Enclosure 2

Seismic Walkdown Report In Response To The 50.54(f) Information Request Regarding Fukushima Near-Term Task Force Recommendation 2.3: Seismic for the Braidwood Station, Unit 2
Report Number: 12Q0108.10-R-002, Revision 0

(616 pages)

SEISMIC WALKDOWN REPORT

IN RESPONSE TO THE 50.54(f) INFORMATION REQUEST REGARDING FUKUSHIMA NEAR-TERM TASK FORCE RECOMMENDATION 2.3: SEISMIC

for the

BRAIDWOOD NUCLEAR POWER STATION UNIT 2
35100 South Route 53, Braceville, Illinois, 60407
Facility Operating License No. NPF-77
NRC Docket No. STN 50-457
Correspondence No.: RS-12-159

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Report Number: 12Q0108.10-R-002, Rev. 0

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Executive Summary

The purpose of this report is to provide information as requested by the Nuclear Regulatory Commission (NRC) in its March 12, 2012 letter issued to all power reactor licensees and holders of construction permits in active or deferred status. (Ref. 6) In particular, this report provides information requested to address Enclosure 3, Recommendation 2.3: Seismic, of the March 12, 2012 letter. (Ref. 6)

Following the accident at the Fukushima Dai-ichi nuclear power plant resulting from the March 11, 2011, Great Tohoku Earthquake and subsequent tsunami, the NRC established the Near Term Task Force (NTTF) in response to Commission direction. The NTTF issued a report - *Recommendations for Enhancing Reactor Safety in the 21st Century: The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident* - that made a series of recommendations, some of which were to be acted upon "without unnecessary delay." (Ref. 11) On March 12, 2012, the NRC issued a letter to all power reactor licensees in accordance with 10CFR50.54(f). The 50.54(f) letter requests information to assure that certain NTTF recommendations are addressed by all U.S. nuclear power plants. (Ref. 6) The 50.54(f) letter requires, in part, all U.S. nuclear power plants to perform seismic walkdowns to identify and address degraded, non-conforming or unanalyzed conditions and to verify the current plant configuration is within the current seismic licensing basis. This report documents the seismic walkdowns performed at Braidwood Generating Station Unit 2 in response, in part, to the 50.54(f) letter issued by the NRC.

The Nuclear Energy Institute (NEI), supported by industry personnel, cooperated with the NRC to prepare guidance for conducting seismic walkdowns as required in the 50.54(f) letter, Enclosure 3, Recommendation 2.3: Seismic. (Ref. 6) The guidelines and procedures prepared by NEI and endorsed by the NRC were published through the Electric Power Research Institute (EPRI) as EPRI Technical Report 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic,* dated June 2012; henceforth, referred to as the "EPRI guidance document." (Ref. 1) Exelon/Braidwood has utilized this NRC endorsed guidance as the basis for the seismic walkdowns and this report. (Ref. 1)

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
- Seismic Licensing Basis Evaluations
- IPEEE Vulnerabilities Resolution Report
- Peer Review

Seismic Licensing Basis

The Seismic Licensing Basis is briefly described in Section 2 of this report. The maximum horizontal and vertical ground accelerations at the foundation level are 20% of gravity for the safe shutdown earthquake (SSE). (Ref. 2 section 3.7.1.1)

Personnel Qualifications

Personnel qualifications are discussed in Section 3 of this report. The personnel who performed the key activities required to fulfill the objectives and requirements of the 50.54(f) letter are qualified and trained as required in the EPRI guidance document. (Ref. 1) These personnel are responsible for:

- Selecting the SSCs that should be placed on the Seismic Walkdown Equipment List (SWEL),
- Performing the Seismic Walkdowns and Area Walk-Bys,
- Performing the seismic licensing basis evaluations, as applicable,
- Identifying the list of plant-specific vulnerabilities identified during the IPEEE program and describing the actions taken to eliminate or reduce them,
- Performing the peer reviews

Selection of SSCs

Selection of SSCs is discussed in Section 4 of this report. The process used to select the items that were included in the overall Seismic Walkdown Equipment List (SWEL) is described in detail in the EPRI guidance document, Section 3: Selection of SSCs. (Ref. 1) The SWEL is comprised of two groups of items, which are described at a high level in the following subsections.

Sample of Required Items for the Five Safety Functions – SWEL 1

Screen #1 narrowed the scope of SSCs in the plant to those that are designed to Seismic Category I requirements because they have a seismic licensing basis.

Screen #2 narrowed the scope of SSCs by selecting only those that do not regularly undergo inspections to confirm that their configuration continues to be consistent with the plant licensing basis.

Screen #3 narrowed the scope of SSCs included on SWEL 1 as only those associated with maintaining the five safety functions. These five safety functions include the four safe shutdown functions (reactor reactivity control, reactor coolant pressure control, reactor coolant inventory control, and decay heat removal, which includes the Ultimate Heat Sink), plus the containment functions.

Screen #4 was a process intended to result in a SWEL 1 that sufficiently represented the broader population of plant equipment and systems needed to meet the objectives of the 50.54(f) letter. The following five sample attributes were used:

- A variety of types of systems
- Major new or replacement equipment
- A variety of types of equipment
- A variety of environments

- Equipment enhanced due to vulnerabilities identified during the IPEEE program

Spent Fuel Pool Related Items – SWEL 2

Screen #1 and Screen #2 were used to narrow the scope of spent fuel pool related SSCs to those that have a seismic licensing basis and those that are appropriate for an equipment walkdown process. Screen #3 was a process intended to result in SWEL 2 that sufficiently represents the broader population of spent fuel pool Seismic Category I equipment and systems to meet the objectives of the 50.54(f) letter, and included the following sample selection attributes:

- A variety of types of systems
- Major new or replacement equipment
- A variety of types of equipment
- A variety of environments

Screen #4 identified items of the spent fuel pool that could potentially cause a rapid drain-down of the pool, even if such items are not Seismic Category I. Rapid drain-down is defined as lowering of the water level to the top of the fuel assemblies within 72 hours after the earthquake. Any items identified as having the potential for rapidly draining the spent fuel pool were to be added to SWEL 2.

For Braidwood Unit 2, the SWEL is comprised of:

- SWEL 1 resulted with 106 items for walkdown.
- SWEL 2 resulted with 23 items for walkdown.
- No items associated with spent fuel pool rapid drain-down are included on SWEL 2.

Seismic Walkdowns and Area Walk-Bys

Section 5, Appendix C, and Appendix D of this report documents the equipment Seismic Walkdowns and the Area Walk-Bys. The online seismic walkdowns for Braidwood Unit 2 were performed during the week of July 30, 2012. During the walkdown activities, the walkdown team consisted of two (2) Seismic Walkdown Engineers (SWEs), a station Equipment Operator, and various station personnel.

The seismic walkdowns focused on the seismic adequacy of the items on the SWEL. The walkdowns focused on the following:

- Adverse anchorage conditions
- Adverse seismic spatial interactions
- Other adverse seismic conditions (e.g., degradation, configuration, etc.,)

Area Walk-Bys were conducted in each area of the plant that contained an item on the SWEL (generally within 35 feet of the SWEL component). The Area Walk-By was performed to identify potentially adverse seismic conditions associated with other SSCs located in the vicinity of the SWEL item. The key examination factors that were considered in the Area Walk-Bys included the following:

- Anchorage conditions (if visible without opening equipment)

- Significantly degraded equipment in the area
- Potential seismic interaction
- A visual assessment (from the floor) of cable/conduit raceways and HVAC ducting (e.g., condition of supports or fill conditions of cable trays)
- Potential adverse interactions that could cause flooding/spray and fire in the area
- Other housekeeping items, including temporary installations

The seismic walkdown team inspected 111 of the 129 components on the SWEL (comprised of SWEL 1 and SWEL 2). Walkdowns for 18 components were deferred due to accessibility issues such as being located in containment or energized equipment. The 18 remaining items will be inspected during a unit outage or another time when the equipment is accessible, as required. Anchorage verification was required for a minimum of 33 components. (Ref. 1) A total of 40 anchorage configurations were confirmed to be installed in accordance with the station documentation and an additional 3 anchor configurations will be confirmed as the 18 deferred items are inspected.

Following the completion of the online seismic walkdowns, the industry was made aware that the NRC staff had clarified a position on opening electrical cabinets to inspect for other adverse seismic conditions. Supplemental inspections of 38 electrical cabinets are planned and will be completed, as required, during a unit outage or another time when the equipment becomes accessible. The list of electrical cabinets along with the milestone completion schedule is provided in Table E-2.

During the seismic walkdowns at the Braidwood Unit 2 eleven (11) Issue Reports (IRs) were issued. After evaluation through the CAP, it was determined that none of the issues identified in the IRs were adverse seismic conditions.

Seismic Licensing Basis Evaluations

The EPRI guidance document, Section 5: Seismic Licensing Basis Evaluation provides a detailed process to perform and document seismic licensing basis evaluations of SSCs identified when potentially adverse seismic conditions are identified. The process provides a means to identify, evaluate and document how the identified potentially adverse seismic condition meets a station's seismic licensing basis without entering the condition into a station's Corrective Action Program (CAP). In lieu of this process, Exelon/Braidwood utilized the existing processes and procedures (Site CAP Expectations) to identify, evaluate and document conditions identified during the Seismic Walkdowns.

In accordance with Exelon/Braidwood processes and procedures, all questionable conditions identified by the SWEs during the walkdowns were entered into the station CAP to be further evaluated and addressed as required. The SWEs provided input to support the identification and evaluation (including seismic licensing basis evaluations, as required) of the potentially adverse seismic conditions entered into the CAP. The station corrective action program is a more robust process than that provided in the EPRI guidance document; in part, ensuring each condition is properly evaluated for conformance with design and licensing bases and corrected as required.

Conditions identified during the walkdowns were documented on the Seismic Walkdown Checklists (SWCs), Area Walk-By Checklists (AWCs), and entered into the CAP. For those conditions that required, seismic licensing basis evaluations were completed and

documented within the IR. Tables 5-2 and 5-3 in the report provide the IR, a summary of the condition, and the action completion status.

IPEEE Vulnerabilities

IPEEE vulnerabilities are addressed in Section 7 and Appendix G of this report. No vulnerabilities were identified as a result of the effort that addressed the Individual Plant Examination of External Events (IPEEE). (Ref. 3 and 5) However, plant improvements were identified in section 7 of Reference 3. Table G-1 provides the list of plant improvements, the IPEEE proposed resolution, the actual resolution and resolution date.

Peer Reviews

A peer review team consisting of at least two individuals was assembled and peer reviews were performed in accordance with Section 6: Peer Reviews of the EPRI guidance document. The Peer Review process included the following activities:

- Review of the selection of SSCs included on the SWEL
- Review of a sample of the checklists prepared for the Seismic Walkdowns and Area Walk-Bys
- Review of licensing basis evaluations, as applicable
- Review of the decisions for entering the potentially adverse conditions into the CAP process
- Review of the submittal report
- Provided a summary report of the peer review process in the submittal report

Section 8 of this report contains a summary of the Peer Review. The Peer Review determined that the objectives and requirements of the 50.54(f) letter are met. Further, it was concluded by the peer reviews that the efforts completed and documented within this report are in accordance with the EPRI guidance document.

Summary

In summary, seismic walkdowns have been performed at the Braidwood Generating Station Unit 2 in accordance with the NRC endorsed walkdown methodology. All potentially degraded, nonconforming, or unanalyzed conditions identified as a result of the seismic walkdowns have been entered into the corrective action program.

Evaluations of the identified conditions are complete and documented within the CAP. These evaluations determined the Seismic Walkdowns resulted with no adverse anchorage conditions, no adverse seismic spatial interactions, and no other adverse seismic conditions associated with the items on the SWEL. Similarly, the Area Walk-Bys resulted with no adverse seismic conditions associated with other SSCs located in the vicinity of the SWEL item(s).

The Seismic Walkdowns identified eleven (11) minor conditions. Other than these minor conditions, the Seismic Walkdowns identified no degraded, nonconforming, or unanalyzed conditions that required either immediate or follow-on action. No planned or newly identified protection or mitigation features have resulted from the efforts to address the 50.54(f) letter.

Follow-on activities required to complete the efforts to address Enclosure 3 of the 50.54(f) letter include inspection of 18 items deferred due to inaccessibility along with

supplemental inspections of 38 electrical cabinets. Area Walk-Bys will be complete, as required, during these follow-on activities.

All IPEEE plant improvements and associated actions are complete.

1 Introduction

1.1 PURPOSE

The purpose of this report is to provide information as requested by the Nuclear Regulatory Commission (NRC) in its March 12, 2012 letter issued to all power reactor licensees and holders of construction permits in active or deferred status. (Ref. 6) In particular, this report provides information requested to address Enclosure 3, Recommendation 2.3: Seismic, of the March 12, 2012 letter. (Ref. 6)

1.2 BACKGROUND

Following the accident at the Fukushima Dai-ichi nuclear power plant resulting from the March 11, 2011, Great Tohoku Earthquake and subsequent tsunami, the NRC established the Near Term Task Force (NTTF) in response to Commission direction. The NTTF issued a report - *Recommendations for Enhancing Reactor Safety in the 21st Century: The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident* - that made a series of recommendations, some of which were to be acted upon "without unnecessary delay." (Ref. 11) On March 12, 2012, the NRC issued a letter to all power reactor licensees in accordance with 10CFR50.54(f). The 50.54(f) letter requests information to assure that certain NTTF recommendations are addressed by all U.S. nuclear power plants. (Ref. 6) The 50.54(f) letter requires, in part, all U.S. nuclear power plants to perform seismic walkdowns to identify and address degraded, non-conforming or unanalyzed conditions and to verify the current plant configuration is within the current seismic licensing basis. This report documents the seismic walkdowns performed at Braidwood Generating Station Unit 1 in response, in part, to the 50.54(f) letter issued by the NRC.

The Nuclear Energy Institute (NEI), supported by industry personnel, cooperated with the NRC to prepare guidance for conducting seismic walkdowns as required in the 50.54(f) letter, Enclosure 3, Recommendation 2.3: Seismic. (Ref. 6) The guidelines and procedures prepared by NEI and endorsed by the NRC were published through the Electric Power Research Institute (EPRI) as EPRI Technical Report 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic,* dated June 2012; henceforth, referred to as the "EPRI guidance document." (Ref. 1) Exelon/Braidwood has utilized this NRC endorsed guidance as the basis for the seismic walkdowns and this report. (Ref. 1)

1.3 PLANT OVERVIEW

The Braidwood nuclear power plant consists of two nearly identical generating units, and two pressurized water reactors (PWR) (NSSS) and turbine-generators furnished by Westinghouse Electric Corporation (Westinghouse). The reactor containments are of post-tensioned concrete construction with a carbon steel liner. Sufficient free volume is provided to contain the energy released in a major accident without need for "pressure

suppression" devices. Sargent & Lundy was responsible for containment design. (Ref. 2 section 1.1)

The Braidwood Station is located in northeastern Illinois, near the town of Braidwood and near the Kankakee River. Cooling for the plant is provided by a large man-made cooling pond of approximately 2500 acres constructed over a previously strip-mined area. Essential service cooling is provided by a 99-acre auxiliary cooling pond which is integral with the main pond. The fuel loading dates for the two units were October 1986 and December 1987 for Units 1 and 2, respectively. The corresponding dates for commercial operation were July 1988 and October 1988. (Ref. 2 section 1.1)

1.4 APPROACH

The EPRI guidance document is used for the Braidwood Generating Station Unit 2 engineering walkdowns and evaluations described in this report. In accordance with Reference 1, the following topics are addressed in the subsequent sections of this report:

- Seismic Licensing Basis
- Personnel Qualifications
- Selection of SSCs
- Seismic Walkdowns and Area Walk-Bys
- Licensing Basis Evaluations
- IPEEE Vulnerabilities Resolution Report
- Peer Review

1.5 CONCLUSION

Seismic walkdowns have been performed at the Braidwood Generating Station Unit 2 in accordance with the NRC endorsed walkdown methodology. All potentially degraded, nonconforming, or unanalyzed conditions identified as a result of the seismic walkdowns have been entered into the corrective action program.

Evaluations of the identified conditions are complete and documented within the CAP. These evaluations determined the Seismic Walkdowns resulted with no adverse anchorage conditions, no adverse seismic spatial interactions, and no other adverse seismic conditions associated with the items on the SWEL. Similarly, the Area Walk-Bys resulted with no adverse seismic conditions associated with other SSCs located in the vicinity of the SWEL item(s).

The Seismic Walkdowns identified eleven (11) minor conditions. Other than these minor conditions, the Seismic Walkdowns identified no degraded, nonconforming, or unanalyzed conditions that required either immediate or follow-on action. No planned or newly identified protection or mitigation features have resulted from the efforts to address the 50.54(f) letter.

Follow-on activities required to complete the efforts to address Enclosure 3 of the 50.54(f) letter include inspection of 18 items deferred due to inaccessibility along with supplemental inspections of 38 electrical cabinets. Area Walk-Bys will be complete, as required, during these follow-on activities.

2 Seismic Licensing Basis

2.1 OVERVIEW

This section of the report summarizes the seismic licensing basis for the Braidwood Generating Station Unit 1 and Unit 2. The safe shutdown earthquake and a summary of the codes, standards, and methods used in the design of Seismic Category I SSCs are presented. This section does not establish or change the seismic licensing basis of the facility and is intended to provide a fundamental understanding of the seismic licensing basis of the facility.

2.2 SAFE SHUTDOWN EARTHQUAKE (SSE)

The maximum horizontal and vertical ground accelerations at the foundation level are 20% of gravity for the safe shutdown earthquake (SSE). (Ref. 2 section 3.7.1.1)

2.3 DESIGN OF SEISMIC CATEGORY I SSCS

A full description of the Safe Shutdown Earthquake along with the codes, standards, and methods used in the design of the Seismic Category I SSCs for meeting the seismic licensing basis requirements is provided in the following Braidwood Station UFSAR sections:

- 3.2 Classification of Structures, Components, and Systems
- 3.7 Seismic Design
- Attachment 3.7A – Reevaluation and Validation of the Byron/Braidwood Seismic Design Basis
- 3.8 Design of Category I Structures
- 3.9 Mechanical Systems and Components
- 3.10 Seismic Qualification of Seismic Category I Instrumentation and Electrical Equipment 3.2 Classification of Structures, Components, and Systems

These UFSAR sections should be referred to for a detailed understanding of the seismic licensing basis.

Summary of Seismic Design

The site response spectra, which are defined at the ground surface, are given in section 2.5.2 of Reference 2 and are shown in UFSAR Figures 2.5-47 and 2.5-48 for the Braidwood site. Foundation level response spectra and time histories were generated by a deconvolution procedure described in section 3.7.1.2 of Reference 2. The maximum horizontal and vertical ground accelerations at the foundation level are 20% of gravity for the safe shutdown earthquake (SSE) and 9% of gravity for operating basis earthquake (OBE). The comparisons between the free field seismic design motion

applied at the surface and the corresponding foundation (rock) spectra for 2%, 3%, 4%, 5%, and 7% damping ratios are shown in UFSAR Figures 3.7-21 through 3.7-40 for the Braidwood site. (Ref. 2 section 3.7.1.1)

During the review of the FSAR for an Operating License, the Byron/Braidwood seismic design was reevaluated using the Regulatory Guide 1.60 spectra without the application of a deconvolution analysis. UFSAR Attachment 3.7A contains the specific NRC questions/responses on seismic design. These questions and responses document the historical evolution of certain aspects of the Byron/Braidwood seismic design. UFSAR Attachment 3.7A also provides the details and results of this reevaluation. It is concluded that the present seismic design of Byron/Braidwood is conservative. Based on the reevaluation described in UFSAR Attachment 3.7A, the Byron/Braidwood seismic design basis is acceptable and will therefore be used for all future seismic evaluations. (Ref. 2 section 3.7.1.1)

Seismic Class I structures are designed for seismic forces calculated from the aforementioned spectra using a response spectrum method of analysis. The directional combination rule uses three components of earthquake motions (two horizontal directions with vertical direction) combined by the square-root-sum-of-the-squares (SRSS) method. For evaluation of Seismic Class I components, In Structure Response Spectra (ISRS) are used. For horizontal directions, ISRS are generated using an input acceleration time history at the base (foundation) of mathematical models that represent the plant structures. (Ref. 3)

To determine the foundation (rock) level motion, the soil rock profile above the foundation was modeled as a one-dimensional continuous shear layer system. The ground surface spectra consistent time histories were applied at the ground surface and the foundation level motion was obtained using the SHAKE program. For all of the structures founded on rock, the foundation level motion was used directly to excite the fixed base model. (Ref. 3)

Summary of Codes and Standards

The information presented below has been extracted from the section 3.8 of Reference 2. This section summarizes the codes, specifications, standards of practice, and other accepted industry guidelines which are adopted to the extent applicable, in the design and construction of the following:

- Containment - the applicable codes, standards, and specifications for the containment are 1 through 23 in Table 2-1 below.
- Containment Internal Structures – all of the items listed in Table 2-1 below are applicable for the containment internal structures.
- Safety-Related Structures Outside of Containment - all of the items listed in Table 2-1 below are applicable, with the exception of Items 17 and 18.
- Foundations for Seismic Category I Structures - the applicable codes, standards, and specifications are 1 through 14 and 19 through 23 in Table 2-1 below.

Table 2-1. List of Standards, Codes, and Specifications

UFSAR Table 3.8-2 – List of Specifications, Codes, and Standards		
Specification Reference Number	Specification or Standard Designation	Title
1	ACI 318-71, 77, 83	Building Code Requirements for Reinforced Concrete
2	ACI 301	Specifications for Structural Concrete for Buildings
3	ACI 347 ANSI A145.1	Recommended Practice for Concrete Formwork
4	ACI 305 ANSI A170.1	Recommended Practice for Hot Weather Concreting
5	ACI 211.1	Recommended Practice for Selecting Proportions for Normal Weight Concrete
6	ACI 304	Recommended Practice for Measuring, Mixing, Transporting, and placing concrete
7	ACI 315	Manual of Standard Practice for Detailing Reinforced Concrete Structures
8	ACI 306	Recommended Practice for Cold Weather Concreting
9	ACI 309	Recommended Practice for Consolidation of Concrete
10	ACI 308	Recommended Practice for Curing Concrete
11	ACI 214 ANSI A146.1	Recommended Practice for Evaluation of Compression Test Results of Field
12	ACI 311	Recommended Practice for Concrete Inspection
13	ACI 304	Preplaced Aggregate Concrete for Structural and Mass Concrete
14	Report by ACI Committee 304	Placing Concrete by Pumping Method
15	AISC-69,78	Specification for the Design, Fabrication, and Erection of Structural Steel for Building
16	AWS D1.1	Structural Welding Code
17	ASME	Boiler & Pressure Vessel Code, Section III
	ASME-1971, S73	Division 1, Subsection NE
	ASME-1974, S75	Division 1, Subsection NF
	ASME-1973	Division 2, Proposed Standard Code for Concrete Reactor Vessels and Containments Issued for Trial Use and Comments
	ASME-1980	Division 2, CC 6000
	ASME-1992	1992 Addenda, Division 1, Section XI, Subsection IWL, IWE
18	American Public Health Assoc. (APHA)	Test Methods Sulphides in Water, Standard Methods for the Examination of Water and Waste Water
19	ASTM	Annual Books of ASTM Standards
20	CRSI MSP-1	Manual of Standard Practice

UFSAR Table 3.8-2 – List of Specifications, Codes, and Standards		
Specification Reference Number	Specification or Standard Designation	Title
21	ANSI N45.2.5	Proposed Supplementary Q.A. Requirements for Installation, Inspection and Testing of Structural Concrete and Structural Steel During Construction Phase of Nuclear Power Plants
22	CRD	Chief of Research and Development Standards, Department of the Army, Handbook for Concrete and Cement Volume I and II, Corps of Engineers U.S. Army
23	ACI-349-76, 85	Code Requirements for Nuclear Safety Related Concrete Structures
24	AISI	Specification for design of cold-formed steel structural members

Seismic qualification of Seismic Category I instrumentation and electrical equipment is in accordance with IEEE 344-1971 or IEEE 344-1975, IEEE Recommended Practices of Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations. (Ref. 2 section 3.10)

3 Personnel Qualifications

3.1 OVERVIEW

This section of the report identifies the personnel that participated in the NTTF 2.3 Seismic Walkdown efforts. A description of the responsibilities of each Seismic Walkdown participant's role(s) is provided in Section 2 of the EPRI guidance document. (Ref. 1) Resumes included in Appendix A provide detail on each person's qualifications for his or her role.

3.2 WALKDOWN PERSONNEL

Table 3-1 below summarizes the names and corresponding roles of personnel who participated in the NTTF 2.3 Seismic Walkdown effort.

Table 3-1. Personnel Roles

Name	Equipment Selection Engineer	Plant Operations	Seismic Walkdown Engineer (SWE)	Licensing Basis Reviewer	IPEEE Reviewer	Peer Reviewer
A. Perez	X					
K. Hull	X					
T.K. Ram						X(1)
M. Delaney			X	X		
P. Gazda			X	X		
B. Lory						X(2)
W. Djordjevic						X
R. Richard (Exelon)		X				
D. Shaw (Exelon Contractor)		X				
T. Bortolini (Exelon)				X	X	

Notes:
1. Peer Review Team member for SWEL review only.
2. Peer Review Team Leader.

3.2.1 Stevenson & Associates Personnel

The following provides a synopsis of each individual's background and experiences.

Antonio Perez, P.E.: Mr. Perez is a Senior Engineer III and serves as the General Manager of the S&A Hudson, WI office. He earned his Bachelor of Science degree in Mechanical Engineering at Michigan Technological University and is a licensed Professional Engineer in the states of Wisconsin and Minnesota. Mr. Perez has over 15 years of experience in project management, project engineering, equipment design, and mechanical systems design and has served in the nuclear power industry for over 11 years. He has extensive experience in Program and Design Engineering and has held positions such as MOV Engineer, Responsible Design Engineer, Design Engineering Supervisor and STA Trainee in the nuclear power industry. Mr. Perez has successfully completed the Near-Term Task Force Recommendation 2.3 – Plant Seismic Walkdowns Training Course.

Kim Hull: Mr. Hull is a Senior Engineer III in the S&A Hudson, WI office. He earned his Master of Science degree in Mechanical Engineering at Michigan State University. Mr. Hull has over 30 years of experience in the nuclear power industry and has held positions such as Shift Technical Advisor, Principal Engineer, Senior Instructor, and Mechanical Design Supervisor. He has an extensive background in all aspects of nuclear power plant modifications with a thorough understanding of configuration control/management along with design and licensing basis of nuclear power plants. Mr. Hull has successfully completed the Near-Term Task Force Recommendation 2.3 – Plant Seismic Walkdowns Training Course.

Tribhawan K. Ram, P.E.: Mr. Ram is a Senior Engineer III in the S&A Phoenix, AZ Office. He has over 28 year experience in the nuclear power industry with expertise in plant systems and design engineering. Currently, Mr. Ram is leading the electrical engineering effort in support of Post-Fukushima Seismic Margin Analysis (SMA) for two Taiwan nuclear stations (PWR and BWR). This effort, in support of the plant Safe Shutdown Equipment List (SSEL), consists of relay list development, relay screening (using GERS, SQURTS or other available testing data), and relay chatter analysis. Mr. Ram was involved in resolving USI A-46 relay outliers for several plants (Dresden, Quad Cities, Millstone, Palisades, and Pilgrim). He evaluated dozens of control circuits for relay chattering issues. To replace outliers, Mr. Ram developed and/or supervised the development of modification packages including: replacement relay selection; relay testing specification preparation; and seismic testing facility visits for relay qualification. As a systems manager, Mr. Ram conducted periodic system walkdowns to discover and then pursue resolutions for any design, maintenance or operational issues with equipment. He has developed test plans for circuit breaker and other electrical equipment replacement, including involvement in test plan execution during refueling outages. Mr. Ram has interfaced, with NRC in their biennial Component Design Basis Inspections (CDBI), and with INPO in their biennial evaluations. Mr. Ram has MS degrees in Nuclear and Electrical Engineering from the University of Cincinnati, and an MBA from Bowling Green State University. He is a licensed Professional Engineer (electrical) in Ohio. Mr. Ram has completed a six month training course in BWR systems.

