~~SECURITY-RELATED INFORMATION - WITHHOLD UNDER 10 CFR 2.390~~

Duke Energy®

**George T. Hamrick**
Vice President
Harris Nuclear Plant
5413 Shearon Harris Rd
New Hill NC 27562-9300

919-362-2502

Ref: 10 CFR 50.54(f)

November 27, 2012
Serial: HNP-12-119

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Subject: Shearon Harris Nuclear Power Plant, Unit No. 1 Response to Recommendation 2.3 Seismic Walkdown of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident

Reference: Request For Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Dated March 12, 2012

Ladies and Gentlemen:

By letter dated March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information (Reference) requesting licensees to provide information regarding Recommendation 2.3 (Seismic) to support the evaluation of the NRC staff recommendations for the Near-Term Task Force (NTTF) review of the accident at the Fukushima Dai-ichi nuclear facility.

By this letter, Carolina Power & Light Company (CP&L) submits the Shearon Harris Nuclear Power Plant, Unit No. 1 response regarding the performance of seismic walkdowns to identify and address degraded, non-conforming or unanalyzed conditions and to verify the current plant configuration with the current seismic licensing basis.

The information provided herein and the activities described in this report are consistent with the guidance provided by the Electric Power Research Institute's (EPRI) 2012 Technical Report 1025286 titled, "Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic."

Enclosure 1 to this letter provides the requested information.

Enclosure 2 to this letter contains the Shearon Harris Nuclear Power Plant, Unit No. 1 management signatures documenting site management review of this document.

**Attachments 6 and 7 of Enclosure 1 of this letter contain**

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**Upon removal of Attachments 6 and 7 from the Enclosure, this letter is decontrolled.**

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CP&L requests that Attachments 6 and 7 of the Enclosure to this letter, which contain security-related information, be withheld from public disclosure in accordance with 10 CFR 2.390.

If you have any questions regarding this submittal, please contact Mr. Dave Corlett, Supervisor – Licensing/Regulatory Programs, at (919) 362-3137.

I declare under the penalty of perjury that the foregoing is true and correct. Executed on November 27, 2012.

Sincerely,

George T. Hamrick

Enclosure 1: Seismic Walkdown Submittal
Enclosure 2: Report Review by Site Management

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP
Ms. A. T. Billoch Colón, NRC Project Manager, HNP
Mr. V. M. McCree, NRC Regional Administrator, Region II

**Attachments 6 and 7 of Enclosure 1 of this letter contain**

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**Upon removal of Attachments 6 and 7 from the Enclosure, this letter is decontrolled.**

ENCLOSURE 1
SEISMIC WALKDOWN SUBMITTAL

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400
RENEWED LICENSE NO. NPF-63

# SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1 RESPONSE TO RECOMMENDATION 2.3 SEISMIC WALKDOWN OF THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

**Shearon Harris Nuclear Power Plant Seismic Walkdown Report**

## 1.0 Introduction

The Nuclear Regulatory Commission (NRC) has issued a Request for Information pursuant to Title 10 of the Code of Federal Regulations 50.54(f) (hereafter 50.54(f) letter) regarding "Recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force (NTTF) review of insights from the Fukushima Dai-Ichi Accident" resulting from the Great Tohoku Earthquake and subsequent tsunami. This submittal report, pursuant to the NRC's request for information, is offered to address the scope associated only with the 50.54(f) letter Enclosure 3, NTTF Recommendation 2.3 Seismic. Specifically, this report provides information for the Shearon Harris Nuclear Power Plant (HNP) regarding the performance of seismic walkdowns to identify and address degraded, non-conforming or unanalyzed conditions and to verify the current plant configuration is consistent with the current seismic licensing basis. The information provided herein and the activities described in this report are consistent with the guidance provided by the Electric Power Research Institute's (EPRI) 2012 Technical Report 1025286 "Seismic Walkdown Guidance: For Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic." The NRC, in its letter dated May 31, 2012, endorsed the EPRI guidance document.

There were 114 areas walked down and 46 areas walked by. The 2.3 Seismic Walkdown inspections performed were primarily non-intrusive visual inspections of primarily plant Seismic Category I systems, structures, and components (SSCs). During the inspections observed degraded, nonconforming, or unanalyzed conditions were identified and addressed through the corrective action program (CAP). Based on the EPRI guidance document, the list of SSCs for inspection were to be obtained through a systematic selection process to establish a random while broadly populated Seismic Walkdown Equipment List (SWEL). The SWEL was made up of two separate lists. SWEL 1 included SSCs from various locations throughout the plant and SWEL 2 included a shorter list of Spent Fuel Pool (SFP) SSCs.

This selection process for the SSCs combined with the inspection checklist attributes assessed the design basis seismic capabilities of the plant. These attributes pertain to SSC anchorage, interaction and other considerations based on NRC and industry insights of the Fukushima Dai-Ichi Accident.

A similar past seismic effort includes the Individual Plant Examination for External Events (IPEEE) program. Many of the same SSCs inspected for the IPEEE were re-inspected for the current 2.3 Seismic Walkdowns. Most of the SWEL items originated from the IPEEE Safe Shutdown Equipment List (SSEL). The IPEEE program used Seismic Margins programs to assess the plants capabilities to perform properly to a larger Review Level Earthquake (RLE) and modifications were performed if needed.

The 2.3 Seismic Walkdown inspections were performed to visually check the material condition of the SSCs and its anchorage to meet its seismic design basis. Also inspected are the surrounding equipment and area for interactions with other SSCs, fire hazards, water spray, and housekeeping issues that may interact with the SSCs. Conditions found were recorded on the developed checklists and evaluated. Any condition that was a potential adverse seismic condition (PASC) was further evaluated for its ability to meet its seismic design basis requirements and put into the plant CAP. In addition to checking the SSCs with respect to their design basis, this report discusses the general adequacy of licensee monitoring and maintenance procedure by reviewing walkdown observations.

## 2.0 Seismic Licensing Basis

The Seismic Licensing Basis found in the HNP Updated Final Safety Analysis Report (UFSAR) and other design documents provides the protection and mitigation features to assure that the SSCs perform their important to safety function both during and after a Safe Shutdown Earthquake (SSE). The development of the site characteristics, earthquake characteristics, the seismic design requirements for SSCs and the various codes and standards used for seismic designs at HNP are summarized below.

Site characteristics are identified in the UFSAR Section 2. All seismic category I buildings structural foundations are reinforced concrete mats, founded on suitable rock or concrete fill. The natural grade around the plant is approximately 260 feet above mean sea level. The area of the plant was excavated to an approximate elevation of 234 feet for the shallowest part to 179 feet for the deepest level.

Seismic Design is found in Section 3.7 of the UFSAR and was based on an Operating Basis Earthquake (OBE) with a horizontal ground acceleration of 0.075g, and SSE with horizontal ground acceleration of 0.15g. The vertical and horizontal ground accelerations associated with the OBE and SSE were normalized to 0.15g for the SSE and 0.075g for the OBE. The response spectrum was developed from the strong motion record of the 1935 Helena, Montana earthquake.

Design of Seismic Category I structures is found in UFSAR Section 3.8. The design of safety-related structures, equipment and safety related piping is found in UFSAR 3.9. Stress and deformation behavior of safety-related structures, piping, and equipment were maintained within the allowable limits when subjected to loads such as dead, live, pressure, and thermal, under normal operating conditions combined with the seismic effects resulting from the response to the SSE and OBE. These allowable limits are defined in appropriate design standards such as the ASME Boiler and Pressure Vessel Code Section III, ASME III Division II/ACI 359 (Winter '75 Addendum), ASME III, Division 1, Subsection NE, (Winter 1971 Addendum); American National Standards Institute (ANSI) B31.1.0 for Power Piping; ACI 318-1971, ACI 349-1976 Appendix C, ACI 349-1980 Appendix B, and American Institute of Steel Construction (AISC 1970/1971). The stresses that resulted from normal loads and design basis loss-of-coolant accident loads combined with the response to the SSE were limited so that no loss of function occurred and the capability of making a safe and orderly plant shutdown was maintained.

Seismic Category I Instrumentation and Electrical Equipment seismic design is described in UFSAR Section 3.10. The equipment must perform their safety function before, during and after a seismic event. The standard for seismic testing of equipment is Institute of Electrical and Electronics Engineers (IEEE) 344-1971. For equipment purchased after March 1, 1977, IEEE 344-1975 is applicable. Class 1E equipment and supports meet IEEE 323-1974.

## 3.0 Personnel Qualifications

### 3.1 Equipment Selection Personnel

#### 3.1.1 Billy Alumbaugh

Billy R. Alumbaugh is a Registered Professional Engineer and has over 30 years engineering experience including 16 years nuclear experience with site experience working for a utility and as a consultant. Progressive experience in civil engineering ranges from individual contribution to supervisory and project management. Supervised multiple engineers at operating nuclear facility and was involved in several projects including: Control Room expansion, Equipment obsolescence, Dry Fuel Storage, and Containment redesign/design pressure uprate. Training received includes Auxiliary Operator, Waste Control Operator, Systems Training, 10CFR50.59 certification, and modification/change control. As a consultant, he served as the Civil/Structural Engineering Design Lead for the new plant Design Certification and Combined Operating License projects providing a technical review of civil based licensing responses to clients or the NRC and project management. More recently served as the Civil-Structural-Architect Discipline Manager for the detailed design phase of the US-APWR including all aspects of the design including the site specific and Design Control Document seismic evaluations. Billy Alumbaugh has an MS and a BS degree in Civil Engineering.

#### 3.1.2 Primo Novero

Mr. Novero has over 46 years of engineering experience, with 40 years in structural design, four in construction, and two in environmental. He has 34 years of nuclear structural design experience in various structures, systems and components involving different materials, and in diverse topical matters including seismic. Primo Novero has a BS in Civil Engineering and Environmental Engineering, and is a Registered Professional Engineer in the field of Civil, Structural and Environmental.

3.1.3 Mike Weber

Mr. Weber has worked at the Harris plant since 1983 and held various positions within the Operations organization including Reactor Operator, Senior Reactor Operator, Control Room Supervisor, Nuclear Shift Manager, and Superintendent – Operations Support. He currently holds an active Senior Reactor Operator license on the Harris Plant.

3.1.4 Brad Morrison

Mr. Morrison has over 30 years of experience in nuclear power and has held various supervisory/management positions including Instrumentation & Control, Engineering Scheduling, Maintenance Surveillance Test Group, Outage & Scheduling, Nuclear Assessment and Materials & Contract Services, Additionally, he served as the Functional Area Manager responsible for overall fleet outage planning, performance, and execution. He has also served as Shift Outage Manager during four refueling outages including steam generator replacement outages.

3.2 Seismic Walkdown Engineers

3.2.1 Jose Olmeda

Mr. Olmeda has over 30 years of experience in the Analysis and Design of nuclear related facilities, components structures and systems. This includes the use of Industry Standards and codes as: ACI-318, ACI-349, AISC-ASD/LRFD, SEI/ASCE-7, ASCE-4-98, ASCE-43-05, ANSI/AISC N690, NFPA-17, and the Life Safety Code. He has a high degree of knowledge of the theory and applications of finite elements using structural analysis and design software such as GT-Strudl, STAAD.Pro2007 and other common design software in the structural engineering field. He is a longstanding member with the American Concrete Institute, American Institute of Steel Construction, and a Charter Member of the Structural Engineers Institute of the American Society of Civil Engineers. Mr. Olmeda maintains an Associated Membership in the ACI-118 Committee, Use of Computers for Concrete Applications.

3.2.2 Les Galazka

Mr. Galazka has over 30 years of leadership/project management experience, including engineering. He has twenty-six years of nuclear experience including Structural, Mechanical, Piping and Pipe Support, Start–up, Nuclear Waste Process and Management, and System Engineering. He has six years of international experience on construction, equipment installation and testing, QC, engineering and management. He holds a Bachelors and a Masters in Mechanical/Structural Engineering.

