
- Five of the 7 uninspected items are located in the Reactor Building and were later inspected during the supplemental walkdowns. The remaining 2 items needed to be de-energized and were also inspected during the supplemental walkdowns. Thus, the 10 items listed in Table 3-5 have been fully inspected.

- Supplemental inspections (“flashlight inspections” of the cabinet internals) of 13 electrical cabinets that were not opened during the at-power seismic walkdown were completed during the follow-on walkdowns to comply with the updated guidance (See Table 3-6). The anchorages for these items were external and satisfactorily inspected (with the exception of XNG05) during the seismic walkdown process; however, no “flashlight inspection” of the internals was conducted at that time.
- 8 electrical cabinets were inspected internally during the initial seismic walkdowns but the external anchorages were inaccessible. They were later inspected once the flooring was removed (See Table 3-6).
- Forty-eight (48) area walk-bys were performed. There were 17 observations (9 equipment and 8 Area Walk-Bys) that could not be readily resolved by the consensus of the SWEs and were considered potentially adverse seismic conditions requiring further evaluation. These items are discussed in Section 5 of this report.

Summaries of seismic walkdown observations are presented below.

### **Potentially Adverse Anchorage Conditions**

While inspecting anchorages for SWEL equipment and in-scope area walk-by equipment, the SWT noted several cases in the Control Room where as-installed configurations could not be verified by the CEC documentation brought into the field (drawings, vendor documents, and calculations). This was due to the fact that the anchorage was not visible because of the presence of floor tiles and front plastic baseboards at the cabinet fronts. These items are highlighted in Table 3.6.

One potentially degraded anchorage condition was noted for the ESW ultimate heat sink cooling tower Fan “A” (CEF01A) when the SWT observed corrosion on the anchor bolts (Item 2 in Appendix C). The SWT noted the observation as a potentially adverse. Other less extensive anchorage degradation was noted for A/C units SGK05A and SGK04B during area walk-bys. These are Items 7 and 17 in Appendix C. Again, the SWT noted the observations as potentially adverse.

### **Potentially Adverse Seismic Spatial Interactions**

In general, the SWT noted adequate clearances around safety-related equipment and sufficient anchorages of potential safety-related equipment impact hazards including transient materials. Potential exceptions, including gaps between cabinets, were documented for further review under licensing basis evaluations. The full list of potential special interaction concerns with their resolutions is summarized in Items 1, 3, 9, 14, 15, and 16 in Appendix C.

The SWT inspected overhead piping and distribution systems including cable tray and found them well-supported throughout the unit. Overhead lighting was also noted to be adequately supported in all areas with sensitive equipment, particularly the Control Building. Where equipment is less sensitive to impact, several instances of lighting fixtures supported by open S-hooks were observed and noted to CEC. One instance was noted where a light fixture supported from the ceiling on chains was close to component NN13 and had impact potential (Item 8 in Appendix C). The issue was documented on the

SWC and raised to CEC for further evaluation. Another instance was noted in which a pipe at penetration OP41W0340 had a 1-1/2 inch gap to NK71 (Item 14 in Appendix C); again, the issue was documented on the SWC and raised to CEC for further evaluation.

Attached lines and piping to SWEL equipment were inspected and generally concluded to have adequate flexibility. During the walkdown, the SWE's questioned the flexibility of one of the pipes connected to CCW Surge Tank (TEG01A). The seismic qualification of the tank was reviewed and it was found that the tank is considered rigid. Therefore, there is no seismic concern (Item 13 in Appendix C).

All scaffolding encountered by the SWT was found to be adequately braced and anchored in addition to having sufficient clearances to safety-related equipment except for one case during the area walk-by of room 1501 at Auxiliary Building elevation 2047.5', where vertical ladders in a scaffold rack were not laterally supported. The issue was judged not to be a seismic concern and noted for CEC to correct.

Some minor housekeeping issues were discovered. These issues were documented in the appropriate SWCs and raised to CEC to investigate their associated RFRs; however, none represented potential adverse seismic conditions to safety-related equipment.

### **Other Potentially Adverse Conditions**

The SWT did not note any other major degraded conditions or irregular mountings on equipment. In one instance, the SWT observed a missing jam nut in NE01A; the issue was judged not to be a seismic concern and noted for CEC to correct. Another instance was observed for the fuel pool cooling heat exchanger (EEC01A), where most of the nuts were not seated in the saddle base and were raised by 1/16 inch (Item 5 in Appendix C). The issue was noted for further design basis evaluation and as a potential adverse condition. Also for the fuel pool cooling pump (PEC01A), where all the anchor bolts had missing washers (Item 6 in Appendix C). The issue was noted for further design basis evaluation and as a potentially adverse condition. Another instance was noted in the area walk-by of room 1126 at Auxiliary Building elevation 1974' where the baseplate of EMC0001 (permanently removed from service) had missing grout (Item 4 in Appendix C); the issue was documented on the SWC and raised for CEC for further evaluation. Also, during the area walk-by of room 1513 at Auxiliary Building elevation 2047.5', two vertical supports to tubing adjacent to GLPD10101 were found to have missing base plate nuts and washers (Item 12 in Appendix C); again, the issue was raised to CEC for further evaluation. In addition, in room 1506, a vertical support 6 ft north of GFV0702 was missing two base plate nuts and one bolt had less than a full nut engagement (Item 11 in Appendix C); again, the issue was raised to CEC for further evaluation. Open S-hooks were noticed near cabinets NF039A and SE054A. The issue was raised to CEC and a CAR was generated.

### **Potential Flooding/Spray Hazards**

The SWT was cognizant of potential spray and flooding hazards, particularly from threaded fire piping. Overhead fire piping was generally found to be welded and ruggedly supported at close and regular intervals. Areas that had threaded piping, the piping was judged to be adequately supported as to not pose a spray and/or flood hazard.

### Potential Seismically Induced Fire Interactions

No potential seismically-induced fire interactions were noted for CEC by the SWT.

### Non-NTTF 2.3 Related Observations

The SWT and accompanying CEC Operations and Engineering staff were also cognizant of issues not necessarily pertaining to the seismic qualification of safety-related equipment. Table 4-1 lists the non-NTTF 2.3 related observations and their associated CARs that were generated.

<b>Table 4-1      Non-NTTF 2.3 Related Observations</b>	
<b>Date</b>	<b>Observation</b>
9/10/2012	Plastic sign and rolling seats stored near east wall (No CAR required)
9/10/2012	CAR# 201206434 – Cracked Card Slot inside SB078
9/10/2012	CAR#201206775 – Ladder near RP068 will knock against cabinet
9/11/2012	CAR#201206498 – Lighting deflector in ‘A’ ESW Pump Room not properly attached
9/11/2012	CAR#201206500 – Missing Jam Nut on NE01 (A Diesel Generator)
9/12/2012	Component description incorrect on GMTZ001B (No CAR required)
9/13/2012	SGK04A 1 jam nut not fully engaged (No CAR required)
8/07/2013	CAR# 201306223 – Rear plate fastener loose.

## 5 LICENSING BASIS EVALUATIONS

The 17 potentially adverse seismic conditions identified in either the equipment seismic walkdowns or the area walk-bys as discussed in Section 4 of this report were evaluated with respect to their seismic licensing basis. These potentially adverse conditions are included in Appendix C, along with their dispositions. Potentially adverse seismic conditions that could not readily be shown to meet the seismic licensing basis were submitted to the site's Corrective Action Program (CAP) through the Callaway Action Request (CAR) system. For each of the items that fell into this category, the CAR tracking number is included in the disposition text.

General methodologies adopted by the licensing basis reviewers, who are listed in Section 2.3, for addressing the observations noted in Section 4 of this report are summarized in the following subsections.

### Evaluations of Potentially Adverse Anchorage Conditions

For the anchorage observations noted in Section 4 of this report that involved degraded anchorage conditions, the licensing basis reviewers sought and reviewed the calculations of record for evaluations that represent the CLB.

### Evaluations of Potentially Adverse Seismic Spatial Interactions

Observations involving the possibility of insufficient clearances between safety-related components were generally resolved by estimating relative displacement from the in-structure response spectra (References 5 through 7). Given equipment anchorage and spatial configuration, the licensing basis reviewers determined lower-bound estimates of component frequencies. These frequency estimates, along with the appropriate damping values from FSAR Table 3.7(B)-1, were used to obtain spectral accelerations. Component displacement was then estimated by using the following formula (Reference 33):

$$d = SF * \frac{S_a * 386.4 \frac{\text{in}}{\text{s}^2}}{(\omega * 2\pi)^2}$$

where:

- $SF$  = modal shape factor (1.6 for cantilever)
- $S_a$  = spectral acceleration (g) from response spectra
- $\omega$  = fundamental frequency (Hz)

If the combinations of component displacements under SSE loadings did not exceed the gap noted in the walkdown, the gap was noted as sufficient to preclude impact. In some instances, licensing basis evaluations of potential spatial interactions were resolved by inspection of installation details and existing analyses to check that the maximum top analyzed displacements are less than the field-measured gaps.

### **Evaluations of Other Potentially Adverse Conditions**

There were no licensing basis evaluations pertaining to other adverse interaction issues that resulted in an adverse seismic condition as documented in Appendix C.

### **Evaluations of Potential Flooding/Spray Hazards**

Potential flooding/spray hazards noted during the walkdown were evaluated by further documentation review. For potentially wet threaded fire piping, the SRT judged that fire piping was adequately supported; thereby concluding that it will maintain structural integrity during a seismic event.

### **Evaluations of Potential Seismically Induced Fire Interactions**

No potential seismically induced fire interactions were noted for CEC by the SWT; therefore, there are no licensing basis evaluations.

## **6 PEER REVIEW**

### **6.1 OVERVIEW**

This section documents the independent peer review for the NTTF Recommendation 2.3 Seismic Walkdowns. The peer review addresses the following activities:

- Review of the selection of the structures, systems, and components, (SSCs) that are included in the Seismic Walkdown Equipment List (SWEL).
- Observation of the seismic walkdowns on September 12th-14th, 2012 and adherence to the Seismic Walkdown Guidance (Reference 15) by the Peer Reviewers: Messrs. Steve Sherfey and Todd Bacon.
- Review of a sample of the checklists prepared for the initial seismic walkdowns & walk-bys performed between Sept 12-14, 2012.
- Review of a sample of the checklists prepared for the follow-on walkdowns performed between March 2013 and August 2013.
- Review of any licensing basis evaluations.
- Review of the decisions for entering the potentially adverse conditions into the plant's Corrective Action Program (CAP).
- Review of the final submittal report
- Review of the Supplement Report

The peer reviewers for the original report for CEC were Messrs. Todd A. Bacon of S&A, designated the Peer Review Team Leader, and Monzer Allam and Steve Sherfey of Westinghouse. For the supplemental report, the peer reviewers were Monzer Allam, designated the Peer Review Team Leader, and Gary Douglas, both of Westinghouse. None of the aforementioned engineers was involved in the seismic walkdown inspection process such that they have maintained their independence from the project. Mr. Bacon is a civil-structural engineer with over thirty years of nuclear engineering experience and received the Seismic Walkdown Engineer (SWE) training. Mr. Allam is a civil-structural engineer with over fifteen years of experience in structural analysis and design and has received the SWE training. Mr. Sherfey is a civil engineer with over thirty-five years of experience and has also received the SWE training. Messrs. Bacon and Allam, as Peer Review Team Leaders, participated in all phases of the peer review process for the original and supplemental reports, respectively, for CEC.

The SWEL development was performed by Terry Keller and Derek Seaman of Westinghouse. All items on the SWEL peer review checklist were addressed in the final SWEL development. The completed SWEL Peer Review Checklist is found in Appendix D. The discussion for the SWEL development peer review is found in Section 6.2.

The peer review of the initial seismic walkdown inspection started on September 12, 2012, with a peer check of the actual walkdowns. Messrs. Bacon and Sherfey joined the walkdown team for a portion of the



day's planned walkdowns to observe the conduct of walkdowns and adherence to the SWG. Interviews were conducted by Messrs. Bacon, Sherfey, and Allam with the SWE inspection team after review of a sample of the Seismic Walkdown Checklists (SWCs) and the Area Walk-by Checklists (AWCs) to ascertain procedural compliance with the SWG. The interviews were conducted with Messrs. Samer El-Bahey and Curtis Stundebek of the SWE inspection team on September 24, 2012 and Messrs. Apostolos Karavoussianis and Randy Wilson on September 26, 2012. The discussion of the sample SWCs and AWCs is provided in Section 6.3.

The peer review of the follow-on seismic walkdown inspection started with interviews with the Seismic Walkdown Engineers. Interviews were conducted by Messrs. Allam and Douglas with the SWE inspection team for the follow-on walkdowns after review of a sample of the Seismic Walkdown Checklists (SWCs) and the Area Walk-by Checklists (AWCs) to ascertain procedural compliance with the SWG. The interviews were conducted with Messrs. Randy Wilson and Curtis Stundebek of the SWE inspection team on November 12, 2013. The discussion of the sample SWCs and AWCs is provided in Section 6.3.

The results of the peer review of the licensing basis evaluations are provided in Section 6.4.

## **6.2 PEER REVIEW – SELECTION OF SSCs**

### **6.2.1 Purpose**

The purpose of this section is to describe the process that was used to perform the peer review of the selected structures, systems, and components (SSCs) that were included in the Seismic Walkdown Equipment List for CEC. The final SWEL is composed of SWEL 1 and SWEL 2 as described in Section 3.

### **6.2.2 Peer Review Activity – Selection of SSCs**

The guidance in the EPRI Technical Report (Reference 15) was used as the basis for this review.

This peer review was based on reviews of the spreadsheets utilized by the SWEL developers to generate the Base Lists and Seismic Walkdown Equipment Lists. This peer review was based on interviews with the following individuals who were directly responsible for development of the SWEL:

- Ms. Terry Keller, Westinghouse
- Mr. Derek Seaman, Westinghouse

This peer review utilized the checklist shown in the SWG (Reference 15), Appendix F: Checklist for Peer Review of SSC Selection.

For SWEL 1 development, the following actions were completed in the peer review process:

- Verification that the SSCs selected represented a diverse sample of the equipment required to perform the following five safety functions:
  - Reactor Reactivity Control

- Reactor Coolant Pressure Control
- Reactor Coolant Inventory Control
- Decay Heat Removal
- Containment Function

This peer review determined that the SSCs selected for the seismic walkdowns represent a diverse sample of equipment required to perform the five safety functions. The review of SWEL1 (shown in Appendix F) revealed that 58 of the 102 SWEL1 items represent the Reactor Reactivity Control function, 67 of the 102 SWEL1 items represent the Reactor Coolant Pressure Control function, 68 of the SWEL1 items represent the Reactor Coolant Inventory Control function, 81 of the 102 SWEL1 items represent the Decay Heat Removal function, and 58 of the 102 SWEL1 items represent the Containment Function. Note that many of the SWEL1 items represent several safety functions at the same time.

- Verification that the SSCs selected include an appropriate representation of items having the following sample selection attributes:
  - Various types of systems
  - Major new and replacement equipment
  - Various types of equipment
  - Various environments
  - Equipment enhanced based on the findings of the IPEEE
  - Risk insight consideration

The peer review for the inclusion of a variety of systems was achieved by ensuring that the systems represented in the SWEL cover all plant systems (shown in Table 3-1) and the list of a PWR systems provided in Appendix E of Reference 15. The peer review determined that at least one SSC was selected per system with the exception of systems GD, GF, HB, and LF. The justification for not including any components from these systems is provided in Section 3.2.2 of this report.

The peer review determined that major new and replacement equipment were adequately represented in the SWEL selection. The major new or replacement equipment was identified by plant engineering and operation. 10 of the 102 SWEL items represent equipment that are within the major new or replacement equipment category.

The peer review determined that the SSCs selected in the SWEL represent a diverse sample of equipment types. This was achieved by verifying that the various equipment types that were selected in the SWEL represent all the equipment types listed in Appendix B of Reference 15. The review of the SWEL Equipment List, shown in Appendix F determined that the equipment types included in the SWEL cover 18 of the 21 equipment types listed in Appendix B of Reference 15. Type categories 11 (Chillers), 12 (Air Compressors), and 13 (Motor Generators) were not represented because the site has no SC-I chillers, air compressors, or motor generators.

