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Revision 0

January 2014

Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1 - Supplemental Information

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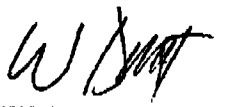
Rolando Perez *
Risk Applications & Methods II



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January 2014

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REVISION LOG

Rev	Date	Revision Description
Rev. 0	1/2014	Supplement 1 includes the main body of WCAP-17679-NP, Rev. 0 (Reference 48, "Executive Summary" through "References") and new or revised content in the appendices that address the conduct and results of the follow-on walkdown activities performed during and following refueling outage 1R17. Revision bars are used in the main body to easily identify the updates. With the exception of Appendices A and B, revision bars are utilized in the appendices to identify the updates relative to the corresponding appendices of WCAP-17679-NP, Rev. 0. Note that Appendices A and B consist of the completed checklists resulting from the follow-on walkdowns and one original SWC (1JRMNB04) that required editorial correction. Editorial and formatting corrections relative to WCAP-17679-NP, Rev. 0 are not identified with individual revision bars in this document. Supplement 1 corrects an error contained in the second paragraph of Section 6.4 regarding potentially adverse seismic conditions entered into the plant's CAP.

Executive Summary

Following the March 2011 accident at the Fukushima Dai-ichi nuclear plant, the Nuclear Regulatory Commission (NRC or Commission) established the Near-Term Task Force (NTTF) in response to Commission direction. The NTTF made several recommendations, some of which are related to improving the protection of nuclear power plants against natural phenomena. With recommendation 2.3 (Rec 2.3), the NTTF recommended the NRC require licensees to perform seismic and flooding walkdowns to identify and address vulnerabilities and verify the adequacy of hazard protection features. On March 12, 2012, the NRC issued a letter, pursuant to 10 CFR 50.54(f), that requests information from all power reactor licensees related to NTTF recommendations 2.1, 2.3 and 9.3. For the seismic aspect of Rec 2.3, licensees are required to perform Seismic Walkdowns to verify the current plant configuration with the current seismic licensing basis, verify the adequacy of current strategies and maintenance plans, and identify and address degraded, non-conforming, or unanalyzed conditions. This report contains the Arizona Public Service Company (APS) response for Palo Verde Nuclear Generating Station (PVNGS) Unit 1 to the request for information related to the seismic aspects of NTTF Rec 2.3, as addressed in enclosure 3 of the NRC letter.

The original version of this WCAP report summarizes the results from the at-power Seismic Walkdowns and Area Walk-Bys performed from July 30 through August 6, 2012. Supplement 1 incorporates the results from the additional walkdowns performed during and after refueling outage 1R17, from April 6 through April 7, 2013, and on April 30, 2013.

To establish a consistent methodology for performance of the Seismic Walkdowns, the Electric Power Research Institute (EPRI), in conjunction with the industry, developed guidance in EPRI Technical Report TR-1025286. This guidance was endorsed by the NRC on May 31, 2012. The Seismic Walkdowns conducted at PVNGS Unit 1 conform to the requirements of the EPRI Technical Report. Consistent with the guidance, the following topics are addressed in this PVNGS Unit 1 Seismic Walkdown report:

1. Seismic Licensing Basis for Seismic Category I Structures, Systems, and Components (SSCs)
2. Personnel Qualifications
3. Process used for selection of SSCs
4. Seismic Walkdowns and Area Walk-Bys
5. Licensing Basis Evaluations
6. Peer Review
7. IPEEE Vulnerabilities Resolution Report

The required Seismic Walkdowns and Area Walk-Bys were performed for accessible equipment in PVNGS Unit 1 during the period from July 30 through August 6, 2012, while the plant was operating in Mode 1. Inaccessible equipment (containment building and energized high-voltage equipment) are identified in the PVNGS Unit 1 Seismic Walkdown Report and walkdowns were conducted during the Unit 1 refueling outage, 1R17, from April 6 through April 7, 2013, and afterward on April 30, 2013. Also during 1R17, supplemental inspections of electrical cabinets were performed in accordance with the NRC response to industry frequently asked question 4.20. In addition, Area Walk-Bys were completed, as required, during these follow-on activities. Documentation of these additional inspections and the related evaluations is provided in this supplemental report.

The following information identifies the requests in the 50.54(f) letter (in italics) followed by a summary of the APS response:

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

The PVNGS current Seismic Licensing Basis (seismic codes, standards, and methods) is documented in report Section 1 and was used to inform the Seismic Walkdown licensing basis evaluations.

b. *Information related to the implementation of the walkdown process.*

The approach used to implement the Seismic Walkdown process at PVNGS conforms to the guidance of EPRI Technical Report TR-1025286. Report Sections 3 through 5 provide detailed descriptions of how the walkdown process was implemented at PVNGS.

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

No plant-specific seismic vulnerabilities were identified at PVNGS Unit 1 by the Individual Plant Examination of External Events (IPEEE) program. The results of the IPEEE program are described in report Section 7.

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

The summary of the key findings of the Seismic Walkdowns and Area Walk-Bys is provided in report Section 4. The licensing basis evaluations of potentially adverse seismic conditions and their resolutions are described in detail in Section 5 and Appendix D of this report. A total of 38 licensing basis evaluations have been satisfactorily closed and seven open evaluations have been entered into the PVNGS Corrective Action Program (CAP) for resolution. Items entered into the CAP are annotated in Appendix D. None of these identified conditions prevent the equipment from performing the intended safety functions during or after a design basis seismic event. Results of the Seismic Walkdowns and Area Walk-Bys are documented on EPRI TR-1025286 checklists in report Appendices A and B, respectively.

e. *Any planned or newly installed protection and mitigation features.*

There are no planned or newly installed protection or mitigation features that resulted from the implementation of the Seismic Walkdown guidance at PVNGS. However, two of the potentially adverse seismic conditions that were identified during the Seismic Walkdowns resulted in action being taken to restore seismic design margins. Bookcases installed near the control boards in the Unit 1 Control Room were removed and maintenance was performed in Unit 1 on a solenoid valve support plate related to the controls for an atmospheric steam dump valve. Neither of these conditions would have prevented safety-related equipment from performing its intended safety function during or after a design basis seismic event; the changes were implemented to restore seismic design margins.

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

The peer review process performed at PVNGS confirmed and informed the selection of SSCs process, provided real-time feedback to the Seismic Walkdown engineers (SWEs) during performance of the walkdowns, and confirmed that the licensing basis evaluations carefully

compared the actual as-found plant configurations to the current licensing basis documentation. Details of the peer reviewer activities are described in report Section 6.

In summary, PVNGS Unit 1 equipment that was inspected and evaluated for the Seismic Walkdown process, including initial and supplemental inspections and related licensing basis evaluations, was determined to be capable of performing intended safety functions during and after a design basis seismic event and the site monitoring and maintenance procedures were determined to be adequate. Follow-on activities to complete the remaining aspects of this process were completed as described in this supplemental report. Therefore, the required NTTF 2.3 walkdown activities have been successfully completed for PVNGS Unit 1 in accordance with the EPRI Guidance document and the intent of Enclosure 3 to the NRC 50.54(f) letter has been satisfied.

ACKNOWLEDGEMENTS

We wish to acknowledge the following contributors to the effort.

Mike Powell – Arizona Public Service (Director Fukushima Response)

Chris Wandell – Arizona Public Service

Justin Wood – Arizona Public Service

Winston Borrero – Arizona Public Service

Randall "Gene" Eimar – Arizona Public Service

Jonathon Lucero – Arizona Public Service

Nick Reidenbach – Arizona Public Service

Derek Morris – Arizona Public Service

Mark Meyer – Arizona Public Service

Nathan Hardwick – Arizona Public Service

Jose "Angel" Delgadillo – Arizona Public Service

Michael Cribbins – Westinghouse Electric Company

Rolando Perez – Westinghouse Electric Company

Derek Seaman – Westinghouse Electric Company

Gary Douglas – Westinghouse Electric Company

Joe Somsel – Westinghouse Electric Company

Paul Karavoussianis – Stevenson & Associates

Walter Djordjevic – Stevenson & Associates

Hunter Young – Stevenson & Associates

Timothy Nealon – Stevenson & Associates

Andrew Masiunas – Stevenson & Associates

Cory Figliolini – Stevenson & Associates

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AFAS	Auxiliary Feedwater Actuation Signal
AF	Auxiliary Feedwater
AFW	Auxiliary Feedwater System
AHU	Air Handling Unit
APS	Arizona Public Service
ASME	American Society of Mechanical Engineers
AUX	Auxiliary Building
AWC	Area Walk-By Checklist
CAP	Corrective Action Program
CE	Combustion Engineering
CF	Containment Function
CH	Chemical and Volume Control
CLB	Current Licensing Basis
CP	Containment Purge
CST	Condensate Storage Tank
CT	Condensate Transfer and Storage
CTMT	Containment
CTRL	Control Building
CVCS	Chemical and Volume Control System
DBM	Design Basis Manual
DCM	Design Criteria Manual
DF	Diesel Fuel Oil and Transfer
DG	Diesel Generator
DHR	Decay Heat Removal
EAHU	Essential Air Handling Unit
EC	HVAC Essential Chilled Water
EPRI	Electric Power Research Institute
EQCF	Equipment Qualification Control Form
EQID	Equipment Identification
EW	Essential Cooling Water
FAQ	Frequently Asked Question(s)
FCR	Field Change Request
GA	Service Gas
GR	Gaseous Radwaste
HA	HVAC Auxiliary Building
HC	HVAC Containment Building
HD	HVAC Diesel Generator Building
HJ	HVAC Control Building
HPSI	High Pressure Safety Injection
HVAC	Heating, Ventilation and Air Conditioning

Acronym	Definition
IA	Instrument and Service Air
IC	Reactor Coolant Inventory Control
IPEEE	Individual Plant Examination of External Events
IEEE	Institute of Electrical and Electronics Engineers
ISRS	In-Structure Response Spectra
MCC	Motor Control Center
MO	Motor-Operated
MOV	Motor-Operated Valve
MSSS	Main Steam Support Structure
NCR	Non-Conformance Reports
NQR	Non-Quality Related
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
NTTF	Near-Term Task Force
OBE	Operating Basis Earthquake
P&ID	Piping and Instrumentation Diagram
PB	Class 1E 4.16 kv Power
PC	Reactor Coolant Pressure Control
PE	Class 1E Standby Generation
PG	Class 1E 480v Power Switchgear
PGD	Project General Design Criteria
PH	Class 1E 480v Power Motor Control Center
PK	Class 1E 125 VDC
PN	Class 1E Instrument Power
PRA	Probabilistic Risk Assessment
PSA	Probabilistic Safety Assessment
PVAR	Palo Verde Action Request (Corrective Action Program)
PVNGS	Palo Verde Nuclear Generating Station
RAS	Re-circulation Actuation Signal
RAW	Risk Achievement Worth
RC	Reactivity Control or Reactor Coolant
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RD	Radioactive Waste Drain
RLE	Review Level Earthquake
RM	Main Control Board
ROB	Rule of the Box
RWT	Refueling Water Tank
S&A	Stevenson & Associates
SA	Engineered Safety Features Actuation System
SB	Reactor Protection
SC-1	Seismic Category I

Acronym	Definition
SDC	Shutdown Cooling
SDOC	Vendor/Supplier Document
SFP	Spent Fuel Pool
SG	Main Steam
SI	Safety Injection
SOV	Solenoid-Operated Valve
SP	Essential Spray Ponds
SPRA	Seismic Probabilistic Risk Assessment
SQUG	Seismic Qualification Utility Group
SSCs	Structures, Systems, and Components
SSE	Safe Shutdown Earthquake
SSEL	Safe Shutdown Equipment List
SWC	Seismic Walkdown Checklist
SWE	Seismic Walkdown Engineer
SWEL	Seismic Walkdown Equipment List
SWG	Seismic Walkdown Guidance (EPRI TR-1025286)
SWMS	Site Work Management System
SWT	Seismic Walkdown Team
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
ZA	Auxiliary Building
ZG	Diesel Generator Building
ZJ	Control Building

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LIST OF TABLES

1. SEISMIC LICENSING BASIS

This report is applicable to Palo Verde Nuclear Generating Station (PVNGS) Unit 1.