Marlene Delaney, P.E., S.E.: Ms. Delaney is a Senior Engineer III in the S&A Chicago, IL Office. She has a Bachelor of Science degree in civil engineering and has more than 30 years of experience in the nuclear power plant industry. She is a licensed Structural

Engineer in the State of Illinois and has a licensed Professional Engineer in several states. She is a SQUG Qualified Seismic Capability Engineer (SCE) and has completed the NTTF Recommendation 2.3 Training Course (SWE). In addition to her involvement in design and analysis of structures, systems, and components at nuclear power plants, she has performed SQUG walkdowns at various nuclear power plants.

Phil Gazda, P.E., S.E.: Mr. Gazda is a Senior Consultant and serves as the Vice President of S&A as well as the Office Manager of the S&A Chicago, IL Office. He is an advanced degree structural engineering graduate and has more than 35 years of experience in the nuclear power plant industry. He is a licensed Structural Engineer in the State of Illinois and has a licensed Professional Engineer in several states. He is a SQUG Qualified Seismic Capability Engineer (SCE) and has completed the NTTF Recommendation 2.3 Training Course (SWE). In addition to his involvement in design and analysis of structures, systems, and components at nuclear power plants, he has been involved in SQUG and IPEEE walkdowns and assessments at ten nuclear plants and led the ComEd team performing the SQUG program at Zion Station. Mr. Gazda has also been the moderator for three SQUG qualification training classes provided for utility engineers. In addition, Mr. Gazda was the Project Manager for the seismic assessment of HVAC ducts at another utility based on EPRI document Seismic Evaluation Guidelines for HVAC Duct and Damper Systems Revision to 1007896.

Bruce Lory Mr. Lory is a Senior Engineer III in the S&A Chicago, IL Office. He has a Bachelor of Science degree in mechanical engineering and has more than 30 years of experience in the nuclear power plant industry. He is a SQUG Qualified Seismic Capability Engineer (SCE) and is the instructor of the Fundamentals of Equipment Seismic Qualification training course for EPRI, and is the co-instructor of the Fukushima Seismic Walkdown training course in response to NTTF 2.3. In addition, he has been involved with equipment modifications for Extended Power Uprates (EPU), as well as Seismic Qualification (SQ) and Environmental Qualification (EQ) of equipment/components at numerous nuclear power plants.

Walter Djordjevic, P.E. Mr. Djordjevic is a Senior Consultant and serves as President of S&A with specialization in the dynamic analysis and design of structures and equipment for seismic, blast, fluid, and wind loads. He has managed and led seismic walkdowns and fragility analyses of structures and components for use in probabilistic risk assessments. Mr. Djordjevic has 37 years of seismic experience serving the nuclear industry. Mr. Djordjevic performed and managed more than 20 USI A-46 and IPEEE projects in response to the requirements of Generic Letters 87-02 and 88-20. Mr. Djordjevic has a Master of Science in Structural Engineering from the Massachusetts Institute of Technology. He has received industry training as a Seismic Capability Engineer (EPRI SQUG training), EPRI IPEEE Add-on, Seismic Fragility and Seismic Walkdown Engineer (SWE).

3.3 ADDITIONAL PERSONNEL

Exelon plant Operations staff members Messrs. R. Richard and D. Shaw reviewed the SWEL. Mr. Richard is a previously licensed Senior Reactor Operator (SRO) at Braidwood Station with numerous years of experience in various aspects of plant operations. Mr. Shaw is a previously licensed SRO at Byron Station with numerous years of experience in various aspects of plant operations.

Various additional station personnel also provided support to the SWEL preparer to help identify major equipment or system modifications, equipment and systems located in

different environments, and equipment and systems that would be accessible for inspection during the plant walkdowns, in accordance with Reference 1.

Exelon Engineering staff member Mr. T. Bortolini performed the IPEEE Vulnerabilities Review based, in part, on the Braidwood IPEEE submittal along with subsequent correspondence and station records. (Ref. 3) Mr. Bortolini is a Structural Engineer in the Exelon Engineering Department. He has over 38 years of engineering experience and has worked at Braidwood since 1998. Mr. Bortolini has completed the NTTF Recommendation 2.3 Training Course (SWE).

4 Selection of SSCs

4.1 OVERVIEW

This section of the report describes the process used to select structures, systems, and components, (SSCs) that were included in the Seismic Walkdown Equipment List (SWEL). The actual equipment lists that were developed in this process are found in Appendix B and are as follows:

- Table B-1, Base List 1
- Table B-2, Base List 2
- Table B-3, SWEL 1
- Table B-4, SWEL 2

4.2 SWEL DEVELOPMENT

The selection of SSCs process described in EPRI Technical Report 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic*, dated June 2012, was utilized to develop the SWEL for Braidwood Generating Station Unit 2. (Ref. 1)

The SWEL is comprised of two groups of items:

- SWEL 1 is a sample of items to safely shut down the reactor and maintain containment integrity
- SWEL 2 is a list of spent fuel pool related items

4.2.1 SWEL 1 – Sample of Required Items for the Five Safety Functions

The process for selecting a sample of SSCs for shutting down the reactor and maintaining containment integrity began with the composite Seismic Individual Plant Examination for External Events (IPEEE) Success Path Equipment List (SPEL). (Ref. 3) The IPEEE SPEL was then subjected to the following four screens to identify the items to be included on the first Seismic Walkdown Equipment List (SWEL 1):

1. **Screen #1 – Seismic Category 1**

   As described in Reference 1, only items that have a defined seismic licensing basis are to be included in SWEL 1. Each item on the IPEEE SPEL was reviewed to determine if it had a defined seismic licensing basis. All items identified as Safety Category I, as defined in the Byron/Braidwood UFSAR Chapter 3, were identified as having a defined seismic licensing basis. (Ref. 2) Electrical enclosures containing Class 1E devices were identified as Safety Category I. Safety Category I and Class 1E determination was made through a review of current design and licensing basis documentation.

2. Screen #2 – Equipment or Systems

This screen narrowed the scope of items to include only those that do not regularly undergo inspections to confirm that their configuration is consistent with the plant licensing basis. This screen further reduced the IPEEE SPEL of any Safety Category I Structures, Containment Penetrations, Safety Category I Piping Systems, cable/conduit raceways and HVAC ductwork.

3. Screen #3 – Support for the Five Safety Functions

This screen narrowed the scope of items included on the SWEL 1 to only those associated with maintaining the following five safety functions:

A. Reactor Reactivity Control (RRC)

B. Reactor Coolant Pressure Control (RCPC)

C. Reactor Coolant Inventory Control (RCIC)

D. Decay Heat Removal (DHR)

E. Containment Function (CF)

The first four functions are associated with bringing the reactor to a safe shutdown condition. The fifth function is associated with maintaining containment integrity.

As described in Appendix E of Reference 1, the safety function for each item on the IPEEE SPEL was identified. It is noted that items on SWEL 1 with a specific safety function(s) are considered frontline systems. Items with a safety-function designation of 'Support System HVAC', 'Support System AC Power', 'Support System DC Power', 'Engineered Safety Features Actuation System' (ESFAS) or 'Cooling Water' may be a frontline or support system. Items with a safety function designation of 'Support System HVAC', 'Support System AC Power', 'Support System DC Power', 'Engineered Safety Features Actuation System' (ESFAS) or 'Cooling Water' support at least one of the five safety functions however, the specific safety function(s) is not indicated as identification of the specific safety function(s) is not required by Reference 1.

The resultant equipment list after Screen #3 is defined in the EPRI guidance document as Base List 1 and is included in Appendix B. (Ref. 1)

4. Screen #4 – Sample Considerations

This screen is intended to result in a SWEL 1 that sufficiently represents a broad population of plant Seismic Category 1 (Safety Category I) equipment and systems to meet the objectives of the NRC 50.54(f) letter. The following attributes were considered in the selection process for items included on SWEL 1:

A. A variety of types of systems

The system is identified for each item on SWEL 1. The equipment included on SWEL 1 is a representative sample of several systems that perform one or multiple safety functions. Further, the systems represented include both frontline and support systems as listed in Reference 1 Appendix E: Systems to Support Safety Function(s).

B. Major new and replacement equipment

The equipment included on SWEL 1 includes several items that have been modified or replaced over the past several years. Each item on SWEL 1 that is new or replaced is identified.

C. A variety of types of equipment

The equipment class is identified for each item on SWEL 1. The equipment included on SWEL 1 is a representative sample from each of the classes of equipment listed in Reference 1 Appendix B: Classes of Equipment. Where appropriate, at least one piece of equipment from each class is included on SWEL 1.

Screening #1, #2, and #3 resulted in no equipment in the following classes:

- (12) Air Compressors
- (13) Motor Generators.

D. A variety of environments

The location for each item is identified on SWEL 1. The equipment included on SWEL 1 is a representative sample from a variety of environments (locations) in the station.

E. Equipment enhanced due to vulnerabilities identified during the IPEEE program

The equipment included on SWEL 1 includes several items that were enhanced as a result of the IPEEE program. Each item on SWEL 1 that was enhanced as a result of the IPEEE program is identified.

F. Contribution to risk

In selecting items for SWEL 1 that met the attributes above, some items with similar attributes were selected based on their higher risk significance. To determine the relative risk significance, the Risk Achievement Worth (RAW) and Fussell-Vesely importance for a Loss of Off-Site Power (LOOP) scenario from the internal plant PRA were used. Additionally, the list of risk-significant components for the LOOP PRA were compared with the draft SWEL 1 to confirm that a reasonable sample of risk-significant components (relevant for a seismic event) were included on SWEL 1. (Ref. 7)

4.2.2 SWEL 2 – Spent Fuel Pool Related Items

The process for selecting a sample of SSCs associated with the spent fuel pool (SFP) began with a review of the station design and licensing basis documentation for the SFP and the interconnecting SFP cooling system. The Braidwood Generating Station Unit 2 SWEL 2 includes the second train of SFP cooling and common components not included on the Braidwood Generating Station Unit 1 SWEL 2. The following four screens narrowed the scope of SSCs to be included on the second Seismic Walkdown Equipment List (SWEL 2):

1. Screen #1 - Seismic Category 1

Only those items identified as Seismic Category 1(Safety Category I) are to be included on SWEL 2 with exception to the SFP structure. As described in Reference 1, the adequacy of the SFP structure is assessed by analysis as a Seismic Category 1 structure. Therefore, the SFP structure is assumed to be

seismically adequate for the purposes of this program and is not included in the scope of items included on SWEL 2.

Per the Braidwood UFSAR Chapters 3 and 9, portions of the SFP SSCs are classified as Safety Category I and are screened into the SWEL 2 list. These Safety Category I SSCs include; the Spent Fuel Pit Heat Exchanger, Spent Fuel Pit Pump, Refueling Water Purification Pump 0A, associated instrumentation, piping and manual/check valves. Development of the Braidwood Unit 2 SWEL 2 list excludes the components associated with the common (Unit 0) Refueling Water Purification Pump 0A. Note, these pump's motors are Safety Category II, even though the Refueling Water Purification Pump 0A has an ESF power source. There are no Motor, Air or Fluid operated valves in the Safety Category I SSC flow paths.

2. Screen #2 – Equipment or Systems

This screen considers only those items associated with the SFP that are appropriate for an equipment walkdown process.

3. Screen #3 – Sample Considerations

This screen represents a process that is intended to result in a SWEL 2 that sufficiently represents a broad population of SFP Seismic Category 1 (Safety Category I) equipment and systems to meet the objectives of the NRC 50.54(f) letter. The following attributes were considered in the development of SWEL 2:

A. A variety of types of systems

The system is identified for each item on SWEL 2. The equipment included on SWEL 2 is a representative sample of the systems associated with the SFP and its cooling system.

The SFP pump, Refueling Water Purification Pump 0A flow path components not included in the Braidwood Unit 1 SWEL 2 list, and SFP heat exchanger are included in the SWEL 2 list. A representative sample of instrumentation, manual valves, and check valves are also included.

B. Major new and replacement equipment

The equipment included on SWEL 2 should include items that have been modified or replaced over the past several years. However, a review was performed that found none of the proposed equipment on SWEL 2 has been modified or replaced.

C. A variety of types of equipment

The equipment class is identified for each item on SWEL 2. The equipment included on SWEL 2 is a representative sample from each of the classes of equipment listed in Reference 1 Appendix B: Classes of Equipment. Where appropriate, at least one piece of equipment from each class is included on SWEL 2.

The classes/types of equipment include; (5) Horizontal Pumps, (21) Tanks and Heat Exchangers, (18) Instrument Racks, (19) Temperature Sensors, and (0) Other. The manual and check valves are included in the "(0) Other" class.

D. A variety of environments

The location for each item is identified on SWEL 2. The equipment included on SWEL 2 is a representative sample from a variety of environments

(locations) for equipment associated with the SFP and its cooling system. All items are in the Auxiliary Building or Fuel Handling Building.

4. Screen #4 – Rapid Drain-Down

This screen identifies items that could allow the spent fuel pool to drain rapidly. Consistent with Reference 1, the scope of items included in this screen is limited to the hydraulic lines connected to the SFP and the equipment connected to those lines. For the purposes of this program it is assumed the SFP gates are installed and the SFP cooling system is in its normal alignment for power operations. The SFP gates are passive devices that are integral to the SFP. As such, they are considered capable of withstanding a design basis earthquake without failure and do not allow for a rapid drain-down of the SFP.

The SSCs identified in this screen are not limited to Seismic Category 1 (Safety Category I) items, but is limited to those items that could allow rapid drain-down of the SFP. Rapid drain-down is defined as lowering of the water level to the top of the fuel assemblies within 72 hours after the earthquake.

Excerpts from the Braidwood UFSAR 9.1.3.2 System Description document the design features which preclude rapid drain down of the Spent Fuel Pit.

The Safety Category I spent fuel pool cooling system shown in Drawing M-63 consists of two complete cooling trains. The spent fuel pool cooling system (piping, pumps, valves, and heat exchangers) is Safety Category I, Quality Group C. The 3-inch piping from the refueling water storage tanks to the refueling water purification pump, the pump, and its associated piping and valves are Safety Category I, Quality Group C. A 2-inch Safety Category I, Quality Group C line from the discharge of the refueling water purification pump to the spent fuel pool is permanently installed. This is the Category I water makeup circuit. The backup Safety Category I makeup system consists of piping and hoses from the Safety Category I fire protection system. The primary water makeup system non-Category I takes water from both primary water storage tanks and routes the water through the spent fuel pool water filter and then to the return header as indicated in Drawing M-63. In addition, primary water may be added to the spent fuel pool via a fire hose connection in the fuel handling building. In summary, there are three sources of makeup water available, a primary unborated non-Category I source, a borated Safety Category I source, and an unborated fire protection Safety Category I water system. (Ref. 2, 8, 9, & 10)

The spent fuel pool system piping arrangement precludes siphoning after any failure by containing a 1/2-inch diameter hole four inches below the water level. Ten feet above the active fuel corresponds to an elevation of 410'-0". Both the cooling and skimmer systems meet this requirement. No piping in the pool extends below the 410'-0" elevation except the spent fuel pool cooling system discharge pipe. This pipe contains an anti-siphon hole near the surface of the spent fuel pool. Therefore, piping connections to the SPF explicitly contain anti-siphon features which preclude a rapid drain down of the SFP.

Excerpts from the Braidwood UFSAR Section 9.1.3.3 Safety Evaluation discuss SFP Dewatering incidents. Incident C discussed is a sluice/transfer gate failure with the transfer canal empty, an open/empty transfer tube and an empty refueling cavity. In this incident, the spent fuel pool water level would be lowered approximately 22 feet 10 inches to the bottom sill of the sluice/transfer gate. This

leaves at least 2 feet 6 inches of water as shielding over the active portion of the spent fuel in storage.

This incident is not considered a rapid drain down transient. The gate is a structural element, seismically designed as part of the SFP structural analysis, and is a passive barrier with no active components.

There are no rapid drain-down considerations included in the Braidwood Unit 2 SWEL 2 list.

5 Seismic Walkdowns and Area Walk-Bys

5.1 OVERVIEW

Seismic Walkdowns and Area Walk-Bys were conducted by two (2) person teams of trained Seismic Walkdown Engineers (SWEs), in accordance with the EPRI guidance document during the week of July 30, 2012. The Seismic Walkdowns and Area Walk-Bys are discussed in more detail in the following sub-sections.

Consistent with the EPRI guidance document, Section 4: Seismic Walkdowns and Area Walk-Bys, the SWEs used their engineering judgment, based on their experience and training, to identify potentially adverse seismic conditions. Where needed, the engineers were provided the latitude to rely upon new or existing analyses to inform their judgment.

The SWEs conducted the Seismic Walkdowns and Area Walk-Bys together as a team. During the evaluations, the SWEs actively discussed their observations and judgments with each other. The results of the Seismic Walkdowns and Area Walk-Bys reported herein are based on the comprehensive agreement of the SWEs.

5.2 SEISMIC WALKDOWNS

The Seismic Walkdowns focused on the seismic adequacy of the items on the SWEL as provided in Appendix B of this report. The Seismic Walkdowns also evaluated the potential for nearby SSCs to cause adverse seismic interactions with the SWEL items. The Seismic Walkdowns focused on the following adverse seismic conditions associated with the subject item of equipment:

- Adverse anchorage conditions
- Adverse seismic spatial interactions
- Other adverse seismic conditions

The results of the Seismic Walkdowns have been documented on the Seismic Walkdown Checklist (SWC) provided in the EPRI guidance document, Appendix C. Seismic Walkdowns were performed and a SWC completed for 111 of the 129 items identified on the Braidwood Unit 2 SWEL. The completed SWCs are provided in Appendix C of this report. Additionally, photos have been included with most SWCs to provide a visual record of the item along with any comments noted on the SWC. Drawings and other plant records are cited in some of the SWCs, but are not included with the SWCs because they are readily retrievable documents through the station's document management system.

Seismic Walkdowns are deferred for the remaining 18 items to a unit outage or appropriate time when the equipment is accessible. These items could not be walked down during the 180-day period following the issuance of the 10CFR50.54(f) letter due to their being inaccessible. Inaccessibility of this equipment was either based on the location of the equipment (environment that posed personnel safety concerns while the

unit is operating) or due to the electrical safety hazards posed while the equipment is operating. Appendix E of this report identifies the inaccessible equipment along with the plan for future Seismic Walkdowns.

The following subsections describe the approach followed by the SWEs to identify potentially adverse anchorage conditions, adverse seismic interactions, and other adverse seismic conditions during the Seismic Walkdowns.

5.2.1 Adverse Anchorage Conditions

Guidance for identifying anchorage that could be degraded, non-conforming, or unanalyzed relied on visual inspections of the anchorage and verification of anchorage configuration. Details for these two types of evaluations are provided in the following two subsections.

The evaluation of potentially adverse anchorage conditions described in this subsection applies to the anchorage connections that attach the identified item of equipment to the civil structure on which it is mounted. For example, the welded connections that secure the base of a Motor Control Center (MCC) to the steel embedment in the concrete floor would be evaluated in this subsection. Evaluation of the connections that secure components within the MCC is covered later in the subsection "Other Adverse Seismic Conditions."

5.2.2 Visual Inspections

The purpose of the visual inspections was to identify whether any of the following potentially adverse anchorage conditions were present:

- Bent, broken, missing, or loose hardware
- Corrosion that is more than mild surface oxidation
- Visible cracks in the concrete near the anchors
- Other potentially adverse seismic conditions

Based on the results of the visual inspection, the SWEs judged whether the anchorage was potentially degraded, non-conforming, or unanalyzed. The results of the visual inspection were documented on the SWC, as appropriate. If there was clearly no evidence of degraded, nonconforming, or unanalyzed conditions, then it was indicated on the checklist and a licensing basis evaluation was not necessary. However, if it was not possible to judge whether the anchorage is degraded, nonconforming, or unanalyzed, then the condition was entered into the Corrective Action Program (CAP) as a potentially adverse seismic condition.

5.2.3 Configuration Verification

In addition to the visual inspections of the anchorage as described above, the configuration of the installed anchorage was verified to be consistent with existing plant documentation for at least 50% of the items on the SWEL.

Line-mounted equipment (e.g., valves mounted on pipelines without separate anchorage) was not evaluated for anchorage adequacy and was not counted in establishing the 50% sample size.

Examples of documentation that was considered to verify that the anchorage installation configurations are consistent with the plant documentation include the following:

- Design drawings
- Seismic qualification reports of analyses or shake table tests
- IPEEE or USI A-46 program documentation, as applicable

The Table C-1 of Appendix C indicates the anchorage verification status for components as follows:

N/A: components that are line-mounted and/or are not directly anchored (with separate anchorage) to the civil structure and therefore do not count in the anchorage confirmation total

Y: components that are anchored to the civil structure which were confirmed to be consistent with design drawings and/or other plant documentation

N: components that are anchored to the civil structure for which anchorage drawings were not identified and/or retrieved

See Table 5-1 below for the accounting of the 50% anchorage configuration confirmations, and the individual SWC forms in Appendix C for the specific drawings used for each anchorage verification confirmation.

Table 5-1. Anchorage Configuration Confirmation

SWEL	No. of SWEL Items (A)	N/A Items (B)	Required to Confirm? (A-B)/2	Items Confirmed
Total	129	64	33	43[1]

Notes:
1) Three (3) anchorage verifications have been deferred and will be completed as outlined in Appendix E

5.2.4 Adverse Seismic Spatial Interactions

An adverse seismic spatial interaction is the physical interaction between the SWEL item and a nearby SSC caused by relative motion between the two during an earthquake. An inspection was performed in the area adjacent to and surrounding the SWEL item to identify any seismic interaction conditions that could adversely affect the capability of that SWEL item to perform its intended safety-related functions.

The three types of seismic spatial interaction effects that were considered are as follows:

- Proximity
- Failure and falling of SSCs (Seismic II over I)
- Flexibility of attached lines and cables

Detailed guidance for evaluating each of these types of seismic spatial interactions is described in EPRI guidance document, Appendix D: Seismic Spatial Interaction.

The Seismic Walkdown Engineers exercised their judgment to identify seismic interaction hazards. Section 5.2.6 provides a summary of issues identified during the Seismic Walkdowns.

5.2.5 *Other Adverse Seismic Conditions*

In addition to adverse anchorage conditions and adverse seismic interactions, described above, other potentially adverse seismic conditions that could challenge the seismic adequacy of a SWEL item could have been present. Examples of the types of conditions that could pose potentially adverse seismic conditions include the following:

- Degraded conditions
- Loose or missing fasteners that secure internal or external components to equipment
- Large, heavy components mounted on a cabinet that are not typically included by the original equipment manufacturer
- Cabinet doors or panels that are not latched or fastened
- Other adverse conditions

Any identified other adverse seismic conditions are documented on the items' SWC, as applicable.

5.2.6 *Conditions Identified during Seismic Walkdowns*

Table 5-2 provides a summary of the conditions identified during the equipment Seismic Walkdowns. The equipment Seismic Walkdowns resulted in a total of six (6) conditions identified which were entered into the station's CAP. The conditions were assessed and it was concluded that the conditions would not prevent the associated equipment from performing its safety-related function(s). The conditions identified by the SWEs during the equipment Seismic Walkdowns were concluded to not be adverse seismic conditions.

5.3 AREA WALK-BYS

The purpose of the Area Walk-Bys is to identify potentially adverse seismic conditions associated with other SSCs located in the vicinity of the SWEL items. Vicinity is generally defined as the room containing the SWEL item. If the room is very large (e.g., Turbine Hall), then the vicinity is identified based on judgment, e.g., on the order of about 35 feet from the SWEL item. This vicinity is described on the Area Walk-By Checklist (AWC), shown in Appendix D of this report. A total of 42 Area Walk-bys were performed for Braidwood Unit 2. It is noted that additional area walk-bys will be completed, as required, as deferred and supplemental inspections are completed.

The key examination factors that were considered during Area Walk-Bys include the following:

- Anchorage conditions (if visible without opening equipment)
- Significantly degraded equipment in the area
- A visual assessment (from the floor) of cable/conduit raceways and HVAC ducting (e.g., condition of supports or fill conditions of cable trays)
- Potentially adverse seismic interactions including those that could cause flooding, spray, and fires in the area

- Other housekeeping items that could cause adverse seismic interaction (including temporary installations and equipment storage)
- Scaffold clearances and tie offs were reviewed to meet Exelon Standard NES-MS-04.1, Rev. 6 Seismic Prequalified Scaffolds
- Seismic housekeeping was examined to meet station procedure BwAP 1100-23, Seismic Housekeeping Requirements for the Temporary Storage of Materials in Category I Area.

The Area Walk-Bys are intended to identify adverse seismic conditions that are readily identified by visual inspection, without necessarily stopping to open cabinets or taking an extended look. Therefore, the Area Walk-By took significantly less time than it took to conduct the Seismic Walkdowns described above for a SWEL item. If a potentially adverse seismic condition was identified during the Area Walk-By, then additional time was taken, as necessary, to evaluate adequately whether there was an adverse condition and to document any findings.

The results of the Area Walk-Bys are documented on the AWCs included in Appendix D of this report. A separate AWC was filled out for each area inspected. A single AWC was completed for areas where more than one SWEL item was located.

Additional details for evaluating the potential for adverse seismic interactions that could cause flooding, spray, or fire in the area are provided in the following two subsections.

5.3.1 Seismically-Induced Flooding/Spray Interactions

Seismically-induced flooding/spray interactions are the effect of possible ruptures of vessels or piping systems that could spray, flood or cascade water into the area where SWEL items are located. This type of seismic interaction was considered during the IPEEE program. Those prior evaluations were considered, as applicable, as information for the Area Walk-Bys.

One area of particular concern to the industry is threaded fire protection piping with long unsupported spans. If adequate seismic supports are present or there are isolation valves near the tanks or charging sources, flooding may not be a concern. Numerous failures have been observed in past earthquakes resulting from sprinkler head impact. Less frequent but commonly observed failures have occurred due to flexible headers and stiff branch pipes, non-ductile mechanical couplings, seismic anchor motion and failed supports.

Examples where seismically-induced flooding/spray interactions could occur include the following:

- Fire protection piping with inadequate clearance around fusible-link sprinkler heads
- Non-ductile mechanical and threaded piping couplings can fail and lead to flooding or spray of equipment
- Long, unsupported spans of threaded fire protection piping
- Flexible headers with stiffly supported branch lines
- Non-Seismic Category I tanks

The SWEs exercised their judgment to identify only those seismically-induced interactions that could lead to flooding or spray.

5.3.2 Seismically-Induced Fire Interactions

Seismically-induced fire interactions can occur when equipment or systems containing hazardous/flammable material fail or rupture. This type of seismic interaction was considered during the IPEEE program. Those prior evaluations were considered, as applicable, as information for the Area Walk-Bys.

Examples where seismically-induced fire interactions could occur include the following:

- Hazardous/flammable material stored in inadequately anchored drums, inadequately anchored shelves, or unlocked cabinets
- Natural gas lines and their attachment to equipment or buildings
- Bottles containing acetylene or similar flammable chemicals
- Hydrogen lines and bottles

Another example where seismically-induced fire interaction could occur is when there is relative motion between a high voltage item of equipment (e.g., 4160 volt transformer) and an adjacent support structure when they have different foundations. This relative motion can cause high voltage busbars, which pass between the two, to short out against the grounded bus duct surrounding the busbars and cause a fire.

The Seismic Walkdown Engineers exercised their judgment to identify only those seismically-induced interactions that could lead to fires.

5.3.3 Conditions Identified during Area Walk-bys

Table 5-3 at the end of this section provides a summary of the conditions identified during the Area Walk-Bys. Five (5) conditions were identified during the Area Walk-Bys and entered into the station CAP. No potentially adverse seismic conditions were identified that resulted in a seismic licensing basis evaluation. No seismically-induced flooding or spray interactions were identified during the Area Walk-Bys. No seismically-induced fire interactions were identified during the Area Walk-Bys.

5.4 SUPPLEMENTAL INFORMATION ON ELECTRICAL CABINET INTERNAL INSPECTIONS

Following the completion of the online seismic walkdowns, the industry was made aware that the NRC staff had clarified a position on opening electrical cabinets to inspect for other adverse seismic conditions. The purpose for opening these cabinets is to inspect for evidence of:

- internal components not being adequately secured,
- whether fasteners securing adjacent cabinets together are in place, and
- other adverse seismic conditions.