The peer review determined that the SWEL items represent an adequate variety of environment types as defined in Note “1” of SWEL 1 list shown in Appendix F. The peer review revealed that

27 of the 102 SWEL items are in a hot/dry environment, 26 items of the SWEL items are in a hot/humid environment, 29 items of the SWEL items are in a mild/dry environment, 25 items of the SWEL items are in a cool/dry environment, and 1 item of the SWEL items is in a mild/chemical environment. The environment of each of the SWEL items was determined by using the Callaway FSAR (Reference 1) Table 3.11(B)-1.

The peer review determined that the full list of the IPEEE vulnerabilities and enhancements was included in the Base 1 List. However, a sample of the items included in this list was included in the SWEL. The SWEL contains 6 items that are related to the IPEEE vulnerabilities. The IPEEE vulnerabilities or enhancements that were not included in the SWEL in addition to those that were included are listed in Table 7-1 with the reference documents associated with the resolution of the issue identified.

The peer review determined that 18 items of the SWEL items were identified as risk significant items. This is based on selecting items with a Risk Achievement Worth (RAW) greater than 2. The items with high RAW values were determined using the Callaway Internal Events (IE) Probabilistic Risk Assessment (PRA) model (Reference 21).

The peer review concluded that the SSCs selected for the seismic walkdowns include a sample of items that represent each attribute/consideration identified in Screen 4 of the Reference 15 selection criteria for SWEL1.

For SWEL 2 development, the following actions were completed in the peer review process:

- Verification that spent fuel pool related items were considered and appropriately added to SWEL 2.

This peer review determined that spent fuel pool related items were given appropriate consideration. Portions of the spent fuel pool cooling system are classified as Seismic Category I. SWEL 2 was sufficiently populated as appropriate. There were no items identified as potentially related to rapid drain down.

- Verification that appropriate justification was documented for spent fuel pool related items that were not added to the SWEL 2.

The peer review determined that an appropriate level of justification was documented for those items related to the spent fuel pool that were not added to SWEL 2.

### **6.2.3 Peer Review Findings – Selection of SSCs**

This peer review found that the process for selecting SSCs that were added to the SWEL was consistent with the process outlined in the SWG Section 3: Selection of SSCs.

The peer review checklist is contained in Appendix D with additional findings documented as appropriate.

The peer review resulted in no additional findings.

## 6.2.4 Resolution of Peer Review Comments – Selection of SSCs

All comments requiring resolution were incorporated prior to completion of this peer review.

## 6.2.5 Conclusion of Peer Review – Selection of SSCs

This peer review concludes that the process for selecting SSCs to be included on the Seismic Walkdown Equipment List appropriately followed the process outlined in the SWG, Section 3: Selection of SSCs. It is further concluded that the SWEL sufficiently represents a broad population of plant Seismic Category I equipment and systems to meet the objectives of the NRC 50.54(f) letter (Reference 14).

## 6.3 REVIEW OF SAMPLE SEISMIC WALKDOWN & AREA WALK-BYS CHECKLISTS

### 6.3.1 Overview

A peer review of the SWCs and AWCs for the initial walkdowns was performed on September 12 – 14, 2012, after which an interview was conducted by Messrs. Bacon, Allam and Sherfey with the SWE inspection team in accordance with the SWG requirements. For the follow-on walkdowns, an interview with SWEs was conducted in accordance with the SWG requirements. The SWG-trained walkdown engineers were Messrs. Apostolos Karavoussianis, Samer El-Bahey, Curtis Stundebek, and Randy Wilson.

### 6.3.2 Sample Checklists

Table 6-1 lists the SWC and AWC samples which represent approximately 19% of the SWCs and 31% of the AWCs. The sample includes the equipment inspected during the peer review and other equipment items from other classes to introduce diversity to the sampling procedure.

<b>Table 6-1 Table of SWC and AWC Samples from Seismic Walkdown Inspection</b>			
<b>Equipment Identification</b>	<b>Equipment Class (GIP)</b>	<b>Walkdown Item</b>	<b>Observations</b>
BNHV004	8 – Motor Operated and Solenoid Operated Valves	RWST Supply to CTMT Spray Pump A	No concerns
SGL13A	10 – Air Handlers	Containment Spray Pump Room Cooler	No concerns
SGL09A	10 – Air Handlers	Safety Injection Pump Room Cooler	No concerns

<b>Table 6-1 Table of SWC and AWC Samples from Seismic Walkdown Inspection (Continued)</b>			
<b>Equipment Identification</b>	<b>Equipment Class (GIP)</b>	<b>Walkdown Item</b>	<b>Observations</b>
NF039A	20 – Instrumentation and Control Panels and Cabinets	Containment SHED SEQ CH 1 Logic	1) Open S-hooks found – CAR 201206436 initiated to address. 2) Covered anchorage is scheduled for inspection as noted above in Table 3-6 by the end of Refueling Outage 20, currently scheduled to begin 10/4/2014 per Job 12004987.
SB078	20 – Instrumentation and Control Panels and Cabinets	RPV Level Instrument System PROC PROT System	Covered anchorage scheduled for inspection as noted above for NF039A and in Table 3-6.
EKJ04A	21 – Tanks and Heat Exchangers	Lube Oil Cooler	No concerns
TKJ01A	21 – Tanks and Heat Exchangers	DG A Jacket Water Expansion Tank	No concerns
EFHV097	8 – Motor Operated and Solenoid Operated Valves	ESW Pump A Discharge Recirc Valve	No concerns
PEG01A	5 – Horizontal Pumps	Component Cooling Water Pump	No concerns
GNPT935	18 – Instruments on Racks	Containment Atmosphere	No concerns
ABPT001	18 – Instruments on Racks	Steam Generator A Steamline Pressure	No concerns
NG07	2 – Low Voltage Switchgear	LC 480 VAC	No concerns
FEF02A	0 – Other	ESW Self-cleaning Strainer	No concerns
RP315	20 – Instrumentation and Control Panels and Cabinets	125V DC Distribution Panel	No concerns
KJ121	20 – Instrumentation and Control Panels and Cabinets	Gauge Panel	No concerns
NE01	17 – Engine-Generators	Standby #1	No concerns
GMD0001	0 – Other	DG Vent Supply Fan A Suction Out Air Backdraft Damper	No concerns
NG07F	1 – Motor Control Centers	MCC 480 VAC	No concerns
GMTE001	19 – Temperature Sensors	Diesel Generator Vent Supply Fan 1A	No concerns

<b>Table 6-1 Table of SWC and AWC Samples from Seismic Walkdown Inspection (Continued)</b>			
<b>Equipment Identification</b>	<b>Equipment Class (GIP)</b>	<b>Walkdown Item</b>	<b>Observations</b>
TJE02A	21 – Tanks and Heat Exchangers	Emergency Fuel Oil Day Tank	No concerns
NK01	14 – Distribution Panel	125 VDC Bus Switchboard	1) Cabinet NK01 has 1/8" gap to equipment side bolts. Displacement calculated and found to be acceptable. 2) 1-1/2" gap between pipe on penetration OP41W0340 and equipment, pipe is flexible in the lateral direction and free to knock the cabinet. Movement calculated and found acceptable. 3) Covered anchorage scheduled for inspection by the end of Refueling Outage 20, currently scheduled to begin 10/4/2014 per Job 12004989.
NN13	16 – Battery Chargers and Inverters	7.5 KVA	Light on chains supported on ceiling can swing into cabinet. CAR 20126775 initiated to examine issue and found that no significant effect will occur. Hence, there is no seismic concern.
Aux. Bldg. El. 1974.00, 1111	N/A	N/A	No concerns
Aux. Bldg. El. 1974.00, 1115	N/A	N/A	No concerns
Cont. Bldg. El. 2047.50, 3601	N/A	N/A	No concerns

<b>Table 6-1 Table of SWC and AWC Samples from Seismic Walkdown Inspection (Continued)</b>			
<b>Equipment Identification</b>	<b>Equipment Class (GIP)</b>	<b>Walkdown Item</b>	<b>Observations</b>
Cont. Bldg. El. 2047.50, 3605	N/A	N/A	<p>1) Storage cabinet 9.5" from RJ050F addressed in RFR No. 17572A.</p> <p>2) Gap between SA075A and SA066A is 1/4". Displacement calculated and judged to be acceptable.</p> <p>3) Ladder near RP068 may knock against cabinet (RFR 15112A). CAR 201206775 initiated to address ladder.</p> <p>4) Three-drawer filing cabinets against SB030B. Storage cabinet (78" tall) is 13" away from RP053EB. RFR 15112A states a support is to be provided with the minimum qualifications. The 3 drawer filing cabinet is acceptable per the Seismic II/I evaluation.</p>
Cont. Bldg. El. 2000.00, 3301	N/A	N/A	No concerns
DGB El. 2000.00, 5203	N/A	N/A	No concerns
ESW Bldg. El. 2000.00, U104	N/A	N/A	No concerns
UHS Bldg. El. 2000.00, U301	N/A	N/A	No concerns
Aux. Bldg. El. 2000.00, 1323	N/A	N/A	No concerns
Aux. Bldg. El. 2026.00, 1410	N/A	N/A	No concerns
Fuel Bldg. El. 2000.00, 6105	N/A	N/A	No concerns
Aux. Bldg. El. 2000.00, 1326	N/A	N/A	No concerns

<b>Table 6-1 Table of SWC and AWC Samples from Seismic Walkdown Inspection (Continued)</b>			
<b>Equipment Identification</b>	<b>Equipment Class (GIP)</b>	<b>Walkdown Item</b>	<b>Observations</b>
Aux. Bldg. El. 2047.50, 1506	N/A	N/A	Vertical support 6 ft north of GFV0702 is missing two base plate nuts and one bolt has less than a full nut engagement. CAR No. 201207502 initiated to evaluate and Corrective Job 12005523 initiated to correct.
Aux. Bldg. El. 2037.60, 1508	N/A	N/A	No concerns
Aux. Bldg. El. 2047.50, 1513	N/A	N/A	Two vertical supports to tubing adjacent to GLPD10101 are missing nuts and washers. CAR No. 201207502 initiated to evaluate and Corrective Job 12005524 initiated to correct.

### 6.3.3 Evaluation of Findings

The peer reviewers provided the following observations based on the seismic walkdowns and review of the checklists.

Several occurrences of seismic interactions were observed involving temporary, portable, or permanent equipment found in close proximity to safety-related equipment. Small gaps next to permanent equipment are dispositioned to CEC for further evaluation. A plant-wide review of the housekeeping procedure is recommended to reinforce the importance of managing portable equipment in the plant with the intent of eliminating inappropriate placement of temporary equipment.

The peer reviewers consider the judgments made by the SWEs to be appropriate and in concurrence with the SWG.

In regard to the follow-on seismic walkdowns, the peer review team reviewed all the SWCs that were generated from this walkdown. The peer review of the SWCs resulted in several questions and comments that were all addressed by the SWEs by providing additional clarifications or by initiating job orders. In summary, the SWCs were deemed to be appropriate and in accordance with the Seismic Walkdown Guidance.

## 6.4 REVIEW OF LICENSING BASIS ASSESSMENTS

Appendix C provides a list of the potentially adverse seismic conditions identified during the seismic walkdowns and how they were addressed. Messrs. Bacon, Allam and Sherfey conducted interviews with



the SWE inspection team on September 24 & 26, 2012 to discuss the issues identified to determine if, in the opinion of the peer reviewers, any of them potentially affected the current licensing basis of the plant. A tracking list for resolution of any potential licensing basis items was maintained up to closure for this report. Items requiring further evaluation were raised up to CEC for their evaluation.

As noted in Section 5, there were seventeen potentially adverse seismic conditions identified in either the equipment Seismic Walkdowns or the Area Walk-Bys requiring evaluation with respect to their seismic licensing basis. The peer reviewers performed a review of all licensing basis evaluations and the walkdown team's decisions for entering these potentially adverse seismic conditions into the plant's CAP. The peer reviewers determined that all evaluations complied with the seismic walkdown guidance, and the decisions for entering conditions into the plant's CAP complied with plant requirements.

The peer reviewers performed a review of the status of items that were entered into the plant's CAP as a result of the seismic walkdown inspections as shown in Table 6-2. The submittal report was found to appropriately reflect these updates.

<b>Table 6-2 Table of CAP Status from Seismic Walkdown Inspection</b>		
<b>CAP</b>	<b>Item</b>	<b>CAP Status</b>
CAR 201206775	AWC-CB-2047.5-3605 Ladder near RP068 will knock against cabinet.	Closed; action completed.
CAR 201206518	CEF01A Degradation is visible in anchorage.	Closed; action per Jobs 12004830, 12004831, 12004832 and 12004833.
CAR 201206775	AWC-AUX-1974-1126 Instrument tubing support with no grout under base plate EMC0001.	Closed; action completed.
CAR 201206775	EEC01A Most nuts are not seated in contact with saddle base.	Closed; action completed.
CAR 201206775	PEC01A Missing Washers for all anchor bolts.	Closed; action completed.
CAR 201207170	SGK05A Two bolts and skid are corroded and area is damp.	Closed; action per Job 12004112.
CAR 201206775	NN13 Light on chains supported on ceiling can swing into cabinet.	Closed; action completed.
CAR 201207502	AWC-AUX-2047.5-1506 Vertical support is missing two base plate nuts and one bolt has less than a full nut engagement.	Closed; action completed on Job 12005523.
CAR 201207502	AWC-AUX-2047.5-1513 Two vertical supports to tubing are missing nuts and washers.	Closed; action completed on Job 12005524.
CAR 201207170	AWC-AUX-2047.5-1501 Degraded Condition for anchor bolts of SGK04B.	Closed; action per Job 12001591.

In regard to the follow-on walkdowns, none of the issues discovered during the walkdown or as a result of the Peer Review required a Licensing Basis Assessment.

## **6.5 REVIEW OF FINAL AND SUPPLEMENT REPORT SUBMITTALS & SIGN-OFF**

The entire final submittal report was reviewed by Messrs. Bacon, Allam and Sherfey and found to meet the requirements of the EPRI Seismic Walkdown Guidance (Reference 15). The entire supplement report was reviewed by Messrs. Allam and Douglas and found to meet the requirements of the EPRI Seismic Walkdown Guidance (Reference 15). The Peer Review of the final and supplement reports determined that the objectives and requirements of the 50.54(f) letter (Reference 14) are met. Further, the efforts completed and documented within final and supplement submittal reports are in accordance with the EPRI guidance document.

### **Peer Review Approval**

Monzer Allam\*, Westinghouse Electric (Lead PR) \_\_\_\_\_  
\_\_\_\_\_

\*Electronically approved records are authenticated in the electronic document management system.

## 7 IPEEE VULNERABILITIES

A review of IPEEE vulnerabilities is available in the Callaway Individual Plant Examination of External Events (Reference 16). The standard techniques recommended by the NRC in NUREG-1407 (Reference 34) were employed throughout the IPEEE. The analysis of seismic events was conducted by performing a focused-scope Seismic Margin Assessment (SMA) in accordance with EPRI NP-6041-SL. The methodology was modified to take advantage of the CEC robust seismic design. Comparison of the Callaway design floor response spectra (FRS) with the Review Level Earthquake (RLE) in conjunction with seismic qualification documentation allowed most components to be prescreened from further analysis.

During the walkdowns, the IPEEE SRT was able to inspect nearly all components listed in the Area Walkdown Sheets (AWSs) and open and inspect the interiors of all the MCCs and all instrument and control panels on the SSEL for the internal mounting of components and relays. Several other items were addressed during the walkdowns like the control room acoustic tile ceiling and light fixtures, cable trays and cable tray supports, and representative samples of emergency core cooling system (ECCS) piping, and all were found to be adequate. Also, issues that NUREG-1407 required to be examined during the walkdown were addressed, such as the hydrogen piping that runs through the Auxiliary Building, the reactor coolant pump lube oil drain tanks in the Reactor Building, and the fire suppression system. Seismically-induced flooding was also investigated and only one instance was found in the EWS pipe chase on the 1974' level in the Control Building. The flooding source was a fire sprinkler pipe in the wet pipe fire suppression system that could fail due to seismic interaction; however, no damage to any equipment was found by the SRT. The report also included other evaluations like an assessment of the concrete masonry unit walls and a relay chatter evaluation.