The licensing basis for Seismic Category I (SC-1) equipment at PVNGS Units 1, 2, and 3 is defined in the Updated Final Safety Analysis Report (UFSAR, Reference 32) Section 3.7 and is supported by summary seismic design criteria defined in Design Criteria Manual - Project General Design Criteria (DCM-PGD, Reference 42) Section 1.3.2. Site design ground motion response spectra for the Safe Shutdown Earthquake (SSE) are provided in UFSAR Figures 3.7-1 and 3.7-2, as well as UFSAR Sections 3.9.2.2, 3.9.3 and 3.10, and adhere to Regulatory Guide 1.60, *Design Response Spectra for Seismic Design of Nuclear Power Plants* (Reference 43). Damping values for SC-1 equipment are listed in UFSAR Table 3.7-1 and conform to Regulatory Guide 1.61, *Damping Values for Seismic Design of Nuclear Power Plants* (Reference 44).

As defined in UFSAR Section 2.5, the SSE is based on the postulated occurrence of a magnitude 8.0 earthquake located 72 miles from the site. Through use of attenuation curves, extrapolation of response spectra, and analysis of intensity data, 0.2g is considered a conservative representation of the severity of horizontal and vertical vibratory ground motion for the SSE. For additional conservatism, the seismic analysis of all Category I structures was performed utilizing a 0.25g SSE. Figures 3.7-1 through 3.7-4 of the UFSAR show the horizontal and vertical design response spectra corresponding to the SSE and Operating Basis Earthquake (OBE), respectively.

1.1 IN-STRUCTURE RESPONSE SPECTRA

A time-history analysis was used to develop in-structure response spectra (ISRS) for buildings housing SC-1 equipment. Modeling techniques such as the selection of the minimum number of mass points, number of dynamic degrees of freedom per mass point, and torsional effects, are described in Bechtel Topical Report BC-TOP-4-A (Reference 51). The seismic input was defined in terms of the free-field acceleration time history and the soil-structure interaction parameters. The structural damping values used were per Regulatory Guide 1.61 (Reference 44). Soil damping characteristics were modified to account for strain levels. Design basis ISRS are plotted in DBM-C5 (Reference 53) Appendix A.

1.2 SEISMIC QUALIFICATION OF SC-1 EQUIPMENT

SC-1 equipment is classified according to Regulatory Guide 1.29, *Seismic Design Classification* (Reference 45), and is discussed in UFSAR Section 3.2 (Reference 32) and in DCM-PGD Section 1.4.3 (Reference 42), which states:

> *Category I structures, systems, and components are those that are important to safety and designed to remain functional in the event of a safe shutdown earthquake (SSE). These structures, systems, and components are those necessary to assure:*
>
> - *The integrity of the reactor coolant pressure boundary (RCPB).*
> - *The capability to shutdown the reactor and maintain it in a safe condition.*
> - *The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures.*

Per UFSAR Section 3.10.2, SC-1 electrical equipment within the Bechtel scope of supply was qualified per Institute of Electrical and Electronics Engineers (IEEE) Std 344-75 (Reference 46). This standard is comprehensive and similar to current requirements for nuclear safety-related components. Per UFSAR

Section 3.10.5, SC-1 electrical equipment within the Combustion Engineering scope of supply was qualified per IEEE Std 344-71 (Reference 41) plus the additional requirements listed. With the additional requirements, the qualification criteria and methods are similar to those of IEEE Std 344-75 (Reference 46). For qualification by testing, per application of the preceding criteria, much of the electrical equipment was subject to shake table testing. The required test levels were typically based on the in-structure response spectra discussed above.

Per Section 3.9.2.2 of the UFSAR, analytical methods without testing were employed to qualify Seismic Category I mechanical equipment such as piping, ductwork, tanks and vessels, heat exchangers, filters, and pumps. Qualification for mechanical components with mechanisms that must change position in order to perform the safety-related function was performed by test or a combination of test and analysis as per the IEEE Std 344-1975 requirements and UFSAR Sections 3.9.2, 3.9.3 and 3.10. These components include American Society of Mechanical Engineers (ASME) and non-ASME items such as valves with actuators and their appurtenances as well as check valves, relief valves, fans, chillers, air handling units, and various skid-supplied devices.

2. PERSONNEL QUALIFICATIONS

2.1 EQUIPMENT SELECTION PERSONNEL

The Seismic Walkdown Equipment List (SWEL) development was performed by Westinghouse personnel, Messrs. Rolando Perez and Derek Seaman. Resumés are provided in Appendix E. PVNGS Operations (Gene Eimar, Shift Manager and Angel Delgadillo, Senior Auxiliary Operator) provided verification of safety function selections. PVNGS Engineering (Chris Wandell, Winston Borrero) provided technical input to screening and selection of equipment. PVNGS System Engineering input was provided by performing a review of System Health Reports.

Rolando Perez – Mr. Perez is the Technical Leader for the Palo Verde Unit 1 SWEL development activity in the Risk Applications and Methods Group of Westinghouse's Engineering, Equipment and Major Projects Division. Rolando has over 15 years of experience in Westinghouse and over 35 years of experience in the nuclear safety area. Rolando has worked for Westinghouse and Combustion Engineering (CE) as a Training Engineer, Transient Analyst, and Setpoint Analyst. Rolando has conducted lectures on reactor core physics, health physics, fluid systems, protection systems, and plant operational concepts. In 2009 Rolando expanded his expertise to include CE-designed plants that employ digital-based reactor trip and monitoring systems ("CE digital plants").

Derek Seaman – Mr. Seaman is a member of the Palo Verde Unit 1 SWEL development team in the Risk Applications and Methods Group of Westinghouse's Engineering, Equipment and Major Projects Division. Derek has over 6 years of experience in Westinghouse in the nuclear engineering area. Derek has rotated through various plant outage positions including reload engineering analyses and project management of fuel reload campaigns. Derek has evaluated power increase proposals from a safety analysis perspective and has designed and implemented quality assurance systems in the nuclear engineering area.

Chris J. Wandell, P.E. – Mr. Wandell is a Senior Consulting Civil Engineer in the Palo Verde Nuclear Design Engineering Department. Chris is a Professional Civil Engineer with over 30 years of experience in the design, analysis, and modification of Seismic Category I pipe supports, electrical raceway supports, heating, ventilation and air conditioning (HVAC) supports, instrument supports, and steel and concrete structures. His experience also includes Class 1E Seismic Equipment Qualification. Mr. Wandell is Palo Verde's structural and seismic subject matter expert. He has attended EPRI's NTTF 2.3 Seismic Walkdown Training Course and is a certified Seismic Walkdown Engineer.

Winston G. Borrero – Mr. Borrero is a Senior Consulting Mechanical Engineer in the Palo Verde Nuclear Design Engineering Department. Winston has over 30 years of experience in the design and construction of Nuclear Plants having worked for Bechtel, Stone & Webster and Sargent & Lundy Engineers at various nuclear sites. Areas of expertise include stress analysis, fracture mechanics and fatigue analysis, seismic and environmental qualification of equipment, and bolted joint analysis. Mr. Borrero is Palo Verde's bolted joint and fatigue stress analysis subject matter expert. He has attended EPRI's NTTF 2.3 Seismic Walkdown Training Course and is a certified Seismic Walkdown Engineer.

2.2 SEISMIC WALKDOWN ENGINEERS

The Seismic Walkdown team (SWT) consisted of Seismic Walkdown engineers (SWEs) from Stevenson and Associates (S&A). S&A is recognized as a leading seismic consultant to the nuclear industry and as a regular contributor to the advancement of earthquake engineering knowledge through funded research

projects. The professional staff has expertise and capabilities in earthquake engineering, structural dynamics, and structural design. S&A has performed seismic evaluations of US nuclear power plants, using either Seismic Probabilistic Risk Assessments (PRA) or Seismic Margin Assessments, to address US Nuclear Regulatory Commission (NRC) Individual Plant Evaluation for External Events (IPEEE) for over 35 US and European plants. S&A conducted seismic PRA analyses for all of the US Army depots that are demilitarizing their stores of nerve gas ordnance.

The SWT for PVNGS Unit 1, consisting of Hunter Young and Timothy Nealon of S&A, conducted initial walkdowns from July 30, 2012, through August 2, 2012. For supplemental walkdowns occurring April 6, 2013, through April 7, 2013, during refueling outage 1R17 and April 30, 2013, the SWT consisted of Hunter Young and Cory Figliolini of S&A (Resumés are provided in Appendix E). Chris Wandell and Winston Borrero led the support from PVNGS for walkdowns as well as the interface with plant operators. Other PVNGS professional staff provided support and guidance and these persons are acknowledged within this report. The Stevenson & Associates Seismic Walkdown Engineers were accompanied by at least one of the following PVNGS qualified Seismic Walkdown Engineers: Chris Wandell, Nicholas Reidenbach, Winston Borrero, Justin Wood, Derek Morris, and Mark Meyer. The PVNGS engineers (along with the Auxiliary Operator team member) provided walkdown oversight relative to expected conduct in the plant (Nuclear, Radiological and Industrial Safety), compliance with NRC-Approved EPRI Seismic Walkdown Guidance (TR-1025286), PVNGS procedural compliance (inclusive of CAP), and insight into Licensing Basis issues.

Hunter Young, P.E. – Mr. Young is a Senior Engineer in the S&A Phoenix office with specialization in the dynamic analysis and design of structures and equipment for seismic, blast, fluid, and wind loads. He has managed and led Seismic Walkdowns and fragility analyses of structures and components for use in probabilistic risk assessments. Mr. Young has performed the seismic analyses of braced steel frames, concrete foundations, masonry walls, large storage tanks, and electrical and mechanical equipment anchorage. In addition, Mr. Young has executed the walkdown and analysis of tank structures and their associated leak path piping to assess loss of inventory in the event of beyond-design-basis seismic events using manual and finite element methods. Mr. Young has a Master of Engineering in Structural Engineering from the Massachusetts Institute of Technology and Bachelors of Science in Civil Engineering from the University of Notre Dame. He is a licensed P.E. (civil) in California and has completed the 5-day Seismic Qualification Utility Group (SQUG) Walkdown training course.

Timothy Nealon – Mr. Nealon is an Engineer in the S&A Phoenix office with specialization in the dynamic analysis and design of structures and equipment for seismic, blast, fluid, and wind loads. He has participated in Seismic Walkdowns and fragility analyses of structures and components for use in probabilistic risk assessments. In addition, Mr. Nealon has conducted walkdowns and analysis of tank structures and their associated leakpath piping to assess loss of inventory in the event of beyond-design-basis seismic events using various methods. Furthermore, he has been trained and has conducted NTTF 2.3 Fukushima response Seismic Walkdowns at multiple nuclear stations. Mr. Nealon has a Master of Science in Structural Engineering and a Bachelor of Science in Civil and Environmental Engineering from the University at Buffalo. Mr. Nealon has completed the 5-day SQUG Walkdown training course.

Cory Figliolini – Mr. Figliolini is a Staff Engineer in the S&A Phoenix office. He has planned and performed Seismic Walkdowns and fragility analyses of structures and components for use in probabilistic risk assessments. Mr. Figliolini has conducted seismic analyses of electrical and mechanical equipment anchorage, storage tanks, and civil structures including containment. Mr. Figliolini has a Joint Master of Science, Structural Engineering & Mechanics from the Universities of Glasgow and Edinburgh and a Bachelors of Science in Civil Engineering from Worcester Polytechnic Institute. He is registered as an E.I.T. in Massachusetts. Mr. Figliolini has completed the 5-day SQUG Walkdown training course.

2.3 LICENSING BASIS REVIEWERS

The Licensing Basis Reviewers for PVNGS Unit 1 consisted of Hunter Young, Timothy Nealon, and Cory Figliolini from the SWT. Their qualifications are provided under Section 2.2. Chris Wandell and Winston Borrero participated in the development of the licensing basis evaluations and provided technical bases for Operability Determinations/Functional Assessments for potentially adverse seismic conditions which were entered into the Corrective Action Program.

2.4 IPEEE REVIEWERS

The IPEEE Reviewers consisted of a combination of the Equipment Selection Personnel and the SWT. Rolando Perez and Derek Seaman of Westinghouse Electric Company LLC (qualifications listed in Appendix E) identified equipment subject to IPEEE enhancements for incorporation in SWEL 1. Hunter Young and Timothy Nealon of S&A (qualifications listed in Section 2.2) performed the identification of actions taken to eliminate or reduce the IPEEE vulnerabilities previously identified. Jonathan Lucero, Engineer Sr. PRA from PVNGS, contributed to the IPEEE review.