3.2.3 Harold Bamberger

Harold Bamberger has over 40 years of experience in both field and office functions required for designing, analyzing, and installing piping and pipe supports for metallic and non-metallic systems in major power, chemical, and pharmaceutical facilities. Mr. Bamberger has worked for various nuclear power plants in design and review of piping, piping supports and other nuclear structure using ASME Section III, ASME/ANSI B31.1 and B31.3, and applicable nuclear plant procedures. Mr. Bamberger is a Registered Professional Engineer and holds an AD in Mechanical Engineering Technology with additional classes in Mechanical Engineering and Technology.

3.2.4 Nazir Sheikh

Mr. Sheikh is a Registered Professional Engineer and has over 35 years engineering experience with over 30 years nuclear experience. Mr. Sheikh has been associated with nuclear design in nuclear piping design, concrete and steel structures using ACI 318, ACI 349, AISC, mechanical

electrical equipment qualification and testing in accordance with IEEE-344. Nazir Sheikh has a BS in Civil Engineering and studies toward a MS in Mechanical Engineering.

3.3 Licensing Basis Reviewers

3.3.1 Harold Bamberger

See 3.2.3 above

3.4 IPEEE Reviewers

3.4.1 Harold Bamberger

See 3.2.3 above.

3.4.2 Jose Olmeda

See 3.2.1 above.

3.5 Peer Reviewers

3.5.1 Louis Wade

Louis Wade has over 30 years experience in Quality Assurance/Quality Control (QA/QC), Project Management, and QA/QC consulting. Over 15 years in management positions associated with construction, maintenance, modifications, including work package control, and operation of DOE and NRC regulated facilities such as nuclear power plants, vitrification facilities, radioactive waste facilities, gaseous diffusion facilities, and TRU waste chacterization and disposal. Mr. Wade is an ASQ Certified Quality Auditor 10600, Lead Auditor per ANSI N45.2.23, and Lead Auditor per ASME-NQA 1.

3.5.2 David Dickinson

Mr. Dickinson has 40 years experience in the engineering profession as a civil/ structural engineer on a variety of projects. Experience includes both office and field assignments with contractors and engineering consulting firms on nuclear power generation, industrial and petrochemical projects. He has extensive experience in the structural analysis, seismic equipment qualification, foundations, support of heavy equipment, rigging and cranes, heavy lifts, and modifications to existing buildings and structures for nuclear power stations.

## 4.0 Selection of SSCs

4.1 SWEL 1 Development

The selection of SSCs included in SWEL 1 for HNP was based on the guidance provided in EPRI Guidelines, Section 3. Plant staff participated in the SSC selection process and concurred with the SSCs selected for SWEL 1 and SWEL 2. The inspection of items on this list addresses safe shutdown and containment integrity at the plant. This selection process was conducted by experienced personnel and plant operations staff members selecting SSCs based on the EPRI Guidance using screening selection criteria. These screens are listed as follows:

- Screen #1: Seismic Category I
- Screen #2: Equipment or systems NOT regularly inspected
- Screen #3: Supports five safety functions
    - Reactor reactivity control
    - Reactor coolant pressure control

- Reactor coolant inventory control
- Decay Heat Removal
- Containment function

- Screen #4: Sample considerations (systems, major new/replacement, equipment types, environments, IPEEE enhancements)

The list of equipment resulting from Screen #3 is Base List 1. At HNP, the Base List 1 was created as suggested by the EPRI guidance document, through the use of a previous equipment list from implementation of the IPEEE Seismic program. Per EPRI 1025286, the first screen narrows the list to SSCs classified as Seismic Category I items because only those have a defined seismic licensing basis against which to evaluate the as-installed configuration. The second screen further narrows the list by selecting only those remaining items that do not have regular inspections to confirm their configuration is consistent with the licensing basis. The third screen ensures that those remaining items are associated with at least one of the five safety functions.

Once Base List 1 was established, Screen #4 was applied to ensure the inspections encompassed a broad and varying array of equipment. Screen #4 included selection considerations compiled from the EPRI guidance document and from the 50.54(f) letter Enclosure 3. This resulted in the creation of SWEL 1. Considerations made for the creation of SWEL 1 are detailed in the sections below.

4.1.1 Equipment types/classes

One of the sampling objectives was to select items from all equipment classes where possible.

| Class No. | Equipment Included | Base List 1 Total | Selected |
|---|---|---|---|
| 0 | Other | 13 | 5 |
| 1 | Motor Control Centers and Wall-Mounted Contactors | 15 | 7 |
| 2 | Low Voltage Switchgear and Breaker Panels | 4 | 2 |
| 3 | Medium Voltage Metal-Clad Switchgear | 2 | 1 |
| 4 | Transformers | 8 | 3 |
| 5 | Horizontal Pumps | 17 | 6 |
| 6 | Vertical Pumps | 1 | 1 |
| 7 | Pneumatic-Operated Valves | 10 | 4 |
| 8 | Motor-Operated and Solenoid Operated Valves | 82 | 10 |
| 9 | Fans | 4 | 0 |
| 10 | Air Handlers | 4 | 2 |
| 11 | Chillers | 2 | 1 |
| 12 | Air Compressors | 4 | 0 |
| 13 | Motor Generators | 0 | 0 |

| Class No. | Equipment Included | Base List 1 Total | Selected |
|---|---|---|---|
| 14 | Distribution Panels and Automatic Transfer Switches | 14 | 7 |
| 15 | Battery Racks | 2 | 1 |
| 16 | Battery Chargers and Inverters | 6 | 3 |
| 17 | Engine Generators | 2 | 1 |
| 18 | Instrument Racks | 106 | 35 |
| 19 | Temperature Sensors | 0 | 0 |
| 20 | Instrument and Control Panels | 2 | 1 |
| 21 | Tanks and Heat Exchangers | 39 | 10 |
| | Total | 337 | 100 |

There were four (4) Class 9 items, Diesel Generator Fans and four (4) Class 12 items, Diesel Starting Air Separators, listed on the SSEL. All eight of these items were found to be declassified as Seismic Category 1 equipment due to modifications to the diesel air starting system since the IPEEE effort. Check valves were added to the diesel air staring system causing the Class 9 and 12 items to declassified as Seismic Category 1. The added check valves were included in SWEL 1 and are shown in Attachment 2. Upon searching the HNP Equipment Database (EDB), there were no SC 1 (Quality Group A) Fans or compressors that satisfied the safety function criteria set forth by EPRI, and therefore they screened out.

4.1.2 Five safety functions

The appropriate proportion of SSCs serving each of the five safety functions on Base List 1 was maintained in the selection of SSCs for the SWEL 1 as follows:

| Safety Function | Base List 1 SSCs | Selected SSCs |
|---|---|---|
| Reactor reactivity control | 112 | 59 |
| Reactor coolant pressure control | 127 | 73 |
| Reactor coolant inventory control | 126 | 68 |
| Decay heat removal | 172 | 91 |
| Containment function | 95 | 43 |

This table demonstrates full coverage of the five safety functions for the selected SSCs. Base List 1 in Attachment 1 includes the safety function category of each SSC.

4.1.3 Locations

The items selected for inclusion on the SWEL 1 are from a variety of plant locations including the Reactor Auxiliary Building, Diesel Generator Building, Containment Building and Service Water Building, among others. SWEL 1 in Attachment 2 includes the building location of each SSC.

SSCs from a variety of environments including dry and hot, wet and cold, mild and harsh, and inside and outside buildings were included for inspection in the SWEL 1. SWEL 1 in Attachment 2 includes the environment of each item.

4.1.5 Systems

During the SWEL 1 selection process, consideration was given to equipment of varying systems including the Chemical Volume Control, Auxiliary Feedwater, Main Steam, and Residual Heat Removal Systems. Table B-1 of Appendix E "Safety Function-System Matrix for PWRs" of the EPRI guidance was consulted to ensure systems to support safety functions were included. Additionally, equipment in the Service Water System that support access to the Ultimate Heat Sink was included in SWEL 1. SWEL 1 in Attachment 2 includes the system of each SSC.

4.1.6 Risk

Risk was considered in the selection of the SSCs from the SSEL list for items to include in the SWEL 1. The selection team was able to readily identify items that posed a higher risk ranking due to their knowledge and experience working at nuclear plants. Such items as emergency diesels, station batteries, core cooling systems, emergency cooling water systems, and 1E electrical switchgear are identified as critical equipment that have a higher risk and associated consequences. These equipments were included while maintaining a balance with the other requirements of selecting SWEL equipment.

4.1.7 IPEEE vulnerabilities

HNP had 13 IPEEE vulnerabilities of which six were selected for inclusion on SWEL 1. Particular attention was paid to these items during the walkdowns and no discrepancies were identified. The IPEEE vulnerabilities are indicated on SWEL 1 in Attachment 2.

4.1.8 Modified, replacement, and new equipment

Modifications to the plant including new and replacement equipment was considered when developing the SWEL.

4.1.9 Accessibility

Though a limited numbers of SSC's were found to have anchorage conditions obscured by material such as insulation, cables, etc. none were found to be inaccessible during the scheduled evaluation period. An entry into the containment area was made and the SWEL items within evaluated. Cabinets with handles latches or thumb screws were opened and observed. Opening cabinets that would cause equipment inoperability or cabinets without handles, latches, or thumbscrews were omitted from the group that required opening.

4.2 SWEL 2 Development

The SWEL 2 selection process started with the list of Safety-Related components listed with the SFP system number. The starting list satisfied the first screen. The equipment selection engineers then assigned an equipment class to the remaining items. This equipment class was used to satisfy screens 2 since a variety of equipment and system types were selected. Screen 3 was satisfied by selecting items that are walkdown appropriate and in a variety of areas. Base list 2 was completed after the equipment number was assigned and items in the In Service Inspection (ISI) program were removed. The equipment classes were used to ensure a variety of types of equipment would be included, similar to the way it was done for SWEL 1. There was no previous inspection data, so a realistic distribution was achieved by the equipment selection personnel.

Rapid Drain-Down added 4 valves in filtration and purification lines below the pool. These piping systems are not seismic category I so they were not present on base list 2. The lines the valves are on are located at elevations such that a failure would cause a rapid drain down. The gates separating the pools were not added to the inspection since they are considered structures and per the EPRI guidance (Ref. 2) structures need not be considered. The pools are full during normal operation so even if a gate failed, it would not cause a rapid drain down. The pool skimmer cannot drain the pool enough to qualify as a rapid drain down risk due to the limited length of hose attached to it. The Drain-Down List is located in Attachment 4. These items were added to selected items from Base List 2 to create SWEL 2, which is included in Attachment 5.

## 5.0 Seismic Walkdowns and Area Walk-Bys

The methodology used to complete the walkdowns and area walk-bys complies with the EPRI guidance. The walkdowns and area walk-bys were performed by the SWEs listed in Section 3.2. The SWEs used engineering judgment, based on their experience and training, to identify PASCs. Walkdown results were documented on the Seismic Walkdown Checklists and area walk-bys on Area Walk-By Checklists. These Checklists are provided as Attachments 6 and 7, respectively.

### 5.1 Seismic Walkdown Methodology

Seismic walkdowns were performed on each item in SWEL 1 and SWEL 2. The walkdown effort included an investigation of the SWEL equipment for potentially adverse seismic conditions (PASC). PASC's include adverse anchorage conditions, adverse seismic spatial interactions and any other adverse seismic condition concerning the equipment. When deficiencies and PASC's were identified during the inspection, they were documented with a description of the condition on the Seismic Walkdown Checklist (SWC). The Seismic Walkdown Engineers (SWEs) made judgments based on their evaluation and experience regarding the acceptability or lack thereof of the equipment anchorage. These observations were documented on the checklist for that item.

Seismic walkdowns were performed on each SWEL 1 and 2 and were evaluated for adverse anchorage conditions, adverse seismic spatial interactions, or other adverse seismic conditions as detailed below.