Appendix E of this report includes Table E-2 which identifies components in the specified equipment classes that would be considered as electrical cabinets:

1. Motor Control Centers and Wall-Mounted Contactors
2. Low Voltage Switchgear and Breaker Panels

3. Medium Voltage, Metal-Clad Switchgear
4. Transformers
14. Distribution Panels and Automatic Transfer Switches
16. Battery Chargers and Inverters
20. Instrumentation and Control Panels

Components that are identified on Table E-1 (inaccessible and deferred components) are not listed on Table E-2 to avoid redundancy. Table E-2 indicates internal accessibility of each cabinet. Cabinets that have been identified as requiring these supplemental internal inspections are those with doors or panels with latches or thumbscrews and can be readily opened during normal maintenance activities. Also provided for each cabinet is a proposed milestone schedule for performing these internal inspections and the associated station tracking number (IR number).

The Seismic Walkdown Checklists (SWC) for the components identified in Table E-2 that can be opened for internal inspections will be revised at the time of the supplemental walkdown to indicate the results of these internal inspections.

Table 5-2. Conditions Identified during Seismic Walkdowns

Item ID	Description of Issue	Action Request ID (IR)	Actions Complete Yes/No (See Notes 1 & 2)
0FC8754	A large C-clamp was found clamped to a Tube Steel Hanger approximately 6' above the floor near 1FC01P Spent Fuel Pump Motor.	1394927	Yes
2PI-0633	Loose nut attached to an approximately 1/8" screw on the backside of the support channel was loose. The remaining two screws are tight. The pressure indicator weighs approximately 2 lbs. There are no immediate concerns with the loose nut.	1394916	Yes
2DC01E	There is an open S-hook on one chain in the Battery Room 211 above 2DC01E. The other chain does not have an open S-hook	1395456	Yes
2AF005G	It was observed that the handwheel for valve 2AF005H is within 1/8" from the actuator of valve 2AF005G. Piping is observed to well-supported (lateral movement is limited and impact would be to rugged part of valve).	1396037 (WO 1454280 EC 380050)	Yes
2DO01TA	Hairline cracks are visible at 10 of the 16 anchor bolts. The cracks are in the 1' plus thick foundation pad and do not extend to the base slab.	1396566	Yes
2CV112E	Valve operator is in contact with grating. Investigation into valve movements and existing calculation being performed.	1429477 (WO 1584588)	Yes

Notes:
1) "Yes" indicates that any corrective actions resulting from the issue are complete
2) "No" indicates that any corrective actions resulting from the issue are NOT complete. Actions are tracked by the IR number in the station Corrective Action Program.

Table 5-3. Issues Identified during Area Walk-Bys

Item ID	Description of Issue	Action Request ID (IR)	Actions Complete Yes/No (See Notes 1 & 2)
Area Walk-by 8 Fuel Handling Building El 401 FC HX Room	Plastic cover fell off smoke detector above U2 FC HX. The detector had the number 139-1.	1395709	Yes
Area Walk-by 38 Aux El 346 Column M-23, P-24 (2AP38E)	There were numerous seismic housekeeping issues in the area: 1. staged scaffolding is approximately 2" from Blockwall 2A-14A, 2. Scaffolding cart is approximately 2" from cable riser	1396891	Yes
Area Walk-by 38 Aux El 346 Column M-23, P-24 (2AP38E)	Near Cabinet 2AP38E and the adjacent cabinets, numerous components are stored in violation of BwAP 1100-23: 1. SX drain down equipment cabinet is 9" from 2AP38 E (MCC 233X1), 2. SX drain down equipment is 8" from Rack 2PL92J, 3. Vollo 20E lifting device is 11" from adjacent cabinet.	1396872	Yes
Area Walk-by 35 Aux El 364 Column M-23 (2CC01PA, 2CC01PB)	Two 6 foot tall storage cabinets were found to be approximately 2 1/2" and 1" away from a block wall.	1396940	Yes
Area Walk-by 20 2A/2D MSIV Room at El. 401 (2MS018D)	A chainfall was found attached to a tube steel hanger near the ceiling at the doorway to the 2A/2D MSIV Room.	1396953	Yes

Notes:
1) "Yes" indicates that any corrective actions resulting from the issue are complete
2) "No" indicates that any corrective actions resulting from the issue are NOT complete. Actions are tracked by the IR number in the station Corrective Action Program.

6 Licensing Basis Evaluations

The EPRI guidance document, Section 5: Seismic Licensing Basis Evaluation provides a detailed process to perform and document seismic licensing basis evaluations of SSCs identified when potentially adverse seismic conditions are identified. The process provides a means to identify, evaluate and document how the identified potentially adverse seismic condition meets a station's seismic licensing basis without entering the condition into a station's Corrective Action Program (CAP). In lieu of this process, Exelon/Braidwood utilized the existing processes and procedures (Site CAP Expectations) to identify, evaluate and document conditions identified during the Seismic Walkdowns.

In accordance with Exelon/Braidwood processes and procedures, all questionable conditions identified by the SWEs during the walkdowns were entered into the station CAP to be further evaluated and addressed as required. The SWEs provided input to support the identification and evaluation (including seismic licensing basis evaluations, as required) of the potentially adverse seismic conditions entered into the CAP. The station corrective action program is a more robust process than that provided in the EPRI guidance document; in part, ensuring each condition is properly evaluated for conformance with design and licensing bases and corrected as required.

Conditions identified during the walkdowns were documented on the SWCs, AWCs, and entered into the CAP. For those conditions that required, seismic licensing basis evaluations were completed and documented within the IR. Tables 5-2 and 5-3 in the report provide the IR, a summary of the condition, and the action completion status.

7

IPEEE Vulnerabilities Resolution Report

Per the ComED Transmittal of Braidwood Station Individual Plant Examination of External Events (IPEEE) Submittal Report, dated June 27, 1997 and the Staff Evaluation Report of Braidwood IPEEE dated May 30, 2001, an explicit definition of vulnerability was not provided and no vulnerabilities with respect to potential severe accidents related to external events were identified in the IPEEE submittal. (Ref. 3 and 6) However, plant improvements were identified in Sections 3 and 7 of Reference 3. Table G-1 in Appendix G lists the plant improvements, the IPEEE proposed resolution, the actual resolution and resolution date. No open items exist as a result of the seismic portion of the IPEEE program.

8 Peer Review

A peer review team consisting of at least two individuals was assembled and peer reviews were performed in accordance with Section 6: Peer Reviews of the EPRI guidance document. The Peer Review process included the following activities:

- Review of the selection of SSCs included on the SWEL
- Review of a sample of the checklists prepared for the Seismic Walkdowns and Area Walk-Bys
- Review of Licensing basis evaluations, as applicable
- Review of the decisions for entering the potentially adverse conditions into the CAP process
- Review of the submittal report
- Provide a summary report of the peer review process in the submittal report

The peer reviews were performed independently from this report and the summary Peer Review Report is provided in Appendix F of this report.

9 References

Reference drawings related to SWEL items are provided in the Seismic Walkdown Checklists and if applicable, in the Area-Walkdown Checklists.

1. EPRI Technical Report 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic*, dated June 2012.

2. Byron/Braidwood Nuclear Stations Updated Final Safety Analysis Report (UFSAR), Revision 13.

3. ComEd letter from H. Gene Stanley to Office of Nuclear Reactor Regulation, dated June 27, 1997, Subject: Transmittal of Braidwood Station Individual Plant Examination of External Events Submittal Report

4. Not used

5. Staff Evaluation Report of Braidwood Individual Plant Examination of External Events (IPEEE), dated May 30, 2001

6. NRC (E Leeds and M Johnson) Letter to All Power Reactor Licensees et al., "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," Enclosure 3, "Recommendation 2.3: Seismic," dated March 12, 2012

7. BW-MISC-018 Rev. 0, "Braidwood Risk Importance to Support Development of Seismic Walkdown Equipment List".

8. Drawing M-63 Sheet 1A rev. AZ, "Diagram of Fuel Pool Cooling and Clean-Up Units 1&2"

9. Drawing M-63 Sheet 1B rev. BE, "Diagram of Fuel Pool Cooling and Clean-Up Units 1&2"

10. Drawing M-63 Sheet 1C rev. BB, "Diagram of Fuel Pool Cooling and Clean-Up Units 1&2"

11. "Recommendations for Enhancing Reactor Safety in the 21st Century: The Near-term Task Force Review of Insights from the Fukushima Dai-ichi Accident," ADAMS Accession No. ML111861807, July 12, 2011

A

Project Personnel Resumes and SWE Certificates

Resumes and certificates (where applicable) for the following people are found in Appendix A:

Stevenson & Associates

Antonio J. Perez, P.E.

SUMMARY

Mr. Perez has over 15 years of experience in project management, project engineering, equipment design, and mechanical systems layout for nuclear and industrial facilities.

EDUCATION

B.S. – Mechanical Engineering
Michigan Technological University, Houghton, MI
Magna cum Laude

LICENSES

Professional Engineer, Wisconsin: September 2002
Minnesota: December 2010

PROFESSIONAL EXPERIENCE

Stevenson & Associates, Green Bay, WI

General Manager October 2010 – Present

- Responsible for interfacing with clients with a focus on continuously improving relationships.
- Responsible for managing staff resources to meet or exceed clients' needs.
- Responsible for recruiting and hiring staff necessary to meet resource requirements while effectively increasing capacity.
- Responsible for providing Engineering Consultation services to clients.

Project Manager March 2007 – October 2010

- Performing Project Management tasks including development of project plans, identification of resource needs, estimating task durations, developing project schedules, and monitoring budgets.
- Lead design team efforts at the Kewaunee Power Station on multiple projects that include two separate Auxiliary Feedwater flow control modifications, Auxiliary Feedwater flow monitoring instrumentation modifications, and Auxiliary Building roof modifications.
- Supported the Calculation Reconstitution and Improvement Project at the Prairie Island Nuclear Generating Plant by mapping calculations associated with the RHR system.

Dominion Energy Kewaunee (formerly Nuclear Management Company 2001 - 2005)
Kewaunee Power Station, Kewaunee, WI

Shift Technical Advisor (trainee) January 2006 – March 2007

- Trainee in a Senior Reactor Operator Certificate training program.

Stevenson & Associates

Antonio J. Perez, P.E.

Engineering Supervisor – ME/CE/SE Design May 2004 – January 2006

- Supervised a staff of 12 to 15 engineers (mechanical, civil, and structural design) who were charged with developing design changes, maintaining design and licensing basis documentation and supporting maintenance.
- Integrated the civil/structural engineering group and the mechanical engineering group into a cohesive unit that resulted in gained efficiency and a net reduction of one full time equivalent engineer.
- Substantially increased the quality of engineering products developed and published by the ME/CE/SE Design Engineering group through coaching and feedback as a result of increased supervisory oversight of engineering products.
- Developed a work management system for the group that provided a means for prioritizing activities, estimating the level of effort, and scheduling of activities. This system allowed for an increased understanding of workload and became an invaluable tool for prioritizing work and managing resources.
- Increased communications within the group by holding daily 15 minute meetings where station messages were delivered and where the group's resources were assessed and redirected as necessary to meet commitments. This resulted in an increase in morale and an increase in commitments met.
- Increased communications with other departments by establishing a central point of contact for the group and by assuring that the ME/CE/SE Design Engineering group was represented at Planning and Scheduling meetings.

Motor Operated Valve Engineer

June 2001 – May 2004

- Established a project plan and led the implementation effort that re-organized the Motor-Operated Valve Program at KPS. This effort consisted of developing a Program Manual, developing controlled calculations, performing Design Basis Reviews, and compiling and/or establishing plant positions on known industry issues. The result of this effort was a reduction of full time equivalent engineers, from 3 to 1, required to maintain the Program.
- Performed and reviewed MOV safety related calculations including Minimum Required Stem Thrust, Weak Link Analysis, and Available Margin.
- Assisted in MOV testing by providing engineering support to maintenance personnel.

DISTRIBUTION PLANNING, INC., Grandville, MI
Systems Mechanical Engineer 2000 – 2001

- Integrated mechanical systems and designed equipment for material handling systems.
- Procured equipment and coordinated delivery schedules with vendors.

Stevenson & Associates

Antonio J. Perez, P.E.

SMS SANDMOLD SYSTEMS, INC., Newaygo, MI
Project Engineer /Manager 1998 – 2000

- Led multi-discipline project design teams for several projects that ranged in size from a few thousand dollars up to $2.2 million.
- Coordinated efforts with engineering, manufacturing, and installation groups to establish and maintain project schedules that met or exceeded the client's expectations.
- Procured equipment and coordinated delivery schedules with vendors.
- Acted as the company's liaison with clients to work through issues that arose during projects. Provided project status updates to clients and management.
- Designed equipment such as sand storage bins – up to 540-ton live load capacity, bucket elevators, belt conveyors, screw conveyors, and mixers. Most of this equipment was for handling of bulk solids (foundry sand).
- Analyzed and designed structural support members for various types of equipment such as vibratory conveyors, mixers, and conveyors. Designed access structures such as stair towers, service platforms and catwalks.
- Calculated foundation loads and point loads of equipment support points.

LIFT-TECH INTERNATIONAL, Muskegon, MI
Project Engineer 1997 – 1998

- Performed engineering analyses, wrote critiques, and recommended design modifications of structural members for the purpose of upgrading bridge cranes and hoists.
- Implemented engineering design changes to enhance product development.

Certificate of Completion

Tony Perez

Successfully Completed

Training on Near Term Task Force
Recommendation 2.3 – Plant Seismic Walkdowns

Bruce M. Lory (16 PDH)
Bruce M. Lory – Instructor
NTTF 2.3 Seismic Walkdown Course

Date: 06/26/12

KIM L. HULL

BACKGROUND SUMMARY

Accomplished **Lead Engineer/ Project Manager** with significant experience in commercial nuclear power industry. Demonstrated ability to lead and contribute on cross-functional project teams. Possess strong analytical, problem resolution, collaboration, and communication skills when interacting with diverse audiences including regulatory inspectors, internal inspectors, management, and employees. Respected trainer with ability to develop and present information and measure effectiveness through evaluation techniques. Strengths include:

Project Management	Design Modifications	Plant Operational Support
Procurement	Management/Leadership	Regulatory Compliance
Training/Coaching	Auditing	Inspections

KEY ACCOMPLISHMENTS

- Served as KNPP Lead Engineer/ Project Supervisor for approximately 125 plant design changes.
- Experienced in all aspects of nuclear power plant modification packages including development of calculations, design, engineering, and procurement specifications.
- Thorough understanding of configuration control, management, and preparation of 10CFR50.59 analyses.
- Participated in several regulatory and industry audits, including CDBI and INPO assessments.
- Experienced as a Technical Specialist performing NUPIC Audits.
- Well-developed communication skills for preparing technical presentations including lesson plans, project reports, and meetings in support of regulatory activities and inspections.
- Qualified Shift Technical Advisor for KNPP Operations Group (1980s).

PROFESSIONAL EXPERIENCE

STEVENSON & ASSOCIATES – Project Manager **2010 - Current**
National consulting engineering firm specializing in civil, structural and mechanical engineering for power, industrial and advanced technology facilities.

Project Manager
- Development of plant specific Seismic Walkdown Equipment Lists for multiple Units in response to NRC 50.54(f) requirements regarding Recommendation 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," Enclosure 2.3, "Recommendation 2.3: Seismic."
- Onsite at Kewaunee Power Station Consultant support to resolve Q-list Open Items
- On-site at Kewaunee Power Station Consultant support for Auxiliary Feedwater Flow Control Modification including preparation and review of design documentation.

WISCONSIN PUBLIC SERVICE RESOURCES / Nuclear Management Company
DOMINION ENERGY - Kewaunee, WI **1982 to 2010**

Senior Instructor (Maintenance) (2009 - 2010)
- Developed lesson plans and taught Basic Systems and Continuing Training Topics for Engineering and Technical Support training program.

Engineer III/Principal Engineer (2004 - 2009)
- Responsible for modifications and emergent issues including Steam Exclusion Boundaries, Fuel Transfer Carriage, Frazil Ice development on the KPS Circulating Water Intake, and NRC 96-06 Two Phase flow.
- Member of Dominion Fleet Calculation Quality Review Team and Mentor for Calculation training.
- Outage nightshift Lead Mechanical Design Engineer/Back-up Supervisor.
- KPS Engineering representative on the Independent Review Team developed to address CDBI

inspection findings. Assigned to review all calculations, modification packages, 10CFR 50.59 screenings, evaluations, and procurement packages.
- Technical Instructor for Administrative Process training for new engineers.

Mechanical Design Supervisor (2002 - 2004)
- Supervised nine engineers, analysts, and technicians assigned to the KNPP Mechanical Design Group.
- Provided Mechanical Design Oversight for all vendor activities impacting KNPP Mechanical Design Bases.
- Provided support for emergent plant issues, NRC Inspections, and Physical Change Packages.
- Subject Matter Expert Instructor for 10CFR 50.59 process training for new engineers.

Principal Engineer (Analytical Group SGR Project) (1998 - 2002)
- Contract Manager for Steam Generator Replacement (SGR).
- Responsible for coordination of SGE design, fabrication and installation contracts.
- Provided outage schedule development, coordination, and work process integration between Bechtel and KNPP.
- Coordinated contractor mobilization, badging, and plant specific training.
- Technical Specialist for Quality Assurance audits of vendors.
- SGR Shift Manager for night shift
- Responsible Engineer for SGR related Physical Change Packages.
- Responsible for SGR budget development up to 1998.
- Prepared, reviewed, and awarded Bechtel Installation contract.
- Participated in review and award of Ansaldo Fabrication contract.
- Served on team to review and award Westinghouse Design contract.
- Selected to work at Arkansas Nuclear One for their steam generator installation.

Senior Engineer (Analytical Group) (1994–1998)
- Responsible Engineer for Physical Change Packages.
- Member KNPP Engineering Reorganization Team.
- Recognized Technical Expert for KNPP systems.

Senior Project Supervisor (1992–1994)
- Provided project management and engineering services for KNPP DCR packages.
- Supervisor of KNPP NPM Project Attendants responsible for modification package organization and close out.

Nuclear Services Supervisor (1991–1992)
- Supervised initial Steam Generator replacement project effort.
- Provided specification development for services and major plant components.

Prior to 1992 – Held engineering positions from Associate Engineer to Nuclear Design Engineering Supervisor.

EDUCATION

Masters Program Coursework - Mechanical Engineering; Michigan State University - E. Lansing, MI
B.S. - Mechanical Engineering - Michigan State University - E. Lansing, MI
B.A. - Biology - Albion College - Albion, MI

Certificate of Completion

Kim Hull

Successfully Completed

Training on Near Term Task Force
Recommendation 2.3 – Plant Seismic Walkdowns

Bruce M. Lory (16 PDH)
Bruce M. Lory - Instructor
NTTF 2.3 Seismic Walkdown Course

Date: 06/26/12

Stevenson & Associates

MARLENE M. DELANEY

PROFESSIONAL EXPERIENCE

March 1998 – Present
Stevenson & Associates
Project Engineer

Stevenson & Associates is a structural/mechanical engineering firm.

Job tasks as a Project Engineer include performing engineering and project engineering activities on a broad scope of projects. Typical engineering activities include:

- Seismic equipment qualification and anchorage design.
- Component and support evaluations including modifications and new designs.
- Analysis and modification design for cable tray systems.
- SQUG/IPEEE evaluations and walkdowns.
- Reinforced concrete analysis.
- Structural steel framing assessments.
- Detail fabrication drawings for steel modifications.
- Interface with clients on all aspects of projects.

January 1981 – February 1998
Sargent & Lundy Engineers
Senior Engineer, Engineer

Sargent & Lundy is an engineering firm that consults primarily to the power industry.

Job tasks as a Senior Engineer included:

- Performing project engineering and project management duties for numerous plant modification projects. Responsibilities included overall project scheduling, technical supervision, and budget control.
- Interfaced with clients, contractors on various projects.
- Prepared conceptual design report and cost estimates for rehabilitation of hazardous waste handling facility and canal water treatment facility owned by Argonne National Laboratories.
- Field engineer at LaSalle County Nuclear Station, Enrico Fermi Atomic Power plant and Zion Nuclear Station.
- Supervised and coordinated analysis of structural framing and designed modifications to such structures.
- Evaluated and designed modifications for railroad bridges.
- Detailed fabrication drawings.

EDUCATION

University of Wisconsin – Milwaukee, Bachelor of Science in Civil Engineering, Graduated with Honors.

PROFESSIONAL REGISTRATIONS

Licensed Professional Engineer in the State of Wisconsin
Licensed Structural Engineer in the State of Illinois
Licensed Professional Engineer in the State of Illinois

Certificate of Completion

Marlene Delaney

Successfully Completed

Training on Near Term Task Force
Recommendation 2.3 – Plant Seismic Walkdowns

Bruce M. Lory (16 PDH)
Bruce M. Lory - Instructor
NTTF 2.3 Seismic Walkdown Course

Date: 06/26/12

SQUG

Certificate of Achievement

This is to Certify that

Marlene M. Delaney

has Completed the SQUG Walkdown Screening and Seismic Evaluation Training Course

April 20-24, 1998
Date of Course

Paul C Smith
SQUG Representative

Training Course Administrator

STEVENSON & ASSOCIATES

PHILIP A. GAZDA

PROFICIENCIES

- Civil engineering
- Structural analysis and design
- Structural dynamics
- Plant betterment
- Specifications
- Project management
- Excellent communication, presentation and organizational skills
- Proven ability to function as part of a team
- SQUG and IPEEE assessments
- Strong commitment to customer service and long term relationships

EXPERIENCE

1997 – Present
Stevenson & Associates

General Manager, Stevenson & Associates – Chicago

Responsible for the day to day operation of the S&A Chicago office. Manages the engineering efforts of the Chicago office and coordinates the efforts with other S&A offices.

He is a SQUG Qualified Seismic Capability Engineer. He been involved in SQUG and IPEEE walkdowns and assessments at ten nuclear plants and led the ComEd team performing the SQUG program at Zion Station. Mr. Gazda has also been the moderator for three SQUG qualification training classes provided for utility engineers. In addition, Mr. Gazda was the Project Manager for the seismic assessment of HVAC ducts at another utility based on EPRI document Seismic Evaluation Guidelines for HVAC Duct and Damper Systems Revision to 1007896.

1995 – 1997
ComEd

Head - Maintenance Engineering Department, Zion Nuclear Power Station

Managed and coordinated the activities of thirty-five Mechanical, Electrical, Structural and Program Engineers who supported the operation and maintenance of the Zion Nuclear Power Station. Support activities included engineering trouble shooting and evaluations to repair degraded electrical, mechanical and structural components/systems. Oversaw engineering programs such as In Service Inspection, Vibration Testing, Thermographic Investigations and the Evaluation and repair of piping systems for the effects of Flow Accelerated Corrosion. Performed administrative duties related to the management of the Maintenance Engineering Department. Conducted and managed the Zion SQUG and IPEEE programs.

1973 – 1995
Sargent & Lundy

1986 – 1995, *Associate and Senior Project Engineer*

Managed, coordinated and was responsible for the activities of the structural team engaged in the analysis and design of the structural

and civil portions of power plants and other miscellaneous structures. Had ultimate responsibility and ownership for the quality of the structural team and the product produced by the team. The team included hydrologists, geologists, soils engineers, architects, designers and structural engineers depending on the expertise required for each project. Responsible for coordinating the structural work with that of the Mechanical and Electrical disciplines on the project team. Established the technical approach and design criteria for the work, set schedules, and authorized drawings for construction.

1983 – 1986, *Project Engineer*

The responsibilities are essentially the same as those described for the Senior Project Engineer (see above). Reported to the Senior Project Engineer.

1979 – 1983, *Supervising Design Engineer*

Supervised the team generating engineering analyses, calculations, sketches, designs and drawings for steel and concrete structures, foundations, and electrical and mechanical component supports. Reported to Project Engineer.

1978 – 1979, *Supervising Structural Engineering Specialist*

Supervised the team that performed the structural analysis and design of specialized power plant structures such as containments, fuel pools, base mats, and drywells. Reported to Project Engineer.

1973 – 1978, *Senior Structural Engineering Specialist (1976 - 1978) Structural Engineering Specialist (1973 -1976)*

Performed the analysis and design of power plant structures. This work included dynamic analysis for seismic and hydrodynamic loads, finite element analysis, and reinforced concrete and steel design for structures and foundations. Extensively involved in the analysis, design and construction of the heavy reinforced concrete structures for Illinois Power's Clinton Station. Reported to Project Engineer.

1972 – 1973
University of Illinois

Research Assistant

Performed research at the University of Illinois for the U.S. Department of Transportation tunnel liner support system project.

EDUCATION

- University of Illinois at Urbana, IL.
  M.S. Civil Engineering

- University of Illinois at Urbana, IL.
  B.S. Civil Engineering

REGISTRATIONS

- Licensed Structural Engineer - Illinois
- Licensed Professional Engineer - Wisconsin
- Licensed Professional Engineer – Texas
- Licensed Professional Engineer – Nebraska
- Licensed Professional Engineer – Minnesota

MEMBERSHIPS & AFFILIATIONS

- American Concrete Institute
- American Society of Civil Engineers
- Structural Engineers Association of Illinois
- University of Illinois Civil Engineering Alumni Association Board of Directors, 1992 – 2000
- University of Illinois Civil Engineering Student Mentor Program, 1993 – present

PUBLICATIONS

- "Using Advanced Computer Technology to Consolidate Project Information" (co-author), American Power Conference, Chicago, Illinois, April, 1993
- "Structural Considerations in Steam Generator Replacement" (co-author), American Power Conference, Chicago, Illinois, April 1991
- "Nuclear Plant License Renewal - Structural Issues" (co-author), American Power Conference, Chicago, Illinois, April 1991
- "Modifications at Operating Nuclear Power Plants" (co-author), American Society of Civil Engineers Convention, Denver, Colorado, April 1985
- "Engineering of Structural Modifications for Operating Nuclear Power Plants" (co-author), Seventh International Conference on Structural Mechanics in Reactor Technology, Chicago, Illinois, August 1983

Certificate of Completion

Phil Gazda

Successfully Completed

Training on Near Term Task Force
Recommendation 2.3 – Plant Seismic Walkdowns

Bruce M. Lory (16 POH)
Bruce M. Lory - Instructor
NTTF 2.3 Seismic Walkdown Course

Date: 06/26/12

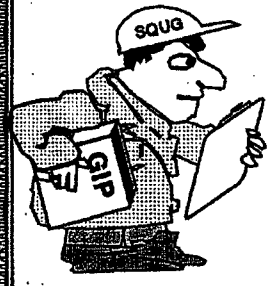
SQUG

Certificate of Achievement

This is to Certify that

Philip A. Gazda

has Completed the SQUG Walkdown Screening and Seismic Evaluation Training Course



Aug 2-4 & 10-11, 1994
Date of Course

Fred P. Smith
SQUG Representative

Bruce M. Long
Training Course Administrator

Tribhawan Ram

EDUCATION:

B.S. - Electrical Engineering, Punjab University, India, 1972
M.S. - Electrical Engineering, University of Cincinnati, 1977
M.S. - Nuclear Engineering, University of Cincinnati, 1982
M.B.A. - Bowling Green State University, 1996

PROFESSIONAL REGISTRATION:

State of Ohio

PROFESSIONAL HISTORY:

Stevenson & Associates, Inc., Senior Engineer, 2011 - present
Public Service Electric & Gas Co., Senior Plant Systems Engineer, Hancock Bridge, NJ, 2007 - 2011
Entergy Corporation, Plymouth, Massachusetts, Senior Design Engineer, 2002-2007
Various Companies, Contract Consulting Project Engineer, 1996 – 2002
Public Service Electric & Gas Co., Senior Staff Engineer, Hancock Bridge, NJ, 1983-1990
Toledo Edison Co., Toledo, Ohio, Senior Assistant Engineer, Associate Engineer, 1978-1983

PROFESSIONAL EXPERIENCE:

- Electrical and Controls Design Engineering
- Plant Systems Engineering
- Transformer and Relay(s) Spec Developer
- Plant Modification Engineering
- Systems and Component Test Engineering
- Factory Testing Witness
- 6 Month BWR Systems Engineering Training
- ETAP Trained
- Arc Flash IEEE 1584 Trained

Mr. Ram has over 28 years of electrical project, design and systems engineering experience in US nuclear plants. As part of the Seismic Margin Analysis (SMA) team, in 2012, Mr. Ram is leading the electrical engineering EPRI methodology effort to perform Post-Fukushima relay list development and evaluation to support Safe Shutdown Equipment List (SSEL), including relay functional screening and chatter analysis, for Taiwan nuclear plants (both PWR and BWR). In this effort, he is preparing the final reports including recommendations to replace any bad actor relays. Mr. Ram is preparing proposals to replace these bad actors including modification package development for field replacement of these relays. He has prepared proposals to lead similar forthcoming relay evaluation efforts for several Westinghouse plants in the USA. Mr. Ram has either prepared or peer reviewed the Seismic Walkdown Equipment Lists (SWEL 1 & 2) for several Exelon Plants.