Jonathan L. Lucero – Mr. Lucero is a Senior Engineer in the Palo Verde Probabilistic Risk Assessment Department. Jonathan has over 10 years of engineering experience in foundation design, structural dynamics, and uncertainty analysis. His experience also includes multidisciplinary applications, generalized information theory and fuzzy logic. Mr. Lucero is Palo Verde's seismic PRA subject matter expert. He has attended EPRI's Education of Risk Professionals Program and Seismic PRA training course.

2.5 PEER REVIEW TEAM

The peer reviewers for PVNGS Unit 1 are Messrs. Walter Djordjevic of S&A and Gary L Douglas of Westinghouse. Mr. Djordjevic is also designated the peer review Team Leader. Neither was involved in the Seismic Walkdown inspection process as to maintain their independence from the project. Mr. Djordjevic is an advanced-degree structural engineer with over 30 years of nuclear seismic experience and has been trained as a Seismic Capability Engineer (EPRI SQUG training), EPRI IPEEE Add-on, and Seismic Fragility and Seismic Walkdown Engineer (SWE). Mr. Douglas is a nuclear engineer with 15 years of nuclear engineering experience and 10 years of aerospace engineering experience. Resumés are provided in Appendix E. Mr. Djordjevic led the seismic peer review activities and Mr. Douglas led the SWEL selection peer review. All peer review activities were performed by both engineers.

3. SELECTION OF STRUCTURES, SYSTEMS, AND COMPONENTS

3.1 SELECTION PROCESS SUMMARY

This section describes the process used by Westinghouse to select the structures, systems, and components (SSCs) that were included in the Palo Verde Nuclear Generating Station Unit 1 (PVNGS-1) Seismic Walkdown Equipment List (SWEL). The process described in Section 3 (Selection of SSCs) of EPRI Technical Report 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic*, dated June 2012 (Reference 1), was used as guidance to develop the PVNGS-1 SWEL. The following steps from the integrated project schedule outline this process of SWEL selection:

- Project Kickoff Meeting
- Obtain customer inputs
  - Retrieve original Individual Plant Examination of External Events (IPEEE – full-scope Seismic Margin Assessment) documentation – basis for Safe Shutdown Equipment List (SSEL) Base List 1
  - Review current Seismic Probabilistic Risk Assessment (SPRA) database
  - Retrieve containment function equipment
  - Retrieve modifications since the IPEEE
  - Retrieve recently modified/upgraded equipment information
  - Retrieve seismic vulnerabilities from Corrective Action Program (CAP)
  - Retrieve System Health Reports
  - Retrieve spent fuel pool (SFP) SC-1 equipment (piping and instrumentation drawings, Design Basis Manuals, and Training Manual) – basis for SSEL Baselist 2
- Assemble preliminary Safe Shutdown Equipment List (i.e., Base List 1)
  - Perform Screen #1, Seismic Category I (non-Seismic Category I SSCs screen out)
  - Perform Screen #2, Regular Inspections (Structures, Piping, Penetrations screen out)
  - Perform Screen #3, Safety Function Support
- Assemble preliminary SSEL (Base List 2)
  - Perform Screen #1, Seismic Category I (non-Seismic Category I SSCs screen out)
  - Perform Screen #2, Regular Inspections (Structures, Piping, Penetrations screen out)
- Site visit to confirm preliminary SSEL
- Finalize SSEL
- Select SWEL 1
  - Perform Screen #4
    - System variety
    - Equipment type variety
    - Environment variety
    - Risk importance considerations
    - Equipment access considerations
    - Major new or replacement equipment
    - Recently modified/upgraded (zone of influence effects)
    - IPEEE Seismic Vulnerability findings
    - Sample considerations including unit-to-unit variation
- Select SWEL 2 (spent fuel pool related items)
  - Perform Screen #3
    - System variety
    - Equipment type variety
    - Environment variety

Equipment access considerations
Major new or replacement equipment
Recently modified/upgraded (zone of influence effects)
Sample considerations including unit-to-unit variation
Perform Screen #4 rapid drain-down assessment
Confirm SWEL with Seismic Walkdown Engineers (SWEs)
Obtain PVNGS-1 Operations approval of SWEL
SWEL Peer Review

Per the guidance provided in Section 2 of Reference 1, PVNGS Operations and Design Engineering staff members participated in the selection of the SSCs comprising the SWEL and provided input and assistance to the Equipment Selection Personnel collecting the data associated with the equipment considered. The exchange of information between the Equipment Selection Personnel and the PVNGS staff members included:

- Review of the IPEEE and PRA list of components was performed by the Westinghouse and PVNGS team to correct discrepancies in classification, errors in equipment identification (EQID), omissions, risk categorization, etc.
- Weekly status meetings for review of the SWEL progress.
- A presentation held on July 17, 2012, to discuss Westinghouse's methodology for SWEL selection.
- Verification of equipment information through PVNGS's Site Work Management System (SWMS) (Reference 2).
- Provide risk importance data derived from the PVNGS Internal Events Probabilistic Risk Assessment (PRA) model (Reference 33).
- Assist in identifying and categorizing the different operating environment types existing at the plant.
- Discussions with Operations relative to recent upgrades and changes to the plant that have the potential to be relevant to the SWEL.
- Discussions with Design Engineering and Operations to select equipment with operational experience relevant to SWEL selection.
- Equipment Qualification Control Form (EQCF) Database for review of CAP and modifications against seismic equipment.
- Provide System Health Reports and Design Basis Manuals (DBMs) for review by the Equipment Selection Personnel.
- SWEL Peer Review and approval of the SSCs selected for the Walkdowns and Area Walk-Bys (see Appendix F).

Meetings were conducted from June 26, 2012, through June 29, 2012, to perform a Pre-Job Brief of the project and to conduct working sessions with PVNGS Operations and Design Engineering staff members with the goal of achieving confirmation of at least 80% of the SWEL and to identify items for follow-up. The agenda followed during the meetings included:

- Pre-Job Brief of the SWEL selection project
- Discuss high-level approach to SWEL Development
- Review of preliminary Base List 1 for accuracy and completeness
  - Populate the Screen #4 Sample Selection attributes
  - Select the SWEL 1 items
  - Identify items for follow-up
- Review of preliminary Base List 2 for accuracy and completeness
  - Populate the Screen #3 Sample selection attributes
  - Select the SWEL 2 items
  - Identify items for follow-up
- Identify any unit-to-unit considerations
- Summarize results
- Summary post-job briefing

A second meeting was held on July 17, 2012, to provide a presentation summarizing the Westinghouse/PVNGS team's selection methodology and conduct a second working session with PVNGS staff members to further refine the SWEL.

The following personnel participated in these working sessions:

Attendee	Company	Position
Chris Wandell	APS	Senior Consulting Engineer (Civil)
Winston Borrero	APS	Senior Consulting Engineer (Mechanical)
Justin Wood	APS	Engineer (Modifications)
Jose (Angel) Delgadillo	APS	Auxiliary Operator
Randall (Gene) Eimar	APS	Operations Shift Manager
Rolando Perez	Westinghouse	SWEL Development Lead (participated remotely via WebEx[1])
Derek Seaman	Westinghouse	SWEL Developer

Per the guidance provided in Section 3 of Reference 1, SSCs were selected in the following two groups:

- SWEL 1 – A sample of items that safely shutdown the reactor and maintain containment integrity.

- SWEL 2 – A sample of spent fuel pool (SFP) related items, including items that could result in a rapid drain-down of the SFP.

The SWELs from these two groups were combined into a single SWEL for use during the Seismic Walkdowns and Area Walk-Bys.

The following sections discuss how the PVNGS-1 SWEL selection process has met the objectives of the guidance of Reference 1, particularly as it relates to incorporating the appropriate variety of classes of

[1] WebEx is a trademark or registered trademark of Cisco Systems, Inc.

equipment, environments, primary and secondary systems, new and replacement equipment, and other elements discussed in Section 3 of Reference 1.

3.2 SAMPLE OF REQUIRED ITEMS FOR THE FIVE SAFETY FUNCTIONS

The 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.

The IPEEE (Reference 3) Safe Shutdown Equipment List (SSEL) was used as the starting point for compiling a list (Base List 1) of the SSCs to be considered in the SWEL 1 selection process. A list consisting of 979 SSCs was assembled based on the following tables documented in Appendix 3.A of Reference 3:

- Table 3A-1 – Reactor Protection System SSEL (36 items)
- Table 3A-2 – Support Systems SSEL (403 items)
- Table 3A-3 – Required Instrumentation SSEL (72 items)
- Table 3A-4 – Primary Auxiliary Feedwater SSEL (70 items)
- Table 3A-5 – Secondary Auxiliary Feedwater SSEL (59 items)
- Table 3A-6 – Atmospheric Dump Valves SSEL (72 items)
- Table 3A-7 – Auxiliary Pressurizer Spray SSEL (42 items)
- Table 3A-8 – Shutdown Cooling System SSEL (84 items)
- Table 3A-9 – High Pressure Safety Injection SSEL (89 items)
- Table 3A-10 – High Pressure Recirculation SSEL (52 items)

A review of the Seismic Probabilistic Risk Assessment (SPRA) database (Reference 34) was then performed to expand the equipment list. Seismic Category I (SC-1) equipment that was considered in the SPRA, but not included in the IPEEE tables, was identified and added to the equipment list, resulting in a total equipment count of 1236 items.

Since the IPEEE applies to the three PVNGS Units, general EQIDs were used in the SSEL tables (i.e., the EQIDs presented therein do not show the Unit number, which is normally indicated by the first character of the EQID). In contrast, in the SPRA database, much of the equipment was identified by using the Unit 1 designation. Therefore, all EQIDs in the list were converted to the Unit 1 designation.

Per the guidance provided in Section 3 of Reference 1, the process for selecting a sample of the SSCs associated with the safe shutdown of the reactor and maintaining containment integrity must include the following four screens:

- Screen #1 – Seismic Category I:

  The purpose of Screen #1 is to restrict the scope of SSCs in the SWEL to those that are classified as SC-1. This is intended to comply with the request in the NRC 50.54(f) letter (Reference 50), under the "Requested Actions" section, to "verify current plant configuration with the current license basis."

  Out of 1236 SSCs initially considered, 1119 were retained by Screen #1 and subsequently passed to Screen #2.

- Screen #2 – Equipment or Systems:

  The purpose of Screen #2 is to filter out the SSCs that regularly undergo inspections to confirm that their configuration continues to be consistent with the established plant licensing basis. The types of SSCs that are excluded consist of SC-1 Structures, Containment Penetrations, and SC-1 Piping Systems.

  Manual valves, check valves, flow orifices, fire dampers, and relief valves were also excluded in accordance with the guidance, since they are either considered in-line components or equipment that is regularly inspected.

  Out of 1119 items coming in from Screen #1, 775 were retained by Screen #2 and subsequently passed to Screen #3.

- Screen #3 – Support for the 5 Safety Functions:

  The purpose of Screen #3 is to filter out the SSCs that do not support at least one of the following safety functions:

  - Reactor reactivity control
  - Reactor coolant pressure control
  - Reactor coolant inventory control
  - Decay heat removal, including the ultimate heat sink
  - Containment function

  The safety functions supported by each SSC exiting Screen #2 were determined in consultation with PVNGS staff members (Shift Manager/Auxiliary Operator) during the first set of meetings.

  Out of 775 items coming in from Screen #2, 412 were retained by Screen #3 and subsequently passed to Screen #4. The list of equipment from Screen #3, entering Screen #4, is defined as Base List 1.

- Screen #4 – Sample Considerations:

  The purpose of Screen #4 is to narrow the Base List 1 candidate items to those of most significance. The PVNGS-1 SWEL 1 contains 124[2] representative items from each of the following sample selection attributes:

  - A variety of types of systems:

    The PVNGS-1 Base List 1 equipment was categorized based on the third and fourth characters of their EQIDs, which identifies the plant system. There were 31 system categories contained in Base List 1. Table 3-1 shows how these system categories were represented in SWEL 1.

[2] The original SWEL 1 consisted of 125 items. One item was removed (1MCHEE01) because it was inaccessible in a locked high-radiation area. See discussion in Section 3.4.