The seismic capability walkdown resulted in the vast majority of the SSEL components being screened out as capable of withstanding the 0.3g RLE. A few components were not screened out due to issues identified during the walkdown. Some of these issues were resolved by further research done immediately and some were resolved by the implementation of recommendations made by the SRT of the calculation of HCLPF values. Table 7-1 provides a list of those issues and notes where a plant modification was required to resolve. The table also includes the CEC responses to those issues and their resolution.

The IPEEE report concluded that the CEC is very seismically resistant and most of the structures and equipment were overqualified for design basis seismic events by use of an envelope of loading that could result at any of the proposed SNUPPS plants. A very large seismic margin exists for the equipment because vendors tended to overtest them for specified loads. The report also concluded that most of the equipment was well anchored and supported such that large margins exist relative to the RLE.

Table 7-1 IPEEE Vulnerabilities and CEC Resolutions

WALKDOWN ISSUE	ADDRESSED BY	RESOLUTION
Spray Shields on MCCs NG03C, NG04C, NG05E, NG06E, NG07F, and NG08F are in contact with adjacent walls. This will cause impact with the wall during an earthquake.	RFR 14417A, SOS 93-1867	The MCCs in question were modified by attaching them to the adjacent wall by angle braces attached to the spray shields.
The CCPs, SiPs, and AFW pumps have openings for shear pins and the seismic qualification packages for these pumps appear to take credit for these pins. Shear pins are not installed in the AFW pumps and drivers, and the B train SI/CCP drivers.	RFR 14418A, RFR 14455A, SOS 93-1787, WRs 542627, 542628, 542629	Westinghouse letter SCP-93-169 documented that shear pins are not required for the SI/CCPs. The AFW pumps have had shear pins installed. It has been determined that the AFW pump drivers do not require shear pins. High strength bolts are sufficient.
The fire sprinkler piping and risers in the D/G rooms are rod hung with lateral stability. This could result in the piping falling on the D/Gs during an earthquake.	RFR 14420A	The fire piping was assessed during the II/I hazards analysis as being able to withstand the SSE based on engineering judgment. Additional review by the SRT indicates that there is enough interference to prevent the piping from falling on the D/Gs.
Hand-held fire extinguishers throughout the plant are mounted on relatively shallow hooks. During an earthquake they could rock off the hooks and fall to the floor. This may result in a missile hazard due to the bottle or neck fracturing.	RFR 14421A, RFR14421B, RFR14421C <i>W160508</i> <i>8/7/95</i> <i>status 90</i> <i>9/6/95</i>	Fire extinguishers in CTMT have been removed to eliminate the concern. Also, they have been drop tested and are able to withstand a fall from the current mounting height. But several extinguishers <del>are being</del> <i>have been</i> remounted to meet the req'd drop height.
Carts, file cabinets, and other unsecured items behind the Control Room may shift during an earthquake and impact safety related cabinets.	Memo to J.F. Hogg dated 9/2/93	A sign has been posted on the wall in the vicinity of NF039A-C, and SA036A-E stating that no loose equipment should be stored along this wall. All loose equipment verified removed on 2/1/94.

Table 7-1 (cont.) IPEEE Vulnerabilities and CEC Resolutions

WALKDOWN ISSUE	ADDRESSED BY	RESOLUTION
An Argon cylinder has been loosely taped for support near EFV0352.		The gas cylinders noted during the walkdown have been verified to be removed as of 12/14/93.
The chain hoists over safety related equipment may travel during an earthquake resulting in the chains impacting soft targets such as cables, instrumentation lines, relief valves, and oil bubblers.	Memo UOMM 93-031	The memo stated that RFR 8191 addressed the issue of chain hoists and specified that they be parked away from equipment with the hook fully raised. A walkdown on 2/1/94 found the chain hoists parked away from safety related equipment.
Some of the fluorescent light fixtures could fall during an earthquake because some "S" hooks are open instead of being crimped closed.		The IPEEE walkdown did not identify any fixtures that could fall on safety related equipment. A follow-up walkdown on 12/14/93 found no light fixtures that could damage safety related equipment if they fell.
The fire hose header in the lower cable spreading room is missing its vertical support clamp.	WR162977	A review of the hanger drawing for this piping shows that a clamp is not required at this location.
Sensing line for BBPT0455 is not in its support.	WR162978	The sensing line was put back in its support under a work request.
The floor grate behind the D/G A starting air compressor is loose and could damage the sensing lines passing through it in an earthquake.	WR162979	The floor grate was clipped to the floor by means of a work request.
The power cables to the D/G room ventilation fans are exposed.	RFR 14422A	It has been determined that flexible conduit for these fans is not required.
There is a missing bolt on cabinet RP147A and there are missing retaining screws on some of the Foxboro modules inside the cabinet.	WR162980	The missing bolt and screws were installed by means of a work request.
There is an unsupported fire sprinkler test header in the lower cable spreading room.	RFR 14423A	The piping has been evaluated as II/I qualified. No action required.

Table 7-1 (cont.) IPEEE Vulnerabilities and CEC Resolutions

WALKDOWN ISSUE	ADDRESSED BY	RESOLUTION
In the plant southeast quadrant of the ESW pipe chase, there is a rod-hung sprinkler riser 6 inches from an adjacent rod hung pipe. These pipes could hit during an earthquake resulting in an inadvertent actuation of the fire system.	RFR 14424A	Pipe schedule and wall thickness provide strength against failure, and even if failure occurred, the resulting flooding and/or spray would not damage SSEL equipment.
ESW return from D/G B piping has rigid restraints that do not appear to allow for differential building motion.	RFR 14425A, RFR 14425B, EQE letter of 12/30/93	<p>An initial review of Stress Run P-283 by Engineering indicated that SAM was accounted for and no action was required. Further review by the SRT shows that restraint location was input to code wrong, resulting in wrong anchor movement.</p> <p>Issue resolved for the IPEEE because the SRT judges that the piping will survive an earthquake without damage. Engineering judges that there is sufficient margin in existing design to accommodate the error with no further action.</p>
MSFIS Cabinet SA075A and ESFAS Cabinet SA066A are very close together but are not connected. Clearance between the two cabinets is approximately 1/2" at the top, but 1/8-5/32" where bolt heads project. This could result in impact during an earthquake.	Bechtel Calc J-200H, EQE letter of 12/30/93, RFR 14648A	<p>Bechtel Calculation J-200H found the cabinet motion to be less than the measured gap. Further review found that the as-tested frequencies are less than the calculated frequencies, resulting in larger motion than calculated.</p> <p>This will result in cabinet impact during the RLE. However, Engineering has determined that cabinet impact is acceptable. No further action is required.</p>

Table 7-1 (cont.) IPEEE Vulnerabilities and CEC Resolutions

WALKDOWN ISSUE	ADDRESSED BY	RESOLUTION
CCW Heat Exchanger anchor bolts do not have 10 bolt diameter edge distance nor are they 10 bolt diameters apart.	<i>Calc. EG-30</i>	A High Confidence of Low Probability of Failure (HCLPF) calculation determined the seismic capacity of the CCWHXs to be 0.41g.
Diesel Generator Control Panels KJ121 and KJ122 are mounted on grout pads which are smaller than the panel depth, resulting in the panels being cantilevered over the grout pad.	<i>Calc. KJ-07</i>	A HCLPF calculation determined the seismic capacity of the panels to be 0.49g.
There are block walls around the battery rooms. This is a seismic interaction concern.	EQE letter of 12/30/93	A review of the design calculations found ample margin for the IPEEE.
The seismic capacity of the Control Rod Drive Mechanisms and the Reactor Internals needs to be verified.	Westinghouse letter SCP-93-137	The Reactor Internals were designed for a 1.0g zpa in both horizontal directions and 0.67g in the vertical direction. The CRDM housings have external lateral supports. This meets the requirements of the IPEEE.

## **8 REFERENCES**

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4. Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," Rev. 0, U.S. Nuclear Regulatory Commission, October 1973.
5. 10466-C-04A03S, Rev. 1, "Floor Response Spectra for Standardized Nuclear Unit Power Plant System (SNUPPS),
6. 10466-C-04A10S, Rev. 1, "Floor Response Spectra for Standardized Nuclear Unit Power Plant System (SNUPPS)."
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  19. ULDBD-EF-001, "Essential Service Water," Revision 001.
  20. ULDBD-UHS-001, "Ultimate Heat Sink Cooling Tower," Revision 001.
  21. Callaway Plant, "Callaway Internal Events PRA Model," Update 5, 9/27/2012.
  22. Callaway Plant P&ID, M-22EC01(Q), Rev. 24, "Fuel Pool Cooling and Clean-up System."
  23. Callaway Plant P&ID, M-22KA02(Q), Rev. 26, "Compressed Air System (Service Air)."
  24. Callaway Plant Drawing OOA-BB-00003, Rev. 11, "Refuel Level Indications."
  25. Callaway Plant Drawing C-175A-00001, Rev. 001, "Pool Layout for Spent Fuel Pool."
  26. Callaway Plant Drawing C-2L6111, Rev. 4, "Fuel Building – Area 1 Stainless Steel Liner Plate Plan – Spent Fuel Pool."
  27. Callaway Plant Piping Isometrics M-23EC04(Q), Rev. 8, and M-23EC06, Rev. 7, "Fuel Pool Cooling and Clean Up System."
  28. SLNRC 80-34, "Response Letter to Information Request on Category I Masonry Walls Employed by Plants Under CP and OL Review."
  29. Callaway Plant Operational Quality Control Manual (OQCM), Rev. 26.
  30. Callaway Energy Center Bolting Manual, Rev. 9.
  31. Callaway Plant Procedure MDP-ZZ-0STPR, Rev. 9, "Staging and Storage of Materials, Equipment & Tools Within the Switchyard, Under the Electric Distribution Lines, Protected Area, and Power Block."
  32. Callaway E-2L8900 Rev. 46, Lighting Notes, Symbols and Details

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## **APPENDIX A**

### **SEISMIC WALKDOWN CHECKLISTS (SWCs)**

This appendix provides only the SWCs from the at-power Seismic Walkdowns performed the week of September 10, 2012, that were revised related to FAQ 4.20, plus the SWCs resulting from the walkdowns performed between March 2013 and August 2013. The SWCs from the at-power Seismic Walkdowns that are not contained herein can be found in Appendix A of the original report - Reference 35 ("Ameren Missouri Callaway Energy Center Post-Fukushima NTTF 2.3 Seismic Walkdown Submittal Report").

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: AELT0501

Equipment Class: (18) Instrumentation Rack

Equipment Description: Steam Generator A Wide Range Level Transmitter

Location (Bldg, Elev, Room/Area): Reactor Building, 2010', A15H-O

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)? Yes
2. Is the anchorage free of bent, broken, missing or loose hardware? Yes
3. Is the anchorage free of corrosion that is more than mild surface oxidation? Yes
4. Is the anchorage free of visible cracks in the concrete near the anchors? Yes
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.) Yes  
*Anchorage verified to meet configuration on Dwg. J-27G02. 4-3/8" anchors used to mount tube steel to concrete wall. Instrument and valves mounted to tube steel per Dwgs. J-07G05, J-27G22, and J-27D21.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Yes

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: AELT0501

Equipment Class: (18) Instrumentation Rack

Equipment Description: Steam Generator A Wide Range Level Transmitter

**Interaction Effects**

7. Are soft targets free from impact by nearby equipment or structures? Yes
8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Yes
9. Do attached lines have adequate flexibility to avoid damage? Yes
10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Yes

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? Yes

**Comments**

Evaluated by:

Curtis Stundebek



Date:

9/30/13

Randall Wilson



09/30/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: AELT0501

Equipment Class: (18) Instrumentation Rack

Equipment Description: Steam Generator A Wide Range Level Transmitter

**Photos**



AELT0501 Photo 1



AELT0501 Photo 2

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: AELT0501

Equipment Class: (18) Instrumentation Rack

Equipment Description: Steam Generator A Wide Range Level Transmitter



AELT0501 Photo 3



AELT0501 Photo 4



AELT0501 Photo 5

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: AELT0518

Equipment Class: (18) Instrumentation Racks

Equipment Description: Steam Generator A Narrow Range Level Transmitter

Location (Bldg, Elev, Room/Area): Reactor Building, 2026', A13J-O

Manufacturer/Model:

#### 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.

#### Anchorage

- |  |     |
|--|-----|
| 1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)?   | No  |
| 2. Is the anchorage free of bent, broken, missing or loose hardware?   | Yes |
| 3. Is the anchorage free of corrosion that is more than mild surface oxidation?  | Yes |
| 4. Is the anchorage free of visible cracks in the concrete near the anchors?   | Yes |
| 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.) | N/A |
| 6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions?  | Yes |



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: AELT0518

Equipment Class: (18) Instrumentation Racks

Equipment Description: Steam Generator A Narrow Range Level Transmitter



**Interaction Effects**

7. Are soft targets free from impact by nearby equipment or structures? Yes
8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Yes
9. Do attached lines have adequate flexibility to avoid damage? Yes
10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Yes

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? Yes

**Comments**

Evaluated by: Curtis Stundbeck  Date: 9/30/13  
Randall Wilson  09/30/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: AELT0518

Equipment Class: (18) Instrumentation Rack

Equipment Description: Steam Generator A Wide Range Level Transmitter

**Photos**



AELT0518 Photo 1

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: AELT0518

Equipment Class: (18) Instrumentation Rack

Equipment Description: Steam Generator A Wide Range Level Transmitter



AELT0518 Photo 2



AELT0518 Photo 3

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: BBPT0455

Equipment Class: (18) Instrument Racks

Equipment Description: Pressurizer Pressure Transmitter

Location (Bldg, Elev, Room/Area): Reactor Building, 2026', D14R-O

Manufacturer/Model:

#### 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.

#### Anchorage

- |  |     |
|--|-----|
| 1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)?   | No  |
| 2. Is the anchorage free of bent, broken, missing or loose hardware?   | Yes |
| 3. Is the anchorage free of corrosion that is more than mild surface oxidation?  | Yes |
| 4. Is the anchorage free of visible cracks in the concrete near the anchors?   | Yes |
| 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.) | N/A |
| 6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions?  | Yes |

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: BBPT0455

Equipment Class: (18) Instrument Racks

Equipment Description: Pressurizer Pressure Transmitter

**Interaction Effects**

7. Are soft targets free from impact by nearby equipment or structures? Yes
8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Yes
9. Do attached lines have adequate flexibility to avoid damage? Yes
10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Yes

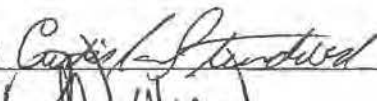
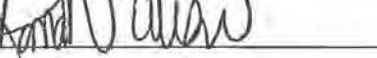
**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? Yes

**Comments**

Evaluated by:

Curtis Stundebek

Date:

9/30/13

Randall Wilson

09/30/13



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: BBPT0455

Equipment Class: (18) Instrumentation Rack

Equipment Description: Pressurizer Pressure Transmitter

### Photos



BBPT0455 Photo 1



BBPT0455 Photo 2



BBPT0455 Photo 3

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: BBPT0455

Equipment Class: (18) Instrumentation Rack

Equipment Description: Pressurizer Pressure Transmitter



BBPT0455 Photo 4



BBPT0455 Photo 5

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: CGN03A

Equipment Class: (9) Fans

Equipment Description: Containment Hydrogen Mixing Fan A

Location (Bldg, Elev, Room/Area): RB, 2047'-6", C07K-O

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)? Yes
2. Is the anchorage free of bent, broken, missing or loose hardware? Yes
3. Is the anchorage free of corrosion that is more than mild surface oxidation? Yes
4. Is the anchorage free of visible cracks in the concrete near the anchors? Yes
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.) Yes  
*Fan anchored to concrete floor with 24 – ½" anchor bolts around perimeter of base. Anchorage is in accordance with Drawing M-619.2-00003 and Dwg. C-2C2963.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Yes



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: CGN03A

Equipment Class: (9) Fans

Equipment Description: Containment Hydrogen Mixing Fan A


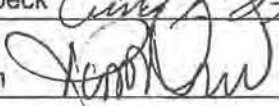
**Interaction Effects**

7. Are soft targets free from impact by nearby equipment or structures? Yes
8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Yes
9. Do attached lines have adequate flexibility to avoid damage? Yes
10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Yes

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? Yes

**Comments**

Evaluated by: Curtis Stundbeck  Date: 9/30/13  
Randall Wilson  09/30/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: CGN03A