As a senior plant systems engineer, Mr. Ram has: 1. Developed several test plans for modification packages for the replacement of low and medium voltage circuit breakers (ABB K-Line to Square D Masterpact; GE Magneblast to Wyle Siemens) and for the replacement of the entire Pressurizer Heater Bus switchgear; 2. Personally been involved in execution of these test plans during refueling outages; 3. Witnessed factory testing of Pressurizer Heater Bus Switchgear; 4. Interfaced with NRC in their biennial Component Design Basis Inspections (CDBI); Interfaced with INPO in their biennial evaluations; 5. Developed and executed Performance Centered Maintenance (PCM) strategies for Motor Control Centers (MCCs) and low and medium voltage circuit breakers and switchgear; 6. Developed and executed margin improvement strategies for pressurizer heater busses, for twin units, through obtaining funds and then equipment replacement; 7. Developed refueling outage scoping for low and medium voltage circuit breakers and MCCs through working with outage group, maintenance, operations, and work MGMT; 8. Resolved breaker grease hardening issue for ABB K-Line breakers, over a two year period, through working with maintenance and work MGMT in implementing accelerated overhauls with better grease; 9. Trained operations and engineering personnel in the Engaging People and Behavior Change process, as part of a case study team and; 10. Resolved day to day operations and maintenance issues with systems of responsibility (low and medium voltage systems)

Mr. Ram has regularly participated in the EPRI annual circuit breaker user group conferences; at the 2011 meeting, he made a presentation on circuit breaker as found testing vis-à-vis protection of equipment, cables, and containment penetrations, and selective coordination preservation.

As a Senior Design Engineer, Mr. Ram has: 1. Developed specifications and procured 345/4.16/4.16 kV and 23/4.16/4.16 kV transformers (ranging up to $1.25 million); 2. Prepared a modification package to install the 23 kV/4.16 kV/4.16 kV transformer, including leading the project team to get this transformer successfully installed, tested, and placed in service; 3. Developed ETAP scenarios and performed load flow studies to successfully support the 2006 INPO evaluation; 4. Performed arc flash calculations per IEEE 1584 methodology for 4 kV, 480V Load Centers, and MCCs, enabling a justification of reduced arc flash rated clothing, thereby allowing conversion of OUTAGE PMs into ONLINE PMs and; 5. Performed single point system vulnerability analysis.

As a Consulting Lead Project Engineer, Mr. Ram was heavily involved in resolution of the USI A-46 for several plants. He performed an extensive review of dozens of control circuits for relay chattering issues. To replace bad relay actors, Mr. Ram developed and/or supervised the development of many modification packages including: selection of replacement relays (both protective and auxiliary); preparation of relay testing specification with civil engineering input; working with and visiting seismic testing facilities for relay qualification and; developing pre and post installation instructions including test procedures. He worked closely with teams consisting of maintenance, operations, and work MGMT during the development and implementation of these projects. Besides the A-46 issue, Mr. Ram first developed and then was personally involved in the implementation of modification packages consisting of Cable, Conduit, Circuit Breaker and motor starter (contactor) replacements.

The following provides a list of USI A-46 resolution projects:

Northeast Utilities – Millstone Station
Consumers Power Co. - Palisades Nuclear Station
Boston Edison Co. - Pilgrim Nuclear Power Station
Commonwealth Edison Company- Dresden Station, Quad Cities Station

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blory@vecsa.com

Bruce M. Lory

EDUCATION AND PROFESSIONAL AFFILIATIONS

- B.S., Mechanical Engineering, State University of New York at Buffalo, Buffalo, NY – 1982
- Exelon-certified instructor – 1992
- ASME Training certification - "Design and Repair of ASME Section I, IV, and VIII, Division 1 Pressure Vessels" – 2000
- Instructor of EPRI "Fundamentals of Equipment Seismic Qualification" course
- Member of 2003-11 IEEE Subcommittee-2 on Equipment Qualification
- Member of 2003-11 IEEE 323 Working Group (Environmental Qualification)
- Member of 2003-11 IEEE 344 Working Group (Seismic Qualification)

QUALIFICATIONS

Degreed Mechanical Engineer with over 30 years experience in the nuclear industry, with specific technical expertise in the field of overseeing equipment modifications for Extended Power Uprates (EPU), as well as Seismic Qualification (SQ) and Environmental Qualification (EQ) of equipment/components. Also possesses technical proficiency in design verification and project management for installation of single failure-proof cranes.

PROFESSIONAL EXPERIENCE – EPU PROJECTS

Provided staff augmentation services as utility responsible engineer, overseeing engineering activities necessary for developing engineering modifications packages for various EPU projects, including:

- Generator rewinds (LaSalle, Clinton, & Dresden), and associated GE support system modifications (SLMS package, flux probe, generator temperature monitoring, rotor torsional vibration monitoring system)
- HP Turbine replacement with new ADSP advanced GE turbine design
- RWCU pump replacements
- Reactor Feed Pump, Recirc Valve, and FW Reg. Valve replacements
- Stator Cooling system improvements (heat exchangers, filters, strainer)
- Replacement of entire IA system with 3 independent system trains in new building.

Activities included interface with Project Manager, Field Engineer, Work Planning, Construction, and Work Week Manager, as modification packages were developed, followed by implementation. Worked within INDUS PassPort program for populating ADL, AEL, loading engineering deliverables in PassPort, ECN processing. Performed owner's review of design descriptions, calculations, construction drawings. etc. Reviewed FAT test plans, as well as witnessed FAT activities at OEM locations, assisted supply chain oversight of OEM milestones and auditing OEM facilities and generating nonconformances. Provided technical interface with OEM as designs developed from mechanical & structural engineering perspectives. Reviewed resulting work order tasks in PassPort to get WO tasks to approved status. Produced CCNs in accordance with station procedures during installation phase to develop quick solution to engineering issues.

Bruce M. Lory

PROFESSIONAL EXPERIENCE – SEISMIC QUALIFICATION

Over 18 years of experience in Seismic Qualification of equipment and components, including seismic stress analyses, equipment foundation load analyses, equipment nozzle secondary stress analyses, and selection of vendors for replacement of seismically qualified Class 1E components. Well versed in requirements of IEEE 344-1975 for seismic qualification of Class 1E components, and use of SQUG methodology for demonstrating seismic adequacy of equipment. Excellent verbal/writing skills in field of SQ and EQ testing/analyses; responds well to organizational challenges, and relationship building. Member/ Chairperson of numerous EPRI EQ and SQ technical committees (see below). Proficient in PC software applications: Microsoft Word, Excel, MS Projects and PowerPoint as well as INDUS PassPort database.

Special expertise in preparation of SQ test plans, and witnessing of SQ tests; having witnessed over 100 seismic tests for numerous utilities. Excellent knowledge of seismic and environmental testing facilities, including Wyle (Norco and Huntsville), NLI, Southern Testing Services, Nutherm, NTS Acton, EGS, and Qualtech.

Served as ComEd (now Exelon) corporate subject matter expert in SQ, providing SQ guidance and policy for all five ComEd generating stations, including on-site SQ engineers. Developed and implemented ComEd ownership of SQ program by authoring corporate procedure and SQ review checklists in 1993. Also created existing ComEd SQ standards used at all sites.

Also served as subject matter expert for ComEd Corporate Engineering, providing technical guidance to Dresden, Quad Cities, and Zion sites required to complete the SQUG project. EPRI SQUG-certified Seismic Capability Engineer, and participated in all SQUG walkdowns at the three ComEd SQUG sites. Served on EPRI G-STERI, and SQURTS committees, as ComEd employee.

Specific SQ experience and special SQ projects includes:

- Designed temporary fix to broken auxiliary switch mounting on Merlin Gerin 4KV circuit breakers in support of restarting Dresden 2 & 3 and Quad Cities 1 & 2 after extended shutdown to investigate issue. Coordinated and witnessed expedited seismic testing of temporary design fix that resulted in NRC approval to restart affected units. Received "Engaging in Excellence" award from ComEd for solving problem (1997).

- Member of EPRI SQUG mock-NRC audit team which performed 1 week inspection of TMI SQUG program at TMI in preparation for formal NRC SQUG inspection (1998).

- Expedited SQ test procedure preparation and witnessed SQ testing and HELB (EQ) testing of Magnetrol level switch needed to replace Dresden HPCI Glo-SLO obsolete level switch, allowing Dresden to exit 14 day LCO (1999).

- Coordinated response to NRC resident inspector inquiry at Byron regarding SQ status of a racked out Westinghouse 4KV circuit breaker, reviewed third party calculation justifying the configuration as seismically qualified, interfaced with Resident Inspector at Byron, and consulted industry on the issue (2000).

- Chairman of 1 day EPRI technical workshop on issue of "racked out" circuit breakers, attended by over 30 utilities and contractors, EPRI NDE Center – Charlotte, NC (1997)

- Coordinated with Quad Cities SQ engineer the response to NRC concern regarding potential contact of 125VDC batteries against hard spot on associated battery racks under seismic loading. Solution involved SQ testing of non-conforming condition, SQ test procedure reviewed and SQ test witnessed as well (1998).

- Member of the special root cause investigative team formed in response to NRC audit concern on seismic qualification status of commercial grade-dedicated protective relays on Quad Cities EDGs (1999).

Bruce M. Lory

PROFESSIONAL EXPERIENCE – ENVIRONMENTAL QUALIFICATION
Possess over 15 years of EQ experience, in consulting services and in utility positions. Prepared and reviewed over 1 00 EQ Binders to meet re quirements station-specific EQ licen sing basis requirement.). Knowledgeable in EQ requirements for satisfying the different levels of EQ lice nsing basis, (10CFR50.49, NUREG 0588 – Category I and II, or DOR Guideline).

Prepared, reviewed over 20 EQ test pro cedures, and witne ssed numerous EQ tests as part of licensee's initial EQ program origination or EQ component replacement objectives. Well versed in EQ requirements contained in IEEE Standards 323, 382, 282, 317, and 649. Understand s differentiation between Arrhenius and Regression Line analysis methodologies for calculating thermal qualified life.

Have performed many F MEAs (Failure Mode Effe cts Analysis) on EQ com ponents down to part level to d etermine applicable failure mode and appropriate corresponding activation energy/regression line slope and intercept for calculating thermal qualified life of a given material. Have used Digital Engineering and Wyle Materials databases to assist FMEAs in selection of most applicable Arrhenius material properties for failure mode/part use.

Member of Corporate EQ group at Commonwealth Edison (ComEd) Downers Grove, IL overseeing EQ program compliance of all 6 nuclear stations (1991-1995). Served as backup EQ Engineer for

ComEd Corporate Engineering office (1998-2000). Specific EQ experience and special EQ projects includes:

- Prepared or reviewed over 100 EQ binders over entire six site ComEd EQ program (1983-1993)
- Project Engineer overseeing staff of 5 EQ engineers prepare 88 EQ binders for Fort St. Vrain EQ program creation from scratch. Nu merous technical challenges due to h igh temperature MSLB profile, necessitating thermal lag anal yses and design of the rmal protection modifications. Inclu ded lead role of defending EQ program in mock-NRC audit followed by successful NRC audit.
- Assisted in EQ impact evaluation for high drywell temperature excursion that o ccurred at ComEd Dresden Nuclear Station, asse ssing EQ life consequences on Class 1E components (1988).
- Assisted in preparation of EQ test pro cedure and witnessed EQ HELB testing of non-conforming Raychem NMCK and WCSF-N electrical splices for ComEd LaSalle County Nuclear Station in support of JCO (1986)
- Member of EQ insp ection team perfo rming mock-NRC audit of Q uad Cities EQ program with respect to co mpliance to R.G. 1.97, in cluding EQ walkdown discovery of Class 1E terminal blocks epoxy glued to junction boxes involving R.G. 1.97 instrumentation circuitry (1991).
- Member of EQ assessment team performing technical review of Consumers Energy - Palisades EQ program for compliance to DOR Guidelines and R.G. 1.97 (1990).
- Performed special EQ impact assessment of potentially non-EQ components installed in Class 1E 480VAC MCCs at ComEd Braidwood Nuclear Station, reviewed over 1 50 NWRs for Stores Item # used for installation.
- Lead 5 EQ engineers on independent EQ asse ssment of Co mEd LaSalle County Nuclea r Station EQ prog ram re-baseline initiative to determin e remaining weaknesses in EQ prog ram and identify corrective actions needed in EQ analyses and component replacements (1997)

Bruce M. Lory

PROFESSIONAL EXPERIENCE – SINGLE FAILURE-PROOF CRANE DESIGN VERIFICATION
Performed utility owner's (CMS Energy – Big Rock Restoration Project) design review of all crane manufacturer's design stress analyses for use of single failure-proof Containment Building Crane for dry cask activities. Activities included assisting project manager in resolving design issues which arose during seismic qualification analyses by crane vendor, resolving crane manufacturer (Ederer) NCRs, and establishing protocol for identification of critical characteristics for commercial grade dedication of crane for safety related use. Crane expertise includes owner's review of manufacturer's design stress calculations for all operating load conditions per CMAA Spec. #70, and compliance with NUREG 0554.

Project highlights included:

- Visited crane manufacturer facility (Ederer) and vendor facility (Bigee) numerous times to resolve owner review comments on design stress calculations, attend project status meetings, and work with crane/vendor engineering staff towards final design resolutions.
- Reviewed over 30 design stress calculations for Ederer "X-SAM" single failure-proof crane trolley and hoist, including vendor bridge, column, and end truck design. Review resulted in three design changes to crane in order to comply with CMAA Spec. #70 and NUREG 0554 design margin requirements.
- Attended NRC meeting at NRR headquarters (Washington D.C.) with client to answer NRC and independent review team technical review questions on crane design and Ederer topical report.
- Assisted utility project manager in related engineering activities of commercial grade dedication, QA program establishment, and seismic qualification interface with Bigee Rigging.

EMPLOYMENT HISTORY
Stevenson & Associates – 2008 to present
EMS Inc. – 2000 - 2007
Commonwealth Edison, 1991-2000
ABB Impell, 1989 – 1991
Sargent & Lundy Engineers, 1979 – 1989

SPECIAL ACHIEVEMENTS & AFFILIATIONS

- Presented ComEd C-Team facility design for LOCA test chamber system to NUGEQ - 1991
- Inaugural Technical Program Chairman of EPRI – SQURTS program, 1993-95
- Member of EPRI – G-STERI program, 1995-98
- *"Engaging in Excellence" award from ComEd for designing and seismically qualifying* emergency fix to broken auxiliary switch mounting on Merlin-Gerin 4KV circuit breakers – 1997
- "Certificate of Appreciation" , ASME PVP Division for being Technical Program Representative of the OAC Committee for the 2000 ASME PVP Division International Conference – 2000
- Instructor of EPRI "Fundamentals of Equipment Seismic Qualification" training course - 2011

Walter Djordjevic

EDUCATION:

B.S. - Civil Engineering, University of Wisconsin at Madison, 1974
M.S. - Structural Engineering, Massachusetts Institute of Technology, 1976

PROFESSIONAL REGISTRATION:

State of California, State of Wisconsin, Commonwealth of Massachusetts, State of Michigan, State of Arizona, State of Missouri

PROFESSIONAL HISTORY:

Stevenson & Associates, Inc., President 1996 - present; Vice President and General Manager of the Boston area office, 1983 - 1995
URS/John A. Blume & Associates, Engineers, Boston, Massachusetts, General Manager, 1980 - 1983; San Francisco, California, Supervisory Engineer, 1979 - 1980
Impell Corporation, San Francisco, California, Senior Engineer, 1976 - 1979
Stone & Webster Engineering Corporation, Boston, Massachusetts, Engineer, 1974 - 1976

PROFESSIONAL EXPERIENCE:

- Structural Engineering
- Structural Dynamics
- Seismic Engineering
- Construction
- Vibration Engineering
- Expert Witness
- Committee Chairman

Mr. Djordjevic founded the Stevenson & Associates Boston area office in 1983 and serves as President and General Manager. Mr. Djordjevic is expert in the field of structural engineering – more specifically, in the areas of structural vulnerabilities to the effects of seismic and other extreme loading phenomena. As a structural dynamicist, Mr. Djordjevic also heads the Vibration Engineering Consultants corporate subsidiary of Stevenson & Associates for which he has overseen numerous designs of vibration sensitive microelectronics facilities for such clients as IBM, Intel, Motorola and Toshiba. He has personally been involved in such projects as resolvi ng vibration problems due to construction activities for the Central Artery Project (Big Dig) in Boston for which he was retained by Massport. Finally, Mr. Djordjevic has been personally retained as an Expert Witness a number of times relating to cases involving construction, structural and mechanical issues.

He has performed over a thousand hours of onsite seismic and other natural phenomena (including tornados, hurricanes, fire, and flooding) inspection walkdowns to assess structural soundness and vulnerabilities. He has inspected microelectronics fabrication facilities, power facilities, and hazardous material government and military reservations. He is one of the most experienced seismic walkdown

inspection screening and verification engineers having personally participated in seismic walkdowns at over 50 U.S. nuclear units.

In recent years, he has concentrated on screening inspection walkdowns and assessments for resolution of the USI A-46 and seismic IPEEE issues, on numerous facilities. The following provides a partial list of recent projects:

American Electric Power - D.C. Cook Station
Boston Edison Co. - Pilgrim Nuclear Power Station (SPRA)
Commonwealth Edison Company- Braidwood Station [PM], Byron Station[PM], Dresden Station[PM], Quad Cities Station[PM]
Consumers Power Co. - Palisades Nuclear Station[PM]
Entergy - Arkansas Nuclear One
Florida Power & Light - Turkey Point Station
New York Power Authority - James A. Fitzpatrick Nuclear Power Plant
Niagara Mohawk Power Corporation - Nine Mile Point Station [PM]
Northern States Power Co. - Monticello Nuclear Generating Plant
Northern States Power Co. - Prairie Island Nuclear Generating Plant
Omaha Public Power District – Fort Calhoun Station (SPRA)
Public Service Electric & Gas - Salem Nuclear Station
Rochester Gas & Electric - R.E. Ginna Station
Wisconsin Electric - Point Beach Nuclear Station[PM] (SPRA)
Wisconsin Public Service - Kewaunee Nuclear Power Plant[PM] (SPRA)
[PM] Indicates projects where Mr. Djordjevic served as Project Manager
Hanford Reservation
Savannah River Plant Reservation
Rocky Flats Reservation
Tooele US Army Depot
Anniston US Army Reservation
Umatilla US Army Reservation
Newport US Army Reservation
Aberdeen US Army Reservation

He is a member of the IEEE 344 Standards Committee, Chairman of the ASCE Working Group for Seismic Evaluation of Electrical Raceways, and Chairman of the IES Committee for Microelectronics Cleanroom Vibrations

Representative projects include overseeing the SEP shake-table testing of electrical raceways, in-situ testing of control panels and instrumentation racks at various nuclear facilities, equipment anchorage walkdowns and evaluations at various nuclear facilities. He is the principal author of the *CERTIVALVE* software package to evaluate nuclear service valves, and contributing author in the development of the *ANCHOR* and *EDASP* software packages commercially distributed by S&A.

Mr. Djordjevic is expert in the area of seismic fr agility analysis and dynamic qualification of electrical and mechanical equipment. He has participated in and managed over twenty major projects involving the evaluation and qualification of vibration sensitive equipment and seismic hardening of equipment. As demonstrated by his committee work and publications, Mr. Djordjevic has participated in and contributed steadily to the development of equipment qualification and vibration hardening methodology.

PROFESSIONAL GROUPS

Member, Institute of Electrical and Electronics Engineers, Nuclear Power Engineering Committee Working Group SC 2.5 (IEEE-344)

Chairman, American Society of Civil Engineers Nuclear Structures and Materials Committee, Working Group for the Analysis and Design of Electrical Cable Support Systems

Member, American Society of Mechanical Engineers Operation, Application, and Components Committee on Valves, Working Group SC-5

Chairman. Institute of Environmental Sciences, Working Group foe Standardization of Reporting and Measuring Cleanroom Vibrations

PARTIAL LIST OF PUBLICATIONS

1979 ASME PVP Conference, San Francisco, California, "Multi-Degree-of-Freedom Analysis of Power Actuated Valves", Paper No. 79-PVP-106.

1983 ASME PVP Conference, Portland, Oregon, "A Computer Code for Seismic Qualification of Nuclear Service Valves", Paper No. 83-PVP-81.

1983 ASME PVP Conference, Portland, Oregon, "Qualification of Electrical and Mechanical Equipment at Rocky Flats Reservation Using Prototype Analysis".

1984 ANS Conference, "Qualification of Class 1E Devices Using In-Situ Testing and Analysis."

1986 Testing of Lithography Components for Vibration Sensitivity, Microelectronics, Cahners Publishing

1990 Nuclear Power Plant Piping and Equipment Confer ence, "Development of Generic Amplification Factors for Benchboard and Relay Cabinet Assemblies", Paper No. 106, Structures and Components Symposium, held by North Carolina State University

1991 Electric Power Research Institute, "Development of In-Cabinet Response Spectra for Benchboards and Vertical Panels," EPRI Report NP-7146

Certificate of Completion

Walter Djordjevic

Successfully Completed

Training on Near Term Task Force Recommendation 2.3 – Plant Seismic Walkdowns

Bruce M. Long (16 POH)
Bruce M. Long - Instructor
NTTF 2.3 Seismic Walkdown Course

Date: 06/26/12

THOMAS J. BORTOLINI, S.E., P.E.

QUALIFICATIONS

Proven civil engineer with extensive and diverse responsibilities in project management and structural engineering. Major strengths in design, organization, team building, and budget cost control. Well organized, adaptable to change, and demonstrated communication and leadership skills.

EXPERIENCE

EXELON CORPORATION, Braidwood, Illinois 1998 to Present

Structural Design Engineer
Responsible for engineering of structural modifications and technical interfaces with architect/engineers:

- Responsible for Security modifications
- ISFSI modifications
- New plant buildings
- Tank foundation modifications
- Single failure-proof crane modifications
- ISI examinations
- Responsible Engineer for concrete containment and containment metal liner

COMMONWEALTH EDISON, Zion, Illinois 1995 to 1998

Project Team Leader, Staff Engineer (1995 to 1996 and 1997 to Present)
Responsible for project management and engineering of structural modifications and technical interfaces with architect/engineers:

- Implemented department goal of using in-house engineering, relying less on A/Es as lead structural engineer for design of $1.5 million instrument air project.
- Tailored vehicle barrier system at $300,000 under projected costs.
- Designed spare main transformer foundation so that it could be moved on or off a rail car expeditiously, reducing downtime by over 50%.
- Developed new piping configuration and oversaw A/E piping analysis for overpressure protection of various piping systems.

Assistant Outage Director of Engineering (1996 to 1997)
Responsible for resolution of emergent engineering issues that affect outage critical path (special 8-month assignment).

- Identified, prioritized, disseminated, and followed through on all emergent engineering issues for over 120 engineers averting significant time delays and costs.
- Interacted with other Assistant Outage Directors to obtain support required by engineering groups.
- Performed peer reviews of station tests and procedures leading to successful test completions.

EXPERIENCE
(Cont'd)

VECTRA TECHNOLOGIES INC., Lincolnshire, Illinois 1987 to 1995
(Formerly IMPELL Corporation)

Supervising Engineer (1991 to 1995)
Responsible for project management and engineering of multiple structural modifications.

- Managed numerous concurrent on-site engineering modifications at Commonwealth Edison's Zion Station in support of department profit and sales goals.
- Site structural lead for $5 million emergency diesel generator controls modification.
- Played key roll as site support engineer for $10 million service water modification.
- Supported installation of the $5 million boric acid modification by resolving field installation problems with no schedule impact.

Engineering Site Coordinator (1989 to 1991)
Responsible for acquiring engineering projects by demonstrating ability to resolve complex technical issues while fostering client teamwork. Knowledgeable of all on-site activities and key interface with engineering groups and station manager.

- Responsible for starting field engineering office and generating $1.0 million in additional engineering services.
- Supervised six engineers and met quality, budgets, and schedules.
- Supported office projects with field support resulting in reducing costs due to minimal redesigns.

Project Engineer (1987 to 1989)
Responsible for issuing engineering modifications and resolving field interferences.

- Oversaw the design of control room ductwork, conduit supports, and suspended ceiling grid within schedule and budget.
- Coordinated and facilitated on site construction of control room ductwork and ceiling grid meeting client's expectation.

SARGENT AND LUNDY ENGINEERS, Chicago, Illinois 1974 to 1987

Senior Structural Engineer (1981 to 1987)
Managed the design of structural steel framing.

- Supervised work of 20 structural engineers performing gallery steel framing final load check.
- Resolved field interferences with the installation and reinforcement of structural members while assigned to Cincinnati Gas and Electric's Zimmer Station, resulting in minimal craft downtime.

Structural Engineer (1974 to 1981)
Analyzed and designed concrete and steel structural members.

EDUCATION

Graduate course work completed towards a Masters in Design and Construction Engineering
University of Cincinnati, Cincinnati, Ohio
Bachelor of Science, Civil Engineering, Valparaiso University, Valparaiso, Indiana

PROFESSIONAL AFFILIATIONS

Registered Structural Engineer, State of Illinois
Registered Professional Engineer, State of Illinois

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Certificate of Completion

Thomas Bortolini

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

June 27, 2012
Date

R.P. Kassawara
Robert K. Kassawara
EPRI Manager,
Structural Reliability & Integrity

B

Equipment Lists

Appendix B contains the equipment lists that were developed during SWEL development. Note that because no Rapid Drain-Down items existed for Braidwood Generating Station Unit 2, there is no Rapid Drain-Down Equipment List.

The following contents are found in Appendix B:

Explanation of SWEL Item Substitution

During the walkdowns at Braidwood Unit 2, it was identified that Valve 2SX101A was no longer installed at the plant. It had been removed during a plant modification. As a result, this component is removed from the SWEL. An adequate quantity of components from Equipment Class 07 (fluid operated valves) are on the SWEL and the SWEL meets the requirements of Reference 1 (EPRI guidance).

During the oversight review of the SWEL for Braidwood Unit 2, it was identified that no components from Equipment Class 11(chillers) were on SWEL. Braidwood has one Category I chiller and this was added to the SWEL and will be walked down in October 2012.

These changes were discussed with Braidwood personnel including Mr. Thomas Bortolini, Mr. Joseph Bannerman, and Mr. Ralph Richard.

Stevenson & Associates

Seismic Walkdown Interim Report, Revision 1
In Response to NTTF Recommendation 2.3: Seismic

Braidwood Generating Station - Unit 2

Kim L. Hull	09/18/2012
Equipment Selection Preparer	date
Tony Perez	09/19/2012
Equipment Selection Reviewer	date
James Kuchenbecker	9/21/2012
Station Operations Staff Member	date

Refer to Attachment 3 for synopsis of Station Operations role and responsibility.