Table 3-1: Sort of the Base List 1 Data and Selected SWEL Items Based on "System Type"

System Type	Definition	Number of Items in Base List 1	Number of Items Selected for SWEL 1
AF	Auxiliary Feedwater	14	8
CH	Chemical and Volume Control	29	10 *
CP	Containment Purge	4	1
CT	Condensate Transfer and Storage	3	1
DF	Diesel Fuel Oil and Transfer	1	0
DG	Diesel Generator	14	3
EC	HVAC Essential Chilled Water	8	4
EW	Essential Cooling Water	8	3
GA	Service Gas	1	0
GR	Gaseous Radwaste	2	1
HA	HVAC Auxiliary Building	4	1
HC	HVAC Containment Building	12	6
HD	HVAC Diesel Generator Building	4	2
HJ	HVAC Control Building	21	11
IA	Instrument and Service Air	1	0
PB	Class 1E 4.16 kv Power	3	1
PE	Class 1E Standby Generation	2	1
PG	Class 1E 480v Power Switchgear	6	3
PH	Class 1E 480v Power Motor Control Center	8	4
PK	Class 1E 125 VDC	20	9
PN	Class 1E Instrument Power	12	6
RC	Reactor Coolant	16	9
RD	Radioactive Waste Drain	2	1
RM	Main Control Board	30	8
SA	Engineered Safety Features Actuation System	11	1
SB	Reactor Protection	14	1
SG	Main Steam	40	7
SI	Safety Injection	101	19
SP	Essential Spray Ponds	4	2
ZA	Auxiliary Building	6	0
ZJ	Control Building	11	1

* Refer to Section 3.4 for explanation of change to SWEL 1 System Type.

Note that the DF (Diesel Fuel Oil and Transfer), GA (Service Gas), IA (Instrument and Service Air), and ZA (Auxiliary Building) systems are not represented because the equipment types covered by each system are already well represented.

- Major new and replacement equipment (including recent modifications):

Major new and replacement equipment were identified through a review of either: 1) Section 8 (System Design History) or 2) Section 11 (Change History), of a selection of the major system DBMs (References 4 through 30). Recent modifications were assessed through consultation with PVNGS Operations and Design Engineering staff members. Additionally, System Health Reports were reviewed to ensure that recent modifications were captured and examined for potential impact. The participating PVNGS Operations staff members were asked to provide any information they felt the System Health Reports may not have touched upon. This was to address any recent modifications where 1) weight and/or the location of the center of gravity of the replacement are significantly

different, or 2) design of the mounting and anchorage of the replacement is significantly different than the original, or 3) items within the zone of influence had to be reinstalled.

Based on this sampling consideration, 38 Base List 1 items were identified as having major new or replacement modifications. Of these, the 15 items shown in Table 3-2 were represented in SWEL 1.

Table 3-2: Equipment Selected for SWEL Based on the "Major New or Replacement Equipment" Attribute

Item	Walkdown Equipment	Description	Major New or Replacement Equipment Modifications
115	1EPBBS04	4.16 kV bus S04	Addition of relays. See Reference 6, p. 101
310	1JSIBUV0616	RC loop 2A isolation valve	Modified the HPSI throttle valves and miniflow isolating valves from rising/rotating stem valves and changed the motor operated actuators. See Reference 30, p. 250.
312	1JSIBUV0626	RC loop 2B isolation valve	Modified the HPSI throttle valves and miniflow isolating valves from rising/rotating stem valves and changed the motor operated actuators. See Reference 30, p. 250.
11	1JAFBUV0034	SG-E01A isolation valve	Replaced actuator and yoke assembly on valves. See Reference 4, p. 104.
12	1JAFBUV0035	SG-E01B isolation valve	Replaced actuator and yoke assembly on valves. See Reference 4, p. 104.
14	1JAFCUV0036	SG-E01A isolation valve	Replaced actuator and yoke assembly on valves. See Reference 4, p. 104.
272	1JSIAUV0651	RC loop 1 long-term recirc/SDC valve	Relocated the motor operated valve from outside the bioshield wall to the inside near the hot leg nozzle to eliminate flow induced vibration in the line. See Reference 30, p. 248.
303	1MSIBP01	LPSI pump "B"	LPSI pump shaft and mechanical seal retrofit. See Reference 30, p. 246.
313	1JSIBUV0636	RC loop 1A isolation valve	Modified the HPSI throttle valves and miniflow isolating valves from rising/rotating stem valves and changed the motor operated actuators. See Reference 30, p. 250.
314	1JSIBUV0646	RC loop 1B isolation valve	Modified the HPSI throttle valves and miniflow isolating valves from rising/rotating stem valves and changed the motor operated actuators. See Reference 30, p. 250.
50	1MDGBF03	DG "B" air intake filter	Modified hangers. See Reference 6, p. 104.
222	1JSGBUV0130	SG-E01A isolation valve	Lock nut screw replaced. See Reference 29, p. 154
223	1JSGBUV0135	SG-E01B isolation valve	Lock nut screw replaced. See Reference 29, p. 154
319	1JSIBUV656	RC loop 2 SDC isolation valve	Added pressure relieving spring check valves. See Reference 30, p. 248.
321	1JSIBUV667	HPSI pump "B" recirc iso (closes on RAS)	Modified the HPSI throttle valves and miniflow isolating valves from rising/rotating stem valves and changed the motor operated actuators. See Reference 30, p. 250.

- A variety of types of equipment:

The Base List 1 items were each assigned to one of the 22 classes of equipment listed in Appendix B of Reference 1. Table 3-3 shows how these classes were represented in SWEL 1. Two classes, compressors and motor generators, were not represented because there are no SC-1 equipment in these categories. Additionally, the transformers that are SC-1 were considered part of the larger equipment typically represented as switchgear or motor control centers (MCCs). Thus, this classification is not individually represented in SWEL 1.

Table 3-3: Sort of the Base List 1 Data and Selected SWEL Items Based on "Equipment Type Number"

Equipment Type Number	Description	Number of Items in Base List 1	Number of Items Selected for SWEL 1
0	Miscellaneous	13	6
1	Motor Control Centers	13	6
2	Low-Voltage Switchgear	12	4
3	Medium-Voltage Switchgear	2	1
4	Transformers	0	0
5	Horizontal Pumps	11	5
6	Vertical Pumps	8	4
7	Fluid-Operated Valves	23	10
8	Motor-Operated Valves, Solenoid-Operated Valves	115	31
9	Fans	8	4
10	Air Handlers	10	4
11	Chillers	2	1
12	Air Compressors	0	0
13	Motor Generators	0	0
14	Distribution Panels	41	5
15	Batteries on Racks	4	2
16	Battery Chargers and Inverters	12	5
17	Engine Generators	2	1
18	Instruments on Racks	74	16
19	Temperature Sensors	3	2
20	Instrumentation and Control Panels and Racks	39	9
21	Tanks and Heat Exchangers	20	8 *

* Refer to Section 3.4 for explanation of change to SWEL 1 Equipment Type Number.

- A variety of environments:

  Since the site is located in a dry environment, typical of a desert climate, it was decided to identify the equipment operating environments based on its location either "inside" (i.e., inside an equipment room) or "outside" (i.e., outdoors) and based on the normal maximum design temperature of the corresponding equipment environment. These design temperatures were determined from a review of Appendix A of the Equipment Qualification Program Manual (Reference 31) and Section 9.4 of the Updated Final Safety Analysis Report (UFSAR) (Reference 32). Based on this review, seven categories of equipment operating environments were identified. Table 3-4 shows how these equipment operating environments were represented in SWEL 1.

Table 3-4: Sort of the Base List 1 Data and Selected SWEL Items Based on "Environment (Temperature)"

Temperature (°F)	Number of Items in Base List 1	Number of Items Selected for SWEL 1
80	142 (All inside)	47 (All inside)
104	150 (All inside)	42 (All inside)
113	8 (2 inside and 6 outside)	3 (All outside)
120	62 (All inside)	17 * (All inside)
122	4 (All outside)	2 (All outside)
124	18 (All inside)	5 (All inside)
140	28 (All inside)	8 (All inside)

* Refer to Section 3.4 for explanation of change to SWEL 1 Environment list.

- Equipment enhanced due to vulnerabilities identified during the IPEEE program:

  Based on a review of the IPEEE report (Reference 3), there were no Unit 1 seismic vulnerabilities identified. However, the IPEEE report states that a limited number of actions were taken to improve plant seismic capacity; no specific actions other than a Unit 3 example were provided, e.g., the anchorage on the bookcases located behind the control cabinets in Unit 3 was improved to reduce the possibility that the cabinets would be impacted during a seismic event.

The following additional considerations were factored into the SWEL 1 selection process:

- Numerical measures of risk importance:

  The Risk Achievement Worth (RAW) derived from the Internal Events PRA model (Reference 33) was compiled for the Base List 1 items to determine potentially risk-significant SSCs. Items with a RAW value greater than 2 were considered of "high" risk importance. There were 70 items of high risk importance in Base List 1; 26 were selected for SWEL 1.

- Protected train restrictions during the walkdown week:

  The protected train schedules [PVNGS "Work Week Schedule"] during the PVNGS-1 walkdown dates (from July 30, 2012, through August 3, 2012) were reviewed so that inaccessible items could be identified and deferred from SWEL 1. Of the 124 items selected for SWEL 1, 2 items were expected to be inaccessible due to protected train restrictions (see Appendix G, Table G-2, Items, 33 and 102). Their walkdowns were deferred to PVNGS refueling outage 1R17, performed in spring 2013.

3.2.1 Base List 1

The list of equipment retained by Screen #3 (and subsequently entering Screen #4) is defined as Base List 1 and is summarized in Appendix G, Table G-1.

3.2.2 SWEL 1

The list of equipment retained by Screen #4 is defined as SWEL 1 and is summarized in Appendix G, Table G-2.

3.3 SPENT FUEL POOL (SFP) RELATED ITEMS

The starting point for compiling a list of the SFP-related SSCs to be considered in the SWEL 2 selection process was a review of the Fuel Pool Cooling and Cleanup System DBM (Reference 35) and its associated drawings (References 36 through 40). This review identified fifteen SC-1 components. Eleven additional components were later identified (during the first set of meetings) based on a system review.

Per the guidance established in Section 3 of Reference 1, the process for selecting a sample of the SSCs associated with the SFP includes the following four screens:

- Screen #1 – Seismic Category I:

  The process for selecting SFP-related SSCs using Screen #1 is similar to the process described earlier for Screen #1 of SWEL 1. The purpose of Screen #1 is to limit the items to those that have a seismic licensing basis.

  All SSCs initially considered for SWEL 2 (26 items) were passed from Screen #1 to Screen #2.

- Screen #2 – Equipment or Systems:

  The process for selecting SFP-related SSCs using Screen #2 is similar to the process described earlier for Screen #2 of SWEL 1. Screen #2 considers only those items associated with the SFP that are appropriate for an equipment walkdown process. The purpose of Screen #2 is to filter out the SSCs that regularly undergo inspections to confirm that their configuration continues to be consistent with the established plant licensing basis.

  Of the 26 items retained by Screen #1, 6 were retained by Screen #2 and subsequently passed on to Screen #3.

- Screen #3 – Sample Considerations:

  The equipment retained by Screen #2 and subsequently entering Screen #3 is defined as Base List 2.

  The process for selecting SFP-related SSCs using Screen #3 is similar to the process described earlier for Screen #4 of SWEL 1. The purpose of Screen #3 is to narrow the Base List 2 candidate items to those of most significance, considering the following sample selection attributes:

  - A variety of types of systems
  - Major new and replacement equipment (including recent modifications)
  - A variety of types of equipment
  - A variety of environments

  Since there were only six items associated with the SFP, all items contained in Base List 2 were selected for input to SWEL 2.

- Screen #4 – Rapid Drain-Down:

The purpose of Screen #4 is to identify items that could allow the SFP to drain rapidly. Per the guidance established in Section 3 of Reference 1, the SSCs considered are not limited to SC-1 items. Any items identified as having the potential for rapidly draining the SFP should be considered.