Equipment Class: (9) Fans

Equipment Description: Containment Hydrogen Mixing Fan

**Photos**



CGN03A Photo 1



CGN03A Photo 3



CGN03A Photo 2

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: EF155

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESW Control Panel

Location (Bldg, Elev, Room/Area): ESW Pump house, 2000', U104

Manufacturer/Model:

**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.

**Anchorage**

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

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: EF155

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESW Control Panel

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? ☒ Y ☐ N ☐ U
- Internal "Flashlight" inspection only performed. No seismic conditions identified. Questions 1 through 10 were previously completed and reported in original Fukushima Seismic Walkdown Report.*

**Comments**

Evaluated by:

Curtis Stundebek



Date:

9/30/13

Randall Wilson



09/30/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: EF155

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESW Control Panel

**Photos**



EF155 Photo 1



EF155 Photo 2



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: EPHV8808A

Equipment Class: (8) MOV

Equipment Description: Accumulator Tank A Outlet Iso Valve

Location (Bldg, Elev, Room/Area): RB, 2011', A17G-O

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)? No
2. Is the anchorage free of bent, broken, missing or loose hardware? N/A
3. Is the anchorage free of corrosion that is more than mild surface oxidation? N/A
4. Is the anchorage free of visible cracks in the concrete near the anchors? 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.) N/A
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Yes

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: EPHV8808A

Equipment Class: (8) MOV

Equipment Description: Accumulator Tank A Outlet Iso Valve

**Interaction Effects**

7. Are soft targets free from impact by nearby equipment or structures? Yes
8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Yes
9. Do attached lines have adequate flexibility to avoid damage? Yes
10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Yes

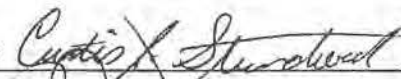
**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? Yes

**Comments**

Evaluated by:

Curtis Stundebek



Date:

9/30/13

Randall Wilson



09/30/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: EPHV8808A

Equipment Class: (8) MOV

Equipment Description: Accumulator Tank A Outlet Iso Valve

**Photos**



EPHV8808A Photo 1



EPHV8808A Photo 2



Status ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: KJ121

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Gauge Panel

Location (Bldg, Elev, Room/Area): Diesel Generator Building, 2000', Rm. 5203

Manufacturer/Model:

#### 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.

#### Anchorage

- |  |   |   |   |     |
|--|---|---|---|-----|
| 1. Is 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. 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 |
| 6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions?  | Y | N | U |     |

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: KJ121

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Gauge Panel

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?  
*Internal "Flashlight" inspection only performed. No seismic conditions identified. Questions 1 through 10 were previously completed and reported in original Fukushima Seismic Walkdown Report.*

☒ Y ☐ N ☐ U

**Comments**

Evaluated by:	Curtis Stundebek 	Date:	9/30/13
	Randall Wilson 		09/30/13

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: KJ121

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Gauge Panel

### Photos



KJ121 Photo 1



KJ121 Photo 2

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 KV BUS #2

Location (Bldg, Elev, Room/Area): Control Bldg. 2000' Elevation, Room 3302

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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.)  
*Eight (8) Plug welds required per SQRSTS Summary E-009-00624759 and Dwgs E-009-00056 and E-009-00032 were observed. Adjacent to the 8 plug welds were either fillet welds (approximately 1 inch length) or anchor bolts; the fillet welds and anchor bolts are not required for qualification. There is no potential adverse seismic condition.* ☒ Y ☐ N ☐ U ☐ N/A
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 KV BUS #2

**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
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 ☐ N/A

**Other Adverse Conditions**

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

**Comments**

Evaluated by: Curtis Stundbeck *Curtis Stundbeck* Date: 11/14/13  
Randall Wilson *Randall Wilson* 11/14/13



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2

**Photos**



NB02 Photo 1



NB02 Photo 2



NB02 Photo 3

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2



NB02 Photo 4



NB02 Photo 5

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2



NB02 Photo 6



NB02 Photo 7



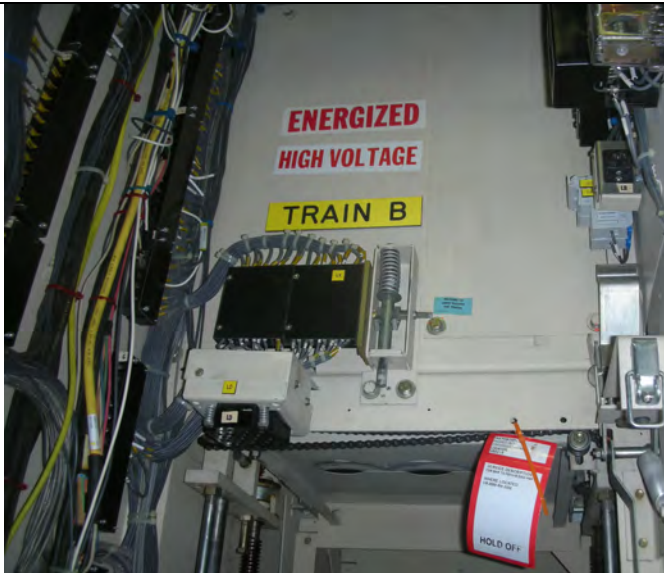
Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2



NB02 Photo 8



NB02 Photo 10



NB02 Photo 9

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2



NB02 Photo 11



NB02 Photo 12



NB02 Photo 13



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2



NB02 Photo 14



NB02 Photo 15



NB02 Photo 16



NB02 Photo 17

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2



NB02 Photo 18



NB02 Photo 19



NB02 Photo 21



NB02 Photo 20

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NB02

Equipment Class: (3) Medium Voltage Switchgear

Equipment Description: 4.16 kV Bus #2



NB02 Photo 22



NB02 Photo 23



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NF039A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CONT SHED/SEQ CH 1 LOGIC

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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  
*Fillet weld 3" long at approximately 5" spacing was observed at front and back of cabinet. This is consistent with detail described in SQRSTS summary report E-092-00624750, Drawing J-104-00285 and Drawing J-104-00413 having 3/16" fillet weld 3" long at 6" spacing along front and back of cabinet with no welds along the sides of the cabinet.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NF039A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CONT SHED/SEQ CH 1 LOGIC

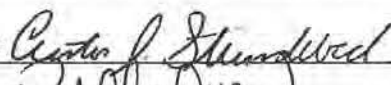
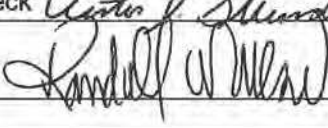
**Interaction Effects**

- |   |   |   |   |     |
|---|---|---|---|-----|
| 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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.500 for this walkdown.

Evaluated by:	Curtis Stundebeck 	Date:	11/14/13
	Randall Wilson 		11/14/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NF039A

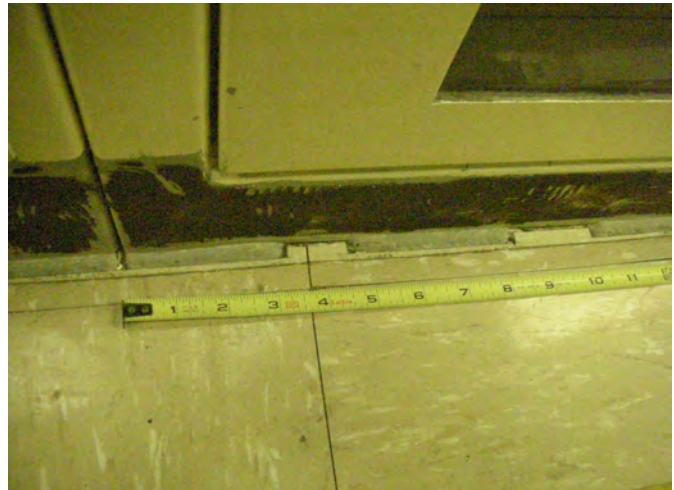
Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Cont Shed/Seq Ch 1 Logic

**Photos**



NF039A Photo 1



NF039A Photo 2



NF039A Photo 3



NF039A Photo 4



Status ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC

Location (Bldg, Elev, Room/Area): Control Bldg. 2000' Elevation, Room 3302

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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.)  
*Anchorage configuration consistent with Dwgs. E-017-00716 and E-017-00004.* ☒ Y ☐ N ☐ U ☐ N/A
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC

**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
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 ☐ N/A

**Other Adverse Conditions**

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

**Comments**

Evaluated by: Curtis Stundbeck *Curtis Stundbeck* Date: 9/30/13  
Randall Wilson *Randall Wilson* 09/30/13

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC

### Photos



NG02 Photo 1



NG02 Photo 2



NG02 Photo 3



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 4



NG02 Photo 5



NG02 Photo 6

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 7



NG02 Photo 8



NG02 Photo 9



NG02 Photo 10



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 11



NG02 Photo 12



NG02 Photo 13



NG02 Photo 14

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 15



NG02 Photo 16



NG02 Photo 17



NG02 Photo 18

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 19



NG02 Photo 21



NG02 Photo 20



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 22



NG02 Photo 23

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



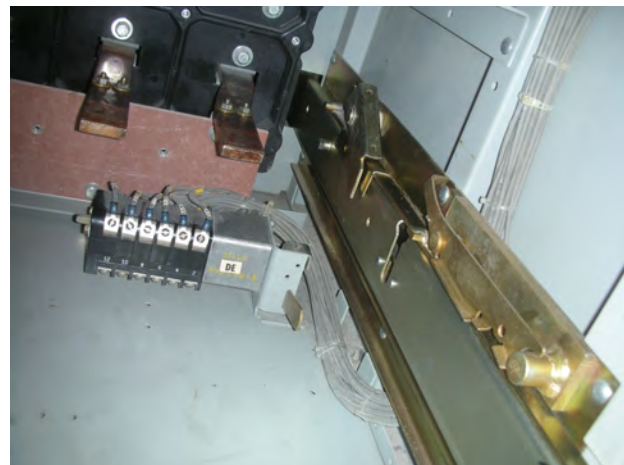
NG02 Photo 24



NG02 Photo 25



NG02 Photo 26



NG02 Photo 27

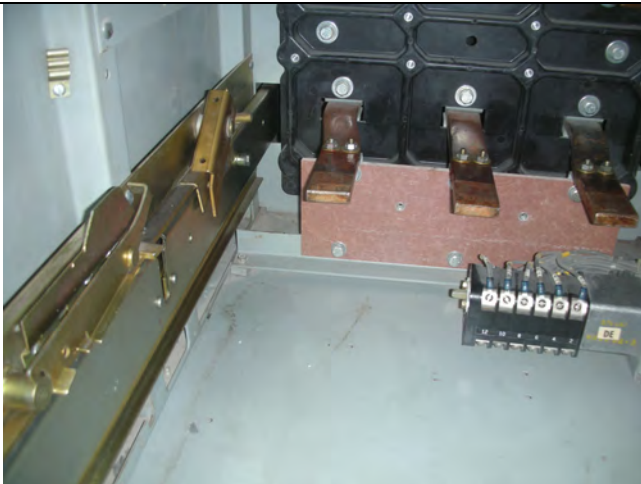
Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 28



NG02 Photo 29



NG02 Photo 30



NG02 Photo 31



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

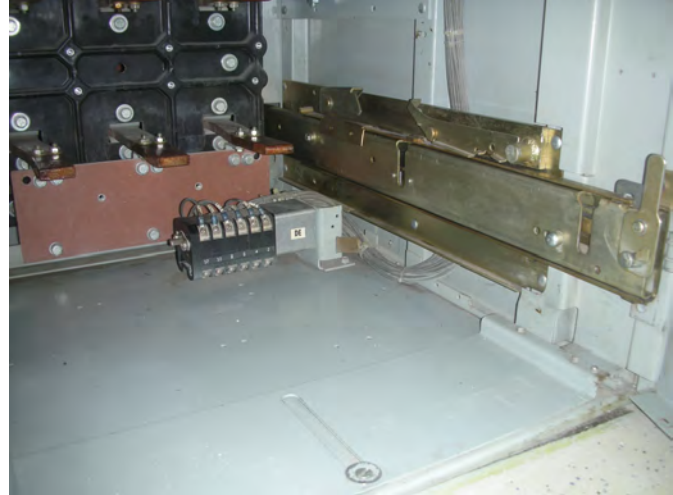
Equipment ID No.: NG02

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: 480 VAC



NG02 Photo 32



NG02 Photo 33



NG02 Photo 35



NG02 Photo 34

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

Location (Bldg, Elev, Room/Area): Control Building, 2000', Rm. 3302

Manufacturer/Model:

#### 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.

#### Anchorage

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

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?  
*Internal "Flashlight" inspection only performed. Questions 1 through 10 were previously completed and reported in original Fukushima Seismic Walkdown Report.*

☒ Y ☐ N ☐ U

*Three (3) screws were observed attaching control power transformer to cabinet. Based on size, approximate 3 ½ inch footprint, and weight, approximate 4 pounds, of transformer, this item is judged to not be a potential adverse seismic concern. Furthermore, the mounting is consistent with transformers provided with the original configuration qualified by seismic testing documented in E-018-00189.*

*Two screws were found missing in the internal panel of the NG02AHR4 cubicle. The panel provides separation between front and back components; however, this is a spare cubicle with no installed equipment. Additionally, it is judged that sufficient fasteners are in place to secure the panel. It is therefore determined to not be a seismic concern.*

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

**Comments** "Flashlight" inspection only. Questions 1-10 were previously completed and reported in original Fukushima seismic walkdown report.

Evaluated by:

Curtis Stundebek

*Curtis J. Stundebek*  
*Randall Wilson*

Date:

*11/15/13*

Randall Wilson

*11/15/13*



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

**Photos**



NG02A Photo 1



NG02A Photo 2



NG02A Photo 3



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC



NG02A Photo 4



NG02A Photo 5

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC



NG02A Photo 6



NG02A Photo 7



NG02A Photo 8



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC



NG02A Photo 9



NG02A Photo 11



NG02A Photo 10

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

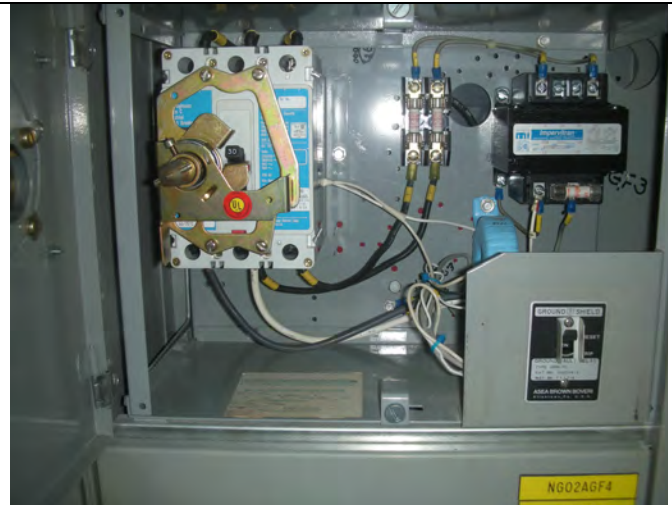
Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC



NG02A Photo 12



NG02A Photo 13



NG02A Photo 14



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC



NG02A Photo 15



NG02A Photo 16



NG02A Photo 17

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG02A

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC



NG02A Photo 18



NG02A Photo 19

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG04C

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

Location (Bldg, Elev, Room/Area): Auxiliary Building, 2047'-6", Rm. 1501

Manufacturer/Model:

#### 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.

#### Anchorage

- |  |   |   |   |     |
|--|---|---|---|-----|
| 1. Is 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. 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 |
| 6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions?  | Y | N | U |     |

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG04C

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?  
*Internal "Flashlight" inspection only performed. Questions 1 through 10 were previously completed and reported in original Fukushima Seismic Walkdown Report.*

☒ Y ☐ N ☐ U

*Three (3) screws were observed attaching control power transformer to cabinet. Based on size, approximate 3 ½ inch footprint, and weight, approximate 4 pounds, of transformer, this item is judged to not be a potential adverse seismic concern. Furthermore, the mounting is consistent with transformers provided with the original configuration qualified by seismic testing documented in E-018-00189.*

**Comments** "Flashlight" inspection only. Questions 1-10 were previously completed and reported in original Fukushima seismic walkdown report.