#### 5.1.1 Adverse Anchorage Conditions

Lack of anchorage or inadequate anchorage has been the primary cause for malfunction and failure of equipment during an earthquake. During the walkdown inspection, the anchorage was inspected against specific design details for approximately 50% of the SWEL items that include anchorage.

For all SWEL items with anchorage, a general visual inspection of anchorage was performed to determine if the SSC had indications of the following:

- Bent, broken, missing, or loose hardware
- Corrosion that is more than mild surface oxidation
- Visible cracks within 10D of an anchor
- Gaps that may exist at the visible parts of the equipment foundation
- Other potential adverse concerns

In cases where the anchorage was inaccessible and a substitution was not possible, an alternate method was used to assess potential degraded, non-conforming, or unanalyzed conditions which included:

- An review of previous walkdown packages to validate prior inspection attributes for adequacy
- A determination whether the local environment could cause the degradation of anchorage or its installation, (e.g. adverse environment conditions):
  - Evidence of moisture or relatively high humidity,
  - Evidence of corrosion on other nearby components and
  - Anchorage, and/or indication of vibration that could loosen the fasteners.
- A check whether the equipment and its anchorage have been subjected to maintenance or modified since it was last walked down

The SWEs used engineering judgment to assess whether the anchorage is potentially vulnerable to seismic failure or malfunction. The basis for any judgment used in the assessment was documented in the seismic walkdown checklists.

5.1.2 Adverse Seismic Spatial Interactions

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. The walkdown included an inspection of the adjacent and surrounding areas to each SWEL item for adverse seismic interaction conditions could occur that would affect the capability of the item to perform its intended safety-related functions. The three types of seismic spatial interaction effects considered were: proximity to an item, failure of an SSC and falling on an item, and flexibility of attached lines impacting an item.

5.1.3 Other Adverse Seismic Conditions

In addition to adverse anchorage and spatial interaction conditions, other potentially adverse seismic conditions that could challenge the adequacy of SWEL items were also identified when present, such as:

- 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 manufacturer
- Cabinet doors or panels that are not latched or fastened

5.2 Area Walk-By Methodology

The focus of the area walk-bys was to identify potentially adverse seismic conditions associated with other SSCs located in the vicinity of the SWEL item (either within the room or for large rooms within approximately 35 feet from the item). The key examination factors that were considered included: anchorage conditions, significantly degraded equipment in the area, a visual assessment of cable/conduit raceways and HVAC ducting, housekeeping items that could cause adverse seismic interaction, seismically induced fire and flooding/spray interactions as described below.

5.2.1 Seismically Induced Fire Interactions

The occurrence of a seismic event could create fire in multiple locations, simultaneously degrade fire suppression capabilities, and as a result prevent mitigation of fire damage to multiple safety-related functions.

During the seismic walkdown, the engineers visually assessed any potential sources of fire (e.g., compressed flammable gas bottles, fuel tanks, other combustible material, etc.) located in the vicinity of the SWEL item to ensure it was adequately restrained.

5.2.2 Seismically Induced Flooding/Spray Interactions

Seismically induced flooding events can potentially cause multiple failures of safety-related systems. Two examples of two potential sources of flooding are rupture of piping and vessels. Instances of concern include threaded fire protection piping, sprinkler head impact, flexible headers and stiff branch pipes, non-ductile mechanical couplings, seismic anchor motion and failed supports.

As the SWEs performed the walkdowns, they visually assessed the potential sources of water (e.g. fire suppression piping, tanks, etc.) located in the vicinity of the subject SSC to ensure they had adequate support throughout the load path and, therefore, were not likely to be a source of flooding or spray that could adversely affect the subject item of equipment. The items that were identified as potential conditions were documented. Any assessment and disposition of the effects were documented with the subject item.

5.3 Results

When conditions were identified during the inspection that were not readily determined as acceptable, they were documented along with an evaluation of the condition using available design information and based on the SWEs experience. SSCs may have been determined to be a non-PASC or PASC at the time of the inspection, or the condition may have been documented and further discussion completed before determining if it is a PASC. Non-PASC conditions found during the inspections are those evaluated and determined to not affect the ability of the item to perform its intended safety function during or after design basis ground motion as noted in the Current Licensing Basis. No SSCs were identified during the walkdowns or walk-bys as a PASC.

5.4 Maintenance Assessment

During the process of conducting the Fukushima Seismic 2.3 area walk-bys there were multiple instances noted where area plant lighting fixtures were attached utilizing "S" hooks. These fixtures are typically installed in a manner that the "S" hooks attached to the fixture are open and could theoretically become disconnected in the course of a seismic event. All open "S" hooks were evaluated for consequences of failure and determined to be acceptable. A Nuclear Condition Report has been initiated to conduct an extent of condition investigation and address the open the "S" hooks. During the walkdowns, relatively few and minor housekeeping problems were noted and contamination was minimal. These indicators suggest that monitoring and maintenance processes and procedures are adequate.

5.5 Planned or Newly Installed Protection or Mitigation Features

There were no items determined to be potentially adverse seismic conditions (PASCs). Therefore there were no planned or newly installed protection or mitigation features.

5.6 Inaccessible Items

No items were found to be inaccessible, and all SWEL items were inspected.

## 6.0 Licensing Basis Evaluations

As no PASCs were identified, the SSCs inspected would have been capable of fulfilling their intended safety function.

## 7.0 IPEEE Vulnerabilities Resolution Report

The results of the IPEEE report are summarized in a table below. These items were closed between November of 1994 and February of 1997 with the exception of the final item in the table below. This item's disposition was confirmed; however, the specific closure date could not be ascertained. With the exception of "S" hooks as stated in Section 5.4, the configuration management program has maintained adequate control of the required features.

| Equipment Description | Action |
|---|---|
| Diesel generator control panel | Close both ends of the S-hooks on the hanging fluorescent lights in the DG control room |
| Diesel generator control panel | Close both ends of the S-hooks on the hanging fluorescent lights in the DG control room |
| Insulation cabinets in Reactor Auxiliary Building | The row of fluorescent lights needs to be relocated on the existing unistrut three inches to the west away from the cabinets |
| Train A Auxiliary Relay Panel | Install missing mounting screw for relay |
| Train B Auxiliary Relay Panel | Install three missing mounting screws for relay |
| Motor Control Center | Replace missing latch on breaker panel door |
| Motor Control Center | Replace missing latch on breaker panel door |
| Motor Control Center | Replace missing latch on breaker panel door |
| Instrument Panel | Replace three missing access panel screws and replace two missing latches for breaker panel door |
| Instrument Panel | Replace three missing access panel screws |
| RHR heat exchanger temp switch | U-bolt has slipped off top of pipe and needs to be reworked |
| Instrument rack | Close both ends of the S-hooks on the hanging fluorescent lights in the DG control room |
| Electric motor operated valve | Compressed gas cylinder adjacent to valve needs to be removed or restrained in accordance with AP-003 |

## 8.0 Peer Review Report

The Peer Review Report is included in Attachment 8.

## Enclosure 1 Attachments

Attachment 1: Base List 1

Attachment 2: SWEL 1

Attachment 3: Base List 2

Attachment 4: Rapid Drain-Down List

Attachment 5: SWEL 2

Attachment 6: Seismic Walkdown Checklists

Attachment 7: Area Walk-By Checklists

Attachment 8: Peer Review Report

# Attachment 1: Base List 1

## 5 pages

| Generic ID from SSEL | Feature | Reactor Reactivity Control | Reactor Coolant Pressure Control | Reactor Coolant Inventory Control | Decay Heat Removal | Containment Function |
|---|---|---|---|---|---|---|
| 1A23-SA | Motor control center 1A23-SA | X | X | X | X | X |
| 1A-SA | 6.9KV switchgear 1A-SA | X | X | X | X | X |
| 1EA-14 | Solenoid valve | X | X | X | X | X |
| 1EA-15 | Solenoid valve | X | X | X | X | X |
| 1EA-29 | Solenoid valve | X | X | X | X | X |
| 1EA-45 | Solenoid valve | X | X | X | X | X |
| 1EA-61 | Solenoid valve | X | X | X | X | X |
| 1B-SA | Diesel Generator Fan E-86 (1B-SA) | X | X | X | X | X |
| 1A-SA | Water chiller unit (WC-2) | X | X | X | X | X |
| 1B-NNS | Diesel starting air compressor, 1B-NNS | X | X | X | X | X |
| 1A-SA | Diesel A generator control panel, 1DG-E036 | X | X | X | X | X |
| DP1B1-SB | Distribution panel for vital DC 1B1-SB | X | X | X | X | X |
| 1B-SB | Vital batteries in rack (1B-SB) | X | X | X | X | X |
| 1B-SB | Solid state battery charger (1B-SB) | X | X | X | X | X |
| 1B-SB | Diesel Generator 1B-SB | X | X | X | X | X |
| LS-2464A-SA | Day tank level switch HH | X | X | X | X | X |
| MCB | Main control board | X | X | X | X | X |
| MCB | Main control board | X | X | X | X | X |
| SSPS-CAB-B | Solid state protection cabinet B | X | X | X | X | X |
| 1A-NNS | Diesel starting air separator - 1A-NNS | X | X | X | X | X |
| 1B-SB-9 | Air handling unit 9 1B-SB | X | X | X | X | |
| 1FS-9429A1 | Chiller flow switch | X | X | X | X | |
| 1TE-420 | Cold leg temperature element TE-420 | X | X | X | X | |
| A1-R14 | Instrument rack for safe shutdown instrumentation | X | X | X | X | |
| A1-R23 | Instrument rack for safe shutdown instrumentation | X | X | X | X | |
| 1A-SA | Charging pump oil cooler | X | X | X | | |
| 1B-SB | Charging pump oil cooler | X | X | X | | |
| 1B21-SB | Motor control center 1B21-SB | X | | X | X | X |
| 1A2-SA | Low voltage switchgear 1A2-SA | X | | X | X | X |
| 1B2-SB | Stepdown transformer 6.9KV to 480V | X | | X | X | X |
| 1LT-993 | RWST Level transmitter 1LT-993 | X | | X | X | X |
| C1-R9 | Instrument rack "D" (RPS II) - PT-456 | X | | X | X | X |
| 1FT-122 | Flow transmitter FT122 | X | | X | X | |
| A21-R17 | Instrument rack for safe shutdown instrumentation | X | | X | X | |
| 1LT-106 | Level Transmitter - Boric Acid Tank | X | | X | | |
| A1-R30 | Instrument rack for safe shutdown instrumentation | X | | | X | |
| DP-1A2-SA | Distribution panel for vital DC 1A2-SA | | | | X | |
| 1PT-475 | Steam generator pressure transmitter PT-475 | | X | X | X | |
| 1PT-484 | Steam generator pressure transmitter PT-484 | | X | X | X | |
| 1PT-486 | Steam generator pressure transmitter PT-486 | | X | X | X | |
| 1PT-495 | Steam generator pressure transmitter PT-495 | | X | X | X | |