The Seismic Walkdown Guidance (Reference 1) specifies the following on page 3-8:

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

UFSAR (Reference 32) Section 9.1.3.3.1.1.1, pages 9.1-35 and 9.1-36, states the following:

> "*If a pipe break were to occur in the Seismic Category I/quality portion of the system, pool cooling could be lost. However, the event would be self-limiting as all pipe penetrations through the pool wall are at or above the minimum required water levels for spent fuel shielding of 10 ft as required by Regulatory Guide 1.13. All pipes extending down into the pool have siphon breaker holes at or above the minimum required water level. Under these conditions, sufficient time (longer than 30 minutes) is available to isolate the break and recover the minimum level required for start of the pool cooling system. If the spent fuel pool clean up system is aligned with the refueling pool (drain valves), administrative procedures are in place to identify, locate and isolate a pipe break within the containment in a timely manner.*"

The first two sentences of this UFSAR excerpt deal with the possibility of losing SFP water inventory following a pipe break. The next two sentences deal with how quickly the Fuel Pool Cooling and Cleanup System can be restored following a pipe break and are not pertinent to rapid drain-down.

Based on this documentation, there are no rapid drain-down items for input to SWEL 2.

A review of the SFP and its relationship to the adjacent fuel transfer canal and cask load pit was conducted to ensure that a rapid drain-down could not occur via a loss of gate seal integrity. A system review showed that the bottom of the fuel transfer canal gate and cask load pit gate invert are 3-1/2 inches below the top of the spent fuel racks. Although a loss of these gate seals would result in flooding of the cask load pit and the fuel transfer canal, it would not result in a water level less than 10 feet above the top of the fuel assemblies. This is due to the relatively small volume of the fuel transfer canal and cask load pit. The fuel transfer tube within the fuel transfer canal was also considered since it provides an isolation path to the reactor cavity. The fuel transfer tube seal, canal isolation valve PPCNV118, and quick-operating closure device MPCEM01A are SC-1 items considered part of the SFP structure assessed by analysis and periodic inspections and were therefore excluded from SWEL 2. Drainage from the cask load pit to the decontamination pit would be limited because the bottom of the decontamination gate invert is 10 feet above the top of the fuel assemblies. Although a rapid drain-down threat associated with the gate seal system was not found, the instrument air supply system to the SFP gate was included in the Area Walk-By.

3.3.1 Base List 2

The equipment retained by Screen #2 and subsequently entering Screen #3 is defined as Base List 2 and is summarized in Appendix G, Table G-3.

3.3.2 Rapid Drain-Down

SWEL 2 is augmented by the equipment that could potentially cause the SFP to drain rapidly (the equipment retained by Screen #4). As discussed earlier, there are no rapid drain-down items for input to the PVNGS-1 SWEL 2.

3.3.3 SWEL 2

SWEL 2 is defined as the list of equipment retained by Screen #3 plus the equipment retained by Screen #4. As discussed earlier, Screen #3 was not utilized because all 6 items contained in Base List 2 were selected for input into SWEL 2. In addition, there was no equipment associated with rapid drain-down. Therefore, SWEL 2 is the same as Base List 2 (summarized in Appendix G, Table G-3).

3.4 INACCESSIBLE ITEMS

The equipment items that were inaccessible during the scheduled PVNGS-1 at-power walkdown dates (from July 30, 2012, through August 3, 2012) are identified in Table 3-5. The guidance allows for items to be deferred to a later date if inspection poses a safety concern. Items with electrical safety challenges or items within containment were deferred to ensure safety when inspecting. The items in Table 3-5 were subsequently walked down during and following PVNGS refueling outage 1R17.

Table 3-5: PVNGS-1 Equipment Inaccessible During the Scheduled At-Power Walkdowns

SWEL 1 Item Number	Walkdown Equipment	Description	Equipment Location
14	1MCHEE01	Regenerative heat exchanger	CTMT
15	1JCHEHV0239	Charging line to reactor coolant loop 2A isolation globe valve	CTMT
20	1JCPBUV0005A	Containment power access purge supply isolation butterfly damper	CTMT
36	1JHCBUV0044	Discharge sampling from RU-1 containment isolation valve	CTMT
37	1JHCBUV0047	Inlet sampling to RU-1 containment isolation valve	CTMT
53	1EPBBS04	4.16 kV bus S04	CTRL
55	1EPGBL32	480 V LC32 bus	CTRL
56	1EPGBL34	480 V LC34 bus	CTRL
77	1JRCBHV0105	Pressurizer and reactor vessel head vent to reactor drain tank globe valve	CTMT
78	1JRCBHV0108	Pressurizer vent to reactor drain tank globe valve	CTMT
79	1JRCBHV0109	Pressurizer vent to reactor drain tank globe valve	CTMT
80	1JRCBPT0102B	Przr pressure (required for RPS/SIAS)	CTMT
81	1JRCBPT104	SDC RCS pressure interlock	CTMT
84	1JRCDPT106	SDC RCS pressure interlock	CTMT
85	1JRCNTE101	Pressurizer temperature	CTMT
101	1JSGCLT1113C	SG-E01A WR level (required for AFAS)	CTMT
102	1JSIAUV0651	RC loop 1 long-term recirc/SDC valve	CTMT
108	1JSIBPSV189	RC loop 2 LTOP relief to sump	CTMT
109	1JSIBUV0614	Safety injection tank 2A discharge isolation globe valve	CTMT
111	1JSIBUV0624	Safety injection tank 2B discharge isolation globe valve	CTMT
120	1JSINPT391	HPSI long-term recirc loop 1 pressure xmtr	CTMT

Item 1MCHEE01 was inaccessible in a locked high-radiation area. For radiological safety considerations, it was decided to remove this component from SWEL 1. A new item was not selected to replace this item for the following reasons:

- This item belongs to system type CH. The removal of this item reduced the number of CH items in SWEL 1 from 11 to 10 (see Table 3-1), which is still a good representation of this system type.
- This item was not identified as having major new or replacement modifications (see Table 3-2). Therefore, the removal of this item from SWEL 1 had no effect on the representation of equipment having major new or replacement modifications.
- 1MCHEE01 belongs to equipment type 21. The removal of this item from SWEL 1 reduced the number of type 21 items from 9 to 8 (see Table 3-3), which is still a good representations of the equipment type.

- 1MCHEE01 is assigned a maximum environment temperature of 120°F. The removal of this item reduced the number of "120°F items" in SWEL 1 from 18 to 17 (see Table 3-4), which is still a good representation of the environment temperature type.

- 1MCHEE01 is not a risk-significant SSC. Therefore, the removal of this item from SWEL 1 had no effect on the representation of high-risk-importance items in SWEL 1.

Following the completion of the Unit 1 at-power 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 15 electrical cabinets per FAQ 4.20 were conducted during the follow-on walkdowns. The list of electrical cabinets that require supplemental inspection is included in Table 3-6.

Table 3-6: PVNGS-1 FAQ 4.20 Supplemental Cabinet Inspections

SWEL 1 Item Number	Walkdown Equipment	Description	Equipment Location
58	1EPHBM32	480 V MCC M32	CTRL
59	1EPHBM34	480 V MCC M34	AUX
60	1EPHBM36	480 V MCC M36	AUX
61	1EPHBM38	480 V MCC M38	AUX
65	1EPKBM42	DC power to TCB1 control circuit	CTRL
68	1EPKCM43 [3]	DC power to TCB1 control circuit	CTRL
57	1EPGBL36	480 V LC36 bus	CTRL
94	1JSBBC03	Reactor trip breaker "B"	AUX
62	1EPKBD22 (ROB to 1EPKBM42)	LC 34 control power	CTRL
66	1EPKCD23 [4] (ROB to 1EPKCM43)	DC distribution panel D23	CTRL
124	1JSABC01	B Train ESFAS relay cabinets	CTRL
64	1EPKBH12	Battery charger "B"	CTRL
69	1EPKCN43	Inverter for shutdown cooling isolation valve 1JSICUV653	CTRL

[3] 1EPKCM43 was inaccessible during 1R17 and was therefore replaced with 1EPKDM44, which was inspected to satisfy FAQ 4.20.

[4] 1EPKCD23 was inaccessible during 1R17 and was therefore replaced with 1EPKDD24, which was inspected to satisfy FAQ 4.20.

Table 3-6: PVNGS-1 FAQ 4.20 Supplemental Cabinet Inspections (Continued)

SWEL 1 Item Number	Walkdown Equipment	Description	Equipment Location
70	1EPKDN44	Inverter for 1JSIDUV654 shutdown cooling B return inside containment isolation valve	CTRL
75	1EPNCN13 [5]	DC/AC inverter "C"	CTRL

The inaccessible equipment walkdowns performed during refueling outage 1R17 are summarized in Table 3-7. Since Train C was protected during refueling outage 1R17, Train C electrical components were substituted with their counterpart from Train D. Table 3-7 indicates equipment substitutions.

Table 3-7: PVNGS-1 Equipment Inspected During Refueling Outage 1R17

SWEL 1 Item Number	Walkdown Equipment	Description	Equipment Location
15	1JCHEHV0239	Charging line to reactor coolant loop 2A isolation globe valve	CTMT
20	1JCPBUV0005A	Containment power access purge supply isolation butterfly damper	CTMT
36	1JHCBUV0044	Discharge sampling from RU-1 containment isolation valve	CTMT
37	1JHCBUV0047	Inlet sampling to RU-1 containment isolation valve	CTMT
53	1EPBBS04	4.16 kV bus S04	CTRL
55	1EPGBL32	480 V LC32 bus	CTRL
56	1EPGBL34	480 V LC34 bus	CTRL
77	1JRCBHV0105	Pressurizer and reactor vessel head vent to reactor drain tank globe valve	CTMT
78	1JRCBHV0108	Pressurizer vent to reactor drain tank globe valve	CTMT
79	1JRCBHV0109	Pressurizer vent to reactor drain tank globe valve	CTMT
80	1JRCBPT0102B	Przr pressure (required for RPS/SIAS)	CTMT
57	1EPGBL36	480 V LC36 bus	CTRL
58	1EPHBM32	480 V MCC M32	CTRL
59	1EPHBM34	480 V MCC M34	AUX
60	1EPHBM36	480 V MCC M36	AUX
61	1EPHBM38	480 V MCC M38	AUX
62	1EPKBD22	LC 34 control power	CTRL
64	1EPKBH12	Battery charger "B"	CTRL

[5] 1EPNCN13 was inaccessible during 1R17 and was therefore replaced with 1EPNDN14, which was inspected to satisfy FAQ 4.20.

Table 3-7: PVNGS-1 Equipment Inspected During Refueling Outage 1R17 (Continued)

SWEL 1 Item Number	Walkdown Equipment	Description	Equipment Location
65	1EPKBM42	DC power to TCB1 control circuit	CTRL
66	1EPKCD23 was inaccessible during 1R17 and was therefore replaced with 1EPKDD24, which was inspected to satisfy FAQ 4.20.	DC distribution panel D24	CTRL
68	1EPKCM43 was inaccessible during 1R17 and was therefore replaced with 1EPKDM44, which was inspected to satisfy FAQ 4.20.	DC power to TCB1 control circuit	CTRL
70	1EPKDN44	Inverter for 1JSIDUV654 shutdown cooling B return inside containment isolation valve	CTRL
75	1EPNCN13 was inaccessible during 1R17 and was therefore replaced with 1EPNDN14, which was inspected to satisfy FAQ 4.20.	DC/AC inverter "D"	CTRL
81	1JRCBPT104	SDC RCS pressure interlock	CTMT
84	1JRCDPT106	SDC RCS pressure interlock	CTMT
85	1JRCNTE101	Pressurizer temperature	CTMT
94	1JSBBC03	Reactor trip breaker "B"	AUX
101	1JSGCLT1113C	SG-E01A WR level (required for AFAS)	CTMT
102	1JSIAUV0651	RC loop 1 long-term recirc/SDC valve	CTMT
108	1JSIBPSV189	RC loop 2 LTOP relief to sump	CTMT
109	1JSIBUV0614	Safety injection tank 2A discharge isolation globe valve	CTMT
111	1JSIBUV0624	Safety injection tank 2B discharge isolation globe valve	CTMT
120	1JSINPT391	HPSI long-term recirc loop 1 pressure xmtr	CTMT
124	1JSABC01	B train ESFAS relay cabinets	CTRL

The equipment that could not be inspected during refueling outage 1R17 is identified in Table 3-8. The walkdown of this equipment was completed on April 30, 2013.