Table B-1. Base List 1

ID	Description	System	Building	Elevation	Location
0CC01A	COMPONENT COOLING HEAT EXCHANGER	CC	Aux	364	ns
0CC01P	COMPONENT COOLING PUMP ASMBLY	CC	Aux	364	364-L-17
0PM01J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
0PM02J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
0SX007	0 CC HX OUTLT VLV ASMBLY	SX	ns	346	12' LOCATED SW OF M-16
0VC01AA	CONTROL ROOM HVAC SYST CHLD WTR COOLING COIL& CABINET	VC	Aux	451	ns
0VC01AB	CONTROL ROOM HVAC SYSTCHLD WTR COOLING COIL& CABINET	VC	Aux	451	ns
0VC01CA	MCR SUPPLY FAN 0A ASMBLY	VC	Aux	451	ns
0VC01CB	CONTROL ROOM HVAC SUPPLY FAN	VC	Aux	451	ns
0VC01FA	0A MCR HVAC SUP FLTRS	VC	Aux	451	ns
0VC01FB	0B MCR HVAC SUP FLTRS	VC	Aux	451	ns
0VC01JA	CONT RM HVAC LOCAL CONT PAN ASMBLY	VC	Aux	451	451-L-10
0VC01JB	CONTROL ROOM HVAC SYST LOCAL CONT PANEL ASMBLY	VC	Aux	451	451-L-26
0VC01SA	CONTROL ROOM HVAC SYSTMAKE UP AIR FILTER UNIT	VC	Aux	463	ns
0VC01SB	0B VC MAKE-UP FILTER UNIT	VC	Aux	463	463-L-24
0VC01YA	TRAIN B RTRN FAN 0B INLT DAMPER	VC	Aux	ns	ns
0VC01YB	TRAIN B RTRN FAN 0B INLT DAMPER	VC	Aux	ns	ns
0VC02CA	CONTROL ROOM HVAC RETURN FAN ASMBLY	VC	Aux	451	ns
0VC02CB	CONTROL ROOM HVAC RETURN FAN ASMBLY	VC	Aux	426	ns
0VC02FA	CONTROL RM REC CHARCOAL FILTER A TRAIN ASMBLY	VC	Aux	ns	ns
0VC02FB	CONTROL RM RE CHARCOAL FILTER B TRAIN ASMBLY	VC	Aux	ns	ns
0VC03CA	MAKE-UP FILTER FAN ASMBLY	VC	Aux	426	ns
0VC03CB	MAKE-UP FAN 0VC03CB HOUSING FILTER ASMBLY	VC	Aux	463	463
0VC05YA	ISOLATION DAMPER BUTTERFLY	VC	Aux	ns	ns
0VC05YB	TRAIN B RECIRC CHARCOAL ABSORBER 0B INLT DAMPER	VC	Aux	ns	ns
0VC05YC	TRAIN B RECIRC CHARCOAL ABSORBER 0B INLT DAMPER	VC	Aux	ns	ns
0VC05YD	TRAIN B RECIRC CHARCOAL ABSORBER 0B INLT DAMPER	VC	Aux	ns	ns
0VC06YA	0B VC ABSORBER OUTLET DAMPER A ISOL DAMPER	VC	Aux	ns	ns
0VC06YB	TRAIN B RECIRC CHARCOAL ABSORBER 0B DISCH DAMPER	VC	Aux	ns	ns
0VC06YC	TRAIN B RECIRC CHARCOAL ABSORBER 0B DISCH DAMPER	VC	Aux	ns	ns
0VC06YD	TRAIN B RECIRC CHARCOAL ABSORBER 0B DISCH DAMPER	VC	Aux	ns	ns
0VC08Y	TRAIN B MAKEUP AIR FLTR UNIT FAN 0B DISCH FLOW CONTROL	VC	Aux	ns	ns

ID	Description	System	Building	Elevation	Location
0VC09Y	TRAIN B EMERGENCY MAKEUP INTAKE FROM TURB BLDG	VC	Aux	ns	ns
0VC15J	MCR U-1 HVAC START PNL	VC	Aux	451	ns
0VC16J	MCR U-2 HVAC START PNL	VC	Aux	463	ns
0VC17YA	ISOLATION DAMPER OPPOSED BLADE	VC	Aux	ns	ns
0VC17YB	TRAIN A RTRN FAN 0A INLT DAMPER	VC	Aux	ns	ns
0VC24Y	TRAIN A MAKEUP AIR FLTR UNIT FAN 0A DISCH FLOW CONTROL	VC	Aux	ns	ns
0VC25Y	TRAIN A EMERGENCY MAKEUP INTAKE FROM THE TURB BLDG	VC	Aux	ns	ns
0WO01CA	CHILLED WATER SYS CONTROL ROOM REFRIGERATION UNIT 0A	WO	Aux	383	ns
0WO01CB	CHILLED WATER SYS CONTROL ROOM REFRIGERATION UNIT 0B	WO	Aux	383	ns
0WO01PA	0A CONTROL ROOM CHILLED WATER PUMP ASMBLY	WO	Aux	383	383-N-8
0WO01PB	0B CONTROL ROOM CHILLED WATER PUMP ASMBLY	WO	Aux	383	383-N-9
0WO14MA	SEPARATOR AIR M-118	WO	Aux	383	+04
0WO14MB	SEPARATOR AIR M-118	WO	Aux	383	+04
2AF006A	AUXILIARY FEEDWATER PMP 2A SX SUCT VLV ASMBLY	AF	Aux	383	ns
2AF006B	AUXILIARY FEEDWATER PMP 2B SX SUCT VLV ASMBLY	AF	Aux	383	IN PP RM
2AF017A	AUXILIARY FEEDWATER PMP 2A SX SUCT VLV ASMBLY	AF	Aux	383	ns
2AF017B	AUXILIARY FEEDWATER PMP 2B SX SUCT VLV ASMBLY	AF	Aux	383	IN PP RM
2AF01AA	FEED PUMP LUBE OIL COOLER	AF	Aux	ns	ns
2AF01AB	AF PP LUBE OIL COOLER	AF	Aux	ns	ns
2AF01EA-1	BATT CHARGER (#1) FOR 2B AUX FEED PUMP	AF	Aux	ns	ns
2AF01EA-A	BATTERY 1 AUXILIARY FEEDWATER PUMP	AF	Aux	383	ns
2AF01EA-B	BATTERY 1A AUXILIARY FEEDWATER PUMP 2B	AF	Aux	383	ns
2AF01EB-1	BATT CHARGER (#2) FOR 2B AUX FEED PP	AF	Aux	ns	ns
2AF01EB-A	BATTERY 2 AUXILIARY FEEDWATER PUMP 2B	AF	Aux	383	383-L-19
2AF01EB-B	BATTERY 2 AUXILIARY FEEDWATER PUMP 2B	AF	Aux	383	ns
2AF01J	AUX FEEDWATER PUMP 2B STARTUP PANEL ASMBLY	AF	Aux	383	383-M-16
2AF01PA	PUMP AUX FEEDWATER, MOTOR DRIVEN ASMBLY	AF	Aux	383	ns
2AF01PA-A	AUX FEEDWATER PUMP 2A AUX LUBE OIL PUMP	AF	Aux	383	ns
2AF01PA-L	AUX FEEDWATER PUMP 2A MAIN LUBE OIL PUMP	AF	Aux	383	ns
2AF01PA-	2A AUX FW PUMP MOTOR	AF	Aux	383	ns

ID	Description	System	Building	Elevation	Location
M					
2AF01PB	PUMP AUX FEEDWATER, DIESEL DRIVEN	AF	Aux	383	ns
2AF01PB-A	2B AUX FW PUMP AUX LUBE OIL PUMP	AF	Aux	383	ns
2AF01PB-B	AUX FW PUMP 2B ENG AUX START RLY BATT 1	AF	Aux	ns	ns
2AF01PB-B	AUX FW PUMP 2B ENG AUX START RLY BATT 2	AF	Aux	ns	ns
2AF01PB-K	AUX FW PUMP 2B DIESEL	AF	Aux	383	ns
2AF01PB-L	AUX FEEDWATER PUMP 2B MAIN LUBE OIL PUMP	AF	Aux	383	ns
2AF02A	DIESEL DRIVEN AF PP GEAR OIL CLR	AF	Aux	383	383
2AP01E	UNIT AUX. POWER TRANSFORMER 241-1	AP	Out-side	401	ns
2AP03E	UAT 241-2	AP	ns	ns	TRANS YRD
2AP05E	EQ 4160 VOLT ESF SWITCH GEAR 241	AP	Aux	426	426-N-28
2AP06E	4160 VOLT ESF SWITCH BUS 242	AP	Aux	426	426
2AP10E	EQ 480V ESF SUBSTATION BUS 231X ASMBLY	AP	Aux	426	426-P-26
2AP11E	EQ 480V ESF UNIT SUB 231X TRANSFORMER 2AP086	AP	Aux	426	426-N-27
2AP12E	EQ SWGR 232X 480 VOLT ESF ASMBLY	AP	Aux	426	426-P-27
2AP13E	EQ UNIT SUBSTATION 232X TRAN 480V ESF	AP	Aux	426	426-N-29
2AP21E	480V AUX BLDG ESF MCC 231X1 XFORMER	AP	Aux	364	ns
2AP22E	480V AUX BLDG ESF MCC 231X3 ASMBLY	AP	Aux	383	383-M-20
2AP23E	480V AUX BLDG ESF MCC 232X1 ASMBLY	AP	Aux	364	364-N-23
2AP24E	EQ 480 V AUX BLDG ESF MCC 232X3 ASMBLY	AP	Aux	383	383-P-19
2AP25E	480V AUX BLDG ESF MCC 231X2 ASMBLY	AP	Aux	414	414-R-24
2AP26E	480V. AUX BLDG ESF MCC 231X4 ASMBLY	AP	Aux	414	ns
2AP27E	EQ 480V AUX BLDG MCC 232X2 ASMBLY	AP	Aux	426	426-R-24
2AP28E	MCC 232X4 ASMBLY	AP	Aux	426	426-R-24
2AP30E	EQ 480V AUX BLDG ESF MCC 231X5 ASMBLY	AP	Aux	426	426-Q-19
2AP32E	EQ 480V AUX BLDG MCC 232X5 ASMBLY	AP	Aux	426	426-Q-19
2AP38E	ASSY - 480V AUX BLDG MCC 233X1	AP	Aux	346	ns
2AP39E	ASSY - 480V AUX BLDG MCC 234V1	AP	Aux	346	ns
2CC01A	CC HEAT EXCHANGER	CC	Aux	364	ns
2CC01PA	2A COMPONENT COOLING WTR PUMP ASMBLY	CC	Aux	364	ns
2CC01PB	EQ MOTOR COMPONENT COOLING PMP 2B	CC	Aux	364	364-N-19

ID	Description	System	Building	Elevation	Location
2CC01T	SURGE TANK COMPONENT COOLING	CC	Aux	426	426-P-12
2CC053	INSIDE CNMT PEN CLG SUPPLY ASMBLY	CC	Cont	377	OMB
2CC9412A	CC FROM RH HX 2A OUTLET ISOL ASMBLY	CC	Aux	364	+13'
2CC9412B	CC FROM RH HX 2B OULET ISOL VALVE ASMBLY	CC	Aux	364	+13'
2CC9422A	RH HX 2A OUTLT RLF VLV	CC	Aux	364	ns
2CC9422B	RH HX 2B OUTLT RLF VLV	CC	Aux	364	364 V 19
2CC9437B	CC FROM EXCESS LETDOWN HX ISOL VLV ASMBLY	CC	Aux	364	PENETRATION P-22
2CO01J	DG 2A RM FP CTRL PANEL	CO	Aux	401	ns
2CO02J	DG 2A DAY TANK ROOM FP CONTROL PANEL	CO	Aux	401	ns
2CO03J	DG 2B ROOM FP CONTROL PANEL	CO	Aux	401	ns
2CO04J	DG 2B DAY TANK ROOM FP CONTROL PANEL	CO	Aux	401	ns
2CO17JA	DG 2A & DAY TANK FIRE DAMPER PANEL	CO	Aux	401	ns
2CO17JB	DG 2B & DAY TANK FIRE DAMPER PANEL	CO	Aux	401	ns
2CO19JA	LSCR & CAB TUN FIRE DAMPER PANEL	CO	Aux	401	ns
2CO19JB	LSCR FIRE DAMPER CONTROL PANEL	CO	Aux	463	ns
2CO20J	UCSR FIRE DAMPER CONTROL PANEL	CO	Aux	426	ns
2CV01FA	2A CV SEAL WATER INJECTION FILTER	CV	Aux	ns	ns
2CV01FB	2B CV SEAL WATER INJECTION FILTER	CV	Aux	ns	ns
2CV01PA	PUMP,2A CENTRIFUGAL CHARGING ASMBLY	CV	Aux	364	ns
2CV01PA-A	PUMP, CNTRFGL CHG PP AUX OIL PP	CV	Aux	364	ns
2CV01PB	PUMP,2B CENTRIFUGAL CHARGING ASMBLY	CV	Aux	364	ns
2CV01PB-A	PUMP, CNTRFGL CHG AUX OIL PP	CV	Aux	364	ns
2CV02A	SEAL WATER HEAT EXCHANGER	CV	Aux	383	ns
2CV02F	SEAL WATER RETURN FILTER	CV	Aux	ns	ns
2CV02P-C	PD CHARGING PUMP FLUID DRIVE OIL COOLER	CV	Aux	364	0
2CV02SA	2A CV PUMP GEAR OIL COOLER	CV	Aux	364	364 AUX
2CV02SB	2B CV PUMP GEAR COOLER	CV	Aux	364	364
2CV03SA	2A CV LUBE OIL COOLER	CV	Aux	364	364 AUX
2CV03SB	2B CV PUMP LUBE OIL COOLER	CV	Aux	364	364
2CV04AA	LETDOWN HT EXCH 2A	CV	Aux	383	ns
2CV04AB	LETDOWN HT EXCH 2B	CV	Aux	383	ns
2CV112B	VCT OUTLT ISOL VLV C/S AT 2PM05J ASMBLY	CV	Aux	426	VCT VLV AISLE
2CV112C	VCT OUTLT ISOL VLV C/S AT 2PM05J ASMBLY	CV	Aux	426	VCT VLV AISLE
2CV112D	RWST TO CHG PMPS SUCT VLV C/S AT 2PM05J ASMBLY	CV	Aux	364	+12' CWA

ID	Description	System	Building	Elevation	Location
2CV112E	RWST TO CHG PMPS SUCT VLV C/S AT 2PM05J ASMBLY	CV	Aux	364	CWA +10' ON N. WALL
2CV8100	SEAL WTR RTRN CNMT ISOL VLV ASMBLY	CV	Aux	375	+21 PIPE CHASE
2CV8105	CHG LINE CNMT ISOL VLV C/S AT 2PM05J ASMBLY	CV	Aux	375	CWA PEN-71
2CV8106	CHG LINE CNMT ISOL VLV C/S AT 2PM05J ASMBLY	CV	Aux	375	CWA P-71
2CV8110	CV PMP MINIFLOW ISOL VLV C/S AT 2PM05J ASMBLY	CV	Aux	364	AB CWA AGAINST N WALL
2CV8111	CHG PMP MINIFLOW ISOL VLV C/S AT 2PM05J ASMBLY	CV	Aux	364	ns
2CV8112	SEAL WTR RTRN CNMT ISOL VLV C/S AT 2PM05J ASMBLY	CV	Cont	377	OMB +18' PEN 28
2CV8114	SOV 2A CV PP ESF MINIFLOW ISOL VLV	CV	Aux	364	ns
2CV8116	SOV 2B CV PP ESF MINIFLOW ISOL VLV	CV	Aux	364	ns
2CV8123	RLF VLV	CV	Aux	ns	ns
2CV8124	RLF VLV	CV	Aux	ns	ns
2CV8145	PZR AUXILIARY SPRAY VLV C/S AT 2PM05J ASMBLY	CV	Cont	412	OMB
2CV8152	LETDOWN LINE CONTAINMENT ISOLATION VALVE	CV	Aux	364	CWA P-41 +27'
2CV8355A	RCP 2A SEAL INJECTION ISOL VLV C/S 2PM05J ASMBLY	CV	Aux	364	AB CWA PEN-33; (374)
2CV8355B	RCP 2B SEAL INJECTION ISOL VLV C/S 2PM05J ASMBLY	CV	Aux	364	AB CWA PEN-53; (374)
2CV8355C	RCP 2C SEAL INJECTION ISOL VLV C/S 2PM05J ASMBLY	CV	Aux	364	AB CWA PEN-53; (374)
2CV8355D	RCP 2D SEAL INJECTION ISOL VLV C/S 2PM05J ASMBLY	CV	Aux	364	AB CWA PEN-33; (374)
2CV8804A	RH HX 2A TO CV PMP SUCT ISOL VLV; C/S AT 2PM06J ASMBLY	CV	Aux	364	+2
2DC01E	125V BATTERY 211 DIV. 21	DC	Aux	451	211 BATTERY RM
2DC02E	125V BATTERY 212 DIV. 22	DC	Aux	451	212 BATTERY RM
2DC03E	BATTERY CHARGER 211 DIV. 21	DC	Aux	451	ns
2DC04E	BATTERY CHARGER 212 DIV. 22	DC	Aux	451	ns
2DC05E	125V DC ESF DIST CENTER 211	DC	Aux	451	ns
2DC05EA	125V DC ESF DIST. PNL 211	DC	Aux	451	ns
2DC06E	125V DC ESF DIST CENTER 212	DC	Aux	451	ns
2DC06EA	125V DC ESF DIST PNL 212	DC	Aux	451	ns
2DC10J	125V DC FUSE PANEL - DIV. 21	DC	Aux	451	ns
2DC11J	125V DC FUSE PANEL - DIV. 22	DC	Aux	451	ns
2DG01KA	2A DIESEL GENERATOR SKID	DG	Aux	401	ns
2DG01KB	DIESEL ENGINE GENERATOR SKID 2B	DG	Aux	ns	ns
2DG01SA	AIR COMPRESSOR PACKAGE 1A	DG	Aux	401	ns
2DG01SB	AIR COMPRESSOR PACKAGE 1B	DG	Aux	401	ns
2DG04EA	DIESEL GENERATOR 1A SYNCHRO-CHECK RELAY BOX	DG	Aux	426	ns
2DG04EB	DIESEL GENERATOR 1B SYNCHRO-CHECK RELAY BOX	DG	Aux	426	ns

ID	Description	System	Building	Elevation	Location
2DO01PA	20 GPM TRANSFER PUMP 2A	DO	Aux	373	Diesel Oil Storage Tk Rm 2A
2DO01PB	20 GPM TRANSFER PUMP 2B	DO	Aux	373	Diesel Oil Storage Tk Rm 2B
2DO01PC	20 GPM TRANSFER PUMP 2C	DO	Aux	373	Diesel Oil Storage Tk Rm 2A
2DO01PD	20 GPM TRANSFER PUMP 2D	DO	Aux	373	Diesel Oil Storage Tk Rm 2B
2DO01TA	DIESEL OIL STORAGE TANK	DO	Aux	373	Diesel Oil Storage Tk Rm 2A
2DO01TB	DIESEL OIL STORAGE TANK 2B	DO	Aux	373	Diesel Oil Storage Tk Rm 2B
2DO02TA	500 GAL DAY TANK 2A	DO	Aux	401	Diesel Oil Day Tank Rm #2
2DO02TB	500 GALLON DAY TANK 2B	DO	Aux	401	Diesel Oil Day Tank Rm #1
2DO10T	500 GAL DIESEL OIL DAY TANK	DO	Aux	383	Oil Day Tank Room #1
2FC009	ISOLATION VALVE	FC	Con	377	EL. 388
2FC012	ISOLATION VALVE	FC	Con	377	EL. 392
2FT-0121	CHARGING LINE D/P CELL FLOW XMITTR	ns	ns	ns	ns
2FT-0132	LETDOWN FLOW D/P CELL	ns	ns	ns	LOCAL MOUNT
2FT-0139	LOOP FILL HEADER FLOW XMITTR	ns	ns	ns	LOCAL MOUNT
2FT-0688	RESID HT EXCH 2B CCW OUT DP FLOW XMITTR	CC	Aux	364	ns
2FT-0689	RESID HX 2A CCW OUT DP FLOW XMITTR	CC	Aux	364	ns
2FT-AF011	SG 2A AUX FEED PUMP 2A FLOW XMTTR	AF	Aux	364	ns
2FT-AF012	AF TO SG 2A FLOW TRANSMITTER	AF	Aux	364	ns
2FT-AF013	AF TO SB 2B FLOW TRANSMITTER	AF	Aux	364	ns
2FT-AF014	AF TO SG 2B FLOW TRANSMITTER	AF	Aux	ns	ns
2FT-AF015	AF TO SG 2C FLOW TRANSMITTER	AF	Aux	ns	ns
2FT-AF016	AF TO SG 2C FLOW TRANSMITTER	AF	Aux	ns	ns
2FT-AF017	AF TO SG 2D FLOW TRANSMITTER	AF	Aux	364	ns
2FT-AF018	AF TO SG 2D FLOW TRANSMITTER	AF	Aux	364	ns
2IP01E	INSTRUMENT BUS 211 TRANSFORMER - DIV. 21	IP	Aux	451	ns
2IP01J	120VAC INSTRUMENT BUS DISTRIBUTION PANEL 211 - DIV. 21	IP	Aux	451	ns
2IP02E	INSTRUMENT BUS 212 TRANSFORMER - DIV. 22	IP	Aux	451	ns
2IP02J	120 VAC INSTRUMENT BUS DISTRIBUTION PNL 212 - DIV. 22	IP	Aux	451	ns
2IP03E	INSTRUMENT BUS 213 TRANSFORMER - DIV. 21	IP	Aux	451	ns
2IP03J	120 VAC INSTRUMENT BUS DISTRIBUTION PANEL 213 - DIV.21	IP	Aux	451	MEER
2IP04E	INSTRUMENT BUS 214 TRANSFORMER - DIV. 22	IP	Aux	451	ns
2IP04J	120 VAC INSTRUMENT BUS DISTRIBUTION PANEL 214 - DIV 22	IP	Aux	451	ns
2IP05E	INSTRUMENT BUS 211 INVERTER - DIV. 21	IP	Aux	451	ns
2IP06E	INSTRUMENT BUS 212 INVERTER - DIV. 22	IP	Aux	451	ns
2IP07E	INSTRUMENT BUS 213 INVERTER - DIV. 21	IP	Aux	451	ns

ID	Description	System	Building	Elevation	Location
2IP08E	INSTRUMENT BUS 214 INVERTER - DIV. 22	IP	Aux	451	ns
2IY-0606	RH HX 2A OUT I/P TRANSDUCER	RH	Aux	364	ns
2IY-0607	RH HX #2B OUT I/P TRANSDUCER	RH	Aux	364	ns
2LS-0940A	CONTAINMENT SUMP LEVEL SWITCH 2A	SI	Cont	ns	ns
2LS-0941A	2B CONTAINMENT RECIRCULATION SUMP LVL LIGHTS	SI	Cont	ns	ns
2LT-0459	PRZR LEVEL D/P TRANSMITTER	RY	Con	377	2PL50J
2LT-0460	PRZR LEVEL D/P TRANSMITTER	RY	Con	377	(LM) +06
2LT-0461	PRZR LEVEL D/P TRANSMITTER	RY	Con	377	2PL52J
2LT-0501	SG LOOP 2A W-RNG LEVEL D/P XMTTR	FW	Con	377	2PL50J
2LT-0502	SG LOOP 2B W-RNG LEVEL D/P TRANSMITTER	FW	Con	377	2PL67J
2LT-0503	SG LOOP 2C W-RNG LEVEL D/P TRANSMITTER	FW	Con	377	2PL75J
2LT-0504	SG LOOP 2D W-RNG LEVEL D/P TRANSMITTER	FW	Con	377	2PL52J
2LT-0517	S/G LOOP 2A LEVEL D/P XMTTR W/FILLED LEG	FW	Con	401	2PL69J
2LT-0518	S/G 2A LEVEL LOOP D/P XMTTR 2/FILLED LEG	FW	Con	412	LM
2LT-0519	S/G LOOP 2A LEVEL D/P XMTTR W/FILLED LEG	FW	Con	412	2PL57J
2LT-0527	S/G LOOP 2B LEVEL D/P TRANSMITTER W/FILLED LEG	FW	Con	377	2PL75J
2LT-0528	S/G 2B LEVEL D/P TRANSMITTER W/FILLED LEG	FW	Con	412	LM
2LT-0529	S/G LOOP 2B LEVEL D/P XMTTR W/FILLED LEG	FW	Con	412	2PL71J
2LT-0537	S/G LP 2C LVL D/P TRANSMITTER W/FILLED LEG	FW	Con	377	2PL75J
2LT-0538	S/G 2C LEVEL LOOP D/P XMITTER W/FILLED LEG	FW	Con	412	LM
2LT-0539	S/G LP 2C LVL D/P TRANSMITTER W/FILLED LEG	FW	Con	412	2PL71J
2LT-0547	S/G LP 2D LVL D/P TRANSMITTER W/FILLED LEG	FW	Con	401	2PL69J
2LT-0548	S/G 2D LEVEL LOOP D/P XMTTR W/FILLED LEG	FW	Con	412	LM
2LT-0549	S/G 2D LVL LOOP D/P TRANSMITTER W/FILLED LEG	FW	Con	412	2PL57J
2LT-0556	S/G LOOP 2A LEVEL D/P TRANSMITTER W/FILLED LEG	FW	Con	412	2PL56J
2LT-0557	S/G 2B LEVEL LP D/P TRANSMITTER W/FILLED LEG	FW	Con	412	2PL72J
2LT-0558	S/G LOOP 2C LEVEL D/P TRANSMITTER W/FILLED LEG	FW	Con	412	2PL72J
2LT-0559	S/G LOOP 2D LEVEL D/P TRANSMITTER W/FILLED LEG	FW	Con	412	LM
2LT-0930	REF WTR STG TK LEVEL D/P XMTTR	SI	RWST Tunnel	379	+05
2LT-0931	REF WTR STG TK LVL D/P XMTTR	SI	RWST Tunnel	379	+06
2LT-0932	REF WTR STG TK LVL D/P XMTTR	SI	RWST Tunnel	379	0
2LT-0933	REF WTR STG TK LVL D/P XMTTR	SI	RWST Tunnel	379	0

ID	Description	System	Building	Elevation	Location
2MS001A	MS ISOL VLV LOOP 2A ASMBLY	MS	Aux	377	2PM06J (377 MSIV)
2MS001B	MS ISOL VLV LOOP 2B ASMBLY	MS	Aux	377	2PM06J; (377 MSIV)
2MS001C	MS ISOL VLV LOOP 2C ASMBLY	MS	Aux	377	2PM06J; (377 MSIV)
2MS001D	2D MSIV	MS	Aux	377	377 MSIV
2MS013A	S/G 2A 1235 PSIG RELIEF	MS	Aux	401	A' SAFETY VALVE RM
2MS013B	S/G 2B 1235 PSIG RELIEF	MS	Aux	401	B' SAFETY VALVE RM
2MS013C	S/G 2C 1235 PSIG RELIEF	MS	Aux	401	C' SAFETY VALVE RM
2MS013D	S/G 2D 1235 PSIG RELIEF	MS	Aux	401	D' SAFETY VALVE RM
2MS014A	S/G 2A 1220 PSIG RELIEF	MS	Aux	401	A' SAFETY VALVE RM
2MS014B	S/G 2B 1220 PSIG RELIEF	MS	Aux	401	B' SAFETY VALVE RM
2MS014C	S/G 2C 1220 PSIG RELIEF	MS	Aux	401	C' SAFETY VALVE RM
2MS014D	S/G 2D 1220 PSIG RELIEF	MS	Aux	401	D' SAFETY VALVE RM
2MS015A	S/G 2A 1205 PSIG RELIEF	MS	Aux	401	A' SAFETY VALVE RM
2MS015B	S/G 2B 1205 PSIG RELIEF	MS	Aux	401	B' SAFETY VALVE RM
2MS015C	S/G 2C 1205 PSIG RELIEF	MS	Aux	401	C' SAFETY VALVE RM
2MS015D	S/G 2D 1205 PSIG RELIEF	MS	Aux	401	D' SAFETY VALVE RM
2MS016A	S/G 2A 1190 PSIG RELIEF	MS	Aux	401	A' SAFETY VALVE RM
2MS016B	S/G 2B 1190 PSIG RELIEF	MS	Aux	401	B' SAFETY VALVE RM
2MS016C	S/G 2C 1190 PSIG RELIEF	MS	Aux	401	C' SAFETY VALVE RM
2MS016D	S/G 2D 1190 PSIG RELIEF	MS	Aux	401	D' SAFETY VALVE RM
2MS017A	2A S/G MAIN STEAM SAFETY RELIEF	MS	Aux	401	A' SAFETY VALVE RM
2MS017B	2B S/G MAIN STEAM SAFETY RELIEF	MS	Aux	401	B' SAFETY VALVE RM
2MS017C	2C S/G MAIN STEAM SAFETY RELIEF	MS	Aux	401	C' SAFETY VALVE RM
2MS017D	2D S/G MAIN STEAM SAFETY RELIEF	MS	Aux	401	D' SAFETY VALVE RM
2MS018A	S/G 2A PORV ASMBLY	MS	Aux	401	ns
2MS018B	S/G 2B PORV ASMBLY	MS	Aux	401	ns
2MS018C	S/G 2C PORV	MS	Aux	404	ns
2MS018D	S/G 2D PORV ASMBLY	MS	Aux	401	ns
2NI-31B	SOURCE RANGE	ns	ns	ns	ns
2NI-32B	SOURCE RANGE	ns	ns	ns	ns
2NR11E	POSTACCIDENT NEUTRON DETECTOR	NR	Cont	ns	ns
2NR13E	POSTACCIDENT NEUTRON DETECTOR	NR	Cont	ns	ns
2PA01J	PROTECTION SYSTEM CABINET (I&E Prot. Cab. CH 1)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA02J	PROTECTION SYSTEM CABINET (I&E Prot. Cab. CH 2)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)