| Generic ID from SSEL | Feature | Reactor Reactivity Control | Reactor Coolant Pressure Control | Reactor Coolant Inventory Control | Decay Heat Removal | Containment Function |
|---|---|---|---|---|---|---|
| A1-R45B | Instrument rack for safe shutdown instrumentation | | X | X | | |
| 1FT-9429B | Chiller flow transmitter | | X | | X | |
| A1-R29 | Instrument rack for safe shutdown instrumentation | | X | | X | |
| 1A21-SA | Motor control center 1A21-SA | | | X | X | X |
| 1LT-9010A | Level transmitter (CST level) | | | | X | |
| 1LT-115 | Level Low press. sensor bellows to bottom of tank | | | X | | |
| CH III | 7.5 kVA inverter Channel III | | | | X | |
| 1A32-SA | Motor control center 1A32-SA | | | | X | |
| PP-1B211-SB | Stepdown transformer | | | | X | |
| 2MS-P19SB-1 | Relief valve oil pump B | | | | X | |
| PP-1A211-SA | 208/120 distribution panel | | | | X | |
| 1FT-2050B | AFW flow transmitter FT-2050B | | | | X | |
| 1FT-652 | Flow transmitter FT-652 | | | | X | |
| 1FT-689 | RHR heat exchanger 1B-SB flow transmitter | | | | X | |
| 1PS-2250A | Pressure switch | | | | X | |
| 1PS-2250B | Pressure switch | | | | X | |
| 1PT-2150B | AFW pressure transmitter PT-2150B | | | | X | |
| 1PT-2250A | Pressure transmitter | | | | X | |
| 1TIS-658A | RHR heat exchanger 1A-SA temp.switch | | | | X | |
| 1TIS-658B | RHR heat exchanger 1B-SB temp. switch | | | | X | |
| 1B34-SB | Motor control center 1B34-SB | | | | | X |
| 1PT-445 | Pressure transmitter PT-445 | | | | | X |
| 1PT-457 | Pressure transmitter PT-457 | | | | | X |
| 1A31-SA | Motor control center 1A31-SA | X | X | X | X | X |
| 1A36-SA | Motor control center 1A36-SA | X | X | X | X | X |
| 1B23-SB | Motor control center 1B23-SB | X | X | X | X | X |
| 1B31-SB | Motor control center 1B31-SB | X | X | X | X | X |
| 1B35-SB | Motor control center 1B35-SB | X | X | X | X | X |
| 1B36-SB | Motor control center 1B36-SB | X | X | X | X | X |
| 1B-SB | 6.9KV switchgear 1B-SB | X | X | X | X | X |
| 1EA-30 | Solenoid valve | X | X | X | X | X |
| 1EA-46 | Solenoid valve | X | X | X | X | X |
| 1EA-60 | Solenoid valve | X | X | X | X | X |
| 1A-SA | Diesel Generator Fan E-86 (1A-SA) | X | X | X | X | X |
| 1C-SB | Diesel Generator Fan E-86 (1C-SB) | X | X | X | X | X |
| 1D-SB | Diesel Generator Fan E-86 (1D-SB) | X | X | X | X | X |
| 1B-SB | Water chiller unit (WC-2) | X | X | X | X | X |
| 1A-NNS | Diesel starting air compressor, 1A-NNS | X | X | X | X | X |
| 1C-NNS | Diesel starting air compressor, 1C-NNS | X | X | X | X | X |
| 1D-NNS | Diesel starting air compressor, 1D-NNS | X | X | X | X | X |
| 1A-SA | Diesel A engine control panel, 1DG-E034 | X | X | X | X | X |

| Generic ID from SSEL | Feature | Reactor Reactivity Control | Reactor Coolant Pressure Control | Reactor Coolant Inventory Control | Decay Heat Removal | Containment Function |
|---|---|---|---|---|---|---|
| 1B-SB | Diesel B engine control panel, 1DG-E035 | X | X | X | X | X |
| 1B-SB | Diesel B generator control panel, 1DG-E037 | X | X | X | X | X |
| DP1A1-SA | Distribution panel for vital DC 1A1-SA | X | X | X | X | X |
| 1A-SA | Vital batteries in rack (1A-SA) | X | X | X | X | X |
| 1A-SA | Solid state battery charger (1A-SA) | X | X | X | X | X |
| 1A-SA | Diesel Generator 1A-SA | X | X | X | X | X |
| C1-R17 | Instrument rack "C" - PT-444 and PT-445 | X | X | X | X | X |
| C1-R6 | Instrument rack "A" (RPS I) - PT-455 | X | X | X | X | X |
| C1-R8 | Instrument rack "B" (RPS III) - PT-457 | X | X | X | X | X |
| LS-2463A-SA | Day tank level switch L/H | X | X | X | X | X |
| LS-2463B-SB | Day tank level switch L/H | X | X | X | X | X |
| LS-2464B-SB | Day tank level switch HH | X | X | X | X | X |
| PIC-CAB-14 | PIC cab 14 | X | X | X | X | X |
| SSPS-CAB-A | Solid state protection cabinet A | X | X | X | X | X |
| SSPST-CAB-A | Solid state protection test cabinet A | X | X | X | X | X |
| SSPST-CAB-B | Solid state protection test cabinet B | X | X | X | X | X |
| TE-6903A | Temperature controller | X | X | X | X | X |
| TE-6903B | Temperature controller | X | X | X | X | X |
| 1A-NNS | Diesel starting air dryer 1A-NNS | X | X | X | X | X |
| 1B-NNS | Diesel starting air separator -1B-NNS | X | X | X | X | X |
| 1C-NNS | Diesel starting air dryer 1C-NNS | X | X | X | X | X |
| 1C-NNS | Diesel starting air separator - 1C-NNS | X | X | X | X | X |
| 1D-NNS | Diesel starting air dryer 1D-NNS | X | X | X | X | X |
| 1A-SA-16 | Air handling unit 16 1A-SA | X | X | X | X | |
| 1A-SA-9 | Air handling unit 9 1A-SA | X | X | X | X | |
| 1B-SB-15 | Air handling unit 15 1B-SB | X | X | X | X | |
| 1FS-9429B1 | Chiller flow switch | X | X | X | X | |
| 1TE-410 | Cold leg temperature element TE-410 | X | X | X | X | |
| 1TE-430 | Cold leg temperature element TE-430 | X | X | X | X | |
| A1-R13 | Instrument rack for safe shutdown instrumentation | X | X | X | X | |
| A1-R22 | Instrument rack for safe shutdown instrumentation | X | X | X | X | |
| A1-R24 | Instrument rack for safe shutdown instrumentation | X | X | X | X | |
| A1-R7 | Instrument rack for safe shutdown instrumentation | X | X | X | X | |
| 1B-NNS | Diesel starting air dryer 1B-NNS | X | X | X | X | |
| 1D-NNS | Diesel starting air separator -1D-NNS | X | X | X | X | |
| 1B24 | Motor control center 1B24 | X | X | X | | X |
| 1A-SA | 1SI-E006 Nitrogen/Air Accumulator A | X | X | X | | X |
| 1B-NNS | 1SI-E007 Nitrogen/Air Accumulator B | X | X | X | | X |
| 1FT-943 | Flow transmitter 1FT-943 | X | X | X | | |
| A1-R27 | Instrument rack for safe shutdown instrumentation | X | X | | X | |
| 1FT-940 | Flow transmitter 1FT-940 | X | X | | | |

| Generic ID from SSEL | Feature | Reactor Reactivity Control | Reactor Coolant Pressure Control | Reactor Coolant Inventory Control | Decay Heat Removal | Containment Function |
|---|---|---|---|---|---|---|
| 1A3-SA | Low voltage switchgear 1A3-SA | X | | X | X | X |
| 1B2-SB | Low voltage switchgear 1B2-SB | X | | X | X | X |
| 1B3-SB | Low voltage switchgear 1B3-SB | X | | X | X | X |
| 1A2-SA | Stepdown transformer 6.9KV to 480V | X | | X | X | X |
| 1A3-SA | Stepdown transformer 6.9KV to 480V | X | | X | X | X |
| 1B3-SB | Stepdown transformer 6.9KV to 480V | X | | X | X | X |
| 1LT-990 | RWST Level transmitter 1LT-990 | X | | X | X | X |
| 1LT-991 | RWST Level transmitter 1LT-991 | X | | X | X | X |
| 1LT-992 | RWST Level transmitter 1LT-992 | X | | X | X | X |
| PIC-CAB-1 | PIC cab 1 (power supply for 1LT-990) | X | | X | X | X |
| PIC-CAB-2 | PIC cab 2 (power supply for 1LT-991) | X | | X | X | X |
| PIC-CAB-3 | PIC cab 3 (power supply for 1LT-992) | X | | X | X | X |
| A21-R15 | Instrument rack for safe shutdown instrumentation | X | | X | X | |
| 1LT-161 | Level Transmitter - Boric Acid Tank | X | | X | | |
| 1A35-SA | Motor control center 1A35-SA | | X | X | X | X |
| 1FT-110 | Flow transmitter | | X | X | X | |
| 1PT-474 | Steam generator pressure transmitter PT-474 | | X | X | X | |
| 1PT-476 | Steam generator pressure transmitter PT-476 | | X | X | X | |
| 1PT-485 | Steam generator pressure transmitter PT-485 | | X | X | X | |
| 1PT-494 | Steam generator pressure transmitter PT-494 | | X | X | X | |
| 1PT-496 | Steam generator pressure transmitter PT-496 | | X | X | X | |
| A1-R33 | Instrument rack for safe shutdown instrumentation | | X | X | | |
| A1-R45A | Instrument rack for safe shutdown instrumentation | | X | X | | |
| A1-R6 | Instrument rack for safe shutdown instrumentation | | X | X | | |
| 1FT-605A | Flow transmitter 1 FT-605A | | X | | X | |
| 1FT-605B | Flow transmitter 1FT-605B | | X | | X | |
| 1FT-9429A | Chiller flow transmitter | | X | | X | |
| 1PS-2150A | Pressure switch | | X | | X | |
| 1PS-2150B | Pressure switch | | X | | X | |
| 1PS-2170 | Pressure switch | | X | | X | |
| 1PS-2270 | Pressure switch | | X | | X | |
| 1PS-431 | Pressure Switch | | X | | X | |
| 1PT-2150A | AFW pressure transmitter PT-2150A | | X | | X | |
| 1PT-2170 | AFW pressure transmitter PT 2170 | | X | | X | |
| 1TE-604A | Temperature Element TE-604A | | X | | X | |
| 1TE-604B | Temperature Element TE-604B | | X | | X | |
| 1TE-606A | Temperature Element TE-606A | | X | | X | |
| 1TE-606B | Temperature Element TE-606B | | X | | X | |
| 1TI-5551A | Local temperature instrument TI-5551A | | X | | X | |
| 1TI-5551B | Local temperature instrument TI-5551B | | X | | X | |
| A1-R28 | Instrument rack for safe shutdown instrumentation | | X | | X | |

| Generic ID from SSEL | Feature | Reactor Reactivity Control | Reactor Coolant Pressure Control | Reactor Coolant Inventory Control | Decay Heat Removal | Containment Function |
|---|---|---|---|---|---|---|
| PIC-CAB-10 | PIC cab 10 - PS-2150B, PS-2170, PS-2250B and PS-2270 | | X | | X | |
| 1B32-SB | Motor control center 1B32-SB | | | X | X | |
| PIC-CAB-4 | PIC cab 4 (power supply for 1LT-992) | | | X | | X |
| 1LT-112 | Level trans. - Low press. sensor bellows at bottom of tank | | | X | | |
| PIC-CAB-18 | PIC cab 18 - FS-9429B1 | | | | X | X |
| PP-1A211-SA | Stepdown transformer | | | | X | |
| PP-1A311-SA | Stepdown transformer | | | | X | |
| PP-1B311-SB | Stepdown transformer | | | | X | |
| 2MS-P18SA-1 | Relief valve oil pump A | | | | X | |
| 2MS-P20SA-1 | Relief valve oil pump C | | | | X | |
| DP-1A-SA | Distribution panel for vital DC 1A-SA | | | | X | |
| DP-1B2-SB | Distribution panel for vital DC 1B2-SB | | | | X | |
| DP-1B-SB | Distribution panel for vital DC 1B-SB | | | | X | |
| PP-1A311-SA | 208/120 distribution panel | | | | X | |
| PP-1B211-SB | 208/120 distribution panel | | | | X | |
| PP-1B311-SB | 208/120 distribution panel | | | | X | |
| CH I | 7.5 kVA inverter Channel I | | | | X | |
| CH II | 7.5 kVA inverter Channel II | | | | X | |
| CH IIII | 7.5 kVA inverter Channel IIII | | | | X | |
| 1FT-2050A | AFW flow transmitter FT-2050A | | | | X | |
| 1FT-2050C | AFW flow transmitter FT-2050C | | | | X | |
| 1FT-653 | Flow transmitter FT-653 | | | | X | |
| 1FT-688 | RHR heat exchanger 1A-SA flow transmitter | | | | X | |
| 1LT-9010B | Level transmitter (CST level) | | | | X | |
| 1PT-2250B | Pressure transmitter | | | | X | |
| 1PT-2270 | Pressure transmitter | | | | X | |
| PIC-CAB-13 | PIC cab 13 - FS-9429A1 | X | | | X | |
| 1A34-SA | MCC 1A34-SA | X | X | | | X |
| 1PT-402 | Pressure transmitter PT-402 | | X | | | X |
| 1PT-403 | Pressure transmitter PT-403 | | X | | | X |
| 1PT-444 | Pressure transmitter PT-444 | | X | | | X |
| 1PT-455 | Pressure transmitter PT-455 | | X | | | X |
| 1PT-456 | Pressure transmitter PT-456 | | X | | | X |
| PIC-CAB-9 | PIC cab 9 - PS-2250A and PS-2150A | X | | | | X |