Table 3-8: PVNGS-1 Item Completed During the April 30, 2013, Inspection

SWEL 1 Item Number	Walkdown Equipment	Description	Equipment Location
69	1EPKCN43	Inverter for shutdown cooling isolation valve 1JSICUV653	CTRL

All required and supplemental inspections are complete. Inspection results are documented on the corresponding Seismic Walkdown checklist in Appendix A.

4. SEISMIC WALKDOWNS AND AREA WALK-BYS

4.1 BACKGROUND

Seismic Walkdowns and Area Walk-Bys were performed in accordance with the requirements of Section 4 of EPRI TR-1025286 (Reference 1). The walkdowns were conducted by the SWT, consisting of the two SWEs mentioned in Section 2.2. Members of PVNGS Operations and Engineering provided support during all walkdowns. The SWEs utilized engineering judgment based upon experience and training indicated in Section 2.2, supplemented by existing current licensing basis (CLB) plant documentation and analyses, where applicable, to identify potentially adverse seismic conditions. For items on the SWEL, these potential seismic conditions included any adverse anchorage conditions, adverse seismic spatial interactions, or other adverse seismic conditions. The results of the walkdown and any pertinent observations were documented for each item on the SWEL using the Seismic Walkdown Checklists (SWCs) included in Appendix A. In addition to potentially adverse seismic conditions, observations described in the SWCs include those that, after discussion between the SWEs, were determined to be adequate.

Area Walk-Bys were conducted by the SWT in each area of the plant that contained an item on the SWEL. The Area Walk-Bys identified potentially adverse seismic conditions associated with other SSCs located in the vicinity of the SWEL item (up to a maximum radius of 35 ft from the component). The area examinations identified: 1) adverse anchorage conditions, 2) degraded equipment in the area, 3) potential seismic spatial interactions, 4) adverse cable/conduit raceways and HVAC ducting, 5) potential flooding/spray or fire hazards, and 6) other adverse housekeeping conditions. The results of the walk-bys and any pertinent observations were documented for each inspected area using Area Walk-By Checklists (AWCs), which are included in Appendix B. Observations described on the AWCs include potentially adverse seismic conditions as well as conditions that were discussed and determined to be adequate at that time.

The SWT was assisted by other individuals present on the walkdown, including PVNGS Operations and Engineering personnel. The SWT for PVNGS Unit 1 initial walkdowns consisted of Hunter Young and Timothy Nealon of S&A. For supplemental walkdowns during refueling outage 1R17, the SWT consisted of Hunter Young and Cory Figliolini. Chris Wandell and Winston Borrero led the support from PVNGS for walkdowns as well as the interface with plant operators. Additional PVNGS staff facilitated access to equipment and provided additional information regarding plant procedures and functions of SWEL items. In addition, these individuals assisted in identifying nearby equipment and systems that could cause adverse seismic interaction. Any issue that could not be resolved by consensus of the SWEs during the walkdowns was identified as a potentially adverse seismic condition on the SWC or AWC (as applicable). The conditions identified were evaluated with respect to the CLB. These Licensing Basis Evaluations are listed and described in Appendix D.

4.2 PREPARATION FOR SEISMIC WALKDOWNS

In preparation for the Seismic Walkdowns and Area Walk-Bys, the SWT obtained the SWEL and selected 50% of the items (excluding line-mounted equipment) for anchorage configuration verification. A total of 76 components were identified as potential anchorage verification candidates and 40 were randomly chosen to fulfill the 50% anchorage configuration verification requirement. The selection was adjusted to consider equipment of interest identified by PVNGS, including items that had recent modifications or anchorage changes. PVNGS design drawings, seismic qualification calculations, and vendor/supplier documents (SDOCs) were reviewed and later taken to the field to verify as-installed configurations were consistent with the CLB established by these documents. The SWT also obtained PVNGS equipment layout drawings to establish a detailed walkdown schedule.

To prepare for observations involving potential interaction with masonry block walls, the SWT reviewed the equipment layout drawings associated with the SWEL and located masonry walls in proximity. The Control Building 74 ft, 100 ft, and 140 ft elevations, in addition to the Auxiliary Building sub-100 ft elevations, were found to have block walls adjacent to SWEL items and Area Walk-By items. The SWT obtained and reviewed calculation 13-CC-ZJ-0120 (Reference 60) for Control Building masonry walls and 13-CC-ZA-0140 (Reference 61) for Auxiliary Building masonry walls. The calculations indicate that all in-scope walls were designed and analyzed to not collapse under SSE accelerations, which enabled the SWT to conclude that the SWEL items were free of seismic spatial interaction due to a postulated masonry block wall collapse. The SWT assessed SWEL and Area Walk-By equipment for seismic spatial interaction due to differential movement between the equipment and the masonry block walls.

In anticipation of potential flooding/spray interaction hazards due to threaded fire piping, the SWT obtained fire suppression diagrams provided within the IPEEE Report (Reference 3). These diagrams were later used in the field for Area Walk-Bys to determine whether threaded fire piping, where present, was normally wet or pre-actuated and dry. Preliminary review of the fire suppression diagrams indicated that areas with threaded fire piping are generally pre-activated sprinkler systems and therefore are normally dry, thus precluding potential flooding/spray interaction hazards. However, the SWT was cognizant of exceptions where threaded piping could be normally wet. For these cases, the SWT would look for long spans with flexible supports, which may lead to excessive threaded joint rotation and potential spray.

Additional current licensing basis documentation obtained and reviewed to support the walkdowns included: the in-structure floor response spectra for the SSE (DBM-C5, Reference 53), structural damping criteria per UFSAR Table 3.7-1 (Reference 32), the PVNGS scaffolding procedure and installation specifications (30DP-9WP11 and 13-CN-0380, References 54 and 55), the PVNGS housekeeping procedure (30DP-0WM12, Reference 56), the PVNGS transient material details and analyses (13-A-ZYD-0034 and 13-CC-ZZ-0309, References 57 and 58), the PVNGS lighting details (13-E-ZAL-0011, Reference 59), and the control room ceiling qualification (Log No. 13-10407-A216-12, Reference 65). The PVNGS IPEEE Report (Reference 3) was also obtained and reviewed. This document is discussed in further detail in Section 7.

4.3 WALKDOWN RESULTS

The SWT conducted the initial Seismic Walkdowns for Unit 1 at PVNGS July 30, 2012, through August 2, 2012. For components not originally inspected due to having either inaccessible internal anchorages, being located inside containment, or requiring additional interior inspection related to FAQ 4.20, additional walkdowns were conducted during refueling outage 1R17 on April 6, 2013, through April 7, 2013, and during follow-on inspections performed on April 30, 2013. Detailed walkdown results are provided on the SWCs and AWCs in Appendices A and B, respectively. When walkdown activities identified potentially adverse seismic conditions, licensing basis evaluations were performed and are discussed in Section 5 and Appendix D. Appendix D provides additional information on the resolution and Operability Determinations/Functional Assessments of each of these conditions. A summary of initial walkdown statistics follows:

- A total of 133 components were walked down and 59 Area Walk-Bys were performed. Six items listed on the SWEL (1EPKBD22, 1EPKDD24, 1EPKCD23, 1JRMBB02, 1JRMBB04, and 1JRMCB05) were child components contained within parent SWEL components. These child components are referred to as "Rule of the Box" (ROB) items, for which the walkdown observations are identical to those of the parent item.

- Fifteen (15) SWEL components were electrical cabinets whose interiors were not completely examined during the initial walkdowns. Following the completion of the at-power Seismic Walkdowns, the industry was made aware that the NRC staff had clarified under FAQ 4.20 a position on opening electrical cabinets to inspect for other adverse seismic conditions. Supplemental inspections of 15 electrical cabinets occurred on April 6, April 7, and April 30, 2013. The list of electrical cabinets requiring supplemental inspection per FAQ 4.20 is included in Section 3.4. Three (3) SWEL electrical cabinets originally inspected during at-power walkdowns were inaccessible during the supplemental inspections due to the plant protected train (refer to Table 3-7, Items 66, 68, and 75). To fulfill the recommendations of FAQ 4.20, sister components for these cabinets on the opposite train were fully inspected—including the cabinet interiors—and documented on SWCs.

- One-hundred-one (101) components and forty-nine (49) Area Walk-Bys were resolved in the field as having no potentially adverse seismic concerns. Two Area Walk-Bys were confirmed in the field to have potentially adverse seismic concerns involving seismic housekeeping. In addition, the door to distribution panel 1EPNBD26 was found unlatched and confirmed in the field as a potentially adverse seismic concern.

- Forty-five (45) observations for thirty-one (31) SWEL components and nine (9) Area Walk-Bys could not be readily resolved by the consensus of the SWEs and were considered potentially adverse seismic conditions requiring further evaluation. It is important to note that some SWEL components or Area Walk-Bys may have multiple potentially adverse conditions that involve anchorage, spatial interaction, or other adverse concerns. Twenty-four (24) of the 45 observations requiring further review involved potential anchorage concerns; 17 involved potential seismic spatial interaction concerns; and four involved spray/flooding hazards. Thirty-eight (38) of the 45 potentially adverse conditions were determined to meet the current seismic licensing basis. Seven (7) conditions could not be readily resolved per the Licensing Basis Evaluation process and were entered into the CAP. All 45 Licensing Basis Evaluation items are discussed in Section 5 and Appendix D, which includes additional information on the current status of potentially non-conforming conditions.

Summaries of Seismic Walkdown observations follow:

Potentially Adverse Anchorage Conditions

While inspecting anchorages for SWEL equipment and in-scope Area Walk-By equipment, the SWT noted 24 cases where as-installed configurations could not be verified by the PVNGS documentation brought in the field (drawings, SDOCs, and calculations). Discrepancies included: exceeded bolt projection lengths, varying equipment pad thicknesses for mechanical components, varying weld patterns for electrical equipment, and varying anchorage spacing. Detailed descriptions of these discrepancies are also indicated in Appendix D. To a limited extent, Field Change Requests (FCRs) and Non-Conformance Reports (NCRs) associated with the anchorage documentation that could verify the as-installed configurations were reviewed as part of Licensing Basis Evaluations.

Three potentially degraded anchorage conditions were observed in the field that required further evaluation. Both the EW "B" Heat Exchanger (1MEWBE01) and the Fuel Pool Cooling Heat Exchanger 2 (1MPCBE01) were noted to have loose anchor bolt nuts which may potentially reduce the bolts' uplift capacities. The SWT noted the observations as potentially adverse and sought documentation allowing for backed off nuts as part of Licensing Basis Evaluations. The SWT also observed hairline temperature and shrinkage cracking on the equipment pad for the ESF Switchgear Room "B" Emergency Air Handling Unit (AHU) (1MHJBZ03). The concern is that the anchorage may have reduced capacity if the equipment pad is not properly reinforced. The SWT noted the observation as potentially adverse and sought documentation indicating proper pad reinforcement as part of Licensing Basis Evaluations.

The SWT observed no indications of reinforcement yielding and no signs of excessive corrosion for in-scope safety-related equipment. All cracks observed were noted to be hairline or small cracks (less than 0.03 inch) as defined in EPRI NP-6041-SL (Reference 47).

Potentially Adverse Seismic Spatial Interactions

The SWT noted seventeen (17) SWEL components or areas where equipment had potential adverse seismic spatial interactions that required further evaluation. Ten (10) involved potential equipment spatial interaction with nearby permanent equipment due to potentially insufficient clearances. For valves 1JSGBHV178 and 1JSGBHV185, the SWT observed 1/16 inch clearances between potentially sensitive valve body components and separately structurally mounted components that could potentially interact due to differential motion during an SSE event. In the Area Walk-By for MSSS Room C-302, the SWT noted a flexible conduit pinched between 1JSGEUV0170 (MSIV) and building steel. Valves 1JGRBUV002 and1JWCAUV0062 (refer to AWC AUX A-A09) in addition to dampers 1MHJBM02 and 1MHJBM03 were also observed to have small clearances to permanent equipment. Electrical components with potentially insufficient clearances to permanent equipment included MCC 1EPKBM42, auxiliary relay cabinets 1JZABC01/C02/C03/C04/C05 (refer to AWC AUX A-127), and 1JSABC06 / 1JSABC04 / 1JZJBC02A / 1JESAC01 / 1JSHCC02 (refer to AWC CTRL Outer Horseshoe). All ten (10) interaction concerns due to potentially insufficient clearances were documented for further review under Licensing Basis Evaluations.