ID	Description	System	Building	Elevation	Location
2PA03J	PROTECTION SYSTEM CABINET (I&E Prot. Cab. CH 3)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA04J	PROTECTION SYSTEM CABINET (I&E Prot. Cab. CH 4)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA06J	CONTROL SYSTEM CABINET (I&C Rack Ctrl. Cab. Grp. 2)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA07J	PROC I&C RACK CONT GRP 3 CAB 7	PA	Aux	451	ns
2PA08J	CONTROL SYSTEM CABINET (I&C Rack Ctrl. Cab. Grp. 4)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA09J	PROTECTION SYSTEM CABINET (SSPS Cab. Train A)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA10J	PROTECTION SYSTEM CABINET(SSPS Cab. Train B)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA11J	SAFEGUARDS TEST CABINET TRAIN A	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA12J	SAFEGUARDS TEST CABINET TRAIN B	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA13J	ESF SEQUENCING & ACTUATION CABINET TRAIN A	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA14J	ESF SEQUENCING & ACTUATION CABINET TRAIN B	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA27J	AUX SAFEGUARD RELAY CABINET (A)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA28J	AUX SAFEGUARD RELAY CABINET (B)	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA33J	CONTROL SYSTEM CABINET ESF DIV. 11	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA34J	CONTROL SYSTEM CABINET ESF DIV. 12	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA51J	RX VESSEL LEVEL CHANNEL A HJTC CABINET	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PA52J	RX VESSEL LEVEL CHANNEL B HJTC CABINET	PA	Aux	451	Aux. Elect. Equip. Rm (AEER)
2PL04J	REMOTE CONTROL PANEL (Remote Shutdown Panel)	ns	Aux	383	ns
2PL05J	REMOTE CONTROL PANEL (Remote Shutdown Panel)	ns	Aux	383	ns
2PL06J	REMOTE CONTROL PANEL (Remote Shutdown Panel)	ns	Aux	383	ns
2PL07J	1A DG 1DG01KA CONTROL PANEL	ns	Aux	401	ns
2PL08J	1B DG 1DG01KB	ns	Aux	401	ns

ID	Description	System	Building	Elevation	Location
2PL10J	FIRE HAZARDS PANEL	ns	Aux	426	ns
2PL50J	LOCAL INSTRUMENT PANEL	ns	Cont	377	377-R-42
2PL52J	LOCAL INSTRUMENT PANEL	ns	Cont	377	ns
2PL56J	RX2 CNMT LOC INST PNL	PL	Con	412	ns
2PL57J	RX2 CNMT LOC INST PNL	PL	Con	412	ns
2PL66J	LOCAL INSTRUMENT PANEL	ns	Cont	377	377-R-32
2PL67J	LOCAL INSTRUMENT PANEL	ns	Cont	377	377-R-33
2PL69J	RX2 CNMT LOC INST PNL	PL	Con	401	ns
2PL71J	RX2 CNMT LOC INST PNL	PL	Con	412	ns
2PL72J	RX2 CNMT LOC INST PNL	PL	Con	412	ns
2PL75J	LOCAL INSTRUMENT PANEL	ns	Cont	377	377-R-27
2PL77JC	LOCAL CONTROL PANEL	ns	Aux	377	2B MSIV RM
2PL79JB	LOCAL CONTROL PANEL	ns	Aux	377	2A MSIV RM
2PL84JA	LOCAL CONTROL PANEL	ns	Aux	364	ns
2PL84JB	LOCAL CONTROL PANEL	ns	Aux	364	ns
2PL85JB	LOCAL CONTROL PANEL	ns	ns	ns	ns
2PL86J	LOCAL CONTROL PANEL	ns	Aux	364	ns
2PL97J	LOCAL CONTROL PANEL	ns	Aux	364	ns
2PM01J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
2PM04J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
2PM05J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
2PM06J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
2PM07J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
2PM11J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
2PM12J	MAIN CONTROL BOARD	ns	Aux	451	Main Control Room
2PT-0455	U2 PRESSURIZER PRESS CHANNEL 455	RY	Cont	ns	ns
2PT-0456	PZR PRESS. PROT. CHANNEL II	RY	Cont	ns	ns
2PT-0457	PRZR PRESSURE TRANSMITTER	RY	Cont	377	377-R-26
2PT-0458	PRZR PRESSURE TRANSMITTER	RY	Cont	ns	1PL75J
2PT-0514	STM GEN LOOP 2A STEAM PRESS PR	MS	Aux	ns	Locally mounted
2PT-0515	STM GEN LOOP 2A STEAM PRESS PR	MS	Aux	ns	Locally Mounted
2PT-0516	STM GEN LOOP 2A STEAM PRESS PR	MS	Aux	ns	ns
2PT-0524	STM GEN LOOP 2B STEAM PRESS PR	MS	Aux	ns	Locally Mounted
2PT-0525	STM GEN LOOP 2B STEAM PRESS PR	MS	Aux	377	2B MSIV Rm; 2PL77JC
2PT-0526	STM GEN LOOP 2B STEAM PRESS PR	MS	Aux	ns	Locally mounted

ID	Description	System	Building	Elevation	Location
2PT-0534	STM GEN LOOP 2C STEAM PRESS PR	MS	Aux	ns	Locally mounted
2PT-0535	STM GEN LOOP 2C STEAM PRESS PR	MS	Aux	377	2B MSIV Rm; 2PL77JC
2PT-0536	STM GEN LOOP 2C STEAM PRESS PR	MS	Aux	ns	Locally Mounted
2PT-0544	STM GEN LOOP 2D STEAM PRESS PR	MS	Aux	ns	Locally Mounted
2PT-0545	STM GEN LOOP 2D STEAM PRESS PR	MS	Aux	ns	Locally Mounted
2PT-0546	STM GEN LOOP 2D STEAM PRESS PR	MS	Aux	ns	ns
2PT-0935	CNMT PRESS XMTTR	SI	Con	451	+04
2PT-0936	CONT PRESS XMTTR	SI	Con	451	+04
2PT-403	LOOP A RC HOT LET WIDE RANGE PRESSURE TRANSMITTER	RC	Cont	ns	2PL75J
2PT-405	LOOP C RC HOT LET WIDE RANGE PRESSURE TRANSMITTER	RC	Cont	ns	2PL66J
2PT-406	LOOP A RC HOT LEG WIDE RANGE PRESS TRANSMITTER	RC	Cont	ns	2PL75J
2PT-407	LOOP C RC HOT LET WIDE RANGE PRESS TRANSMITTER	RC	Cont	ns	2PL66J
2RC01BA	STEAM GENERATOR 2A	RC	Cont	ns	ns
2RC01BB	STEAM GENERATOR 2B	RC	Cont	ns	ns
2RC01BC	STEAM GENERATOR 2C	RC	Cont	ns	ns
2RC01BD	STEAM GENERATOR 2D	RC	Cont	ns	ns
2RC01PA	REACTOR COOLANT PUMP 2A	RC	Con	390	ns
2RC01PB	REACTOR COOLANT PUMP 2B	RC	Con	390	ns
2RC01PC	REACTOR COOLANT PUMP 2C	RC	Con	390	ns
2RC01PD	REACTOR COOLANT PUMP 2D	RC	Con	390	ns
2RC01R	REACTOR VESSEL (INTERNALS)	RC	Cont	ns	ns
2RD01E	2A MG SET	RD	Aux	451	Misc. Elect. Equip. Rm
2RD02E	2B MG SET	RD	Aux	451	Misc. Elect. Equip. Rm
2RD05E	RX TRIP BREAKERS	RD	ns	ns	ns
2RH01PA	PUMP,2A RESIDUAL HEAT REMOVAL ASMBLY	RH	Aux	346	346-U-23
2RH01PA-A	RH PUMP 2A SEAL COOLER	RH	Aux	346	ns
2RH01PB	PUMP, 2B RESIDUAL HEAT REMOVAL ASMBLY	RH	Aux	346	ns
2RH01PB-A	RH PUMP 2B SEAL COOLER	RH	Aux	346	ns
2RH02AA	RESIDUAL HEAT EXCH	RH	Aux	364	357 - 20 - S
2RH02AB	RESIDUAL HEAT EXCH 2B	RH	Aux	364	357 - 20 - V
2RH606	RHR HEAT EXCHANGER 2A FOW CONT VLV ASMBLY	RH	Aux	357	2A RH HX RM +10' (2PM06J)
2RH607	RESIDUAL HEAT REMOVAL HX 2B FLOW CONT VLV ASMBLY	RH	Aux	357	2B HX RM +10'
2RH610	RHR PUMP 2A MINFLOW VLV ASMBLY	RH	Aux	357	NW COR OF 2A HX RM

ID	Description	System	Building	Elevation	Location
					C/S @ 2PM06J
2RH611	RHR PUMP 2B MINFLOW ISOL VLV ASMBLY	RH	Aux	357	N.W CORNER OF 2B RH HX ROOM
2RH8701A	RC LOOP 2A TO RH PMP 2A SUCT ISOL VLV ASMBLY	RH	Cont	377	PEN 68 OMB
2RH8701B	RC LOOP 2A TO RH PMP 2A SUCT ISOL VLV ASMBLY	RH	Cont	377	IMB +10' NEAR D LOOP; IMB
2RH8702A	RC LOOP 2C TO RH PMP 2B SUCT ISOL VLV ASMBLY	RH	Cont	377	OMB PEN 75 (2PM06J)
2RH8702B	RC LOOP 2C TO RH PMP 2B SUCT ISOL VLV ASMBLY	RH	Cont	377	+10' IMB (2PM06J)
2RH8716A	RH HX 2A DISCH CROSSTIE VLV ASMBLY	RH	Aux	364	CWA +11' PEN AREA C/S @ 2PM06J
2RH8716B	RH HX 2B DISCH CROSSTIE VLV ASMBLY	RH	Aux	364	CWA +11' NEAR S. WALL C/S @ 2PM06J
2RY01S	PRESSURIZER ASMBLY	RY	Cont	426	ns
2RY01T	PRESSURIZER RELIEF TANK ASMBLY	RY	Cont	377	ns
2RY32MA	PRESSURIZER PORV ACCUM 2A	RY	Cont	426	OMB
2RY32MB	PRESSURIZER PORV ACCUM 2B	RY	Cont	426	OMB
2RY455A	PZR PORV (C/S AT 2PM05J) ASMBLY	RY	Cont	461	ABOVE PZR
2RY455B	PZR SPRAY VLV (C/S AT 2PM05J) ASMBLY	RY	Cont	390	IMB NEAR ID RCP
2RY455C	PZR SPRAY VLV (C/S AT 2PM05J) ASMBLY	RY	Cont	390	IMB NEAR ID RCP
2RY456	PZR PORV (C/S AT 2PM05J) ASMBLY	RY	Cont	451	TOP OF PZR
2RY8028	PW TO PRT CONTAINMENT ISOLATION VLV	RY	Cont	387	P-44 (25' ABOVE SI8840)
2RY8046	U-2 PRT 2RY01T PW SUP CHK VLV	RY	Cont	ns	ns
2SI01T	REFUELING WATER STORAGE TANK ASMBLY	SI	FH	401	OUTSIDE
2SI05TA	SUMP CNMT RECIRC	SI	Cont	377	IMB
2SI05TB	SUMP CNMT RECIRC	SI	Cont	377	IMB
2SI8801A	CHG PUMP TO COLD LEG INJ ISOL ASMBLY	SI	Aux	375	ORC PEN 26 CWA
2SI8801B	CHG PUMP TO COLD LEGS INST ISOL VLV ASMBLY	SI	Aux	375	ORC PEN 26 CWA
2SI8811A	CNMT RECIRC SUMP 2A ISOL VLV ASMBLY	SI	Aux	364	ns
2SI8811B	CNMT RECIRC SUMP 2B ISOL VLV ASMBLY	SI	Aux	364	ns
2SI8812A	SI PMP 2A SUCT FROM RWST ISOL VLV ASMBLY	SI	Aux	343	2A CS PP RM ABOVE GRATING
2SI8812B	SI PP 2B SUCT FROM RWST ISOL VLV ASMBLY	SI	Aux	343	2B RH PP ROOM ABOVE GRATING
2SI8840	MOV U-2 RH HXS TO 2A/2C LOOP HL ISOL VLV	SI	Aux	374	+05 (EOP VLV)
2SX001A	ESSENTIAL SERVICE WTR PMP 2A SUCT VLV ASMBLY	SX	Aux	346	7' DOWN S VLV PIT
2SX001B	ESSENTIAL SERVICE WTR PMP 2B SUCT VLV ASMBLY	SX	Aux	346	7' DOWN S VLV PIT

ID	Description	System	Building	Elevation	Location
2SX01AA	2A SX PUMP LUBE OIL COOLER	SX	Aux	330	330 AUX
2SX01AB	2B SX PUMP LUBE OIL COOLER	SX	Aux	330	330 AUX
2SX01FA	2A SX PP DSCH STRN	SX	Aux	330	+03
2SX01FB	2B SX PP DSCH STRN	SX	Aux	330	+03
2SX01K	DIESEL DRIVEN AF CLOSED CYCLE HX	SX	Aux	ns	ns
2SX01PA	PUMP, 2A ESSENTIAL SER WTR ASMBLY	SX	Aux	330	ns
2SX01PA-C	PUMP, 2A SX AUX LUBE OIL PP	SX	Aux	330	ns
2SX01PB	PUMP, 2B ESSENTIAL SER WTR ASMBLY	SX	Aux	330	ns
2SX01PB-C	PUMP, 2B SX AUX OIL	SX	Aux	330	ns
2SX02K	DIESEL DRIVEN AF PUMP RT ANGLE GEAR LUBE OIL	SX	Aux	ns	ns
2SX101A	2A AF PUMP COOLING WATER DISCH VALVE	SX	Aux	383	383-M-18
2SX112A	CNMT CHILLER 2A INLT ISOL VLV ASMBLY	SX	Aux	401	401 S 22
2SX112B	CNMT CHILLER 2B INLT ISOL VLV ASMBLY	SX	Aux	401	CNMT CHLR RM
2SX114A	ASSY - AOV 2A CNMT CHLR 2WO01CA SX RTRN VLV	SX	Aux	401	+7
2SX114B	ASSY - AOV 2B CNMT CHLR 2WO01CB SX RTRN VLV	SX	Aux	401	+7
2SX169A	DG 2A SX VLV ASMBLY	SX	Aux	401	401 P 26
2SX169B	DG 2B SX VLV ASMBLY	SX	Aux	401	401 P 29
2SX173	SX SUP VLV TO ENG DRIVEN CLG WTR PMP FOR 2B AUX FEED PMP ASMBLY	SX	Aux	383	+10' AF PMP RM
2SX178	SX RTRN FROM AUX FEED PMP 2B HX ASMBLY	SX	Aux	383	+7' AF PMP RM
2TE-0463	PZR RELIEF DISCH RTD	RY	Cont	439	447-R-25
2TE-0464	PZR SAFE DISCH RTD	RY	Cont	435	435-R-24
2TE-0465	PZR SAFE DISCH RTD	RY	Cont	435	438-R-23
2TE-0466	PZR SAFE DISCH RTD	RY	Cont	439	442-R-25
2TE-0604	RHR LP 2A RETURN RTD	RH	Aux	364	364-S-23
2TE-0605	RHR LP 2B RETURN RTD	RH	Aux	375	375-V-25
2TE-0674	CC HX DISCH RTD 100 OHMS PLATINUM TEMP ELEM	CC	Aux	364	ns
2TE-RC022A	RC WIDE RANGE LP 2A TEMP	RC	Con	390	+03
2TE-RC022B	RC WIDE RANGE LP 2A TEMP	RC	Con	390	+03
2TE-RC023A	RC WIDE RANGE LP 2B TEMP	RC	Con	390	+03
2TE-RC023B	RC WIDE RANGE LP 2B TEMP	RC	Con	390	+03

ID	Description	System	Building	Elevation	Location
2TE-RC024A	RC WIDE RANGE LP 2C TEMP	RC	Con	390	+03
2TE-RC024B	RC WIDE RANGE LP 2C TEMP	RC	Con	390	+05
2TE-RC025A	RC WIDE RANGE LP 2D TEMP	RC	Con	390	+03
2TE-RC025B	RC WIDE RANGE LP 2D TEMP	RC	Con	390	+03
2VA01J	ESS SERV WATER PMP 1A CUB COOLER LOCAL PNL	VA	Aux	330	ns
2VA01SA	COOLER ESSENTIAL SERV WATER PUMP 95-10	VA	Aux	330	330-17-M
2VA01SB	COOLER ESSENTIAL SERVICE WATER PUMP 95-10	VA	Aux	330	330-21-P
2VA02J	ESSENTIAL SERVICE WATER 2B CUBICLE COOLER LOCA	VA	Aux	330	0
2VA02SA	2A RHR PUMP ROOM CUB CLR ASMBLY	VA	Aux	346	346-23-U
2VA02SB	2B RHR PUMP ROOM CUB CLR ASMBLY	VA	Aux	346	346-23-Y
2VA03J	RH PUMP2A CUB CLR LOCAL PANEL	VA	Aux	ns	ns
2VA04J	RH PUMP 2B CUB CLR LOCAL PANEL	VA	Aux	346	ns
2VA04SA	2A SI PP CUB CLR	VA	Aux	364	ns
2VA04SB	2B SI PP CUB CLR	VA	Aux	364	ns
2VA06SA	COOLER,CENTRIFUGAL CHARGING PUMP 2A	VA	Aux	364	364-19-V
2VA06SB	CCOLER AUX BLDG HVAC SYS CEN CHG PP 2B 95-7	VA	Aux	364	364-21-Y
2VA08S	AUX BLDG HVAC SYSTEM D-D AF PUMP-2B CUBICLE CLR	VA	Aux	383	383-M-20
2VA10J	CENT CHARGING PUMP CUBICLE COOLER LOCAL PANEL	VA	Aux	364	ns
2VA11J	CENT CHARGING PUMP CUBICLE COOLER LOCAL PANEL	VA	Aux	364	ns
2VD01CA	DIESEL GENERATOR ROOM VENT FAN ASMBLY	VD	Aux	401	401-28-Q
2VD01CB	2B DG ROOM HVAC FAN ASMBLY	VD	Aux	401	ns
2VD01JA	DIESEL GEN ROOM HVAC SYSTEM ANN PANEL 2A	VD	Aux	401	401-26-Q
2VD01JB	DIESEL GEN ROOM HVAC SYSTEM ANN PANEL	VD	Aux	401	ns
2VD04J	2A DG RM HVAC DMPR START PNL	VD	Aux	401	ns
2VD05J	2B DG RM HVAC DMPR START PNL	VD	Aux	401	ns
2VE01C	MISC ELECT EQUIP ROOM VENT FAN ASMBLY	VE	Aux	451	ns
2VE01J	MEER VENTILATION SYSTEM ANN. PANEL ASMBLY	VE	Aux	451	451-Q-27
2VE02C	BATTERY RM 212 EXHAUST FAN	VE	Aux	ns	ns
2VE03C	BATTERY RM 211 EXHAUST FAN	VE	Aux	451	ns
2VE04C	ASSY - U-2 MISC ELEC EQUIP RM DIV 21 EXH FAN	VE	Aux	463	+22
2VE04J	MISC ELEC EQUIP RM DAMPER STARTER PANEL	VE	Aux	451	ns
2VE05C	ASSY - U-2 MISC ELEC EQUIP RM DIV 22 EXH FAN	VE	Aux	463	+13

ID	Description	System	Building	Elevation	Location
2VP01AA	CNMT ESS'L SERVICE WATER COIL 2A (RCFC)	VP	Cont	377	ns
2VP01AB	CNMT ESS'L SERVICE WATER COIL 2B (RCFC)	VP	Cont	377	ns
2VP01AC	CNMT ESS'L SERVICE WATER COIL 2C (RCFC)	VP	Cont	377	ns
2VP01AD	CNMT ESS'L SERVICE WATER COIL 2D (RCFC)	VP	Cont	377	ns
2VP01CA	PRIM. CNMT VENT SYSTEM RCFC FAN, MOTOR	VP	Cont	377	ns
2VP01CB	PRIM. CNMT VENT SYSTEM RCFC FAN, MOTOR	VP	Cont	377	ns
2VP01CC	PRIM. CNMT VENT SYSTEM RCFC FAN, MOTOR	VP	Cont	377	ns
2VP01CD	PRIM. CNMT VENT SYSTEM RCFC FAN, MOTOR	VP	Cont	377	ns
2VX01C	DIV 22 ESF SWGR ROOM FAN ASMBLY	VX	Aux	426	ns
2VX01J	ESF/BATTERY ROOM VENTILATION SYS ANN PANEL	VX	Aux	426	426-P-28
2VX02J	MISC VENTILATION SYSTEM ANN PANEL	VX	Aux	426	426-30-P
2VX04C	ESF SWGR ROOM DIV 21 VENT FAN CABLE 1VX001 ASMBLY	VX	Aux	426	426-Q-28.3
2VX07J	ESF SWGR RM DIV 22 HVADAMPER STARTER PANEL	VX	Aux	426	ns
2VX08J	ESF SWGR RM DIV 21 HVADAMPER STARTER PANEL	VX	Aux	426	ns
2WO006A	Reactor CNMT Fan CLG 2A/2C Chiller WTR INLT CNMT ISOL VLV ASBLY; 10"	WO	Aux	401	ORC PEN 6 +6'
2WO006B	Reactor CNMT Fan CLRS 2B/2D CHLR WTR INLT CNMT ISOL VLV ASBLY; 10"	WO	Aux	375	ORC PEN 10
2WO020A	REACTOR CNMT FAN CLRS 2A/2C CHLR WTR OUTLT CNMT ISOL VLV ASSY; 10"	WO	Aux	401	ORC PEN 5 +6'
2WO020B	CNMT FAN COOLERS 2B/2D CHL WTR OUTLET CNMT ISOL ASMBLY; 10"	WO	Aux	375	CWA PEN 8
2WO056A	Reactor CNMT Fan CLRS 2A/2C Chiller WTR Outlet CNMT ISOL VLV ASSY; 10"	WO	Cont	401	PEN 5 +6'
2WO056B	Reactor CNMT Fan CLS 2B/2D Chiller WTR OUTLT CNMT ISOL VLV ASSY; 10"	WO	Cont	401	PEN 8

Table B-2. Base List 2

ID	Description	Building	Elevation	Column No
0FC001	REFUEL WTR PURIF PMPS DISCH TO FUEL CASK FILL	AUX	401	15 Y
0FC002A	REFUEL WTR PURIF PMPS DISCH TO SPENT FUEL PIT	AUX	385	15 X
0FC003	REFUELING WTR PURIF PMP 0B SUCTION ISO VLV		364	12 S
0FC004	REFUELING WTR PURIF PMP 0B DISCH CHECK	AUX	364'+8'	12 S
0FC006A	REFUELING WTR PURIF PMPS SUCT HDR INST ROOT TO 0PI-FC003		364	12 S
0FC007A	REFUELING WTR PURIF PMP 0A DISCH INST ROOT TO 0PI-FC005	AUX	364	12 S
0FC011	REFUELING WTR PURIF PMP 0A CASING DRN		364	12 S
0FC012	REFUELING WTR PURIF PMPS SUCT HDR INST ISOL TO 0PI-FC003	AUX	364	17 Q
0FC013	REFUELING WTR PURIF PMP 0A DISCH INST ISOL TO 0PI-FC005	AUX	364	17 Q
0FC03PA	PUMP REFUELING WTR PURIFICATION 0A ASMBLY	AUX	364	12 S
0FC8754	SPENT FUEL PIT HX RTRN ISOL	FH	401	18 Y
0FC8763	REFUELING WTR PURIF PMP 0A DISCH CHECK	AUX	364+18'	12 S
0FC8790	SPENT FUEL PIT HX TO BORON RECY HOLDUP TANKS ISOL	FH	401	18 Y
0HS-FC002	REFUELING WATER PURIF PUMP 0A	AUX	364	12 S
0LS-FC010	SPENT FUEL POOL LEVEL SWITCH		418	20 X
0PI-FC003	REFUELING WTR PURIFICATION PUMP 0A SUCT PRESS			
0PI-FC005	RFLG WTR PURIF PUMP 0A DISCHARGE GAUGE	AUX	364	17 S
0TEW-FC007	RFLG WTR PURIF PUMP 0A DISCH			
0TI-FC007	REFUELING WTR PURIFICATION PUMP 0A DISCH TEMP IND	AUX	364	12 S
0TIS-0626	SPENT FUEL POOL TEMP INDICATING SWITCH	FH	426	20 X
2FC004A	SPENT FUEL PIT HX TUBE SIDE VENT	FH	401	20 Z
2FC004B	SPENT FUEL PIT HX SHELL SIDE VENT	FH	401	19 Y
2FC005	SPENT FUEL PIT PMP CASING DRN	FH	401	19 Y
2FC006	SPENT FUEL PIT PMP CASING VENT	FH	401	19 Y
2FC007	REFUELING WTR PURIF PMP SUCT FROM U-2 REFU CAVITY DRN/TST CONN	AUX	364	23 V
2FC008	SFP FLT DEMIN LOOP RTRN TO U2 REFUEL CAV DRN/TEST CONN	AUX	364	24 U
2FC009	REFUELING WTR PURIF PMP SUCT FROM U-2 REFUEL CAV CNMT ISOL	CNMT	377	2 R
2FC010	REFUELING WTR PURIF PMP SUCT FROM U-2 REFUEL CAV CNMT ISOL	AUX	364	23 V
2FC011	SFP FLT DEMIN LOOP RTRN TO U-2 REFUEL CAV CNMT ISOL	AUX	364	24 U
2FC012	SPENT FUEL PIT FLT DEMIN LOOP RTRN TO U-2 REFUEL CAV CNMT ISOL	CNMT	377	25 R
2FC013	REFUELING WTR PURIF PMP DISCH TO SFP FLTR DEMIN LOOP	AUX	401	19 S
2FC01A	SPENT FUEL PIT HEAT EXCHANGER	FH	401	19 Z