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG04C

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

Evaluated by: Curtis Stundebek

*Curtis Stundebek*  
*Randall Wilson*

Date: 11/15/13

11/15/13

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG04C

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC

### Photos



NG04C Photo 1



NG04C Photo 2



NG04C Photo 3

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG04C

Equipment Class: (1) Motor Control Centers

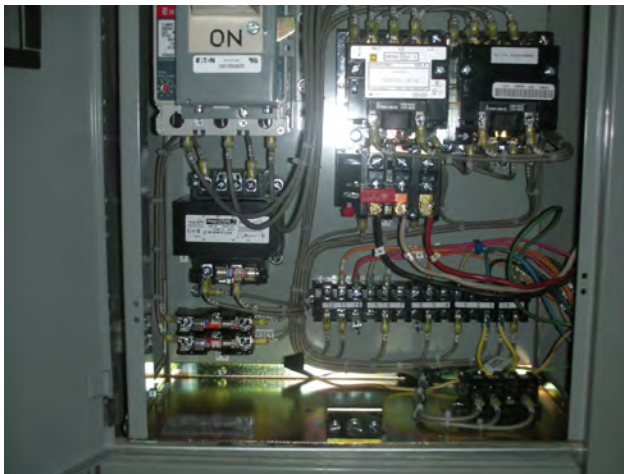
Equipment Description: 480 VAC



NG04C Photo 4



NG04C Photo 5



NG04C Photo 6



NG04C Photo 7



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG04C

Equipment Class: (1) Motor Control Centers

Equipment Description: 480 VAC



NG04C Photo 8



NG04C Photo 9

Status ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG07

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: LC 480 VAC

Location (Bldg, Elev, Room/Area): UHS, 2000 ft, U301

Manufacturer/Model:

#### 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.

#### Anchorage

- |  |   |   |   |     |
|--|---|---|---|-----|
| 1. Is 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. 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 |
| 6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions?  | Y | N | U |     |

Status: Y N U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG07

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: LC 480 VAC

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? Yes  
*Flashlight inspection of accessible NG07 Cubicles performed. No adverse seismic conditions were observed.*

**Comments** "Flashlight" inspection only. Questions 1-10 were previously completed and reported in original Fukushima seismic walkdown report.

Evaluated by: Curtis Stundebek *Curtis Stundebek* Date: 9/30/13  
Randall Wilson *Randall Wilson* 09/30/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG07

Equipment Class: (2) Low Voltage Switchgear

Equipment Description: LC 480 VAC

**Photos**



NG07 Photo 1



NG07 Photo 2



NG07 Photo 3



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG07F

Equipment Class: (1) Motor Control Centers

Equipment Description: MCC 480 VAC

Location (Bldg, Elev, Room/Area): UHS, 2000 ft, U301

Manufacturer/Model:

#### 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.

#### Anchorage

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



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG07F

Equipment Class: (1) Motor Control Centers

Equipment Description: MCC 480 VAC

**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 |
| 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 | N/A |

**Other Adverse Conditions**

- |   |                                    |                         |                         |
|---|------------------------------------|-------------------------|-------------------------|
| 11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?<br><i>Flashlight inspection of accessible NG07F Cubicles performed. No adverse seismic conditions were observed.</i> | <input checked="" type="radio"/> Y | <input type="radio"/> N | <input type="radio"/> U |
|---|------------------------------------|-------------------------|-------------------------|

*Three (3) screws were observed attaching control power transformer to cabinet. Based on size, approximate 3 ½ inch footprint, and weight, approximate 4 pounds, of transformer, this item is judged to not be a potential adverse seismic concern. Furthermore, the mounting is consistent with transformers provided with the original configuration qualified by seismic testing documented in E-018-00189.*

**Comments** "Flashlight" inspection only. Questions 1-10 were previously completed and reported in original Fukushima seismic walkdown report.

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG07F

Equipment Class: (1) Motor Control Centers

Equipment Description: MCC 480 VAC

Evaluated by: Curtis Stundebek

*Curtis Stundebek*

Date: 11/15/13

Randall Wilson

*Randall Wilson*

11/15/13

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NG07F

Equipment Class: (1) Motor Control Centers

Equipment Description: MCC 480 VAC

### Photos



NG07F Photo 1



NG07F Photo 3



NG07F Photo 2



NG07F Photo 4



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG07F

Equipment Class: (1) Motor Control Centers

Equipment Description: MCC 480 VAC



NG07F Photo 5



NG07F Photo 6



NG07F Photo 7



NG07F Photo 8

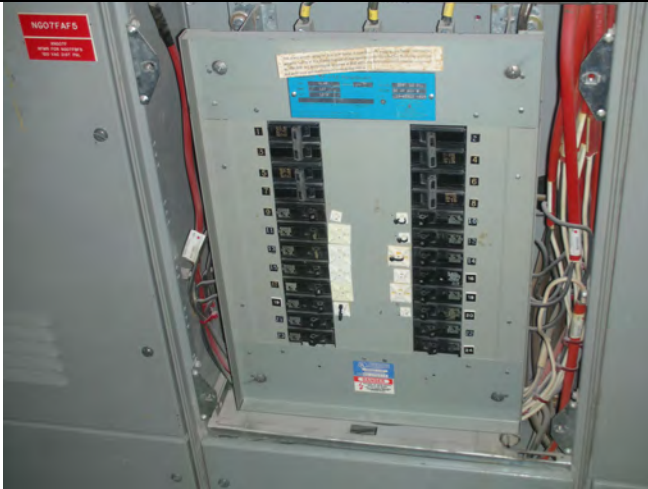
Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NG07F

Equipment Class: (1) Motor Control Centers

Equipment Description: MCC 480 VAC



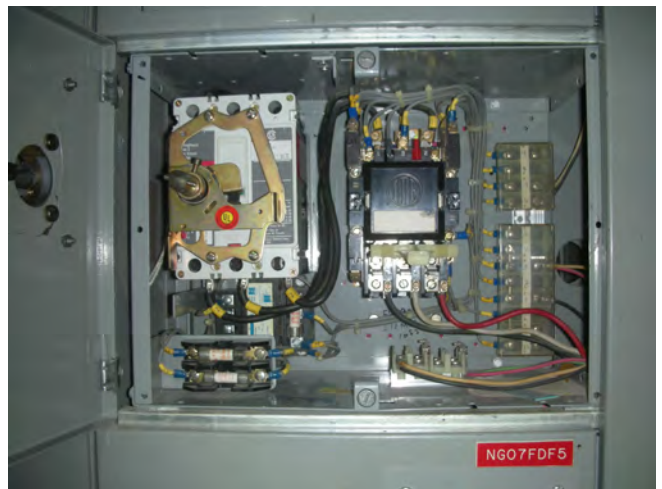
NG07F Photo 9



NG07F Photo 10



NG07F Photo 11



NG07F Photo 12

Sheet 1 of 2

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK01

Equipment Class: 14 Distribution Panel

Equipment Description: 125 VDC Bus Switchboard Class 1E Group 1

Location (Bldg, Elev, Room/Area): Control Building, 2016 Elevation, Room 3408

Manufacturer/Model: General Electric

**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.

**Anchorage**

1. Is 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. 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.)  
*Observed anchorage was eight (8) plug welds consistent with Drawing E-020-00015.* ☒ Y ☐ N ☐ U ☐ N/A
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U



Sheet 2 of 2

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK01

Equipment Class: 14 Distribution Panel

Equipment Description: 125 VDC Bus Switchboard Class 1E Group 1

**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

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 ☐ N/A

**Other Adverse Conditions**

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

**Comments**

1. Rear plate fastener loose. CAR 201306223. No structural or seismic concern.
2. Plastic zip-tie attached to cabinet frame and secured to itself. No unsecured cables were observed in the vicinity. No structural or seismic concern.
3. Small screw observed in bottom channel of cabinet. Inspected cabinet and found no missing screw or loose cables. No structural or seismic concern. Job 13006573 initiated to remove screw.
4. Date of inspection 08/07/2013 by Job 12004989.520. Electricians assisted with removal of front and rear panels.

Evaluated by:

Randall Wilson

Date: 11/14/13

Tim Solberg

11/14/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK01

Equipment Class: (14) Distribution Panel

Equipment Description: 125 VDC Bus Switchboard Class 1E Group 1

**Photos**



NK01 Photo 1



NK01 Photo 3



NK01 Photo 2

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NK01

Equipment Class: (14) Distribution Panel

Equipment Description: 125 VDC Bus Switchboard Class 1E Group 1



NK01 Photo 4



NK01 Photo 5



NK01 Photo 6



NK01 Photo 7



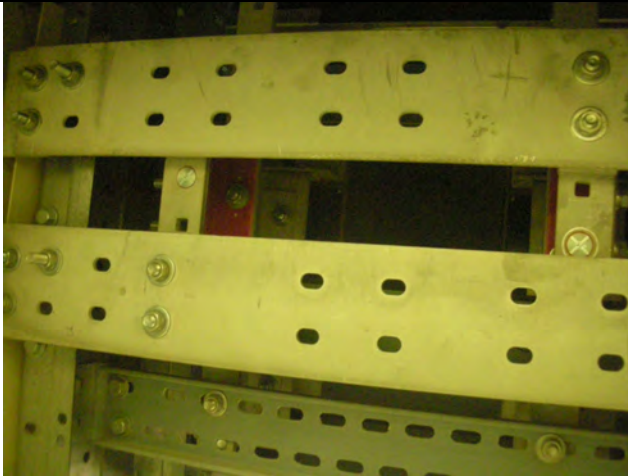
Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

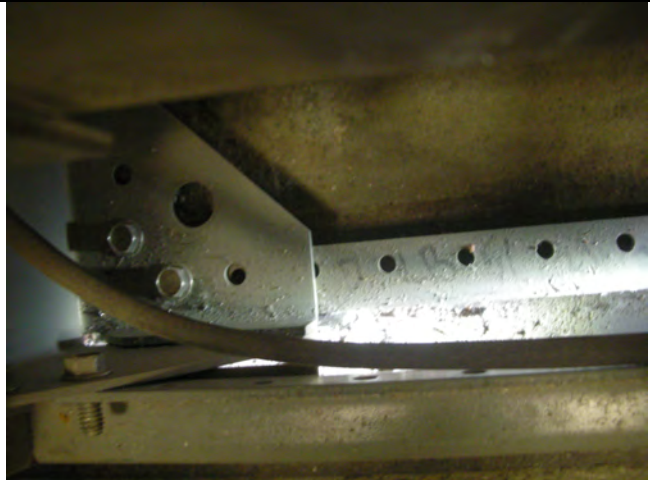
Equipment ID No.: NK01

Equipment Class: (14) Distribution Panel

Equipment Description: 125 VDC Bus Switchboard Class 1E Group 1



NK01 Photo 8



NK01 Photo 9



NK01 Photo 10



NK01 Photo 11

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK01

Equipment Class: (14) Distribution Panel

Equipment Description: 125 VDC Bus Switchboard Class 1E Group 1



NK01 Photo 12



NK01 Photo 13

Sheet 1 of 2

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK41

Equipment Class: 14 Distribution 125 VDC

Equipment Description: 125VDC Instrumentation Panel, Class 1E, Group 1

Location (Bldg, Elev, Room/Area): Control Building, 2016 Elevation, Room 3408

Manufacturer/Model: General Electric

**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.

**Anchorage**

1. Is 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. 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.)  
*Observed anchorage was four (4) plug welds consistent with Drawing E-020-00006.* ☒ Y ☐ N ☐ U ☐ N/A
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U



Sheet 2 of 2

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK41

Equipment Class: 14 Distribution 125 VDC

Equipment Description: 125VDC Instrumentation Panel, Class 1E, Group 1

**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
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 ☐ N/A

**Other Adverse Conditions**

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

**Comments**

1. Short piece of hemp rope attached to upper northwest corner of cabinet, likely original rigging. No structural or electrical impact to the component. Rope was removed by electricians.
2. Date of inspection 08/07/2013. Performed by Job 12004989.510. Electricians assisted by removal of rear and front cabinet panels.

Evaluated by: Randall Wilson

*Randall Wilson*

Date: 11/14/13

Tim Solberg

*Tim Solberg*

11/14/13

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NK41

Equipment Class: (14) Distribution 125 VDC

Equipment Description: 125 VDC Instrumentation Panel, Class 1E, Group 1

### Photos



NK41 Photo 1



NK41 Photo 2



NK41 Photo 3



NK41 Photo 4

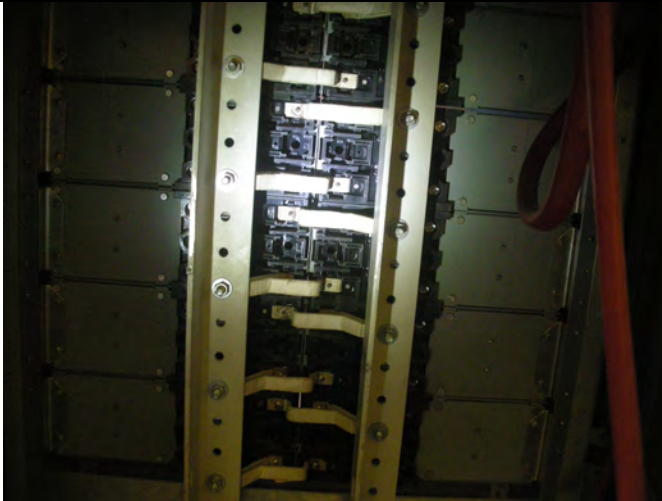
Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

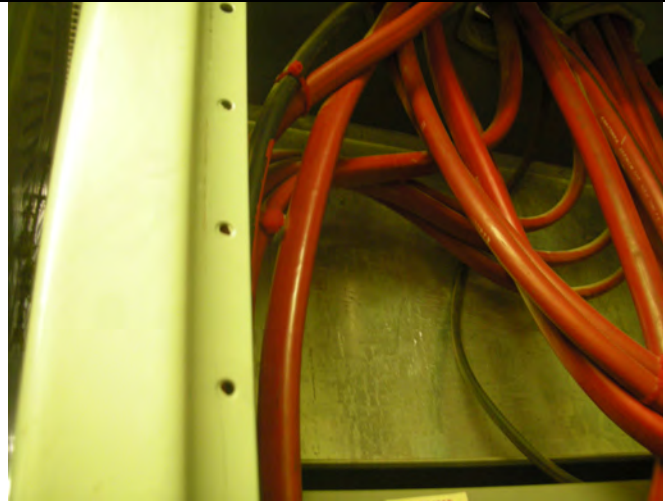
Equipment ID No.: NK41

Equipment Class: (14) Distribution 125 VDC

Equipment Description: 125 VDC Instrumentation Panel, Class 1E, Group 1



NK41 Photo 5



NK41 Photo 6

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NK21

Equipment Class: (16) Inverters

Equipment Description: 125 VDC No. 1

Location (Bldg, Elev, Room/Area): Control Building, 2016', Rm. 3408

Manufacturer/Model:

#### 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.

#### Anchorage

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

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK21

Equipment Class: (16) Inverters

Equipment Description: 125 VDC No. 1

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? ☒ Y ☐ N ☐ U
- Internal "Flashlight" inspection only. No seismic concerns identified. Questions 1 through 10 were previously completed and reported in original Fukushima Seismic Walkdown Report.*

**Comments**

Evaluated by:	<u>Curtis Stundbeck</u>	Date:	<u>9/30/13</u>
	<u>Randall Wilson</u>		<u>09/30/13</u>