**Attachment 2: SWEL 1**

**6 Pages**

| Unique ID TAG # | Feature N=NEW | Class | Reactor Reactivity Control | Reactor Coolant Pressure Control | Reactor Coolant Inventory Control | Decay Heat Removal | Containment Function | Location | Dry Env. | Hot Env. | Wet Env. | Cold Env. | Mild Env. | Harsh Env. | Inside | Outside | System | IPEEE Vulnerabilities | Modification* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A21-SA | MOTOR CONTROL CENTER 1A21-SA | 1 | | | X | X | X | RAB | X | | | X | X | | X | | AC | | |
| 1B21-SB | MOTOR CONTROL CENTER 1B21-SB | 1 | X | | X | X | X | RAB | X | X | | X | X | | X | | AC | | |
| 1B34-SB | MOTOR CONTROL CENTER 1B34-SB | 1 | | X | | X | X | RAB | X | X | | X | X | | X | | AC | | |
| 1A2-SA | LOW VOLTAGE SWITCHGEAR 1A2-SA | 2 | X | | X | X | X | RAB | X | | | X | X | | X | | AC | | |
| 1B3-SB | LOW VOLTAGE SWITCHGEAR 1B3-SB | 2 | X | | X | X | X | RAB | X | X | | | X | | | | AC | | |
| 1A-SA | 6.9KV SWITCHGEAR 1A-SA | 3 | X | X | X | X | X | RAB | X | X | | | X | | X | | AC | | |
| 1CAB-A1-R45B | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 1 8 | | X | X | | | RAB | X | | | | X | | X | | RCS | | |
| 1B2-SB | STEPDOWN TRANSFORMER 6.9KV TO 480V | 4 | X | | X | X | X | RAB | X | X | | | X | | X | | AC | | |
| PP-1B211-SB | STEPDOWN TRANSFORMER | 4 | | | | X | | RAB | X | X | | | X | | X | | AC | | |
| PP-1A211-SA | STEPDOWN TRANSFORMER | 4 | | | | X | | RAB | X | X | | | X | | X | | AC | | |
| DP-1A2-SA | DISTRIBUTION PANEL FOR VITAL DC 1A2-SA | 1 4 | | | | X | | RAB | X | | | | X | | X | | AC | | |
| PP-1A211-SA | 208/120 DISTRIBUTION PANEL | 1 4 | | | | X | | RAB | X | | | | X | | X | | AC | | |
| DP-1A-SA | DISTRIBUTION PANEL FOR VITAL DC 1A-SA | 1 4 | | | | X | | RAB | X | X | | | X | | | | AC | X | |
| PP-1B211-SB | 208/120 DISTRIBUTION PANEL | 1 4 | | | | X | | RAB | X | X | | | X | | | | AC | | |
| 1EE-E115 | VITAL BATTERIES IN RACK (1B-SB) | 1 5 | X | X | X | X | X | RAB | X | | | X | | | X | | DC | | |
| 1EE-E087 | SOLID STATE BATTERY CHARGER (1B-SB) | 1 6 | X | X | X | X | X | RAB | X | | | | X | | X | | DC | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1EE-E094 | 7.5 KVA INVERTER CHANNEL III | 16 | | | | X | | RAB | X | | | | X | | X | | DC | | M |
| 1EE-E093 | 7.5 KVA INVERTER CHANNEL II | 16 | | | | X | | RAB | | | | | | | | | DC | | M |
| 1CH-E008 | CHILLER WATER PUMP P4 1B-SB | 5 | | X | | X | | RAB | X | X | | | X | | X | | ECW | | |
| 1AF-51 | ELECTRIC-HYDRAULIC VALVE | 7 | | X | X | X | | RAB | X | X | | | | | X | | AFW | | |
| 1SW-1055 | ELECTRIC MOTOR OPERATED VALVE | 8 | X | X | X | X | | RAB | X | | | | X | | X | | SWS | | |
| 1SW-1208 | ELECTRIC MOTOR OPERATED VALVE | 8 | X | X | X | X | | RAB | X | | | | X | | X | | SWS | | |
| 1CH-E005 | WATER CHILLER UNIT (WC-2) | 11 | X | X | X | X | X | RAB | X | X | | | X | | X | | ECW | | |
| FT-01AF-2050BSB | AFW FLOW TRANSMITTER FT-2050B | 18 | | X | | X | | RAB | X | X | | | X | | X | | AFW | | |
| FT-01CX-9429BSB | CHILLER FLOW TRANSMITTER | 18 | | X | | X | | RAB | X | | | | X | | X | | ECW | | |
| LT-01CS-0115SW | LEVEL LOW PRESS. SENSOR BELLOWS TO BOTTOM OF TANK | 18 | | | X | | | RAB | X | | | | X | | X | | CVC | | |
| PT-01MS-0475IIIW | STEAM GENERATOR PRESSURE TRANSMITTER PT-475 | 18 | | X | X | X | | RAB | X | | | | X | | X | | RCS | | |
| PT-01MS-0484IIW | STEAM GENERATOR PRESSURE TRANSMITTER PT-484 | 18 | | X | X | X | | RAB | X | | | | X | | X | | RCS | | |
| PT-01MS-0486IVW | STEAM GENERATOR PRESSURE TRANSMITTER PT-486 | 18 | | X | X | X | | RAB | X | | | | X | | X | | RCS | | |
| PT-01MS-0495IIIW | STEAM GENERATOR PRESSURE TRANSMITTER PT-495 | 18 | | X | X | X | | RAB | X | | | | X | | X | | RCS | | |
| 1CAB-A1-R23 | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 18 | X | X | X | X | | RAB | X | | | | X | | X | | RCS | | |
| 1CAB-A1-R24 | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 18 | X | X | X | X | | RAB | X | | | | X | | X | | RCS | | |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1CAB-A1-R28 | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 18 | | X | | X | | RAB | X | | | | X | | X | | AFW | | |
| LT-01CS-0106I | LEVEL TRANSMITTER - BORIC ACID TANK | 20 | X | | X | | | RAB | X | | | | X | | X | | EBS | | |
| 1CC-CCWB | COMPONENT COOLING WATER PUMP 1B-SB | 5 | X | X | X | X | X | RAB | X | X | | | X | | X | | CCW | | |
| 1AF-E005 | AFW STEAM-DRIVEN PUMP 1X-SAB | 5 | | X | | X | | RAB | X | X | | | X | | X | | AFW | | |
| 1A23-SA | MOTOR CONTROL CENTER 1A23-SA | 1 | X | X | X | X | X | DG | X | X | | | X | | X | | AC | | |
| 1EA-14 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | X | | X | | EDG | | |
| 1EA-15 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | X | | X | | EDG | | |
| 1EA-29 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | X | | X | | EDG | | |
| 1EA-45 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | X | | X | | EDG | | |
| 1EA-61 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | X | | X | | EDG | | |
| 1EA-30 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | | | X | | EDG | | |
| 1EA-46 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | | | X | | EDG | | |
| 1EA-60 | SOLENOID VALVE | 8 | X | X | X | X | X | DG | X | X | | | | | X | | EDG | | |
| 1DG-E036 | DIESEL A GENERATOR CONTROL PANEL, 1DG-E036 | 14 | X | X | X | X | X | DG | X | X | | | X | | X | | EDG | X | |
| 1SW-E041 | ESW STRAINER 1A-SA | 0 | | | | X | X | SW | | X | | X | X | | X | | ESW | | |
| 1A32-SA | MOTOR CONTROL CENTER 1A32-SA | 1 | | X | | X | | SW | X | X | | X | X | | X | | AC | X | |
| 1DG-E009 | DIESEL GENERATOR 1B-SB | 17 | X | X | X | X | X | DG | X | X | | | X | | X | | EDG | | |
| LS-01FO-2462ASA | DAY TANK LEVEL SWITCH HH | 18 | X | X | X | X | X | DG | X | | | | X | | X | | DFO | | |
| 1EA-E013 | DIESEL STARTING AIR TANK 1A-SA | 21 | X | X | X | X | X | DG | X | | | | X | | X | | EDG | | |
| 1DJO-E007 | DIESEL GENERATOR 1A-SA JACKET WATER COOLER | 21 | X | X | X | X | X | DG | X | | | | X | | X | | EDG | | |
| LT-01CT-0993IV | RWST LEVEL TRANSMITTER 1LT-993 | 18 | X | | X | X | X | TANK | | | X | | | X | | X | CVC | | M |
| PT-01RC-0445S | PRESSURE TRANSMITTER PT-445 | 18 | | X | | | X | CB | X | X | | | | X | X | | RCS | | |
| PT-01RC-0457III | PRESSURE TRANSMITTER PT-457 | 18 | | X | | | X | CB | X | X | | | | X | X | | RCS | | |

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| PT-01RC-0455I | PRESSURE TRANSMITTER PT-455 | 1 8 | | X | | | X | CB | X | X | | | | X | X | | RCS | | |
| 1CT-E038 | INSTRUMENT RACK "D" (RPS II) - PT-456 | 1 8 | X | | X | X | X | CB | X | X | | | | X | X | | RCS | | |
| FT-01CC-0689S | RHR HEAT EXCHANGER 1B-SB FLOW TRANSMITTER | 1 8 | | | | X | | RAB | X | | | | X | | X | | RHR | | M |
| PT-01AF-2150BSB | AFW PRESSURE TRANSMITTER PT-2150B | 1 8 | | X | | X | | RAB | X | | | | X | | X | | AFW | | |
| PT-01AF-2250ASA | PRESSURE TRANSMITTER | 1 8 | | X | | X | | RAB | X | | | | X | | X | | AFW | | |
| 1CAB-A1-R14 | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 1 8 | X | X | X | X | | RAB | | | | | X | | X | | AFW | | |
| 1CAB-A1-R29 | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 1 8 | | X | | X | | RAB | | | | | X | | X | | AFE | | |
| 1CAB-A1-R30 | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 1 8 | X | | | X | | RAB | | | | | X | | X | | CCW | | |
| TIS-01CC-0658BW | RHR HEAT EXCHANGER 1B-SB TEMP. SWITCH | 1 8 | | | | X | | RAB | X | | | | X | | X | | RHR | | |
| 1DFO-E002 | FUEL OIL TRANSFER PUMP | 5 | X | X | X | X | X | FO | X | X | | | X | | X | | DFO | | |
| LT-01CE-9010ASA | LEVEL TRANSMITTER (CST LEVEL) | 1 8 | | | | X | | TANK | | | | | X | | X | | AFW | | |
| 1CAB-A21-R17 | INSTRUMENT RACK FOR SAFE SHUTDOWN INSTRUMENTATION | 1 8 | X | | X | X | | TANK | X | | | | X | | X | | AFW | | |
| 1AF-19 | ELECTRIC-HYDRAULIC VALVE | 7 | | X | X | X | | RAB | X | X | | | | | X | | AFW | | |
| 1AF-34 | ELECTRIC-HYDRAULIC VALVE | 7 | | X | X | X | | RAB | X | X | | | | | X | | AFW | | |
| 1MS-G | ELECTRIC HYDRAULIC VALVE | 7 | X | X | X | X | | RAB | X | X | | | | | X | | MS | | |
| 1MS-058 | RELIEF VALVE OIL PUMP B | 5 | | | | X | | MST | X | X | | | | X | X | | MS | | |
| 1CS-E045 | BORIC ACID TRANSFER PUMP 1B-SB | 5 | X | | X | | | RAB | X | X | | | X | | X | | CVC | | |
| FT-01CS-0122SW | FLOW TRANSMITTER FT122 | 1 8 | X | | X | X | | RAB | X | | | | X | | X | | CVC | | |
| FT-01CC-0652SW | FLOW TRANSMITTER FT-652 | 1 8 | | X | | X | | RAB | | | | | X | | X | | CCW | | |