ID	Description	Building	Elevation	Column No
2FC01P	PUMP,SPENT FUEL PIT 12X14-14	FH	401	19 Z
2FC021	SPENT FUEL PIT PMP DISCH INST ISOL TO 2PI-627	FH	401	19 AA
2FC022	SPENT FUEL PIT PMP SUCT INST ISOL TO 2PI-633	FH	401	19 AA
2FC02M	SPENT FUEL PIT PUMP START-UP STRAINER			
2FC030	REFUEL WTR PURIF PMP SUCT FROM U-2 REFUEL CAVITY CNMT OUTSIDE DRN		364	23 V
2FC033	REFUEL WTR PURIF PMP SUCT FROM U-2 REFUEL CAVITY CNMT INSIDE DRN			
2FC036	REFUEL WTR PURIF PMP RTRN TO U2 REFUEL CAVITY CNMT OUTSIDE VENT	AUX	364	24 U
2FC03F	SPENT FUEL PIT STRAINER			
2FC8756	SPENT FUEL PIT PMP SUCTION	FH	401	19 Y
2FC8757	SPENT FUEL PIT PMP SUCT INST ROOT TO 2PI-633	FH	401	19 AA
2FC8758	REFUELING WTR PURIF PMP SUCT FROM U-2 RWST	AUX	364	23 V
2FC8761	SPENT FUEL PIT PMP DISCH INST ROOT TO 2PI-627	FH	401	19 Y
2FC8762A	SPENT FUEL PIT HX INLET	FH	401	19 Z
2FC8762B	SPENT FUEL PIT HX OUTLET	FH	401	20 Z
2FC8765	SPENT FUEL PIT FLTR DEMIN LOOP RTRN TO SPENT FUEL PIT	FH	401	18 Z
2FC8766	SPENT FUEL PIT FLTR DEMIN LOOP RTRN TO U-2 RWST CHECK VLV			
2FC8792A	SPENT FUEL PIT HX TUBE SIDE DRN	FH	401	20 Z
2FC8792B	SPENT FUEL PIT HX SHELL SIDE DRN	FH	401	20 Z
2FC8793	SPENT FUEL PIT PMP DISCH CHECK		401	19 Y
2FC8794	SPENT FUEL PIT FLTR DEMIN LOOP INLT ISOL	FH	401	19 Y
2FI-0631	FC DEMIN FLOW INST	AUX	383	15 P
2HS-FC001	SPENT FUEL PIT PUMP	FH	401	
2PI-0627	2FC01P DISCHARGE PRESSURE GAUGE, 0-160 PSIG	FH	401	19 BB
2PI-0633	SFP PMP SUCTION PRESSURE INDICATOR	FH	401	19 BB

Table B-3. SWEL 1

ID	DESCRIPTION	CLASS	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Safety Function(s)	New or Replace ?	IPEEE Enhance-ment?	Comments
0SX007	0 CC HX OUTLT VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	346	346 10-18/	SX	Y	Support System Cooling Water		Y	
0SX146	U-0 CC HX OUTLET HDR ISOL ASMBLY; 30"	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	346	346 15-23/	SX	Y	Support System Cooling Water			
0VC01JB	CONTROL ROOM HVAC SYST LOCAL CONT PANEL ASMBLY	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 U-2 HV	VC	Y	VC			
0VC02FA	CONTROL RM REC CHARCOAL FILTER A TRAIN ASMBLY	(10) Air Handlers	Auxiliary	451	451 U-1 HV	VC	Y	Support System HVAC			
0VC16J	MCR U-2 HVAC START PNL	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	463	451 U-2 AU	VC	Y	Support System HVAC			
2AF005C	S/G 2C FLOW CONT VLV ASMBLY	(07) Fluid-Operated Valves	Auxiliary	364	364 21-26/	AF	Y	DHR			
2AF005G	S/G 2C FLOW CONT VLV ASMBLY	(07) Fluid-Operated Valves	Auxiliary	364	364 21-26/	AF	Y	DHR			
2AF006A	AUXILIARY FEEDWATER PMP 2A SX SUCT VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	383	All	AF	Y	DHR			
2AF017A	AUXILIARY FEEDWATER PMP 2A SX SUCT VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	383	All	AF	Y	DHR			
2AF01EA-A	BATTERY 1 AUXILIARY FEEDWATER PUMP	(15) Batteries on Racks	Auxiliary	383	All	AF	Y	Support System DC Power		Y	
2AF01J	AUX FEEDWATER PUMP 2B STARTUP PANEL ASMBLY	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	383	All	AF	Y	DHR			
2AF01PA	PUMP AUX FEEDWATER, MOTOR DRIVEN ASMBLY	(05) Horizontal Pumps	Auxiliary	383	All	AF	Y	DHR			PRA:F-V=7.83E-02 ,RAW=18.14
2AF01PA-A	AUX FEEDWATER PUMP 2A AUX LUBE OIL PUMP	(05) Horizontal Pumps	Auxiliary	383	All	AF	Y	DHR			
2AP05E	EQ 4160 VOLT ESF SWITCH GEAR 241	(03) Medium Voltage Switchgear	Auxiliary	426	426 ESF SW	AP	Y	Support System AC Power			
2AP10E	EQ 480V ESF SUBSTATION BUS 231X ASMBLY	(02) Low Voltage Switchgear	Auxiliary	426	426 ESF SW	AP	Y	Support System AC Power			
2AP13E	EQ UNIT SUBSTATION 232X TRAN 480V ESF	(04) Transformers	Auxiliary	426	426 ESF SW	AP	Y	Support System AC Power			

ID	DESCRIPTION	CLASS	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Safety Function(s)	New or Replace ?	IPEEE Enhance-ment?	Comments
2AP22E	480V AUX BLDG ESF MCC 231X3 ASMBLY	(01) Motor Control Centers	Auxiliary	383	383-M-20	AP	Y	Support System AC Power			
2AP27E	EQ 480V AUX BLDG MCC 232X2 ASMBLY	(01) Motor Control Centers	Auxiliary	426	426-R-24	AP	Y	Support System AC Power		Y	
2AP30E	EQ 480V AUX BLDG ESF MCC 231X5 ASMBLY	(01) Motor Control Centers	Auxiliary	426	426 GENERA	AP	Y	Support System AC Power			
2AP32E	EQ 480V AUX BLDG MCC 232X5 ASMBLY	(01) Motor Control Centers	Auxiliary	426	426 GENERA	AP	Y	Support System AC Power			
2AP38E	ASSY - 480V AUX BLDG MCC 233X1	(01) Motor Control Centers	Auxiliary	346	346 15-23/	AP	Y	Support System AC Power		Y	
2CC01PA	2A COMPONENT COOLING WTR PUMP ASMBLY	(05) Horizontal Pumps	Auxiliary	364	364 15-21/	CC	Y	Support System Cooling Water			
2CC01PB	EQ MOTOR COMPONENT COOLING PMP 2B	(05) Horizontal Pumps	Auxiliary	364	364 15-21/	CC	Y	Support System Cooling Water			
2CC9412A	CC FROM RH HX 2A OUTLET ISOL ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	364	364 17-19/	CC	Y	Support System Cooling Water			
2CC9438	CC FROM RC PMPS THERMAL BARRIER ISOL VLV ASMBLY	(0) Other	Cont	377	OMB	CC	Y	CF			
2CV01PA	PUMP,2A CENTRIFUGAL CHARGING ASMBLY	(05) Horizontal Pumps	Auxiliary	364	364 2A CV	CV	Y	RCIC			
2CV01PA-A	PUMP, CNTRFGL CHG AUX OIL PP	(05) Horizontal Pumps	Auxiliary	364	364 2A CV	CV	Y	RCIC			
2CV02SA	2A CV PUMP GEAR OIL COOLER	(21) Tanks and Heat Exchangers	Auxiliary	364	364 2A CV	CV	Y	RCIC			
2CV112D	RWST TO CHG PMPS SUCT VLV C/S AT 2PM05J ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	364	364 U-2 AR	CV	Y	RCIC			
2CV112E	RWST TO CHG PMPS SUCT VLV C/S AT 2PM05J ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	364	364 U-2 AR	CV	Y	RCIC			
2CV8105	CHG LINE CNMT ISOL VLV C/S AT 2PM05J ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	375	364 U-2 AR	CV	Y	CF			
2CV8106	CHG LINE CNMT ISOL VLV C/S AT 2PM05J ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	375	364 U-2 AR	CV	Y	CF			
2CV8110	CV PMP MINIFLOW ISOL VLV C/S AT 2PM05J ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	364	364 U-2 AR	CV	Y	RCIC			

ID	DESCRIPTION	CLASS	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Safety Function(s)	New or Replace ?	IPEEE Enhance-ment?	Comments
2CV8804A	RH HX 2A TO CV PMP SUCT ISOL VLV; C/S AT 2PM06J ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	364	364 U-2 AR	CV	Y	DHR			
2DC03E	BATTERY CHARGER 211 DIV. 21	(16) Battery Chargers and Inverters	Auxiliary	451	451 U-2 DI	DC	Y	Support System DC Power			
2DC01E	125V BATTERY 211 DIV. 21	(15) Batteries on Racks	Auxiliary	451	211 Battery Room	DC	Y	Support System DC Power	Y	Y	
2DC04E	BATTERY CHARGER 212 DIV. 22	(16) Battery Chargers and Inverters	Auxiliary	451	451 U-2 DI	DC	Y	Support System DC Power			
2DC05E	125V DC ESF DIST CENTER 211	(14) Distribution Panels	Auxiliary	452	452 U-2 D21	DC	Y	Support System DC Power		Y	
2DC06E	125V DC ESF DIST CENTER 212	(14) Distribution Panels	Auxiliary	451	451 U-2 D22	DC	Y	Support System DC Power	Y	Y	
2DC06EA	125V DC ESF DIST PNL 212	(14) Distribution Panels	Auxiliary	451	451 U-2 DI	DC	Y	Support System DC Power			
2DC10J	125V DC FUSE PANEL - DIV. 21	(14) Distribution Panels	Auxiliary	451	451 U-2 DI	DC	Y	Support System DC Power			
2DG01KA	2A DIESEL GENERATOR SKID	(17) Engine-Generators	Auxiliary	401	401 2A DG	DG	Y	Support System AC Power			PRA:F-V=4.06E-01 ,RAW=16.59
2DG04EA	DIESEL GENERATOR 2A SYNCHRO-CHECK RELAY BOX	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	426	426 ESF SW	DG	Y	Support System AC Power			
2DO01TA	DIESEL OIL STORAGE TANK	(21) Tanks and Heat Exchangers	Auxiliary	373	383 U-2 DI	DO	Y	Support System AC Power			
2FT-AF012	AF TO SG 2A FLOW TRANSMITTER	(18) Instruments on Racks	Auxiliary	364	364 21-26/	FT	Y	DHR			
2IP01E	INSTRUMENT BUS 211 TRANSFORMER - DIV. 21	(04) Transformers	Auxiliary	451	451 U-2 DI	PI	Y	Support System AC Power			
2IP01J	120VAC INSTRUMENT BUS DISTRIBUTION PANEL 211 - DIV. 21	(14) Distribution Panels	Auxiliary	451	451 U-2 AU	IP	Y	Support System DC Power			
2IP02E	INSTRUMENT BUS 212 TRANSFORMER - DIV. 22	(04) Transformers	Auxiliary	451	451 U-2 DI	PI	Y	Support System AC Power			

ID	DESCRIPTION	CLASS	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Safety Function(s)	New or Replace ?	IPEEE Enhance-ment?	Comments
2IP03E	INSTRUMENT BUS 213 TRANSFORMER - DIV. 21	(04) Transformers	Auxiliary	451	451 U-2 DI	PI	Y	Support System AC Power			
2IP04E	INSTRUMENT BUS 214 TRANSFORMER - DIV. 22	(04) Transformers	Auxiliary	451	451 U-2 DI	PI	Y	Support System AC Power			
2IP05E	INSTRUMENT BUS 211 INVERTER - DIV. 21	(16) Battery Chargers and Inverters	Auxiliary	451	451 U-2 DI	IP	Y	Support System DC Power			
2IP06E	INSTRUMENT BUS 212 INVERTER - DIV. 22	(16) Battery Chargers and Inverters	Auxiliary	451	451 U-2 DI	IP	Y	Support System DC Power			
2IP07E	INSTRUMENT BUS 213 INVERTER - DIV. 21	(16) Battery Chargers and Inverters	Auxiliary	451	451 U-2 DI	IP	Y	Support System DC Power			
2IP08E	INSTRUMENT BUS 214 INVERTER - DIV. 22	(16) Battery Chargers and Inverters	Auxiliary	451	451 U-2 DI	IP	Y	Support System DC Power			
2IY-0606	RH HX 2A OUT I/P TRANSDUCER	(18) Instruments on Racks	Auxiliary	364	364 17-19/	IY	Y	DHR			
2IY-0607	RH HX #2B OUT I/P TRANSDUCER	(18) Instruments on Racks	Auxiliary	364	364 17-19/	IY	Y	DHR			
2LT-0459	PRZR LEVEL D/P TRANSMITTER	(18) Instruments on Racks	Cont	377	2PL50J	LT	Y	RCIC			
2LT-0517	S/G LOOP 2A LEVEL D/P XMTTR W/FILLED LEG	(18) Instruments on Racks	Cont	401	2PL69J	LT	Y	DHR			
2LT-0527	S/G LOOP 2B LEVEL D/P TRANSMITTER W/FILLED LEG	(18) Instruments on Racks	Cont	377	2PL75J	LT	Y	DHR			
2MS001C	MS ISOL VLV LOOP 2C ASMBLY	(07) Fluid-Operated Valves	Auxiliary	377	377 U-2 MS	MS	Y	DHR			
2MS018C	S/G 2C PORV	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	404	401 U-2 MS	MS	Y	DHR	Y		
2MS018D	S/G 2D PORV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	401	401 U-2 MS	MS	Y	DHR	Y		
2PA03J	PROTECTION SYSTEM CABINET (I&E Prot. Cab. CH 3)	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 U-2 AU	PA	Y	ESFAS		Y	
2PA09J	PROTECTION SYSTEM CABINET (SSPS Cab. Train A)	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 U-2 AU	PA	Y	ESFAS		Y	
2PA27J	AUX SAFEGUARD RELAY CABINET (A)	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 U-2 AU	PA	Y	ESFAS		Y	

ID	DESCRIPTION	CLASS	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Safety Function(s)	New or Replace ?	IPEEE Enhance-ment?	Comments
2PL07J	2A DG 2DG01KA CONTROL PANEL	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	401	401 2A DG	PL	Y	ESFAS		Y	
2PL08J	2B DG 2DG01KB	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	401	401 2B DG	PL	Y	Support System AC Power		Y	
2PM05J	MAIN CONTROL BOARD	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 MAIN C	PM	Y	ESFAS		Y	
2PM06J	MAIN CONTROL BOARD	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 MAIN C	PM	Y	ESFAS		Y	
2PM07J	MAIN CONTROL BOARD	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 MAIN C	PM	Y	ESFAS		Y	
2PM11J	MAIN CONTROL BOARD	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 MAIN C	PM	Y	ESFAS		Y	
2PT-0455	U2 PRESSURIZER PRESS CHANNEL 455	(18) Instruments on Racks	Cont	377	2PL50J	PT	Y	RCPC			
2PT-0457	PRZR PRESSURE TRANSMITTER	(18) Instruments on Racks	Cont	377	377-R-26	PT	Y	RCPC			
2PT-0514	STM GEN LOOP 2A STEAM PRESS PR	(18) Instruments on Racks	Auxiliary	377	377 U-2 MS	PT	Y	DHR			
2PT-0546	STM GEN LOOP 2D STEAM PRESS PR	(18) Instruments on Racks	Auxiliary	377	377 U-2 MS	PT	Y	DHR			
2PT-0935	CNMT PRESS XMTTR	(18) Instruments on Racks	Auxiliary	451	4	PT	Y	CF			
2RD05E	RX TRIP BREAKERS	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	451	451 U-2 DI	RD	Y	RRC		Y	
2RH01PA	PUMP,2A RESIDUAL HEAT REMOVAL ASMBLY	(06) Vertical Pumps	Auxiliary	346	346 21-25/	RH	Y	DHR			
2RH01PA-A	RH PUMP 2A SEAL COOLER	(21) Tanks and Heat Exchangers	Auxiliary	346	346 21-25/	RH	Y	DHR			
2RH610	RHR PUMP 2A MINFLOW VLV ASMBLY	(07) Fluid-Operated Valves	Auxiliary	357	364 2A RHR	RH	Y	DHR			
2RH8702A	RC LOOP 2C TO RH PMP 2B SUCT ISOL VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Cont	377	OMB PEN 75	SX	Y	DHR			
2RH8716B	RH HX 2B DISCH CROSSTIE VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	364	364 U-2 AR	RH	Y	DHR			

ID	DESCRIPTION	CLASS	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Safety Function(s)	New or Replace ?	IPEEE Enhance-ment?	Comments
2RY32MA	PRESSURIZER PORV ACCUM 2A	(21) Tanks and Heat Exchangers	Cont	426	OMB	RY	Y	Support System Compressed Air			
2RY32MB	PRESSURIZER PORV ACCUM 2B	(21) Tanks and Heat Exchangers	Cont	426	OMB	RY	Y	Support System Compressed Air			
2RY455A	PZR PORV (C/S AT 2PM05J) ASMBLY	(07) Fluid-Operated Valves	Cont	461	ABOVE PZR	RY	Y	RCPC			PRA:F-V=2.21E-01 ,RAW=1.2
2SI8801A	CHG PUMP TO COLD LEG INJ ISOL ASMBLY	(07) Fluid-Operated Valves	Auxiliary	375	383 U-2 AR	SI	Y	RCIC			
2SI8801B	CHG PUMP TO COLD LEGS INST ISOL VLV ASMBLY	(07) Fluid-Operated Valves	Auxiliary	375	383 U-2 AR	SI	Y	RCIC			
2SX004	CC HX 2 INLT VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	330	330 13-18/	SX	Y	Support System cooling water			
2SX005	U-0 CC HX INLET VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	330	330 18-23/	SX	Y	Support System Cooling Water			
2SX01AA	2A SX PUMP LUBE OIL COOLER	(21) Tanks and Heat Exchangers	Auxiliary	330	330 13-18/	SX	Y	Support System Cooling Water			
2SX01PA	PUMP, 2A ESSENTIAL SER WTR ASMBLY	(05) Horizontal Pumps	Auxiliary	330	330 13-18/	SX	Y	Support System Cooling Water			PRA:F-V=6.37E-02 ,RAW=3.27
2SX01PA-C	PUMP, 2A SX AUX LUBE OIL PP	(05) Horizontal Pumps	Auxiliary	330	330 13-18/	SX	Y	Support System Cooling Water			
2SX033	ESSENTIAL SERVICE WTR PMP 2A CROSSTIE VLV ASMBLY	(08) Motor-Operated and Solenoid-Operated Valves	Auxiliary	330	330 13-18/	SX	Y	Support System Cooling Water			
2SX169A	DG 2A SX VLV ASMBLY	(07) Fluid-Operated Valves	Auxiliary	401	401 2A DG	SX	Y	Support System cooling water			PRA:F-V=2.72E-02 ,RAW=7.06
2TE-0604	RHR LP 2A RETURN RTD	(19) Temperature Sensors	Auxiliary	364	364 U-2 AR	TE	Y	DHR			
2TE-RC022A	RC WIDE RANGE LP 2A TEMP	(19) Temperature Sensors	Cont	390	3	TE	Y	DHR			
2VA01J	ESS SERV WATER PMP 1A CUB COOLER LOCAL PNL	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	330	330 13-18/	VA	Y	Support System Cooling Water			
2VA01SA	COOLER ESSENTIAL SERV WATER PUMP 95-10	(05) Horizontal Pumps	Auxiliary	330	330 13-18/	SX	Y	Support System Cooling Water			

ID	DESCRIPTION	CLASS	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Safety Function(s)	New or Replace ?	IPEEE Enhance-ment?	Comments
2VA02SA	2A RHR PUMP ROOM CUB CLR ASMBLY	(10) Air Handlers	Auxiliary	346	346 21-25/	VA	Y	Support System HVAC			
2VA06SA	COOLER,CENTRIFUGAL CHARGING PUMP 2A	(10) Air Handlers	Auxiliary	364	364 2A CV	VA	Y	Support System HVAC			
2VA10J	CENT CHARGING PUMP CUBICLE COOLER LOCAL PANEL	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	364	364 2A CV	VA	Y	RCIC			
2VD01CA	DIESEL GENERATOR ROOM VENT FAN ASMBLY	(09) Fans	Auxiliary	401	401 2A DG	VD	Y	Support System HVAC			PRA:F-V=1.87E-02 ,RAW=5.0
2VD04J	2A DG RM HVAC DMPR START PNL	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	401	401 2A DG	VD	Y	Support System HVAC			
2VP01AD	CNMT ESS'L SERVICE WATER COIL 2D (RCFC)	(10) Air Handlers	Cont	377	(No Data)	VP	Y	Support System HVAC			
2VX07J	ESF SWGR RM DIV 22 HVADAMPER STARTER PANEL	(20) Instrumentation and Control Panels and Cabinets	Auxiliary	426	426 ESF SW	VX	Y	Support System HVAC			
0WO01CA	CHILLED WATER SYS CONTROL ROOM REFRIGERATION UNIT 0A	(11) Chillers	Auxiliary	383	All	VC	Y	RCPC,RCIC,DHR,CF			Added as a result of oversight review

Table B-4. SWEL 2

ID	DESCRIPTION	Class	BUILDING	ELEVATION	LOCATION	SYSTEM	Seismic Cat 1?	Associated with Rapid Draindown?	Comments
2FC01P	PUMP,SPENT FUEL PIT 12X14-14	(05) Horizontal Pumps	FH	401	19 Z	FC	Y	N	
2FC009	REFUELING WTR PURIF PMP SUCT FROM U-2 REFUEL CAV CNMT ISOL	(00) Other	CNMT	377	2 R	FC	Y	N	
2FC8758	REFUELING WTR PURIF PMP SUCT FROM U-2 RWST	(00) Other	AUX	364	23 V	FC	Y	N	
0FC012	REFUELING WTR PURIF PMPS SUCT HDR INST ISOL TO 0PI-FC003	(00) Other	AUX	364	17 Q	FC	Y	N	
0FC006A	REFUELING WTR PURIF PMPS SUCT HDR INST ROOT TO 0PI-FC003	(00) Other	AUX	364	12 S	FC	Y	N	
2FC011	SFP FLT DEMIN LOOP RTRN TO U-2 REFUEL CAV CNMT ISOL	(00) Other	AUX	364	24 U	FC	Y	N	
2PI-0633	SFP PMP SUCTION PRESSURE INDICATOR	(18) Instruments on Racks	FH	401	19 BB	FC	Y	N	
2FC012	SPENT FUEL PIT FLT DEMIN LOOP RTRN TO U-2 REFUEL CAV CNMT ISOL	(00) Other	CNMT	377	25 R	FC	Y	N	
2FC01A	SPENT FUEL PIT HEAT EXCHANGER	(21) Tanks and Heat Exchangers	FH	401	19 Z	FC	Y	N	
2FC8762A	SPENT FUEL PIT HX INLET	(00) Other	FH	401	19 Z	FC	Y	N	
2FC8762B	SPENT FUEL PIT HX OUTLET	(00) Other	FH	401	20 Z	FC	Y	N	
0FC8754	SPENT FUEL PIT HX RTRN ISOL	(00) Other	FH	401	18 Y	FC	Y	N	
2FC8792B	SPENT FUEL PIT HX SHELL SIDE DRN	(00) Other	FH	401	20 Z	FC	Y	N	
2FC004B	SPENT FUEL PIT HX SHELL SIDE VENT	(00) Other	FH	401	19 Y	FC	Y	N	
0FC8790	SPENT FUEL PIT HX TO BORON RECY HOLDUP TANKS ISOL	(00) Other	FH	401	18 Y	FC	Y	N	
2FC8792A	SPENT FUEL PIT HX TUBE SIDE DRN	(00) Other	FH	401	20 Z	FC	Y	N	
2FC004A	SPENT FUEL PIT HX TUBE SIDE VENT	(00) Other	FH	401	20 Z	FC	Y	N	
2FC005	SPENT FUEL PIT PMP CASING DRN	(00) Other	FH	401	19 Y	FC	Y	N	
2FC006	SPENT FUEL PIT PMP CASING VENT	(00) Other	FH	401	19 Y	FC	Y	N	
2FC8793	SPENT FUEL PIT PMP DISCH CHECK	(00) Other	FH	401	19 Y	FC	Y	N	
2FC022	SPENT FUEL PIT PMP SUCT INST ISOL TO 2PI-633	(00) Other	FH	401	19 AA	FC	Y	N	
2FC8757	SPENT FUEL PIT PMP SUCT INST ROOT TO 2PI-633	(00) Other	FH	401	19 AA	FC	Y	N	
2FC8756	SPENT FUEL PIT PMP SUCTION	(00) Other	FH	401	19 Y	FC	Y	N	

C
Seismic Walkdown Checklists (SWCs)

Table C-1 provides a description of each item, anchorage verification confirmation, a list of Area Walk-By Checklists associated with each item, comments, and page numbers of each Seismic Walkdown Checklist.

Table C-1. Summary of Seismic Walkdown Checklists

ID	DESCRIPTION	Anchorage Configuration Confirmed?	AREA WALK-BY	COMMENTS	PAGE
0FC006A	REFUELING WTR PURIF PMPS SUCT HDR INST ROOT TO 0PI-FC003	N/A	40	SWEL 2	C- 7
0FC012	REFUELING WTR PURIF PMPS SUCT HDR INST ISOL TO 0PI-FC003	N/A	3	SWEL 2	C- 10
0FC8754	SPENT FUEL PIT HX RTRN ISOL	N/A	41	SWEL 2	C- 13
0FC8790	SPENT FUEL PIT HX TO BORON RECY HOLDUP TANKS ISOL	N/A	41	SWEL 2	C- 16
0SX007	0 CC HX OUTLT VLV ASMBLY	N/A	37		C- 19
0SX146	U-0 CC HX OUTLET HDR ISOL ASMBLY; 30"	N/A	37		C- 22
0VC01JB	CONTROL ROOM HVAC SYST LOCAL CONT PANEL ASMBLY	N	11		C- 26
0VC02FA	CONTROL RM REC CHARCOAL FILTER A TRAIN ASMBLY	N	14		C- 29
0VC16J	MCR U-2 HVAC START PNL	N	11		C- 34
0WO01CA	CHILLED WATER SYS CONTROL ROOM REFRIGERATION UNIT 0A	N		OUTAGE	
2AF005C	S/G 2C FLOW CONT VLV ASMBLY	N/A	26		C- 37
2AF005G	S/G 2C FLOW CONT VLV ASMBLY	N/A	26		C- 40
2AF006A	AUXILIARY FEEDWATER PMP 2A SX SUCT VLV ASMBLY	N/A	25		C- 44
2AF017A	AUXILIARY FEEDWATER PMP 2A SX SUCT VLV ASMBLY	N/A	25		C- 48
2AF01EA-A	BATTERY 1 AUXILIARY FEEDWATER PUMP	Y	24		C- 51
2AF01J	AUX FEEDWATER PUMP 2B STARTUP PANEL ASMBLY	Y	24		C- 54
2AF01PA	PUMP AUX FEEDWATER, MOTOR DRIVEN ASMBLY	Y	25		C- 59
2AF01PA-A	AUX FEEDWATER PUMP 2A AUX LUBE OIL PUMP	N/A	25	Mounted on skid	C- 63
2AP05E	EQ 4160 VOLT ESF SWITCH GEAR 241	Y (LATER)	15	ANCHORAGE CHECK REQ'D	
2AP10E	EQ 480V ESF SUBSTATION BUS 231X ASMBLY	Y (LATER)	15	ANCHORAGE CHECK REQ'D	
2AP13E	EQ UNIT SUBSTATION 232X TRAN 480V ESF	Y	16		C- 66
2AP22E	480V AUX BLDG ESF MCC 231X3 ASMBLY	Y	23		C- 70
2AP27E	EQ 480V AUX BLDG MCC 232X2 ASMBLY	Y	34		C- 73