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NK21

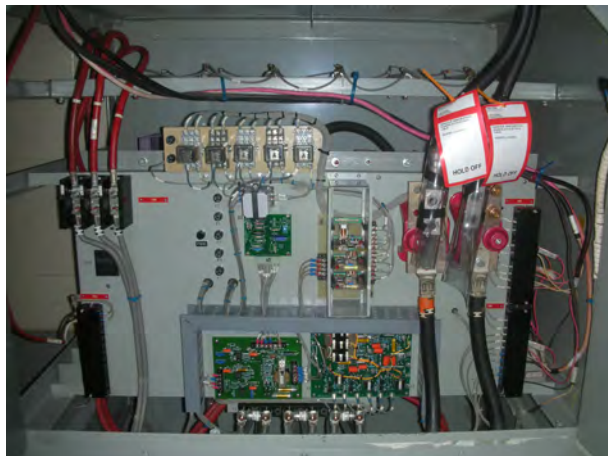
Equipment Class: (16) Inverters

Equipment Description: 125 VDC No. 1

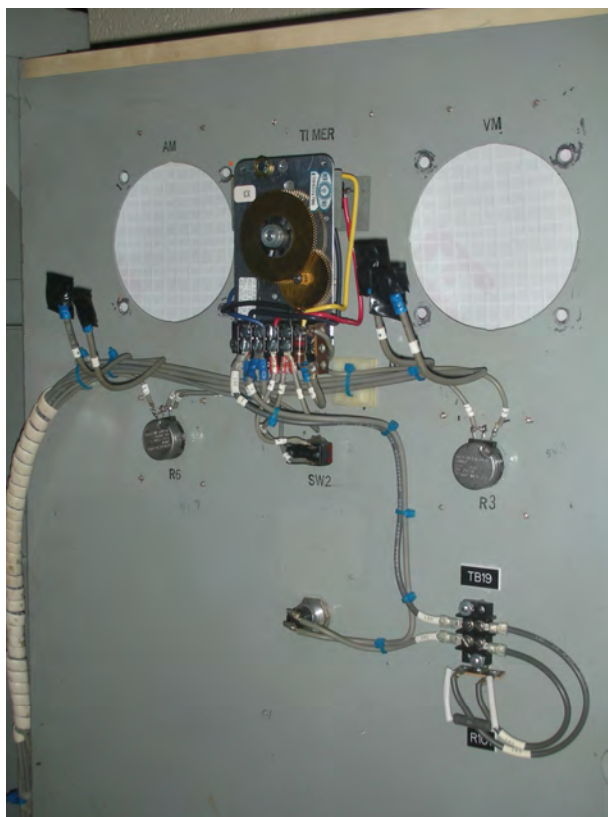
### Photos



NK21 Photo 1



NK21 Photo 3



NK21 Photo 2



NK21 Photo 4



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NK21

Equipment Class: (16) Inverters

Equipment Description: 125 VDC No. 1



NK21 Photo 5



NK21 Photo 6

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK21

Equipment Class: (16) Inverters

Equipment Description: 125 VDC No. 1



NK21 Photo 7



NK21 Photo 8

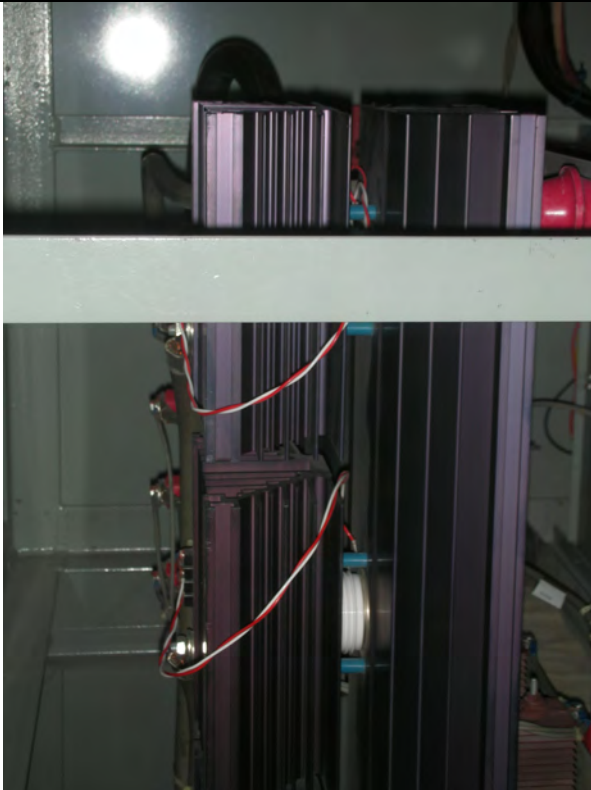
Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK21

Equipment Class: (16) Inverters

Equipment Description: 125 VDC No. 1



NK21 Photo 9

Status ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NK23

Equipment Class: (16) Inverters

Equipment Description: 125 VDC NO 3

Location (Bldg, Elev, Room/Area): Control Building, 2016', Rm. 3414

Manufacturer/Model:

#### 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.

#### Anchorage

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

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK23

Equipment Class: (16) Inverters

Equipment Description: 125 VDC NO 3

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?  
*Internal "Flashlight" inspection only performed. No seismic conditions identified.*

☒ Y ☐ N ☐ U

**Comments**

Evaluated by: Curtis Stundbeck  
Randall Wilson

Date: 9/30/13  
09/30/13



Status: ☒ Y ☐ N ☐ U

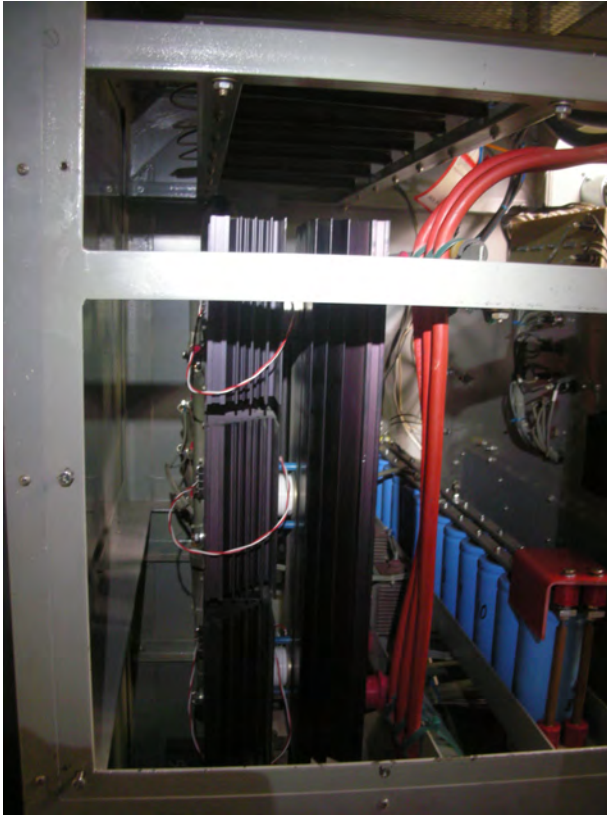
**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NK23

Equipment Class: (16) Inverters

Equipment Description: 125 VDC NO. 3

**Photos**



NK23 Photo 1



NK23 Photo 2



NK23 Photo 3



NK23 Photo 4

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NN13

Equipment Class: (16) Inverters

Equipment Description: 7.5 KVA

Location (Bldg, Elev, Room/Area): Control Building, 2016', Rm. 3414

Manufacturer/Model:

#### 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.

#### Anchorage

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

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: NN13

Equipment Class: (16) Inverters

Equipment Description: 7.5 KVA

**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 |
| 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 | N/A |

**Other Adverse Conditions**

- |  |                                    |                         |                         |
|--|------------------------------------|-------------------------|-------------------------|
| 11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?<br><i>Internal "Flashlight" inspection only performed. No seismic conditions identified. Questions 1 through 10 were previously completed and reported in original Fukushima Seismic Walkdown Report.</i> | <input checked="" type="radio"/> Y | <input type="radio"/> N | <input type="radio"/> U |
|--|------------------------------------|-------------------------|-------------------------|

**Comments**

Evaluated by:	Curtis Stundebeck <i>Curtis Stundebeck</i>	Date:	9/30/13
	Randall Wilson <i>Randall Wilson</i>		09/30/13



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: NN13

Equipment Class: (16) Inverters

Equipment Description: 7.5 KVA

### Photos



NN13 Photo 1



NN13 Photo 3



NN13 Photo 2

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: RL025

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: TURBOGENERATOR AND FW MCB

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)? Y ☒ N ☐ U ☐
2. Is the anchorage free of bent, broken, missing or loose hardware? ☒ Y ☐ N ☐ U ☐ N/A
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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U



Status: Y N U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RL025

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: TURBOGENERATOR AND FW MCB

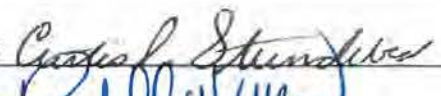
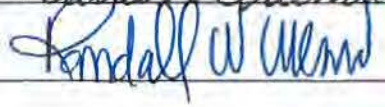
**Interaction Effects**

- |   |   |   |   |     |
|---|---|---|---|-----|
| 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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.535 for this walkdown.

Evaluated by:	Curtis Stundebek 	Date: 11/15/13
	Randall Wilson 	11/15/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RL025

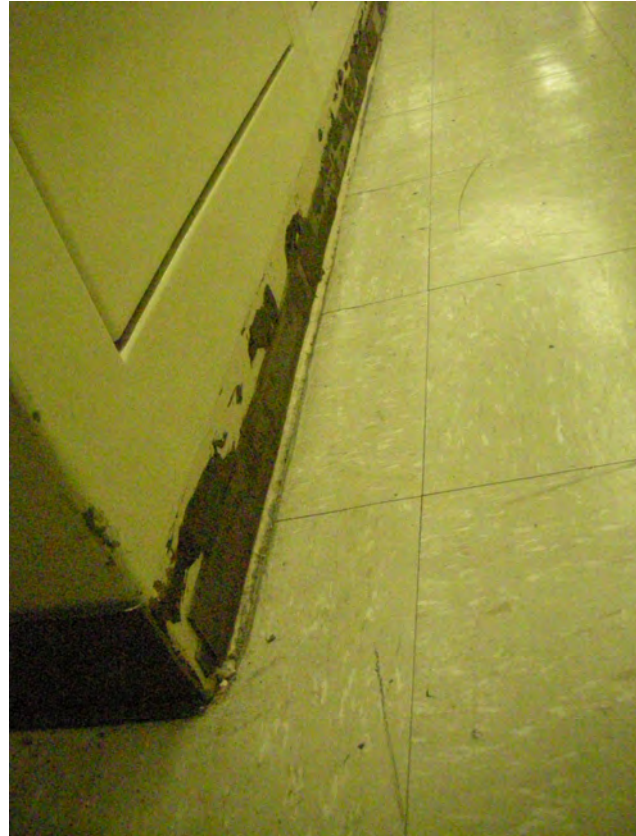
Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: TurboGenerator and FW MCB

**Photos**



RL025 Photo 1



RL025 Photo 2

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: RP081A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: SUBCOOLING MONITORING CABINET

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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  
*Fillet weld 2" long at approximately 8" spacing was observed at front and back of cabinet. 2" long weld observed at corners on East end. This is consistent with Detail 5 on Dwg. C-2008 having 3/16" fillet weld 2" long at 8" spacing. Interior plug welds on west end are inaccessible.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RP081A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: SUBCOOLING MONITORING CABINET

**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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.505 for this walkdown.

Evaluated by:	Curtis Stundebek <i>Curtis Stundebek</i>	Date:	<i>11/15/13</i>
	Randall Wilson <i>Randall Wilson</i>		<i>11/15/13</i>

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RP081A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Subcooling Monitoring Cabinet

**Photos**



RP081A Photo 1



RP081A Photo 2



RP081A Photo 3



RP081A Photo 4



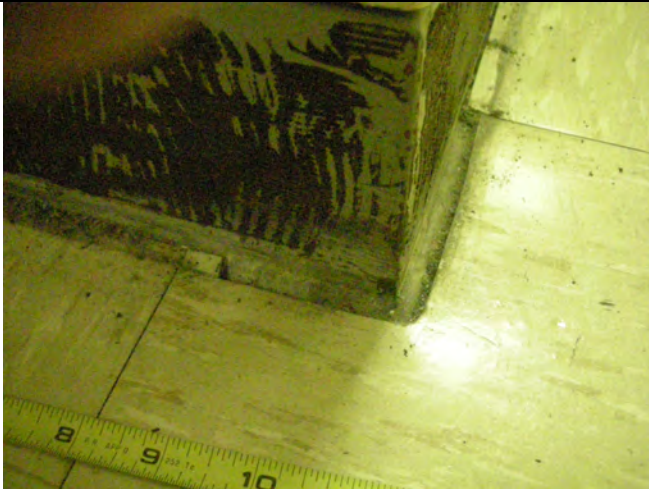
Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

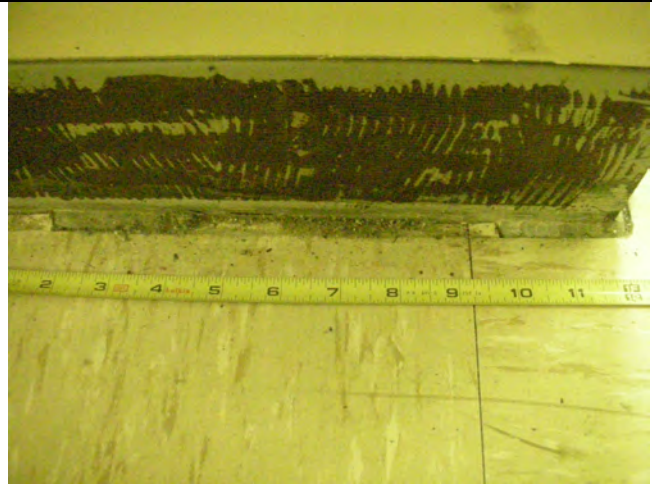
Equipment ID No.: RP081A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

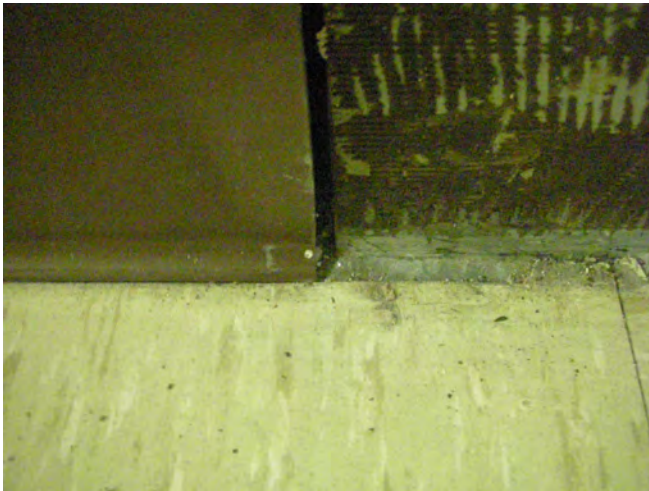
Equipment Description: Subcooling Monitoring Cabinet



RP081A Photo 5



RP081A Photo 6



RP081A Photo 7

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: RP289

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Panel – DC Distribution

Location (Bldg, Elev, Room/Area): Aux. 2047'-6", Rm. 1513

Manufacturer/Model:

#### 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.

#### Anchorage

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

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RP289

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Panel – DC Distribution

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?  
*Internal "Flashlight" inspection only performed. No seismic conditions identified.*

☒ Y ☐ N ☐ U

**Comments**

Questions 1 through 10 were previously completed and reported in the original Fukushima Seismic Walkdown Report. No photos available for this component.

Evaluated by:

Curtis Stundebek

Randall Wilson

Date:

11/15/13

11/15/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RP289

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Panel – DC Distribution

**Photos**

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: RP315

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: 125V DC Dist. Panel

Location (Bldg, Elev, Room/Area): ESW Pumphouse, 2000 ft, U104

Manufacturer/Model:

#### 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.

#### Anchorage

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



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RP315

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: 125V DC Dist. Panel

**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 |
| 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 | N/A |

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?  
*Internal "Flashlight" inspection only performed. No seismic conditions identified.*

☒ Y ☐ N ☐ U

**Comments**

Questions 1 through 10 were previously completed and reported in the original Fukushima Seismic Walkdown Report.

Evaluated by:

Curtis Stundebek

Randall Wilson

Date:

9/30/13

09/30/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: RP315

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: 125V DC Dist. Panel

**Photos**



RP315 Photo 1



RP315 Photo 2

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SA036A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESFAS CH1 TERM CABINET

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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  
*Fillet weld 3" long at approximately 5" spacing was observed at front and back of cabinet. This is consistent with detail shown on Dwg. J-104-00004 having 3/16" fillet weld 3" long at 6" spacing along front and rear of cabinet.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SA036A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESFAS CH1 TERM CABINET


**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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.510 for this walkdown.