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| TIS-01CC-0658AW | RHR HEAT EXCHANGER 1A-SA TEMP.SWITCH | 18 | | | | X | | RAB | X | | | | X | | X | | RHR | X | |
| 1SW-E005 | ESW VERTICAL SUCTION PUMP A | 6 | X | X | X | X | X | SW | X | | | | X | | X | | ESW | | |
| 1CS-CSIPA:007 | CHARGING PUMP OIL COOLER | 21 | X | X | X | | | RAB | X | | | | X | | X | | SWS | | |
| 1CS-CSIPB:007 | CHARGING PUMP OIL COOLER | 21 | X | X | X | | | RAB | X | | | | X | | X | | SWS | | |
| 1AV-AH9B | AIR HANDLING UNIT 9 1B-SB | 10 | X | X | X | X | | RAB | X | | | | X | | X | | ECW | | |
| 1CC-CCWHXA | COMPONENT COOLING WATER HEAT EXCHANGER | 21 | | X | | X | | RAB | X | | | | X | | X | | CCW | | |
| 1B23-SB | MOTOR CONTROL CENTER 1B23-SB | 1 | X | X | X | X | X | DG | X | X | | | X | | X | | AC | | |
| DP-1B1-SB | DISTRIBUTION PANEL FOR VITAL DC 1B1-SB | 14 | X | X | X | X | X | DG | X | X | | | X | | X | | DC | | |
| 1DG-E035 | DIESEL B ENGINE CONTROL PANEL, 1DG-E035 | 14 | X | X | X | X | X | DG | X | X | | | X | | | | AC | | |
| 1A36-SA | MOTOR CONTROL CENTER 1A36-SA | 1 | X | X | X | X | X | RAB | X | X | | | X | | X | | AC | | |
| 1CZ-EA15B | AIR HANDLING UNIT 15 1B-SB | 10 | X | X | X | X | | RAB | | | | | X | | X | | ECW | | |
| FS-01CX-9429A1SA | CHILLER FLOW SWITCH | 18 | X | X | X | X | | RAB | X | | | | X | | X | | ECW | | |
| PS-01AF-2250A | PRESSURE SWITCH | 18 | | X | | X | | RAB | X | | | | X | | X | | AFW | | |
| PS-01AF-2250B | PRESSURE SWITCH | 18 | | X | | X | | RAB | X | | | | X | | X | | AFW | | |
| MCB-1AA | MAIN CONTROL BOARD | 18 | X | X | X | X | X | RAB | X | | | | X | | X | | MCB | X | |
| MCB-1C | MAIN CONTROL BOARD | 18 | X | X | X | X | X | RAB | X | | | | X | | X | | MCB | X | |
| 1IC-E003 | SOLID STATE PROTECTION CABINET B | 18 | X | X | X | X | X | RAB | X | | | | X | | X | | PPS | | |
| 1DFO-E007 | DIESEL GENERATOR FUEL OIL DAY TANK | 21 | X | X | X | X | X | DG | X | | | | X | | X | | DFO | | |
| 1EA-E014 | DIESEL STARTING AIR TANK 1B-SA | 21 | X | X | X | X | X | DG | X | | | | X | | X | | EDG | | |

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| 1DFO-E006 | DIESEL GENERATOR FUEL OIL DAY TANK | 2<br>1 | X | X | X | X | X | DG | X | | | | X | | X | | DFO | | |
| 1EA-E016 | AIR RECEIVER 1D-SB | 2<br>1 | X | X | X | X | | DG | X | X | | | | | X | | EDG | | |
| 1EA-E015 | AIR RECEIVER 1C-SB | 2<br>1 | X | X | X | X | | DG | X | X | | | | | X | | EDG | | |
| 1EA-50 | CHECK VALVE | 0 | X | X | X | X | | DG | X | X | | | | | X | | EDG | | N |
| 1EA-35 | CHECK VALVE | 0 | X | X | X | X | | DG | X | X | | | | | X | | EDG | | N |
| 1EA-19 | CHECK VALVE | 0 | X | X | X | X | | DG | X | X | | | | | X | | EDG | | N |
| 1EA-4 | CHECK VALVE | 0 | X | X | X | X | | DG | X | X | | | | | X | | EDG | | N |

# Attachment 3: Base List 2

**8 pages**

| Generic ID | Feature |
|---|---|
| SF-S3SA-KGB | FUEL POOL COOLING TRAIN A |
| SF-B7SA-1 | 3SF-B7SA-1&4 |
| 2SF-47-LD2 | FT-32SF-5100AS |
| SF-D15SA-KFU | FUEL POOL STRAINER 2A-SA |
| SF-V48SA-KFS | FPC PUMP SUCTION FROM "D" POOL VENT |
| SF-V48SA-KBD | NFP SUPPLY TO "A" TRAIN VENT |
| SF-D233 | SFP TO A TRAIN VENT |
| SF-D232 | NFP AND SFP TO B TRAIN VENT |
| SF-D231 | NEW FUEL POOL TO B TRAIN VENT |
| SF-D230 | FUEL POOL COOLING SUPPLY TO PURIF SYS VENT |
| SF-D21SB-KFS | 2&3B-SB FPC PUMP CASING |
| SF-D21SB-KBD | 1&4B-SB FUEL POOL COOLING PMP CASING |
| SF-D201SB-KFS | FUEL POOL 2&3B-SB HEAT EXCHANGER TUBE SIDE |
| SF-D201SB-KBD | FUEL POOL 1&4B-SB HEAT EXCHANGER TUBE SIDE |
| SF-D199SA-KFS | 2&3A-SA FUEL POOL HEAT EXCHANGER TUBE SIDE |
| SF-D199SA-KBD | 1&4A-SA HEAT EXCHANGER TUBE SIDE |
| SF-D19SA-KFS | 2&3A-SA FPC PMP CASING |
| SF-D19SA-KBD | FPC PUMP 1&4A-SA CASING VENT |
| SF-S4SB-KGB | FUEL POOL COOLING TRAIN B |
| SF-S4SB-BRP | FUEL POOL COOLING TRAIN B |
| SF-S3SA-BRP | FUEL POOL COOLING TRAIN A |
| SF-V4SN-2 | 3SF-V4SN-2&3 |
| SF-V4SN-1 | 3SF-V4SN-1&4 |
| SF-B9SA-2 | 3SF-B9SA-2&3 |
| SF-B9SA-1 | 3SF-B9SA-1&4 |
| SF-B8SB-2 | 3SF-B8SB-2&3 |
| SF-B8SB-1 | 3SF-B8SB-1&4 |

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| SF-B7SA-2 | 3SF-B7SA-2&3 |
| SF-B6SB-2 | 3SF-B6SB-2&3 |
| SF-B6SB-1 | 3SF-B6SB-1&4 |
| SF-B5SA-2 | 3SF-B5SA-2&3 |
| SF-B5SA-1 | 3SF-B5SA-1&4 |
| SF-B4SB-2 | 3SF-B4SB-2&3 |
| SF-B4SB-1 | 3SF-B4SB-1&4 |
| SF-B30SB-2 | 3SF-B30SB-2&3 |
| SF-B30SB-1 | 3SF-B30SB-1&4 |
| SF-B3SA-2 | 3SF-B3SA-2&3 |
| SF-B3SA-1 | 3SF-B3SA-1&4 |
| SF-B29SA-2 | 3SF-B29SA-2&3 |
| SF-B29SA-1 | 3SF-B29SA-1&4 |
| SF-B28SA-2 | 3SF-B28SA-2&3 |
| SF-B28SA-1 | 3SF-B28SA-1&4 |
| SF-B26SA-2 | 3SF-B26SA-2&3 |
| SF-B26SA-1 | 3SF-B26SA-1&4 |
| SF-B25SB-2 | 3SF-B25SB-2&3 |
| SF-B25SB-1 | 3SF-B25SB-1&4 |
| SF-B24SB-2 | 3SF-B24SB-2&3 |
| SF-B24SB-1 | 3SF-B24SB-1&4 |
| SF-B22SA-2 | 3SF-B22SA-2&3 |
| SF-B22SA-1 | 3SF-B22SA-1&4 |
| SF-B21SB-2 | 3SF-B21SB-2&3 |
| SF-B21SB-1 | 3SF-B21SB-1&4 |
| SF-B20SA-2 | 3SF-B20SA-2&3 |
| SF-B20SA-1 | 3SF-B20SA-1&4 |
| SF-B2SB-2 | 3SF-B2SB-2&3 |
| SF-B2SB-1 | 3SF-B2SB-1&4 |

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| SF-B19SA-2 | 3SF-B19SA-2&3 |
| SF-B19SA-1 | 3SF-B19SA-1&4 |
| SF-B18SB-2 | 3SF-B18SB-2&3 |
| SF-B18SB-1 | 3SF-B18SB-1&4 |
| SF-B17SA-2 | 3SF-B17SA-2&3 |
| SF-B17SA-1 | 3SF-B17SA-1&4 |
| SF-B16SN-2 | 3SF-B16SN-2&3 |
| SF-B16SN-1 | 3SF-B16SN-1&4 |
| SF-B15SB-2 | 3SF-B15SB-2&3 |
| SF-B15SB-1 | 3SF-B15SB-1&4 |
| SF-B11SN-2 | 3SF-B11SN-2&3 |
| SF-B11SN-1 | 3SF-B11SN-1&4 |
| SF-B10SB-2 | 3SF-B10SB-2&3 |
| SF-B10SB-1 | 3SF-B10SB-1&4 |
| SF-B1SA-2 | 3SF-B1SA-2&3 |
| SF-B1SA-1 | 3SF-B1SA-1&4 |
| 1&4A33-SA-2C | FUEL POOL COOLING PUMP 2&3A-SA |
| 1&4B33-SB-4C | FUEL POOL COOLING PUMP 2 & 3B-SB |
| 1&4B33-SB-2D | SPENT FUEL COOLING PUMP 1&4B-SB |
| 1&4A33-SA-4D | SPENT FUEL COOLING PUMP 1&4A-SA |
| FU1/2064 | CONTROL FUSE MCC 1&4A33-SA-2C |
| 1&4B33-SB-4C | FUEL POOL COOLING PUMP 2&3B-SB |
| 1&4B33-SB-39 | FUEL POOL COOLING PUMP 2&3B-SB SPACE HEATER |
| 1&4B33-SB-37 | 1&4B-SB PUMP MOTOR-HEATER |
| 1&4B33-SB-2D | SPENT FUEL POOL COOLING PUMP 1&4B-3B |
| 1&4A33-SA-4D | SPENT FUEL POOL COOLING PUMP 1&4A-SA |
| 1&4A33-SA-39 | 2&3A-SA PUMP MOTOR HEATER |
| 1&4A33-SA-37 | 1&4A-SA PUMP MOTOR-HEATER |
| 1&4A33-SA-2C | SPENT FUEL POOL COOLING PUMP 2&3A-SA |