Two (2) SWEL components or areas involved potential adverse seismic spatial interactions due to overhead items. 1MPCAP01 and other safety-related components in the area (refer to AWC DG G-104) are within the zone of influence of large, flat panel lighting mounted overhead should they fail in a seismic event. Documentation detailing the anchorage of these lights was sought as part of Licensing Basis Evaluations.

The SWT inspected overhead piping and distribution systems including cable trays and found them well-anchored and ruggedly supported throughout the unit. Large fire extinguishers on small hooks that could

possibly uplift and fall were found throughout the unit, but no safety-related equipment items were within fire extinguisher zone of influence. Overhead lighting was also noted to be rugged in all areas with sensitive equipment, particularly the Control Building. Where equipment is less sensitive to impact, several instances of lighting fixtures supported by S-hooks with disengaged or missing setscrews were observed. The SWT judged all cases not to be hazardous to safety-related equipment, but the conditions were noted and documented in the CAP.

All attached lines and piping to SWEL equipment were inspected and readily concluded to have adequate flexibility in the field. One exception was noted on the EW "B" Heat Exchanger (1MEWBE01) where the relief line on top may be subjected to overstress due to differential motion between floors. This observation was noted for further review under Licensing Basis Evaluations.

As noted in Section 4.2, all SWEL components and Area Walk-By equipment within the zone of influence of masonry block walls were evaluated prior to walkdowns not to be impact hazards due to collapse per existing calculations. No seismic spatial interaction hazards due to differential movement between the equipment and the masonry block walls were observed during the walkdowns.

All scaffolding encountered by the SWT was found to be adequately braced and anchored in addition to having sufficient clearances to safety-related equipment in accordance with station procedures.

Several housekeeping issues were discovered within the unit. Two housekeeping issues were confirmed as found in the field by the SWT to be potentially adverse seismic conditions. A large waste bin located approximately 12" from a safety-related J-box (1EZF1AAKJ01) was observed during the Area Walk-By of the 100' Elevation of the Fuel Building near the Fuel Building AHUs. The condition was immediately corrected by PVNGS Operations and documented under Palo Verde Action Request (PVAR) 4221593. The SWT also noted laydown equipment stored in proximity to safety-related HVAC duct on the 140' elevation of the Fuel Building (refer to AWC FB 140). The condition was also documented under PVAR 4221593. Housekeeping issues that were found in violation of the housekeeping procedure (Reference 56) were entered into the CAP.

Detailed descriptions of all potentially adverse seismic spatial interaction concerns are provided in Appendix D.

Other Potentially Adverse Seismic Conditions

The SWT observed an unlatched door on distribution panel 1EPNBD26, which contained an undervoltage relay and ground relay inside although not on the door. The condition was corrected immediately and documented under PVAR 4219492. The SWT did not note any other degraded conditions, missing equipment fasteners, or irregular mountings on equipment.

Potential Flooding/Spray Hazards

The SWT was cognizant of potential spray and flooding hazards particularly from threaded fire piping. Overhead fire piping was generally found to be welded and ruggedly supported (no rod hung piping) at short and regular intervals. Areas that had threaded piping were either confirmed to be pre-activated and therefore normally dry or have adequate rigid support spacing so as to preclude excessive joint rotation. One SWEL item and three Area Walk-Bys were observed by the SWT to have potential spray hazards that required additional review as part of Licensing Basis Evaluations. ESF Switchgear Room "B" Emergency AHU (1MHJBZ03, also refer to AWC CTRL J-A05) was observed to be in proximity of a leaking solder joint on the domestic service (DS) water piping north of the AHU. The Area Walk-By for the "B" Diesel Generator Room (refer to AWC DG G-104) was observed to have DS piping within the zone of influence of heavy heaters and lights overhead should they fall during a seismic event. The Area

Walk-By associated with Reactor Trip Breaker "B" (refer to AWC AUX A-227) was observed to have large air handlers on vibration mounts. The concern is that the AHUs could fall off their mounts, allowing their pipe connections to break, flood the area, and open the reactor trip breakers.

Potential Seismically Induced Fire Interactions

No potential seismically induced fire interactions were noted for Unit 1 by the SWT. This included no observations of hazardous/flammable material stored in inadequately anchored drums, inadequately anchored shelves, or unlocked cabinets; and no adverse natural gas or hydrogen lines.

Non-NTTF 2.3 Related Observations

The SWT (including PVNGS Operator and Engineering SWEs) were also cognizant of issues not necessarily pertaining to the seismic qualification of safety-related equipment. The SWT noted conditions such as:

- Broken/missing floor grating clips
- Missing or partially-engaged set-screws on pendant lighting S-hooks
- Support showing wear from seal water tubing to charging pump
- NQR junction box with panel nut not installed
- General housekeeping issues such as:
    - Squeegee stored near AHU
    - Step ladder near surge tank

Non-NTTF 2.3 observations were recorded on the SWCs/AWCs and entered into the PVNGS CAP. Many of these conditions were also corrected on-the-spot by the operations member of the SWT. None of these observations (by definition) represented potentially adverse seismic conditions – fasteners were located on non-seismic components; lighting and loose or unsecured items were not within the zone of influence of any soft targets.

5. LICENSING BASIS EVALUATIONS

The 45 potentially adverse seismic conditions requiring further evaluation identified in either the equipment Seismic Walkdowns or the Area Walk-Bys as discussed in Section 4 were evaluated with respect to their seismic licensing basis. As indicated in Section 4.3, 24 of the 45 items requiring further review involved potential anchorage concerns; 17 involved potential seismic spatial interaction concerns; and four involved spray/flooding hazards. These potentially adverse conditions are included in Appendix D, along with their dispositions. Thirty-eight (38) of the 45 potentially adverse conditions were determined to meet their seismic licensing basis. The seven (7) NTTF status "N" potentially adverse seismic conditions that could not readily be shown to meet the current seismic licensing basis were entered into the site's CAP. For each of the items that fell into this category, the PVAR number is included in the disposition text, which is shown in Appendix D. Additional information pertaining to the current resolution and Operability Determinations/Functional Assessments of these items is included in Appendix D.

General methodologies adopted by the Licensing Basis Reviewers listed in Section 2.3 for addressing the observations noted in Section 4 are summarized in the following subsections.

Evaluations of Potentially Adverse Anchorage Conditions

For the anchorage observations noted in Section 4 that involved discrepancies between the as-installed configurations and the anchorage documentation (drawings, SDOCs, and calculations) taken into the field, the Licensing Basis Reviewers collected and reviewed FCRs and NCRs for updates to the field documents that represent the Current Licensing Basis (CLB). Eighteen (18) as-installed anchorage configurations were determined to meet their seismic licensing basis. Five (5) as-installed anchorage configurations for SWEL components 1MHFAJ01, 1MHFBJ01, 1MPCAE01, 1MECBE01, and 1MPCBE01 could not be readily shown to reflect CLB documentation, and therefore were entered into the CAP and indicated as potentially non-conforming conditions by the listing of "No" under Question 5 of the SWCs. The two potentially degraded conditions involving backed off nuts for 1MEWBE01 and 1MPCBE01 were confirmed not to have documentation allowing for gaps. Therefore, these items were entered into the CAP and indicated as non-conforming conditions by the listing of "No" under Question 2 of the SWCs.

Evaluations of Potentially Adverse Seismic Spatial Interactions

Observations involving the possibility of insufficient clearances between safety-related components were generally resolved by estimating relative displacement from the in-structure response spectra of Reference 53. Given equipment anchorage and spatial configuration, the Licensing Basis Reviewers determined lower-bound estimates of component frequencies. These frequency estimates along with the appropriate damping values from UFSAR Table 3.7-1 (Reference 32) were used to obtain spectral accelerations. Component displacement was then estimated by the following formula (Reference 63):

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

Where SF = modal shape factor (1.6 for cantilever)

S_a = spectral acceleration (g) from response spectra

ω = fundamental frequency (Hz)

If the combinations of component displacements under SSE loadings did not exceed the gap noted in the walkdown, the gap was noted as sufficient to preclude impact.

In some instances, licensing basis evaluations of potential spatial interactions were resolved by inspection of installation details and existing analyses. This disposition method was applied for the auxiliary relay cabinets located 1/8-inch from concrete walls. The Licensing Basis Reviewers located EQCF D95-0038 (Reference 65), which documents that the auxiliary relay cabinets were analyzed by finite element methodology and determined to be rigid. Therefore, the 1/8-inch as-built gap was noted as sufficient.

All but one of the potential spatial interaction concerns were determined to meet their seismic licensing basis. Storage of material near a SC-1 duct in Area FUEL 140 ft. which could potentially impact the duct was immediately corrected. The condition was entered into the CAP and indicated as a non-conforming condition by the listing of "No" under Question 7 of the AWC.

Evaluations of Other Potentially Adverse Seismic Conditions

There were no Licensing Basis Evaluations pertaining to other adverse seismic conditions (loose/missing fasteners, heavy additions to cabinets, unlatched cabinet doors) for Unit 1.

Evaluations of Potential Flooding/Spray Hazards

Potential flooding/spray hazards noted during the walkdown were evaluated by a combination of further documentation review and reassessment of photographs and walkdown information. Of particular note, the vibration-mounted AHUs in proximity to the reactor trip breakers on the 120' elevation of the Auxiliary Building were determined to pose no spray or flood hazard to the reactor trip breakers. Per PVNGS, potential impacts of flooding/spray hazards are mitigated by the enclosed protective cabinets (designed as drip-proof per SDOC N001-1303-00057 (Reference 65)), which house the reactor trip breakers and the distance from the AHUs. All potential flooding/spray hazards were resolved.

Evaluations of Potential Seismically Induced Fire Interactions

No potential seismically induced fire interactions were noted for Unit 1 by the SWT; therefore, there are no Licensing Basis Evaluations.

6. PEER REVIEW

6.1 INTRODUCTION

This section documents the independent peer review for the Near-Term Task Force (NTTF) Recommendation 2.3 Seismic Walkdowns performed by Stevenson & Associates (S&A) for Unit 1 of Palo Verde Nuclear Generating Station (PVNGS). The peer review addresses the following activities:

- Review of the selection of the structures, systems, and components, (SSCs) that are included in the Seismic Walkdown Equipment List (SWEL)
- Review of a sample of the checklists prepared for the Seismic Walkdowns and Area Walk-Bys
- Review of the licensing basis evaluations
- Review of the decisions for entering the potentially adverse conditions in to the plant's Corrective Action Program (CAP)
- Review of the final and supplement submittal reports

The peer reviewers for Palo Verde Unit 1 are Messrs. Walter Djordjevic of S&A and Gary L Douglas of Westinghouse. Mr. Djordjevic is designated the peer review Team Leader and participated in all peer review activities as the seismic subject matter expert. Mr. Douglas participated in all peer review activities and led the SWEL selection peer review as the SWEL selection subject matter expert. Neither peer reviewer was involved in the Seismic Walkdown inspection process. Mr. Djordjevic is an advanced degree structural engineer with over 30 years of nuclear seismic experience. He has received Seismic Capability Engineer (EPRI SQUG training), EPRI IPEEE Add-on, Seismic Fragility and Seismic Walkdown Engineer (SWE) training. Mr. Douglas is a nuclear engineer with 15 years of nuclear engineering experience and 10 years of aerospace engineering experience. Resumés are provided in Appendix E.

The peer review of the SWEL development began on July 25, 2012, and was completed on July 28, 2012. All findings noted on the SWEL Peer Review Checklist were resolved. The completed SWEL Peer Review Checklist is found in Appendix C. The results of the SWEL development peer review are discussed in Section 6.2.

The peer review of the Seismic Walkdown inspection started on July 25, 2012, with a peer check of the actual walkdowns for Unit 2. Messrs. Djordjevic and Douglas joined the walkdown team for a portion of the day's planned walkdowns to observe the conduct of walkdowns and adherence to the Seismic Walkdown Guidance (SWG) (Reference 1). No additional peer review site visits were made for the Unit 1 walkdown as the same procedures were implemented and a similar suite of SWEL equipment was inspected as selected for PVNGS Unit 2. The required interviews were conducted by Messrs. Djordjevic and Douglas with the SWE inspection team on August 23, 2012, after review of a sample of the Unit 1 Seismic Walkdown Checklists (SWC) and Area Walk-By Checklists (AWC) to ascertain the quality and procedural compliance with the SWG. An additional interview was conducted by Messrs. Djordjevic and Douglas with Mr. Hunter A. Young on August 19, 2013, to review the SWCs and AWCs completed during the follow-on walkdowns. The discussion of the results of these sample SWC and AWC reviews are provided in Section 6.3.