Evaluated by:	Curtis Stundebek 	Date: 11/15/13
	Randall Wilson 	11/15/13



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SA036A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESFAS CH1 Term Cabinet

**Photos**



SA036A Photo 1



SA036A Photo 2



SA036A Photo 3



SA036A Photo 4



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SA036D

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESFAS CH1 LOGIC CABINET

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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  
*Fillet weld 3" long at approximately 5" spacing was observed at front and back of cabinet. This is consistent with detail shown on Dwg. J-104-00004 having 3/16" fillet weld 3" long at 6" spacing along front and rear of cabinet.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: Y N U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SA036D

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESFAS CH1 LOGIC CABINET


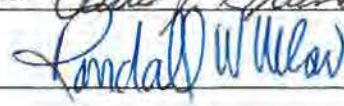
**Interaction Effects**

- |   |   |   |   |     |
|---|---|---|---|-----|
| 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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.515 for this walkdown.

Evaluated by:	Curtis Stundbeck 	Date: 11/15/13
	Randall Wilson 	11/15/13

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SA036D

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: ESFAS CH1 Logic Cabinet

**Photos**



SA036D Photo 1



SA036D Photo 2



SA036D Photo 4



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SB037

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W PROCESS ANALOG PROTECTION SET CAB-03

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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  
*Fillet weld 2" long at approximately 8" spacing was observed at front and back of cabinet. 2" long weld observed at corners on East end. This is consistent with Detail 5 on Dwg. C-2008 having 3/16" fillet weld 2" long at 8" spacing. Interior plug welds on west end are inaccessible.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: Y N U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SB037

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W PROCESS ANALOG PROTECTION SET CAB-03

**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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.520 for this walkdown.

Evaluated by:	Curtis Stundebek 	Date: 11/15/13
	Randall Wilson 	11/15/13



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SB037

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W Process Analog Protection Set CAB-03

### Photos



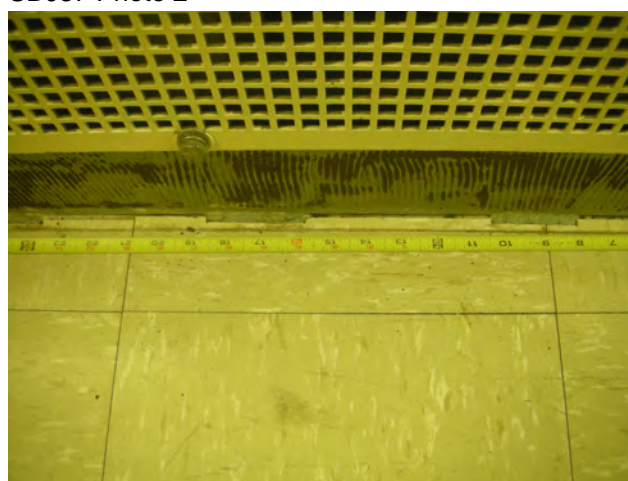
SB037 Photo 1



SB037 Photo 2



SB037 Photo 3



SB037 Photo 4

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

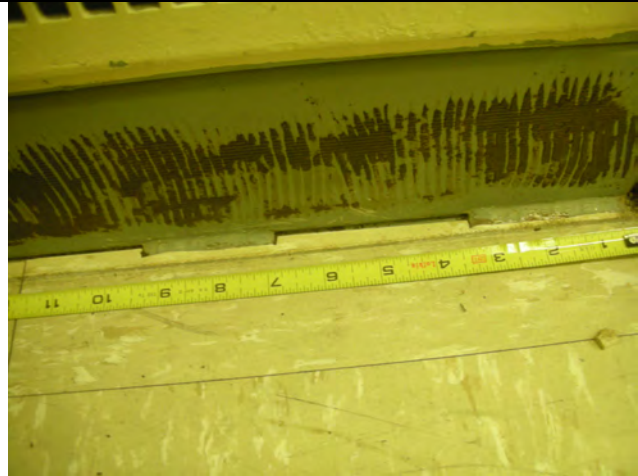
Equipment ID No.: SB037

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W Process Analog Protection Set CAB-03



SB037 Photo 5



SB037 Photo 6



SB037 Photo 7



SB037 Photo 8



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SB078

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CAB W PROCESS PROTECTION RVLIS

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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  
*Fillet weld 2" long at approximately 8" spacing was observed at front and back of cabinet. 2" long weld observed at corners on West end. This is consistent with Detail 5 on Dwg. C-2008 having 3/16" fillet weld 2" long at 8" spacing. Interior plug welds on west end are inaccessible.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SB078

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CAB W PROCESS PROTECTION RVLIS

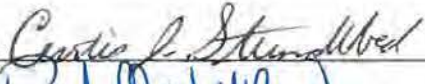
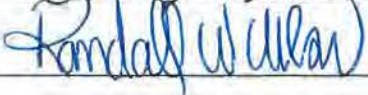
**Interaction Effects**

- |   |   |   |   |     |
|---|---|---|---|-----|
| 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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.525 for this walkdown.

Evaluated by:	Curtis Stundebek 	Date: 11/15/13
	Randall Wilson 	11/15/13



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SB078

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CAB W Process Protection RVLIS

#### Photos



SB078 Photo 1



SB078 Photo 2



SB078 Photo 3



SB078 Photo 4



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SB078

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CAB W Process Protection RVLIS

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SB078 Photo 5



SB078 Photo 6



SB078 Photo 7



SB078 Photo 8

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SB078

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CAB W Process Protection RVLIS

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SB078 Photo 9



SB078 Photo 10



SB078 Photo 11



SB078 Photo 12

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Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SB078

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: CAB W Process Protection RVLIS



SB078 Photo 13

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SE054A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W NUC INSTM NIS 1

Location (Bldg, Elev, Room/Area): CB, 2047'-6", Rm 3605

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is 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. 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  
*Structural attachment is by welding the cabinet to a channel embedded in the concrete floor.*
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
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? ☒ Y ☐ N ☐ U

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SE054A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W NUC INSTM NIS 1

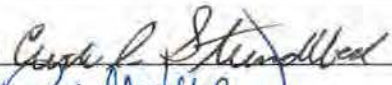

**Interaction Effects**

- |   |   |   |   |     |
|---|---|---|---|-----|
| 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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments** Anchorage inspection only. Questions 7-11 were previously completed and reported in original Fukushima seismic walkdown report. Ref. Job 12004987.530 for this walkdown.

Evaluated by:	Curtis Stundbeck 	Date: 11/15/13
	Randall Wilson 	11/15/13



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SE054A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W NUC INSTRM NIS 1

**Photos**



SE054A Photo 1



SE054A Photo 2



SE054A Photo 3



SE054A Photo 4

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SE054A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W NUC INSTRM NIS 1

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SE054A Photo 5



SE054A Photo 6



SE054A Photo 7



SE054A Photo 8

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SE054A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: W NUC INSTRM NIS 1



SE054A Photo 9



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SENY0032AB

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: PREAMP SR CHAN 2

Location (Bldg, Elev, Room/Area): Auxiliary Building, 2026', Rm. 1409

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)? No
2. Is the anchorage free of bent, broken, missing or loose hardware? Yes
3. Is the anchorage free of corrosion that is more than mild surface oxidation? Yes
4. Is the anchorage free of visible cracks in the concrete near the anchors? Yes
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.) N/A
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Yes

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SENY0032AB

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: PREAMP SR CHAN 2

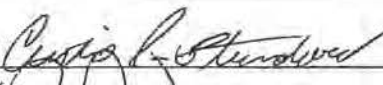

**Interaction Effects**

7. Are soft targets free from impact by nearby equipment or structures? Yes
8. Are overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls not likely to collapse onto the equipment? Yes
9. Do attached lines have adequate flexibility to avoid damage? Yes
10. Based on the above seismic interaction evaluations, is equipment free of potentially adverse seismic interaction effects? Yes

**Other Adverse Conditions**

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment? Yes

**Comments** Component SENY0032AB located inside a junction box. Only exterior of junction box was walked down and reported in original walkdown report. This checklist documents walkdown of interior of junction box.

Evaluated by: Curtis Stundbeck  Date: 9/30/13  
Randall Wilson  09/30/13



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SENY0032AB

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: PREAMP SR CHAN 2

### Photos



SENY0032AB Photo 1



SENY0032AB Photo 2



SENY0032AB Photo 3



SENY0032AB Photo 4

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SENY0060A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Excore Neutron Detector Amplifier

Location (Bldg, Elev, Room/Area): Auxiliary Building, 2026', Rm 1403

Manufacturer/Model: \_\_\_\_\_

#### 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.

#### Anchorage

- |  |   |   |   |     |
|--|---|---|---|-----|
| 1. Is 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. 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 |
| 6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions?  | Y | N | U |     |

Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: SENY0060A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Excore Neutron Detector Amplifier

#### 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 |
| 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 | N/A |

#### Other Adverse Conditions

11. Have you looked for and found no adverse seismic conditions that could adversely affect the safety functions of the equipment?  
*Internal flashlight only inspection performed.*

☒ Y ☐ N ☐ U

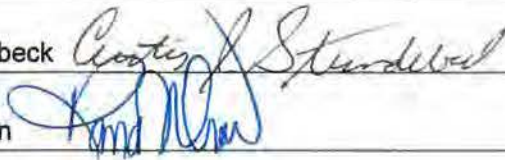
Observed bolts attaching back panel to cabinet not fully engaged in nut by approximately one thread at location having ground wire lug under nut. The degree of engagement was judged to not be a potential adverse seismic concern. Additionally, there is no configuration deviation since the ground wire and bolt arrangement at this location does not conflict with Seismic Test Report J-364-00009 and Instruction Manual J-364-00022.

#### Comments

Questions 1 through 10 were previously completed and reported in the original Fukushima Seismic Walkdown Report.

Evaluated by:

Curtis Stundebek



Date:

11/15/13

Randall Wilson

11/15/13



Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SENY0060A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Excore Neutron Detector Amplifier

**Photos**



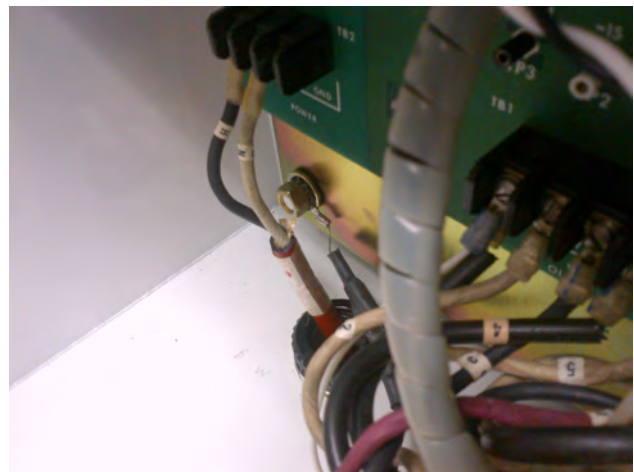
SENY0060A Photo 1



SENY0060A Photo 2



SENY0060A Photo 3



SENY0060A Photo 4

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: SENY0060A

Equipment Class: (20) Instrumentation and Control Panels and Cabinets

Equipment Description: Excore Neutron Detector Amplifier



SENY0060A Photo 5



Status: ☒ Y ☐ N ☐ U

### Seismic Walkdown Checklist (SWC)

Equipment ID No.: XNG05

Equipment Class: (4) Transformers

Equipment Description: Feed MCC NG05E

Location (Bldg, Elev, Room/Area): ESW Pumphouse, 2000', Rm. U104

Manufacturer/Model:

#### 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.

#### Anchorage

1. Is anchorage configuration verification required (i.e. is the item one of the 50% of SWEL items requiring such verification)? Yes
2. Is the anchorage free of bent, broken, missing or loose hardware? Y N U N/A
3. Is the anchorage free of corrosion that is more than mild surface oxidation? Yes  
*Plug welds in structural channel were found to be at locations where coating is different than original. Welds appear to have been ground smooth and areas recoated. Welds were not located during original walkdowns due to being ground smooth. Anchorage is in good condition.*
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.) Yes  
*Four plug weld locations identified on each side of transformer structural C-channel base. Configuration is in accordance with Dwg. E-075-00003.*
6. Based on the above anchorage evaluations, is the anchorage free of potentially adverse seismic conditions? Yes

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: XNG05

Equipment Class: (4) Transformers

Equipment Description: Feed MCC NG05E

**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 |
| 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 | N/A |

**Other Adverse Conditions**

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

**Comments**

Only answered questions previously marked as "Unknown" (Questions 3, 5 and 6) during initial walkdowns due to not locating anchorage.

Evaluated by:	<u>Curtis Stundebek</u> 	Date:	<u>9/30/13</u>
	<u>Randall Wilson</u> 		<u>09/30/13</u>

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: XNG05

Equipment Class: (4) Transformers

Equipment Description: Feed MCC NG05E

**Photos**



XNG05 Photo 1



XNG05 Photo 2



XNG05 Photo 3



XNG05 Photo 4

Status: ☒ Y ☐ N ☐ U

**Seismic Walkdown Checklist (SWC)**

Equipment ID No.: XNG05

Equipment Class: (4) Transformers

Equipment Description: Feed MCC NG05E



XNG05 Photo 5

## **APPENDIX B AREA WALK-BY CHECKLISTS (AWCs)**

This appendix provides only the AWCs from the at-power Seismic Walkdowns performed the week of September 10, 2012, that were revised related to FAQ 4.20, plus the AWCs resulting from the walkdowns performed between March 2013 and August 2013. The AWCs from the at-power Seismic Walkdowns that are not contained herein can be found in Appendix B of the original report - Reference 35 (“Ameren Missouri Callaway Energy Center Post-Fukushima NTTF 2.3 Seismic Walkdown Submittal Report”).



Status: ☒ Y ☐ N ☐ U

### Area Walk-By Checklist (AWC)

Location (Bldg, Elev, Room/Area): Reactor Building, 2000', 'A' Loop Outside Biowall

#### 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.

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
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 appears 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
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

Status: ☒ Y ☐ N ☐ U

**Area Walk-By Checklist (AWC)**

Location (Bldg, Elev, Room/Area): Reactor Building, 2000', 'A' Loop Outside Biowall

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

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

**Comments**

Area walk-by for components EPHV8808A and AELT0501.

**Photos**

Evaluated by:

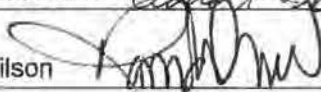
Curtis Stundbeck



Date:

9/30/13

Randall Wilson



09/30/13

Status ☒ Y ☐ N ☐ U

### Area Walk-By Checklist (AWC)

Location (Bldg, Elev, Room/Area): Reactor Building, 2026', Pressurizer Area, Outside Biowall

#### 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.

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
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 appears 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  
*Gai-tronics speaker located in the area. Speaker is securely mounted to concrete wall. No seismic concerns noted.*
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
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

Status: ☒ Y ☐ N ☐ U

**Area Walk-By Checklist (AWC)**

Location (Bldg, Elev, Room/Area): Reactor Building, 2026', Pressurizer Area, Outside Biowall

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

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

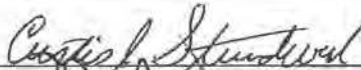
**Comments**

Area walk-by for component BBPT0455.

**Photos**

Evaluated by:

Curtis Stundbeck



Date:

9/30/13

Randall Wilson



09/30/13

Status ☒ Y ☐ N ☐ U

**Area Walk-By Checklist (AWC)**

Location (Bldg, Elev, Room/Area): Reactor Building, 2026', 'A' Loop Outside Biowall

**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.

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
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 appears 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
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



Status: ☒ Y ☐ N ☐ U

**Area Walk-By Checklist (AWC)**

Location (Bldg, Elev, Room/Area): Reactor Building, 2026', 'A' Loop Outside Biowall

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

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

**Comments**

Area walk-by for component AELT0518.

**Photos**

Evaluated by:

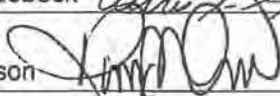
Curtis Stundebek



Date:

9/30/13

Randall Wilson



09/30/13

Status ☒ Y ☐ N ☐ U

### Area Walk-By Checklist (AWC)

Location (Bldg, Elev, Room/Area): Reactor Building, 2047', 'C' Loop Outside Biowall

#### 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.

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
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 appears 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
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

Status ☒ Y ☐ N ☐ U

**Area Walk-By Checklist (AWC)**

Location (Bldg, Elev, Room/Area): Reactor Building, 2047', 'C' Loop Outside Biowall

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

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

**Comments**

Area walk-by for component CGN03A.