ID	DESCRIPTION	Anchorage Configuration Confirmed?	AREA WALK-BY	COMMENTS	PAGE
2AP30E	EQ 480V AUX BLDG ESF MCC 231X5 ASMBLY	Y	33		C- 77
2AP32E	EQ 480V AUX BLDG MCC 232X5 ASMBLY	Y	33		C- 81
2AP38E	ASSY - 480V AUX BLDG MCC 233X1	Y	38		C- 85
2CC01PA	2A COMPONENT COOLING WTR PUMP ASMBLY	Y	35		C- 89
2CC01PB	EQ MOTOR COMPONENT COOLING PMP 2B	Y	35		C- 93
2CC9412A	CC FROM RH HX 2A OUTLET ISOL ASMBLY	N/A	36		C- 97
2CC9438	CC FROM RC PMPS THERMAL BARRIER ISOL VLV ASMBLY	N/A		OUTAGE	
2CV01PA	PUMP,2A CENTRIFUGAL CHARGING ASMBLY	Y	1		C- 100
2CV01PA-A	PUMP, CNTRFGL CHG AUX OIL PP	N	1		C- 105
2CV02SA	2A CV PUMP GEAR OIL COOLER	N	1		C- 108
2CV112D	RWST TO CHG PMPS SUCT VLV C/S AT 2PM05J ASMBLY	N/A	5		C- 111
2CV112E	RWST TO CHG PMPS SUCT VLV C/S AT 2PM05J ASMBLY	N/A	5		C- 114
2CV8105	CHG LINE CNMT ISOL VLV C/S AT 2PM05J ASMBLY	N/A	30		C- 119
2CV8106	CHG LINE CNMT ISOL VLV C/S AT 2PM05J ASMBLY	N/A	30		C- 122
2CV8110	CV PMP MINIFLOW ISOL VLV C/S AT 2PM05J ASMBLY	N/A	5		C- 125
2CV8804A	RH HX 2A TO CV PMP SUCT ISOL VLV; C/S AT 2PM06J ASMBLY	N/A	5		C- 128
2DC01E	125V BATTERY 211 DIV. 21	Y	10		C- 131
2DC03E	BATTERY CHARGER 211 DIV. 21	N	9		C- 136
2DC04E	BATTERY CHARGER 212 DIV. 22	N	10A		C- 140
2DC05E	125V DC ESF DIST CENTER 211	Y	9		C- 143
2DC06E	125V DC ESF DIST CENTER 212	Y	10A		C- 147
2DC06EA	125V DC ESF DIST PNL 212	Y	10A	PART OF 2DC06E	C- 151
2DC10J	125V DC FUSE PANEL - DIV. 21	N	9		C- 154
2DG01KA	2A DIESEL GENERATOR SKID	Y	18		C- 157
2DG04EA	DIESEL GENERATOR 2A SYNCHRO-CHECK RELAY BOX	N	15		C- 162
2DO01TA	DIESEL OIL STORAGE TANK	Y	39		C- 165
2FC004A	SPENT FUEL PIT HX TUBE SIDE VENT	N/A	7	SWEL 2	C- 169
2FC004B	SPENT FUEL PIT HX SHELL SIDE VENT	N/A	7	SWEL 2	C- 172

ID	DESCRIPTION	Anchorage Configuration Confirmed?	AREA WALK-BY	COMMENTS	PAGE
2FC005	SPENT FUEL PIT PMP CASING DRN	N/A	8	SWEL 2	C- 175
2FC006	SPENT FUEL PIT PMP CASING VENT	N/A	8	SWEL 2	C- 178
2FC009	REFUELING WTR PURIF PMP SUCT FROM U-2 REFUEL CAV CNMT ISOL	N/A		SWEL 2 OUTAGE	
2FC011	SFP FLT DEMIN LOOP RTRN TO U-2 REFUEL CAV CNMT ISOL	N/A	31	SWEL 2	C- 181
2FC012	SPENT FUEL PIT FLT DEMIN LOOP RTRN TO U-2 REFUEL CAV CNMT ISOL	N/A		SWEL 2 OUTAGE	
2FC01A	SPENT FUEL PIT HEAT EXCHANGER	Y	7	SWEL 2	C- 184
2FC01P	PUMP,SPENT FUEL PIT 12X14-14	Y	8	SWEL 2	C- 188
2FC022	SPENT FUEL PIT PMP SUCT INST ISOL TO 2PI-633	N/A	6	SWEL 2	C- 192
2FC8756	SPENT FUEL PIT PMP SUCTION	N/A	7	SWEL 2	C- 195
2FC8757	SPENT FUEL PIT PMP SUCT INST ROOT TO 2PI-633	N/A	7	SWEL 2	C- 198
2FC8758	REFUELING WTR PURIF PMP SUCT FROM U-2 RWST	N/A	5&30	SWEL 2	C- 201
2FC8762A	SPENT FUEL PIT HX INLET	N/A	7	SWEL 2	C- 205
2FC8762B	SPENT FUEL PIT HX OUTLET	N/A	7	SWEL 2	C- 208
2FC8792A	SPENT FUEL PIT HX TUBE SIDE DRN	N/A	7	SWEL 2	C- 211
2FC8792B	SPENT FUEL PIT HX SHELL SIDE DRN	N/A	7	SWEL 2	C- 214
2FC8793	SPENT FUEL PIT PMP DISCH CHECK	N/A	8	SWEL 2	C- 217
2FT-AF012	AF TO SG 2A FLOW TRANSMITTER	N/A	26		C- 220
2IP01E	INSTRUMENT BUS 211 TRANSFORMER - DIV. 21	Y	9		C- 226
2IP01J	120VAC INSTRUMENT BUS DISTRIBUTION PANEL 211 - DIV. 21	N	12		C- 230
2IP02E	INSTRUMENT BUS 212 TRANSFORMER - DIV. 22	Y	10A		C- 233
2IP03E	INSTRUMENT BUS 213 TRANSFORMER - DIV. 21	Y	9		C- 236
2IP04E	INSTRUMENT BUS 214 TRANSFORMER - DIV. 22	Y	10A		C- 240
2IP05E	INSTRUMENT BUS 211 INVERTER - DIV. 21	Y	9		C- 243
2IP06E	INSTRUMENT BUS 212 INVERTER - DIV. 22	Y	10A		C- 247

ID	DESCRIPTION	Anchorage Configuration Confirmed?	AREA WALK-BY	COMMENTS	PAGE
2IP07E	INSTRUMENT BUS 213 INVERTER - DIV. 21	Y	9		C- 251
2IP08E	INSTRUMENT BUS 214 INVERTER - DIV. 22	Y	10A		C- 254
2IY-0606	RH HX 2A OUT I/P TRANSDUCER	N/A	36		C- 259
2IY-0607	RH HX #2B OUT I/P TRANSDUCER	N/A	36		C- 262
2LT-0459	PRZR LEVEL D/P TRANSMITTER	N/A		OUTAGE	
2LT-0517	S/G LOOP 2A LEVEL D/P XMTTR W/FILLED LEG	N/A		OUTAGE	
2LT-0527	S/G LOOP 2B LEVEL D/P TRANSMITTER W/FILLED LEG	N/A		OUTAGE	
2MS001C	MS ISOL VLV LOOP 2C ASMBLY	N/A	22		C- 265
2MS018C	S/G 2C PORV	N/A	22		C- 269
2MS018D	S/G 2D PORV ASMBLY	N/A	20		C- 273
2PA03J	PROTECTION SYSTEM CABINET (I&E Prot. Cab. CH 3)	Y	12		C- 277
2PA09J	PROTECTION SYSTEM CABINET (SSPS Cab. Train A)	Y	12		C- 280
2PA27J	AUX SAFEGUARD RELAY CABINET (A)	Y	12		C- 285
2PI-0633	SFP PMP SUCTION PRESSURE INDICATOR	N/A	6	SWEL 2	C- 289
2PL07J	2A DG 2DG01KA CONTROL PANEL	N	18		C- 292
2PL08J	2B DG 2DG01KB	N	19		C- 295
2PM05J	MAIN CONTROL BOARD	Y	13		C- 298
2PM06J	MAIN CONTROL BOARD	Y	13		C- 302
2PM07J	MAIN CONTROL BOARD	Y	13		C- 306
2PM11J	MAIN CONTROL BOARD	N	13		C- 309
2PT-0455	U2 PRESSURIZER PRESS CHANNEL 455	N/A		OUTAGE	
2PT-0457	PRZR PRESSURE TRANSMITTER	N/A		OUTAGE	
2PT-0514	STM GEN LOOP 2A STEAM PRESS PR	N/A	21		C- 312
2PT-0546	STM GEN LOOP 2D STEAM PRESS PR	N/A	21		C- 316
2PT-0935	CNMT PRESS XMTTR	N/A	32		C- 319
2RD05E	RX TRIP BREAKERS	Y (LATER)		OUTAGE	
2RH01PA	PUMP,2A RESIDUAL HEAT REMOVAL ASMBLY	Y	4		C- 323
2RH01PA-A	RH PUMP 2A SEAL COOLER	N	4		C- 328
2RH610	RHR PUMP 2A MINFLOW VLV ASMBLY	N/A	2		C- 331
2RH8702A	RC LOOP 2C TO RH PMP 2B SUCT ISOL VLV ASMBLY	N/A		OUTAGE	
2RH8716B	RH HX 2B DISCH CROSSTIE VLV ASMBLY	N/A	5		C- 335

ID	DESCRIPTION	Anchorage Configuration Confirmed?	AREA WALK-BY	COMMENTS	PAGE
2RY32MA	PRESSURIZER PORV ACCUM 2A	N		OUTAGE	
2RY32MB	PRESSURIZER PORV ACCUM 2B	N		OUTAGE	
2RY455A	PZR PORV (C/S AT 2PM05J) ASMBLY	N/A		OUTAGE	
2SI8801A	CHG PUMP TO COLD LEG INJ ISOL ASMBLY	N/A	29		C- 339
2SI8801B	CHG PUMP TO COLD LEGS INST ISOL VLV ASMBLY	N/A	29		C- 343
2SX004	CC HX 2 INLT VLV ASMBLY	N/A	27		C- 346
2SX005	U-0 CC HX INLET VLV ASMBLY	N/A	28		C- 350
2SX01AA	2A SX PUMP LUBE OIL COOLER	N/A	27		C- 353
2SX01PA	PUMP, 2A ESSENTIAL SER WTR ASMBLY	N	27		C- 356
2SX01PA-C	PUMP, 2A SX AUX LUBE OIL PP	N/A	27		C- 359
2SX033	ESSENTIAL SERVICE WTR PMP 2A CROSSTIE VLV ASMBLY	N/A	27		C- 362
2SX169A	DG 2A SX VLV ASMBLY	N/A	18		C- 366
2TE-0604	RHR LP 2A RETURN RTD	N/A	5		C- 369
2TE-RC022A	RC WIDE RANGE LP 2A TEMP	N/A		OUTAGE	
2VA01J	ESS SERV WATER PMP 1A CUB COOLER LOCAL PNL	Y	27		C- 372
2VA01SA	COOLER ESSENTIAL SERV WATER PUMP 95-10	N	27		C- 375
2VA02SA	2A RHR PUMP ROOM CUB CLR ASMBLY	Y	4		C- 378
2VA06SA	COOLER,CENTRIFUGAL CHARGING PUMP 2A	Y	1		C- 382
2VA10J	CENT CHARGING PUMP CUBICLE COOLER LOCAL PANEL	N	1		C- 386
2VD01CA	DIESEL GENERATOR ROOM VENT FAN ASMBLY	Y	17		C- 389
2VD04J	2A DG RM HVAC DMPR START PNL	N	18		C- 393
2VP01AD	CNMT ESS'L SERVICE WATER COIL 2A (RCFC)	N		OUTAGE	
2VX07J	ESF SWGR RM DIV 22 HVADAMPER STARTER PANEL	Y	16		C- 396

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0FC006A

Equipment Class: (0) Other

Equipment Description: REFUELING WTR PURIF PMPS SUCT HDR INST ROOT TO 0PI-FC003 VALVE

Project: Braidwood 2 SWEL

Location (Bldg, Elev, Room/Area): Auxiliary, 364.00 ft, ALL

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?	Not Applicable
3.	Is the anchorage free of corrosion that is more than mild surface oxidation?	Not Applicable
4.	Is the anchorage free of visible cracks in the concrete near the anchors?	Not Applicable
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.)	Not Applicable
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.: 0FC006A

Equipment Class: (0) Other

Equipment Description: REFUELING WTR PURIF PMPS SUCT HDR INST ROOT TO 0PI-FC003 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? *Rugged valve, no seismic/structural issues*	Yes

Comments

Seismic walkdown team M. Delaney & P. Gazda 7/30/12 pm

Evaluated by: Marlene Delaney Date: 10/1/2012

Philip Gazda 10/1/2012

Status: [Y] N U

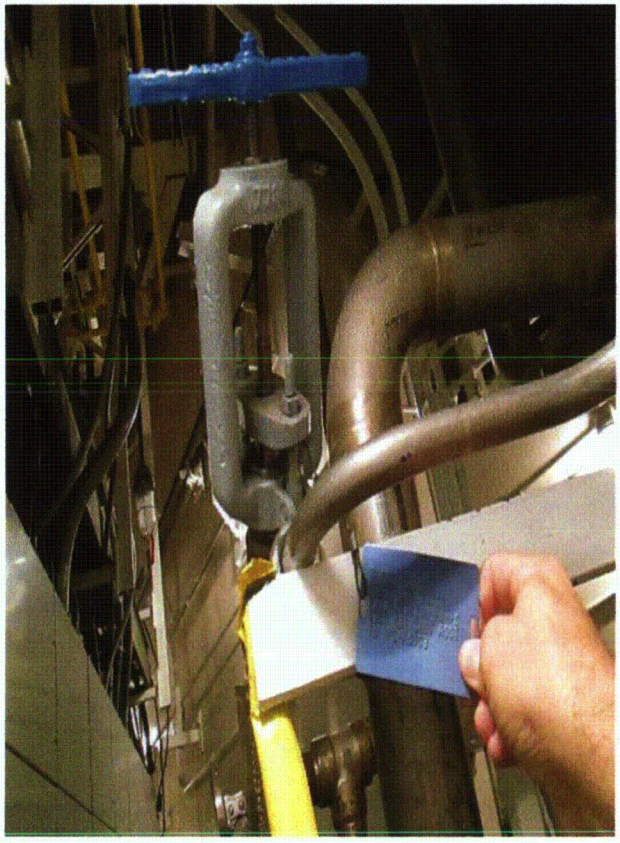
Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0FC006A

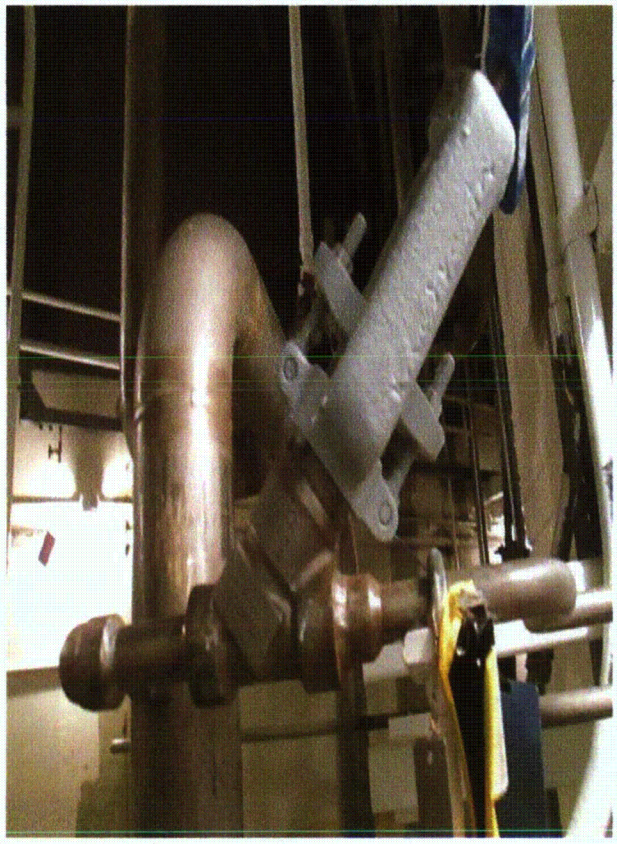
Equipment Class: (0) Other

Equipment Description: REFUELING WTR PURIF PMPS SUCT HDR INST ROOT TO 0PI-FC003 VALVE

Photos



0FC006A 7-30-12 AM 025



0FC006A 7-30-12 AM 026

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0FC012

Equipment Class: (0) Other

Equipment Description: REFUELING WTR PURIF PMPS SUCT HDR INST ISOL TO 0PI-FC003

Project: Braidwood 2 SWEL

Location (Bldg, Elev, Room/Area): Auxiliary, 364.00 ft, ALL

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?	Not Applicable
3.	Is the anchorage free of corrosion that is more than mild surface oxidation?	Not Applicable
4.	Is the anchorage free of visible cracks in the concrete near the anchors?	Not Applicable
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.)	Not Applicable
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.: 0FC012

Equipment Class: (0) Other

Equipment Description: REFUELING WTR PURIF PMPS SUCT HDR INST ISOL TO 0PI-FC003

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? *Seismic block walls.* *Overhead well-supported.*	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

Seismic walkdown team M. Delaney & P. Gazda 7/30/12 pm

Evaluated by: Marlene Delaney Date: 10/1/2012

Philip Gazda 10/1/2012

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

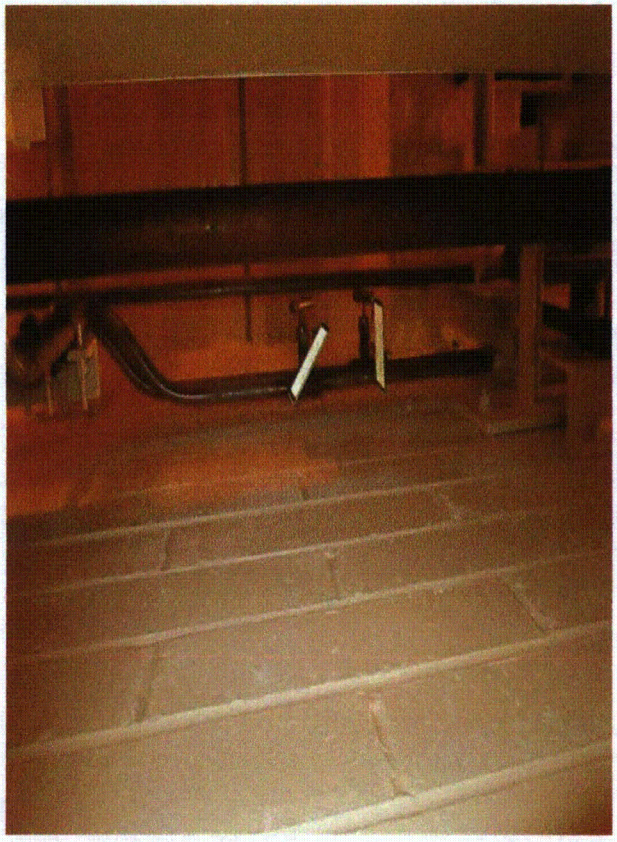
Equipment ID No.: 0FC012

Equipment Class: (0) Other

Equipment Description: REFUELING WTR PURIF PMPS SUCT HDR INST ISOL TO 0PI-FC003

Photos

0FC012 (AWB - GAS BOTTLE -OK PER PLANT PROCEDURE) 7-30-12 AM 023



0FC012 7-30-12 AM 021

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0FC8754

Equipment Class: (0) Other

Equipment Description: SPENT FUEL PIT HX RTRN ISOL VALVE

Project: Braidwood 2 SWEL

Location (Bldg, Elev, Room/Area): FH, 401.00 ft, ALL

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?	Not Applicable
3.	Is the anchorage free of corrosion that is more than mild surface oxidation?	Not Applicable
4.	Is the anchorage free of visible cracks in the concrete near the anchors?	Not Applicable
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.)	Not Applicable
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.: 0FC8754

Equipment Class: (0) Other

Equipment Description: SPENT FUEL PIT HX RTRN ISOL 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? *A large C-clamp was found clamped to TS hanger near this valve. IR 1394927 was written (since walkdown was completed, the clamp has been removed).*	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? *No seismic/structural issues.*	Yes

Comments

Seismic walkdown team M. Delaney & P. Gazda 7/30/12 pm

Evaluated by: Marlene Delaney Date: 10/1/2012

Philip Gazda 10/1/2012

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0FC8754

Equipment Class: (0) Other

Equipment Description: SPENT FUEL PIT HX RTRN ISOL VALVE

Photos

0FC8754 7-30-12 PM 036

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0FC8790

Equipment Class: (0) Other

Equipment Description: SPENT FUEL PIT HX TO BORON RECY HOLDUP TANKS ISOL VALVE

Project: Braidwood 2 SWEL

Location (Bldg, Elev, Room/Area): FH, 401.00 ft, ALL

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?	Not Applicable
3.	Is the anchorage free of corrosion that is more than mild surface oxidation?	Not Applicable
4.	Is the anchorage free of visible cracks in the concrete near the anchors?	Not Applicable
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.)	Not Applicable
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.: 0FC8790

Equipment Class: (0) Other

Equipment Description: SPENT FUEL PIT HX TO BORON RECY HOLDUP TANKS ISOL 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? *Seismic block walls.*	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? *No structural/seismic issues*	Yes

Comments

Seismic walkdown team M. Delaney & P. Gazda 7/30/12 pm

Evaluated by: Marlene Delaney Date: 10/1/2012

Philip Gazda 10/1/2012

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0FC8790

Equipment Class: (0) Other

Equipment Description: SPENT FUEL PIT HX TO BORON RECY HOLDUP TANKS ISOL VALVE

Photos

0FC8790 7-30-12 PM 038

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0SX007

Equipment Class: (8) Motor-Operated and Solenoid-Operated Valves

Equipment Description: 0 CC HX OUTLT VLV ASMBLY

Project: Braidwood 2 SWEL

Location (Bldg, Elev, Room/Area): Auxiliary, 346.00 ft, ALL

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?	Not Applicable
3.	Is the anchorage free of corrosion that is more than mild surface oxidation?	Not Applicable
4.	Is the anchorage free of visible cracks in the concrete near the anchors?	Not Applicable
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.*)	Not Applicable
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.: 0SX007

Equipment Class: (8) Motor-Operated and Solenoid-Operated Valves

Equipment Description: 0 CC HX OUTLT VLV ASMBLY

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? *Rugged valve and well-supported pipe. No structural/seismic issues.*	Yes

Comments

Seismic walkdown team M. Delaney & P. Gazda 8/2/12 pm

Evaluated by: Marlene Delaney Date: 10/1/2012

Philip Gazda 10/1/2012

Status: [Y] N U

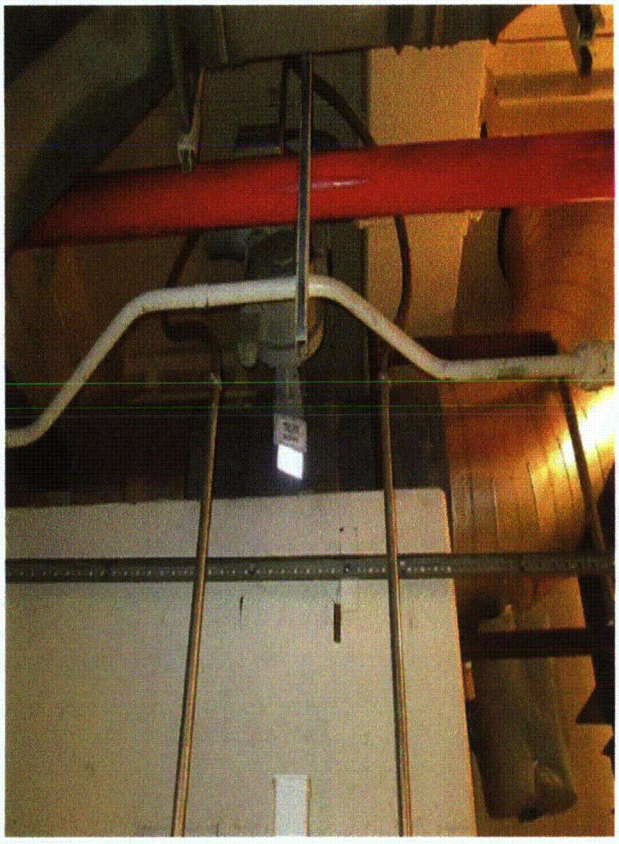
Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0SX007

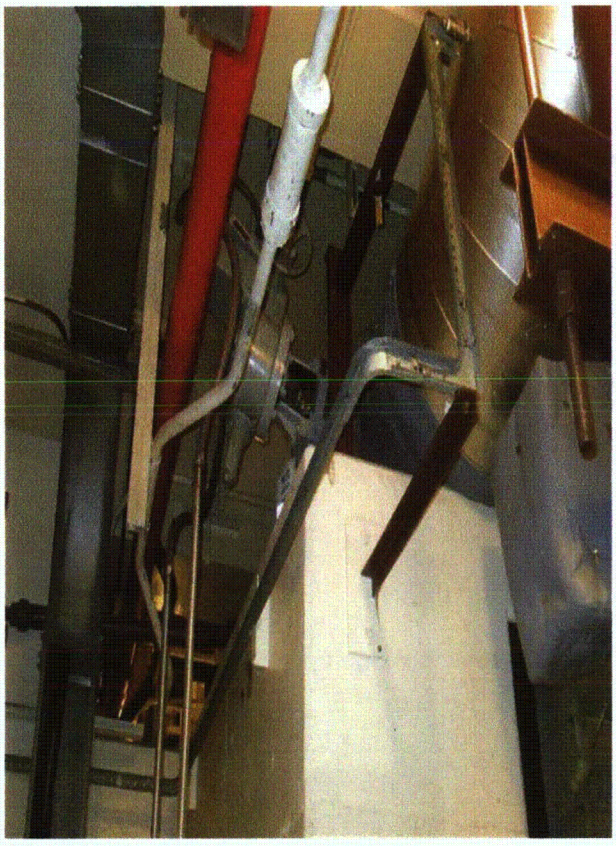
Equipment Class: (8) Motor-Operated and Solenoid-Operated Valves

Equipment Description: 0 CC HX OUTLT VLV ASMBLY

Photos



0SX007 8-2-12 054



0SX007 8-2-12 056

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0SX146

Equipment Class: (8) Motor-Operated and Solenoid-Operated Valves

Equipment Description: U-0 CC HX OUTLET HDR ISOL ASMBLY; 30"

Project: Braidwood 2 SWEL

Location (Bldg, Elev, Room/Area): Auxiliary, 346.00 ft, ALL

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?	Not Applicable
3.	Is the anchorage free of corrosion that is more than mild surface oxidation?	Not Applicable
4.	Is the anchorage free of visible cracks in the concrete near the anchors?	Not Applicable
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.)	Not Applicable
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.: 0SX146

Equipment Class: (8) Motor-Operated and Solenoid-Operated Valves

Equipment Description: U-0 CC HX OUTLET HDR ISOL ASMBLY; 30"

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? *Rugged, well-supported valve*	Yes

Comments

Seismic walkdown team M. Delaney & P. Gazda 8/2/12 pm

Evaluated by: Marlene Delaney Date: 10/1/2012

Philip Gazda 10/1/2012

Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0SX146

Equipment Class: (8) Motor-Operated and Solenoid-Operated Valves

Equipment Description: U-0 CC HX OUTLET HDR ISOL ASMBLY; 30"

Photos

0SX146 (NP-6695) 8-2-12 059

0SX146 8-2-12 057

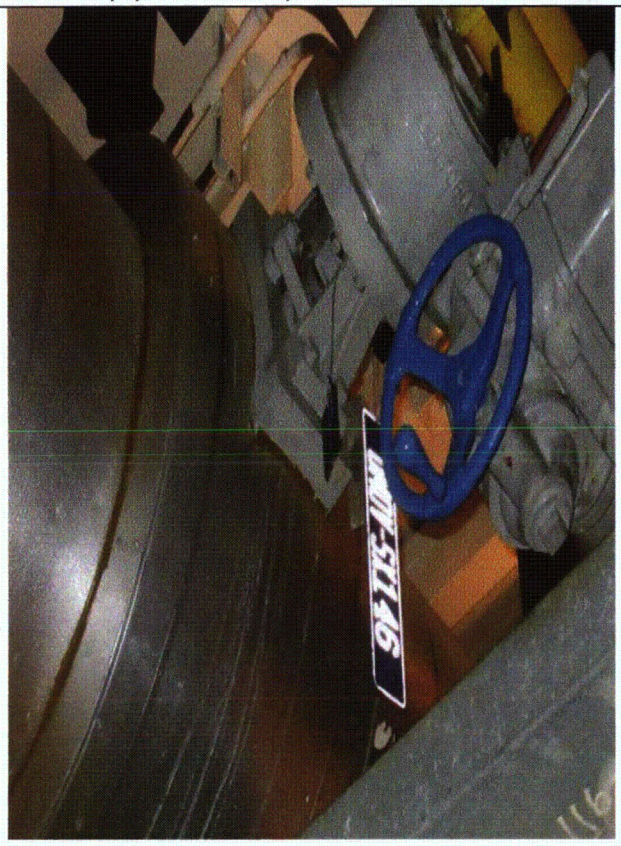
Status: [Y] N U

Seismic Walkdown Checklist (SWC)

Equipment ID No.: 0SX146

Equipment Class: (8) Motor-Operated and Solenoid-Operated Valves

Equipment Description: U-0 CC HX OUTLET HDR ISOL ASMBLY; 30"



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