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| FU1/2065 | CONTROL FUSE MCC 1&4B33-SB-4C |
| 1&4B-SB | 1&4B-SB FUEL POOL COOLING PUMP |
| 2&3B-SB | 2&3B-SB FUEL POOL COOLING PUMP |
| 2&3A-SA | 2&3A-SA FUEL POOL COOLING PUMP |
| 1&4A-SA | 1&4A-SA FUEL POOL COOLING PUMP |
| 2&3B-SB | FUEL POOL COOLING PUMP 2&3B-SB MOTOR |
| 2&3A-SA | FUEL POOL COOLING PUMP 2&3A-SA MOTOR |
| 1&4B-SB | FUEL POOL COOLING PUMP 1&4B-SB MOTOR |
| 1&4A-SA | FUEL POOL COOLING PUMP 1&4A-SA MOTOR |
| FT-5100B-KGI | FUEL POOL D INLET FLOW |
| PDS-5130B-2 | FP COOLING PUMP 2&3B SUCTION STRAINER DP |
| PDS-5130B | SF-S4SB STRAINER |
| PDS-5130A-2 | FP COOLING PUMP 2&3A SUCTION STRAINER DP |
| PDS-5130A | SF-S3SA STRAINER |
| PI-5130B-2 | FP COOLING PUMP 2&3B DISCH PRESS |
| PI-5130B | 1&4B-SB PUMP OUTLET |
| PI-5130A-2 | FP COOLING PUMP 2&3A DISCH PRESS |
| PI-5130A | 1&4A-SA PUMP OUTLET |
| TY/5110B2 | SFP-1 TEMP CHANNEL B |
| TY/5110B1 | SFP-1 TEMP CHANNEL B |
| TY/5110A2 | SFP-1 TEMP CHANNEL A |
| TY/5110A1 | SFP-1 TEMP CHANNEL A |
| TY/5100B2 | NFP-1 TEMP CHANNEL B |
| TY/5100B1 | NFP-1 TEMP CHANNEL B |
| TY/5100A2 | NFP-1 TEMP CHANNEL A |
| TY/5100A1 | NFP-1 TEMP CHANNEL A |
| TT-5110B-2 | SFP C TEMP TRAIN B |
| TT-5110B | SFP-1 TEMP TRAIN B |
| TT-5110A-2 | SFP C TEMP TRAIN A |

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|---|---|
| TT-5110A | SFP-1 TEMP TRAIN A |
| TT-5100B-2 | SFP D TEMP TRAIN B |
| TT-5100B | NFP-1 TEMP TRAIN B |
| TT-5100A-2 | SFP D TEMP TRAIN A |
| TT-5100A | NFP-1 TEMP TRAIN A |
| TD/5110A | SFP-1 TEMP |
| TD/5100A | NFP-1 TEMP |
| FT-5110B-KGI | FUEL POOL C INLET FLOW |
| FT-5110B-KEH | SFP-1 SUPPLY TRAIN B |
| FT-5110A-KGI | FUEL POOL C INLET FLOW |
| FT-5110A-KEH | SFP-1 SUPPLY TRAIN A |
| FT-5100B-KEH | NFP-1 SUPPLY TRAIN B INLET FLOW UNIT 1&4 |
| FT-5100A-KGI | FUEL POOL D INLET FLOW |
| FT-5100A-KEH | NFP-1 SUPPLY TRAIN A INLET FLOW UNIT 1&4 |
| FI-5110B-2 | FP COOLING PMP 2&3B-SB DISCHARGE FLOW INDICATOR |
| FI-5110B | SFP COOLING PMP 1&4B-SB DISCHARGE FLOW INDICATOR |
| FI-5110A-2 | FP COOLING PUMP 2&3A-SA DISCHARGE FLOW INDICATOR |
| FI-5110A | SFP COOLING PMP 1&4A-SA DISCHARGE FLOW INDICATOR |
| TS-5110B-2 | SFP C TEMP HI |
| TS-5110B | SPENT FUEL POOL TEMP HI |
| TS-5110A-2 | SFP C TEMP HI |
| TS-5110A | SPENT FUEL POOL TEMP HI |
| TS-5100B-2 | SFP D TEMP HI |
| TS-5100B | NEW FUEL POOL TEMP HI |
| TS-5100A-2 | SFP D TEMP HI |
| TS-5100A | NEW FUEL POOL TEMP HI |
| TE-5170B-KGG | 2&3B-SB HX OUTLET |
| TE-5170B-KEF | 1&4B-SB HX OUTLET |
| TE-5170A-KGG | 2&3A-SA HX OUTLET |

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| TE-5170A-KEF | 1&4A-SA HX OUTLET |
| TE-5160B-KGG | 2&3B-SB HX INLET |
| TE-5160B-KEF | 1&4B-SB HX INLET |
| TE-5160A-KGG | 2&3A-SA HX INLET |
| TE-5160A-KEF | 1&4A-SA HX INLET |
| TE-5110B-KGG | SPENT FUEL POOL C TEMP |
| TE-5110B-KEF | SPENT FUEL POOL TEMP |
| TE-5110A-KGG | SPENT FUEL POOL C TEMP |
| TE-5110A-KEF | SPENT FUEL POOL TEMP |
| TE-5100B-KGG | SPENT FUEL POOL D TEMP |
| TE-5100B-KEF | NEW FUEL POOL TEMP |
| TE-5100A-KGG | SPENT FUEL POOL D TEMP |
| TE-5100A-KEF | NEW FUEL POOL TEMP |
| FE-5110B-KGH | SFP C 2 SUPPLY TRAIN B INLET FLOW UNIT 2&3 |
| FE-5110B-KEG | SFP-1 SUPPLY TRAIN B INLET FLOW UNIT 1&4 |
| FE-5110A-KGH | SFP C SUPPLY TRAIN A INLET FLOW UNIT 2&3 |
| FE-5110A-KEG | SFP-1 SUPPLY TRAIN A INLET FLOW UNIT 1&4 |
| FE-5100B-KGH | SFP D SUPPLY TRAIN B INLET FLOW UNIT 2&3 |
| FE-5100B-KEG | NFP-1 SUPPLY TRAIN B INLET FLOW UNIT 1&4 |
| FE-5100A-KGH | SFP D SUPPLY TRAIN A INLET FLOW UNIT 2&3 |
| FE-5100A-KEG | NFP-1 SUPPLY TRAIN A INLET FLOW UNIT 1&4 |
| PT-5140A | 1&4A-SA PUMP OUTLET |
| LS-5100A1SA | NEW FUEL POOL UNIT #1 HI LVL PART OF L S 5100ASA |
| CR4/2058 | SPENT FUEL POOL D LEVEL ALARM |
| CR4/2056 | SPENT FUEL POOL D WATER LEVEL ALARM |
| CR4/2054 | SPENT FUEL POOL C WATER LEVEL ALARM |
| CR4/2052 | SPENT FUEL POOL C WATER LEVEL ALARM INDICATION |
| CR2/904 | FUEL POOL COOLING PUMP 1&4A-SA |
| CR2/2065 | FUEL POOL COOLING PUMP 2&3B-SB STATUS |

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|---|---|
| CR2/2064 | FUEL POOL COOLING PMP 2&3A-SA STATUS |
| CR2/2058 | SPENT FUEL POOL D LEVEL ALARM |
| CR2/2057 | SPENT FUEL POOL D WATER LEVEL ALARM |
| CR2/2056 | SPENT FUEL POOL D WATER LEVEL ALARM |
| CR2/2055 | SPENT FUEL POOL D INSTRUMENTATION |
| CR2/2054 | SPENT FUEL POOL C WATER LEVEL ALARM |
| CR2/2053 | SPENT FUEL POOL C WATER LEVEL ALARM INDICATION |
| CR2/2052 | SPENT FUEL POOL C WATER LEVEL ALARM INDICATION |
| CR2/2051 | SPENT FUEL POOL INSTRUMENTATION |
| CR1/904 | FUEL POOL COOLING PUMP 1&4A-SA |
| CR1/2065 | FUEL POOL COOLING PUMP 2&3B-SB STATUS |
| CR1/2064 | FUEL POOL COOLING PMP 2&3A-SA STATUS |
| CR1/2055 | SPENT FUEL POOL D INSTRUMENTATION |
| CR1/2051 | SPENT FUEL POOL INSTRUMENTATION |
| PT-5140B-2 | FP COOLING HEADER 2&3B PRESS |
| PT-5140B | 1&4B-SB PUMP OUTLET |
| PT-5140A-2 | FP COOLING HEADER 2&3A PRESS |
| LS-5110B3 | SPENT FP UNIT #1 LO-LO LVL PART OF LS-5110BSB |
| LS-5110B2 | SPENT FUEL POOL UNIT #1 LO LVL PART OF LS-5110BSB |
| LS-5110B1 | SPENT FUEL POOL UNIT #1 HI LVL PART OF LS-5110BSB |
| LS-5110B-2 | FUEL POOL C LEVEL |
| LS-5110B | SPENT FUEL POOL UNIT 1 |
| LS-5110A3 | SPENT FP UNIT #1 LO-LO LVL PART OF LS-5110ASA |
| LS-5110A2 | SPENT FUEL POOL UNIT #1 LO LVL PART OF LS-5110ASA |
| LS-5110A1 | SPENT FUEL POOL UNIT #1 HI LVL PART OF LS-5110ASA |
| LS-5110A-2 | FUEL POOL C LEVEL |
| LS-5110A | SPENT FUEL POOL UNIT 1 |
| LS-5100B3SB | NEW FUEL POOL UNIT#1 LO-LO LVL PART OF L S 5100BSB |
| LS-5100B2SB | NEW FUEL POOL UNIT #1 LO LVL PART OF L S 5100BSB |

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|---|---|
| LS-5100B1SB | NEW FUEL POOL UNIT #1 HI LVL PART OF L S 5100BSB |
| LS-5100B-2 | FUEL POOL D LEVEL |
| LS-5100B | NEW FUEL POOL UNIT 1 |
| LS-5100A3SA | NEW FUEL POOL UNIT#1 LO-LO LVL PART OF L S 5100ASA |
| LS-5100A2SA | NEW FUEL POOL UNIT #1 LO LVL PART OF L S 5100ASA |
| LS-5100A-2 | FUEL POOL D LEVEL |
| LS-5100A | NEW FUEL POOL UNIT 1 HI LVL |
| CS-905SB | FPCP 3SF-E010 (1&4B-SB) PUMP MOTOR |
| CS-904SA | FPCP 3SF-E009 (1&4A-SA) PUMP MOTOR |
| CS-2065SB | FPCP 3SF-E012(2&3B-SB) PUMP MOTOR |
| CS-2064SA | FPCP 3SF-E011(2&3A-SA) PUMP MOTOR |
| 1&4A-SA | UNIT 1 TRAIN A |
| 2&3B-SB | UNIT 2 TRAIN B |
| 2&3A-SA | UNIT 2 TRAIN A |
| 1&4B-SB | UNIT 1 TRAIN B |

# Attachment 4: Rapid Drain-Down List

1 page

| Unique Equipment ID TAG # | Feature |
|---|---|
| 1SF-146 | UNIT 1 FUEL XFER CANAL EAST DRAIN ISOL |
| 1SF-147 | UNIT 1 FUEL XFER CANAL WEST DRAIN ISOL |
| 2SF-146 | UNIT 2 FUEL XFER CANAL EAST, DRAIN TO PURIFICATION SYSTEM |
| 2SF-147 | UNIT 2 FUEL XFER CANAL WEST, DRAIN TO PURIFICATION SYSTEM |