**Photos**

Evaluated by:

Curtis Stundbeck



Date:

9/30/13

Randall Wilson



09/30/13

**APPENDIX C**  
**LICENSING BASIS EVALUATION SUMMARY**

Item No.	Item Tag/ID	Item Description	Problem Description	Status	Resolution
1	AWC-CB-2047.5-3605	Area Walk-By	<p>1) Storage Cabinet with 9.5" from RJ050F (RFR No. 17572A).</p> <p>2) Gap between SA075A and SA066A is 1/4".</p> <p>3) Ladder near RP068 will knock against cabinet (RFR 15112A).</p> <p>4) Three Drawer filing cabinets against SB030B. Storage cabinet (78" tall) is 13" away from RP053EB.</p>	N	<p>1) This is Item 8 on Drawing M-2G052. This item was addressed on page 15 of RFR 17572A. There is no adverse seismic concern.</p> <p>2) Cabinet SA066A is considered rigid in its strong axis direction. Cabinet SA075A will oscillate in its weak axis direction. Since depth is 24", it is conservatively assumed to have a frequency of 10.8 Hz (Per NP-7146-SLR1) at Elev. 2047.5'. Callaway East SSE Response Spectra is used with 10.8Hz frequency and a 1.0g is extracted. Using a SF of 1.6, Damping of 3%, the response maximum displacement will be 0.15"&lt;0.25". There is no adverse seismic concern. This conclusion is based on the use of the component displacement equation described on pg 5-1 and obtained from Reference 33.</p> <p>3) Ladder will be addressed in CAR 201206775. Restraint will be corrected, no job required. CEC reports that this action in CAR 201206775 has been closed.</p> <p>4) These are items 13 and 14 on Dwg M-2G052. Item 13 (6' Supply Cabinet) is restrained with shallow wall anchors per note on drawing. The associated RFR 15112A states to provide a restraint having strength of 2.5 times the weight of the item and contents. For Item 14, the 3 drawer filing cabinet; the Seismic II/I evaluation on Page 4 of 7, specifically paragraph 5 documents the approval to store this item. There is no adverse seismic concern.</p>



Item No.	Item Tag/ID	Item Description	Problem Description	Status	Resolution
2	CEF01A	ESW ULTIMATE HEAT SINK COOLING TOWER FAN A	Degradation is visible in anchorage.	N	CAR 201206518 was initiated with job No. 12004830 to investigate the extent of condition. CEC reports that CAR 201206518 has been closed. Jobs 12004830, 12004831, 12004832 and 12004833 have been initiated to clean and re-coat the fan base hub of CEF01A, CEF01B, CEF01C and CEF01D, respectively.
3	JELT0001	EMERG F/O DAY TK A LEV XMTR	1/2" gap between mounting structure and unistrut.	Y	The 1/2" gap between the mount structure (TS 6 x 6 x 1/2) and the unistrut bracket is approximately 40" high with approximately 30lbs on edge of mount structure and self-weight. The fundamental frequency of the mount was calculated using the equation $f_n = (1/2 * \pi) * \sqrt{3EI/mL^3} = 65 \text{ Hz}$ , where $L=40"$ and $I=48.3 \text{ in}^4$ , $m = (30\text{lbs} + 42.1\text{lbs} * 3.33') / 386 = 4.4\text{E-4}$ . This corresponds to a spectral acceleration of 0.3g. The maximum top displacement was then calculated to be $6.9\text{E-4} < 1/2"$ . Therefore, no adverse condition exists. This conclusion is based on the use of the component displacement equation described on pg 5-1 and obtained from Reference 33.
4	AWC-AUX-1974-1126	Area Walk-By	Instrument tubing support with no grout under base plate EMC0001 (Permanently removed from service)	N	CAR 201206775 was created to investigate if there are any safety related items in the room that could have seismic interaction issues with the tubing support. CEC reports that CAR 201206775 has been closed. The instrument tubing support has determined to have no adverse seismic interaction impact with safety related equipment.

Item No.	Item Tag/ID	Item Description	Problem Description	Status	Resolution
5	EEC01A	FUEL POOL COOLING HEAT EXCHANGER	Most nuts are not seated in contact with saddle base (Raised 1/16")	N	Review of the installation records indicated that this was the correct configuration. CAR 201206775 was initiated. CEC reports that this action in CAR 201206775 has been closed.
6	PEC01A	FUEL POOL COOLING PUMP	Missing Washers for all anchor bolts	N	A review of additional design basis documents indicated the condition was acceptable. CAR 201206775 was initiated. CEC reports that this action in CAR 201206775 has been closed.
7	SGK05A	CLASS IE ELEC EQUIP A/C UNIT	Two bolts and skid are corroded and area is damp.	N	CAR 201207170 was initiated. CEC reports that CAR 201207170 has been closed to Job 12004112
8	NN13	7.5 KVA	Light on chains supported on ceiling can swing into cabinet	Y	CAR 20126775 was initiated and examined the seismic interaction effect between NN13 and the Light support. Light on chains supported on ceiling can swing into cabinet. Investigation concluded that no significant effect will occur. Hence, no adverse seismic concern. CEC reports that this action in CAR 201206775 has been closed.
9	AWC-CB-2016-3414	Area Walk-By	1/2" gap between NK03 and NK73	Y	Cabinet NK03 is considered rigid in its strong axis direction. Cabinet NK73 will oscillate in its weak axis direction. Since the depth is just 17", it is conservatively assumed to have a low frequency range with the peak response acceleration at elevation 2016'. Callaway East SSE Response Spectra is used with 8Hz frequency and a 1.6g is extracted. Using a SF of 1.6, Damping of 3%, the response maximum displacement will be 0.39"<0.5". Therefore, there is no adverse seismic concern. This conclusion is based on the use of the component displacement equation described on pg 5-1 and obtained from Reference 33.

Item No.	Item Tag/ID	Item Description	Problem Description	Status	Resolution
10	AWC-CB-1974- 3101	Area Walk-By	Pipe support base (West leg of 1st support North of EFHV0040) has 2 bolts and nuts with significantly smaller sizes (3/4" compared to 1-1/4")	Y	Document MTDN 2ct-0599-MH, (Roll 1762, Frame 899) evaluated the bolts and concluded that they were satisfactory. There is no adverse seismic concern.
11	AWC-AUX-2047.5-1506	Area Walk-By	Vertical support 6 ft north of GFV0702 is missing two base plate nuts and one bolt has less than a full nut engagement.	N	CAR 201207502 was initiated; Corrective Job 12005523. CEC reports that CAR 201207502 has been closed and that Job 12005523 has been completed.
12	AWC-AUX-2047.5-1513	Area Walk-By	1) Two vertical supports to tubing adjacent to GLPD10101 are missing nuts and washers. 2) Bolt situation for GKRE004 is similar to GTRE0032	N	1) CAR 201207502 was initiated; Corrective Job 12005524. CEC reports that CAR 201207502 has been closed and that Job 12005524 has been completed. 2) Drawing J-361-00314 addresses the bolt situation for GKRE004.
13	TEG01A	CCW SURGE TANK A	Two valves (top and bottom) of tank are connected to a vertical pipe that is supported at close intervals. Pipe stress analysis may have been done to check pipe flexibility.	Y	From the Equipment Qualification Report M-105A-68 (page 4A), it specifies that the natural frequency in any direction is greater than 33 Hz, from which it is concluded in page 5A that the equipment is rigidly connected at the support legs. Hence no differential movement will be encountered between the tank and the pipe and the pipe is judged to be adequate for flexibility concerns. There is no adverse seismic concern.

Item No.	Item Tag/ID	Item Description	Problem Description	Status	Resolution
14	NK01	125 VDC BUS SWITCHBOAR D	<p>1) Cabinet NK71 has 1/8" gap to equipment side bolts.</p> <p>2) 1-1/2" gap between pipe (with threaded connections) on penetration OP41W0340 and equipment, pipe is flexible in the lateral direction and free to knock the cabinet.</p> <p>3) Anchorage was invisible during the walkdown</p>	Y	<p>1) Cabinet NK01 will oscillate in its strong axis direction. It is assumed to have a high frequency range. Callaway East SSE Response Spectra is used with 12Hz frequency and a 0.4g is extracted. Using a SF of 1.6, Damping of 3%, the combined response maximum displacement for both cabinets will be 0.09"&lt;0.125". There is no adverse seismic concern. This conclusion is based on the use of the component displacement equation described on pg 5-1 and obtained from Reference 33.</p> <p>2) The fundamental frequency of the pipe was calculated as a simply supported beam using the equation <math>f_n = (1/2 * \pi) * \sqrt{48EI/mL^3}</math> =21 Hz, where L=216", m=(630lbs/386.4), I=200 in<sup>3</sup>. This corresponds to a spectral acceleration of 0.3g. The maximum top displacement was then calculated to be 6.7E-3 &lt; 1-1/2". There is no adverse seismic concern. This conclusion is based on the use of the component displacement equation described on pg 5-1 and obtained from Reference 33.</p> <p>3) A follow up walkdown was completed per job 12004989 and the revised checklist is attached in Appendix A.</p>

Item No.	Item Tag/ID	Item Description	Problem Description	Status	Resolution
15	NK41	DIST 125 VDC	1) A 5/8" gap between equipment and NK51 2) Anchorage was invisible during the walkdown	Y	1) Cabinet NK041 and adjacent cabinet will oscillate in their strong axis direction. They are assumed to have a high frequency range. Callaway East SSE Response Spectra is used with 12Hz frequency and a 0.4g is extracted. Using a SF of 1.6, Damping of 3%, the combined response maximum displacement for both cabinets will be 0.09"<0.625". There is no adverse seismic concern. This conclusion is based on the use of the component displacement equation described on pg 5-1 and obtained from Reference 33. 2) A follow up walkdown was completed per job 12004989 and the revised checklist is attached in Appendix A.



Item No.	Item Tag/ID	Item Description	Problem Description	Status	Resolution
16	AWC-CB-2000-3302	Area Walk-By	Cabinet NK76 has a 1/4" gap to cabinet NK26.	Y	Cabinet NK76 and adjacent cabinet will oscillate in their strong axis direction. They are assumed to have a high frequency range. Callaway East SSE Response Spectra is used with 12Hz frequency and a 0.4g is extracted. Using a SF of 1.6, Damping of 3%, the combined response maximum displacement for both cabinets will be 0.09"<0.25". There is no adverse seismic concern. This conclusion is based on the use of the component displacement equation described on pg 5-1 and obtained from Reference 33.
17	AWC-AUX-2047.5-1501	Area Walk-By	Degraded Condition for anchor bolts of SGK04B.	N	CAR 201207170 was initiated to clean the corrosion off the bolts. CEC reports that CAR 201207170 has been closed to Job 12001591.
18	NF039A	CONT SHED/SEQ CH 1 LOGIC	Open S-Hooks Nearby	N	CAR 201206436 was initiated to resolve. CEC reports that CAR 201206436 has been closed to Job 12004790.

**STATUS KEY:**

Y – (Yes) The Seismic Licensing Basis is satisfied and no adverse seismic condition exists.

N – (No) As a result of the walkdown inspection, a corrective action was required.

## **APPENDIX D PEER REVIEW CHECKLISTS**

There were no changes to this appendix. The Peer Review Checklist can be found in Appendix D of the original report - Reference 35 (“Ameren Missouri Callaway Energy Center Post-Fukushima NTTF 2.3 Seismic Walkdown Submittal Report”).

## **APPENDIX E**

### **BASE LIST 1**

There were no changes to this appendix. The Peer Review Checklist can be found in Appendix E of the original report - Reference 35 (“Ameren Missouri Callaway Energy Center Post-Fukushima NTTF 2.3 Seismic Walkdown Submittal Report”)

## **APPENDIX F**

### **SWEL 1**

There were no changes to this appendix. The Peer Review Checklist can be found in Appendix F of the original report - Reference 35 (“Ameren Missouri Callaway Energy Center Post-Fukushima NTTF 2.3 Seismic Walkdown Submittal Report”).

## **APPENDIX G CALLAWAY COMPOSITE SWEL**

There were no changes to this appendix. The Peer Review Checklist can be found in Appendix G of the original report - Reference 35 (“Ameren Missouri Callaway Energy Center Post-Fukushima NTTF 2.3 Seismic Walkdown Submittal Report”).



## **APPENDIX H QUALIFICATIONS**

This appendix contains only the qualifications of new personnel involved with the walkdowns performed between March 2013 and August 2013. The qualifications of personnel involved with the at-power Seismic Walkdowns and Area Walk-Bys performed the week of September 10, 2012 can be found in Appendix H of the original report - Reference 35 (“Ameren Missouri Callaway Energy Center Post-Fukushima NTTF 2.3 Seismic Walkdown Submittal Report”).

## Seismic Walkdown and SWEL Development Résumés

### Timothy W. Solberg

#### Education

**2010 – 2011** *Stanford University, Stanford, California*

Master of Science, Structural Engineering (MS)

**2005 – 2009** *Rice University, Houston, Texas*

Bachelor of Science, Civil and Environmental Engineering (BSCE)

#### Professional Capabilities

Earthquake hazard and risk analysis

Seismic design of structural systems

Structural design and analysis of steel and concrete structures

Dynamic analysis of structures

Completed EPRI Fundamentals of Equipment Seismic Qualification Training

Completed NTTF Recommendation 2.3 Plant Seismic Walkdown Training

#### Professional History

**2012 – Present** *Wolf Creek Nuclear Operating Corporation, Burlington, Kansas*

Design Engineer

**2011 – 2012** *Risk Management Solutions, Inc., Hoboken, New Jersey*

Risk Analyst

#### Experience Summary

##### *Wolf Creek Nuclear Operating Corporation*

Mr. Solberg has participated in various civil, structural, and seismic engineering tasks while at Wolf Creek. He has developed experience in civil/structural design and supports in addition to seismic analyses and evaluations of plant systems and components. He has supported the Fukushima NTTF 2.3 Seismic walkdowns at Wolf Creek as well as provided support for its 2.1 seismic effort.

##### *Risk Management Solutions, Inc.*

Mr. Solberg worked with a risk assessment company to accurately predict building and casualty losses that would arise from natural and man-made catastrophes. He worked on using theory from the hazards of earthquakes, hurricanes, and other extreme events to quantify the potential vulnerability and damage to structures and their inhabitants, and interpreting these results to clients.

Tim Solberg  
Page 2



# *Certificate of Completion*

## **Tim Solberg**

**Training on Near Term Task Force  
Recommendation 2.3  
- Plant Seismic Walkdowns**

July 11, 2013

Date

*R.P. Kassawara*

Robert K. Kassawara  
EPRI Manager,  
Structural Reliability & Integrity

## Peer Review Team Résumés

### GARY L. DOUGLAS

Principal Engineer, Risk Applications & Methods  
Westinghouse Nuclear Services Division

#### Education:

B.S. Oceanography	U.S. Naval Academy
Nuclear Power Program	United States Navy
M.Eng. Materials Science	Cornell University

#### Summary:

Mr. Douglas is a Principal Engineer in the Risk Applications and Methods Group of the Systems & Risk Applications Engineering Department of Westinghouse's Nuclear Services Division. He has 14 years of experience with PWR design, including qualifications in the Navy Nuclear Power Program. He has safety analysis experience in the Nuclear Power and Aerospace Industries. He worked as an engineer for 9 years at South Texas Project Electric Generating Station, with emphasis on root cause analysis, reliability engineering, systems engineering and PRA applications analysis. He worked as an engineer for 10 years at Hamilton Sundstrand, with emphasis on root cause analysis, FMEA, and safety hazards analysis of jet engine controls and space & submarine life support systems.

Specifically, Mr. Douglas's prior engineering experience as an engineer in the Navy Nuclear Power Program and at South Texas Project Electric Generating Station has afforded him plant-wide hands-on experience with all safety and non-safety related equipment comprising military and commercial nuclear steam supply systems.

Mr. Douglas is presently involved in PSA applications activities for several plant sites, with emphasis on External Events and Internal Flooding PRA Modeling. He recently completed a site visit to Fort Calhoun Station for the purpose of performing verification walkdowns of systems supporting the station's PRA model.

Some of the recognitions Mr. Douglas has achieved over his career include the following: Distinguished Midshipman Award, 1983; Advanced Root Cause Analysis Certified, 1996; INPO Recognition as South Texas Project Plant Doctor, 1997; AS9100 Certified Quality Engineer, 2005; NASA Environmental Controls & Life Support Systems Award, 2011 (for contributions to the Oxygen Generation System aboard the International Space Station).