# Attachment 5: SWEL 2

# 1 page

| Unique Equipment ID TAG # | Feature | Building | Rapid Drain Down |
|---|---|---|---|
| 3SF-E007 | FUEL POOL COOLING TRAIN A | FHB | |
| PT-41SF-5140AS | 1&4A-SA PUMP OUTLET | FHB | |
| 3SF-E010 | 1&4B-SB FUEL POOL COOLING PUMP | FHB | |
| 1SF-39 002 | 3SF-B7SA-1&4 | FHB | |
| LS-01SF-5100A1SA | NEW FUEL POOL UNIT #1 HI LVL PART OF L S 5100ASA | FHB | |
| 2SF-47-LD2 | FT-32SF-5100AS | FHB | |
| 3SF-E001 | UNIT 1 TRAIN A | FHB | |
| FT-32SF-5100BS | FUEL POOL D INLET FLOW | FHB | |
| 1SF-146 | UNIT 1 FUEL XFER CANAL EAST DRAIN ISOL | FHB | X |
| 1SF-147 | UNIT 1 FUEL XFER CANAL WEST DRAIN ISOL | FHB | X |
| 2SF-146 | UNIT 2 FUEL XFER CANAL EAST, DRAIN TO PURIFICATION SYSTEM | FHB | X |
| 2SF-147 | UNIT 2 FUEL XFER CANAL WEST, DRAIN TO PURIFICATION SYSTEM | FHB | X |
| FU1/2065 | CONTROL FUSE MCC 1&4B33-SB-4C | FHB | |
| 1&4B33-SB-4C | FUEL POOL COOLING PUMP 2&3B-SB | FHB | |

# Attachment 8: Peer Review Report

## 5 Pages

# Shearon Harris Nuclear Power Plant Seismic Walkdown Peer Review Report

Peer Review activities were performed on the Seismic Walkdown Program in addition to the Programmatic Controls / Oversight that were established for the project. A brief description of the Programmatic Controls / Oversight and Peer Review findings is provided below:

## Programmatic Controls / Oversight

Programmatic Controls / Oversight were developed for the 2.3 Seismic Walkdowns and implanted at Shearon Harris Nuclear Plant (HNP). A specification based on the EPRI guidance was established to control SWEL development and walkdown requirements. A specification was developed since EPRI 1025286 was written as guidance, whereas, the specification provided more definitive criteria and control to avoid interpretation and promote consistency. The specification was inclusive of the EPRI guidance. A Quality Assurance (QA) person was present at the site during the inspection to assure form and specification compliance. Technical oversight was performed by the Project Manager (PM). The PM was onsite during the SWEL development and intermittently during the walkdowns and report generation phases of the project. An in-process review of work was performed during those intervals. Inspections at the four sites were being performed concurrently and lessons learned were relayed to the inspection teams at the other sites to determine if commonality was present within the fleet. These in-process reviews were performed through all phases of the project with the intent of meeting the intent of the EPRI guidance.

## Peer Review

Separate from the programmatic controls implemented at the sites, Peer Review activities were performed on the seismic walkdown program that spanned from the development of the specification and Seismic Walkdown Equipment List (SWEL) through the physical walkdowns and ultimately to the report preparation and review. The Peer Review team concluded that the inspection program was performed in accordance with the guidance provided in EPRI 1025286, Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic, dated June, 2012. The Peer Review found the effort at HNP was performed in a competent manner and a very broad spectrum of components located throughout the power block were included in the program. The results were documented into Duke (Progress Legacy) EC 87910/URS Study 30703-061-13-05-100-003. Aspects of the program that were reviewed by the Peer Review justifying this statement are provided as follows:

*Inspection Team*

The Peer Review found Seismic Walkdown Engineers (SWE) performing the inspections were very experienced with a background in design engineering including seismic design at nuclear facilities dating back to design of the first generation nuclear power plants. SWEs had prior seismic walkdown experience at operating nuclear power plants, Department of Energy facilities, and other pertinent applications. Training consistent with the EPRI training was provided to all SWEs before any inspections were performed. The resumes of the SWEs were reviewed and it was determined that the SWEs were found to have qualifications that were consistent with the requirements of the regulatory guidance.

*Selection of SWEL Items*

The Peer Review concluded the process used to select SWEL items included both selected and diverse aspects. The list of equipment was obtained from the A-46 Safe Shutdown Equipment List (SSEL) and the appropriate screening filters identified in the EPRI guidance were applied. The number of items included in the SWEL represented an appropriate number of items in each equipment class when compared to the total number of items on the SSEL. The items that were individually selected typically were items that would have the most severe consequence in the event that the target item were to fail during the seismic event and resulted in components associated with the Emergency Diesel Generators, vital power, and heat removal systems, etc. being well represented. Other conditions given additional consideration included environmental and distribution into diverse structures, while items that are typically not included in programmatic inspections, (e.g. AOV, MOV, Appendix R, ASME Section XI Subsection IWE/IWL), were minimized. The process used to determine the SWEL items was determined to be in accordance with the EPRI guidance and adequately represents a diverse sample of the equipment required to perform the five safety functions.

The Peer Review confirmed site Operations experience was included in the review of the components to assure a representative distribution of equipment was included in the SWEL. Operations also performed preliminary walkdowns to determine if the components could be safely accessed. A selection/substitution criterion was established before the items were assessed and if items were judged inaccessible, then the substitution criteria was used. The Peer Review interviewed the personnel making the equipment selections and operations personnel to confirm an acceptable approach was used in selecting the equipment for sampling.

A sample of modifications performed at the site since the last IPEEE/A-46 inspection, previous IPEEE outliers, and upgrades were reflected in the SWEL.

The SWEL contained 100 components in SWEL-1 and an additional 14 items in SWEL-2 totaling 114 selected items which was within the recommended range of 90-120 items. The SWEL was taken from the IPEEE SSEL. The number of items inspected at the site is within the guidelines provided by EPRI.

The process used to select the SWEL items, inclusion of Operations Personnel into the selection of the items, IPEEE outliers and modifications were represented in the SWEL and the number and distribution of items was in accordance with the EPRI guidance and confirmed by the Peer Review utilizing the Peer Review Checklist for the SWEL.

*Pre-Inspection Preparation*

Peer Review was performed on the pre-inspection prepared walkdown packages which consisted of general configuration and structural drawings, anchorage detailing, and seismic demand on the anchorage and it was confirmed that these packages were available in the field during the inspection. The inspection packages were reviewed for thoroughness to the criteria and samples were selected to determine appropriateness of the information. At random intervals during the walkdown phase of the project, the SWEs were questioned to determine if they had been adequately prepared and specifically, they were questioned to determine if they knew the vertical and horizontal strong motion demand in the areas that they would be working. Additional instructions were provided during these intermediate assessments to affect subsequent inspections. The SWEs demonstrated that they had adequately prepared for the inspections prior to entering the field.

*Conduct of Inspections*

The Peer Review concluded the SWEs conducted field inspections with the walkdown packages "in-hand." The Seismic Walkdown Checklist (SWC) and Area Walk-By Checklist (AWC) were physically used in the field and place keeping practices were employed. The SWEL items were inspected; the forms were filled out in the field, and were reviewed by the SWEs before they left the area. As a result of conversations with the SWEs and Peer Review observations during the inspections, it was concluded that pertinent and thorough conversations occurred between the SWEs in the field to generally reach a consensus on a real time basis in the field.

The inspections were performed in accordance with the EPRI guidance and within the confines of the controlling specification.

*Review of Walkdown and Area Walk-By Checklist*

The peer reviewers discussed the inspections with the SWEs prior to field implementation and sampled field reports during the inspections to determine adequacy of the inspection. The SWEs were asked to describe the encountered field conditions and the forms were reviewed to determine if the information was representative. The checklist was used predominately with hand written notes being used judiciously to reflect conditions. Intermediate guidance resulting from the reviews during the inspection process was provided.

The final documents (i.e., package including checklist, photographs, drawings, notes) were compared to the field notes with the QA representative reviewing 100% of the forms and the Peer Review reviewing over 30% of the forms. As a result of the Peer Review, there were some instances that required the SWE to obtain and/or delineate additional information in the

walkdown packages. Once incorporated, the information presented on the forms was considered consistent with specification requirements and were judged representative of the field conditions.

*Decisions for Entering Potential Adverse Seismic Conditions (PASCs) into CAP Process*

The Peer Review concluded the identification of potential SSCs placed into the CAP process was in accordance with the controlling walkdown specification. The specification decision process delineated if items were to be initiated in CAP immediately or if they were to be evaluated in accordance with the NTTF 2.3 Seismic program. Site documentation, (e.g. original A-46/IPEEE inspection results, existing CAP Non-Conforming Record (NCRs), calculations, evaluations, etc.), was reviewed if the SWEs could not make an immediate acceptance determination. If the item was originally evaluated and marked as Unknown for PASC determination on the walkdown checklist and additional research did not yield a qualification of the existing condition, an NCR would be initiated and the item identified as a PASC. If additional information was located and the SWEs agreed on the status, the field notes were updated to reflect the acceptable condition. This was represented on the final walkdown and/or walk-by checklists, and no NCR would have been generated. The field notes were reviewed and evidence of documenting additional information was observed. No PASCs were identified at Harris.

The Peer Review concluded that the process for evaluating identified issues in the field to determine if they were PASCS was in accordance with the EPRI guidance. No PASCs were identified at Harris, therefore no Licensing Basis Reviews were performed.

*Review of Licensing Basis*

A Peer Review of the developed licensing basis evaluations, including the decision for entering potentially adverse seismic conditions into HNP's CAP, was performed and found to be acceptable.

*Review of Submittal Report*

The Peer Review reviewed the submittal report and it was found to be consistent with the information provided in the inspection reports and the supporting documentation and met the objectives and requirements of the 50.54(f) letter.

**Summary**

The Peer Review concluded the program was controlled and performed in accordance with the guidance outlined in EPRI 1025286, Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic. The number of items in the SWEL met and exceeded the minimum requirements and was distributed appropriately among the various criteria. The types of issues encountered were appropriate for the seismic demand for the site. Several significant modifications have been made at the site and these improvements were included in the component sampling.

The HNP site is a relatively later vintage nuclear site and it was the general impression of the SWEs that maintenance was being performed at the site and as a rule the site was conducting site work in accordance with the Station's Housekeeping procedures.

In conclusion, the Peer Review found the personnel involved in the inspections had sufficient knowledge of the site before the inspections and inspected the SWEL items in accordance with provided guidance. The conditions encountered and the degree of severity of the conditions indicates that HNP is conducting its maintenance and modification programs with consideration of seismic requirements.

The performed inspections and assessments were conducted in accordance with the guidance provided in EPRI 1025286, Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic. The results were assessed to be reasonable and consistent and consistent with seismic demand for the region.

ENCLOSURE 2
REPORT REVIEW BY SITE MANAGEMENT

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400
RENEWED LICENSE NO. NPF-63

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO.1 RESPONSE TO RECOMMENDATION 2.3 SEISMIC WALKDOWN OF THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

1 Page

# Report Review by Site Management

This submittal report is provided to the Nuclear Regulatory Commission in response to its request for information. Specifically, by letter dated March 12, 2012, the Staff requested licensees to provide information regarding Recommendation 2.3 (Seismic) of the Near-Term Task Force Review of insights from the Fukushima Dai-Ichi Accident. The report provides information for the Shearon Harris Nuclear Power Plant, Unit No. 1 regarding the performance of seismic walkdowns to identify and address degraded, non-conforming or unanalyzed conditions and to verify the current plant configuration with the current seismic licensing basis. The information provided herein and the activities described in this report are consistent with the guidance provided by the Electric Power Research Institute's (EPRI) 2012 Technical Report 1025286 titled "Seismic Walkdown Guidance For Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic."

The signatures below document site management review of this document:

| Signatures | Date |
|---|---|
| Harris Fukushima Seismic Lead<br>Mike Weber / | 11/26/12 |
| Harris Seismic Engineer<br>Alex Holder / | 11/26/12 |
| Harris Design Engineering Supervisor<br>PAT CHRISCOE / | 11/26/12 |

Additionally, the Walkdown Report is submitted under cover letter signed by senior site management.