The results of the peer review of licensing basis evaluations are provided in Section 6.4. These assessments and their outcomes were also discussed with the SWE inspection team on August 23, 2012, and August 19, 2013. The peer reviewers reviewed the 45 licensing basis evaluations and found the final

determinations made by the SWEs to be correctly performed, and also concurred with the conclusions for the 7 items that were not readily determined to meet current licensing basis which were placed in the corrective action program.

6.2 PEER REVIEW – SELECTION OF SSCs

6.2.1 Purpose

The purpose of this section is to describe the process used to perform the peer review of the selected SSCs that were included in the SWEL.

6.2.2 Peer Review Activity – Selection of SSCs

The guidance in EPRI Technical Report 1025286, *Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic*, dated June 2012 (Reference 1), Section 3: Selection of SSCs was used as the basis for this review.

This peer review was also based on reviews of the spreadsheets utilized by the SWEL developers to generate the Base Lists and Seismic Walkdown Equipment Lists.

Peer review was also based on interviews with the following individuals who were directly responsible for development of the SWEL:

- Rolando Perez (Westinghouse)
- Derek Seaman (Westinghouse)
- Chris Wandell (Palo Verde Engineering)
- Winston Borrero (Palo Verde Engineering)

This peer review utilized the Seismic Walkdown Guidance checklist shown in Reference 1 Appendix F: Checklist for Peer Review of SSC Selection.

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

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

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

Verification that the SSCs selected include an appropriate representation of items having the following sample selection attributes:

- Various types of systems
- Major new and replacement equipment
- Various types of equipment

- Various environments
- Equipment enhanced based on the findings of the IPEEE program
- Risk insight consideration

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

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

Verification that appropriate justification was documented for spent fuel pool related items that were not included in SWEL 2.

6.2.3 Peer Review Findings – Selection of SSCs

This peer review found that the process for selecting SSCs that were added to the SWEL complied with the process outlined in Reference 1, Section 3: Selection of SSCs. SWEL 1 selections totaled 124 items and SWEL 2 selections totaled six items.

The peer reviewers verified that the SSCs selected represented a diverse sample of the equipment required to perform the five safety functions. The bases for items selected to SWEL 1 were the IPEEE Report, Appendix 3.A (Reference 3), which listed safe shutdown equipment from each redundant train of the systems supporting the five safety functions, and Seismic Category I items from the Seismic Probabilistic Risk Assessment (SPRA) database. A breakdown of the safety functions represented by the SWEL 1 selections follows:

Reactivity control – 39 SWEL selections support this function

Pressure control – 80 SWEL selections support this function

Inventory control – 53 SWEL selections support this function

Decay heat removal/ultimate heat sink – 89 SWEL selections support this function

Containment function – 19 SWEL selections support this function

The peer reviewers verified that the SSCs selected to SWEL 1 include an appropriate representation of items having the required sample selection attributes. A breakdown of the sample selection attributes represented by the SWEL 1 selections follows:

Twenty-seven (27) of 31 Base List systems were represented in the SWEL 1 list. The peer reviewers recommended that equipment from two unrepresented systems be added to the SWEL list. Components from the remaining unrepresented systems were component types that were adequately represented by other system selections. Since all five safety functions are also adequately represented by the SWEL, the peer review team concluded that the "various types of systems" sample selection attribute was satisfactorily represented.

Fifteen (15) of 38 major new or replacement items were represented in the SWEL 1 list. The sources for these items were Design Basis Manuals for the systems supporting the five safety functions. Several of the new or replacement items involved a change to a group of similar items, and at least one item was selected from each group to represent the change. The peer review team concluded that the "major new and replacement equipment" sample selection attribute was satisfactorily represented. During review of the submittal report, a revision to the SWEL was needed to correct an error to this sample consideration attribute in the spreadsheet that was used to track and implement the SWEL selection process. This error did not result in a change to the

Base List or SWEL selections; it increased the number of major new or replacement items represented in the SWEL 1 list. The peer reviewers verified that the Seismic Walkdown Guidance requirements for this sample consideration attribute were maintained.

Twenty (20) of 22 types of equipment were represented in the SWEL 1 list. The equipment types not represented were "compressors" and "motor-generator sets." The site does not have safety-related equipment in these equipment types. Equipment type "transformer" is a subcomponent to equipment type "switchgear." The peer review team concluded that the "various types of equipment" sample selection attribute was satisfactorily represented.

All environments were represented in the SWEL 1 list. The Palo Verde Units are located in a dry environment; therefore environment classification was based on the maximum design temperature of the equipment rooms. Since at least one item was selected from each environment classification the peer review team concluded that the "various environments" sample selection attribute was satisfactorily represented.

No items were added to the SWEL 1 list based on findings of the IPEEE program because no equipment enhancements were required in Unit 1.

Twenty-six (26) of 70 risk-significant items were represented in the SWEL list. Risk insights were applied from the Seismic PRA and Internal Events models to the selection of items to the SWEL. The peer review team concluded that the "risk insights" sample selection attribute was satisfactorily represented.

The peer reviewers verified that spent fuel pool related items were considered and appropriately added to SWEL 2.

Spent fuel pool related items considered were based on a review of design basis manual descriptions, piping and instrumentation drawings, isometric drawings, and a system review using the Site Work Management System (SWMS). All items that screened into Base List 2 were selected to SWEL 2.

The peer reviewers verified that appropriate justification was documented for spent fuel pool related items that were not included in SWEL 2.

The justification for screening out spent fuel pool related items was reviewed and found to be supported by the Seismic Walkdown Guidance (Reference 1). Components in-line with Seismic Category I piping were screened out. No rapid drain-down items were included in SWEL 2. This conclusion was supported by a review of the UFSAR (Reference 32) which determined that all pipe penetrations through the pool wall are at or above the minimum required water level of 10 ft above top of fuel assemblies. All pipes extending down into the pool have siphon breaker holes that are at or above the minimum required water level of 10 ft above top of fuel assemblies. All items that screened in to Base List 2 were selected to SWEL 2; therefore the peer review team concluded that appropriate justification was documented.

The completed peer review checklist in Appendix C documents the peer review results.

The SWEL was revised during the follow-on walkdowns to remove component 1MCHEE01, and to replace three (3) protected Train C components with corresponding Train D components which were readily accessible. This change reduced the number of SWEL 1 items from 125 to 124. The component was removed because it was located in a locked high-radiation area. It was not necessary to replace 1MCHEE01 with a similar equipment type since the sampling selection attributes remained adequately represented by multiple items on the SWEL. The replacement of Train C components with corresponding Train D components is acceptable per the guidance requirements. The Peer Review Team reviewed these

SWEL changes and verified that all sampling selection attributes remained adequately represented on the SWEL.

6.2.4 Resolution of Peer Review Comments – Selection of SSCs

The peer review comments documented in the peer review checklist in Appendix C were resolved in a timely manner and improved the Seismic Walkdown process as summarized in the following:

- Additional SWEL selections from systems SA and ZJ were recommended; this enhanced the system variety represented on the SWEL.
- Adding an Area Walk-By of the SFP to evaluate interactions of equipment with the SFP transfer gates and inflatable seal equipment was recommended; this enhanced the walkdown effort.
- The enhancements and editorial corrections made to the Unit 2 SWEL report were incorporated into the Unit 1 SWEL report prior to this peer review; this improved report clarity.
- Provided clarification that DF system items will be adequately evaluated by the DG system SWEL Walkdowns and Area Walk-Bys; this provided for clarity in the report.

6.2.5 Conclusion of Peer Review – Selection of SSCs

This peer review concluded that the process for selecting SSCs to be included in the Seismic Walkdown equipment list complied with the process outlined in Reference 1, Section 3: Selection of SSCs. It is further concluded that the SWEL sufficiently represents a variety of the required sampling of plant Seismic Category I safe shutdown equipment to meet the objectives of the NRC 50.54(f) letter (Reference 50).

6.3 PEER REVIEW OF SAMPLE SEISMIC WALKDOWN AND AREA WALK-BY CHECKLISTS

A site visit was made on July 25, 2012, by Messrs. Walter Djordjevic and Mr. Gary L. Douglas to perform the peer review of the Seismic Walkdown team's inspection of Unit 2 equipment. This allowed constructive feedback to be provided to the walkdown team in the field for subsequent application in the Unit 1 and Unit 3 walkdowns. A final review of the SWCs and AWCs was performed on August 22 and 23, 2012, after which an interview was conducted by Messrs. Djordjevic and Douglas with the SWE inspection team in accordance with the SWG requirements. The SWE trained walkdown engineers were Messrs. Hunter A. Young and Timothy S. Nealon. An additional interview was conducted by Messrs. Djordjevic and Douglas with Mr. Hunter A. Young in accordance with the SWG requirements on August 19, 2013.

Table 6-1 lists the SWC and AWC samples which represent 25% of the SWC and 24% of the AWC populations, respectively. The sample includes equipment from various equipment classes to introduce diversity to the sampling procedure.

Table 6-1: SWC and AWC Peer Review Samples from Seismic Walkdown Inspection for Unit 1

Equipment Identification	Equipment (GIP) Class	Walkdown Item	Observations
1EPHBM32	1	Motor Control Center	Gap is properly assessed given that MCC is rigid in the longitudinal direction, so evaluation is acceptable
1EPKDN44	16	Inverter for Shutdown Cooling B Return	No comment
1EPNCD27	14	Power to PPS "C" Instrumentation	No comment
1JAFBFT0041B	18	AFW Instrument Rack	No comment
1JAFBUV0035	8	SG-E01B Isolation Valve	No comment
1JCHBUV0924	8	Regenerative Heat Exchanger Outlet Isolation Globe Valve	No comment
1JHCBPT0351B	18	Containment Pressure Instrument rack	Verified spring nuts on drawing 13-J-ZZS-0143 and -0147
1JHCBPT0351D	18	Containment Pressure Instrument rack	Verified spring nuts on drawing 13-J-ZZS-0143 and -0147
1JRMNB02	20	RWT Level Panel	Performed licensing basis evaluation. PVAR 4220252 generated to correct sheet 53 of calculation 13-CC-ZQ-J01 to reflect installed configuration depicted on sheet 49.
1JRMCB05	20	Control Room Board	No comment
1JSBBC02A	18	I/V Converter Instrument Rack	Adjacent masonry wall is seismically designed
1JSGBHV0185	7	Atmospheric dump valve HV-185	Verified existing gap of approximately 1/16" is insufficient to prevent contact between SOV 1SGB-HY185B and tube steel; however, it is also determined that SOV functionality will not be impaired. Recommendation is to cut HSS member or move mounting channel to provide additional clearance. PVAR 4250333 was entered into the CAP system to document the observation and resolution.
1JSGBUN0135	7	SG-E01B Isolation Valve	No comment
1JSIBPSV409	7	HPSI Train B Injection to EDT Relief	No comment
1JSIBUV0665	8	Containment Spray Pump Recirc to RWT Train B Globe Valve	No comment
1JSIBUV676	8	Sump Isolation Valve	No comment
1MCHBP01	5	Charging Pump 2	No comment
1MCTET01	21	CST	No comment
1MECBE01	11	Essential Chiller B	Excessive bolt projections cannot be reconciled. PVAR 4275110 generated to reconcile the configuration discrepancy.
1MEWBP01	5	EW Pump B	No comment
1MHDBJ01	9	DG "B" Room Essential Exhaust Fan	No comment

Table 6-1: SWC and AWC Peer Review Samples from Seismic Walkdown Inspection for Unit 1

1MHJBF04	10	Control Room EAHU	No comment
1MHJBM03	8	MO Damper	Clearance to duct (1/4") determined to be adequate
1EPKDM44	1	Motor Control Center	Verified anchorage with Sheet 95 of calculation 13-CC-ZQ-E01
1EPNDN14	16	Inverter	Verified anchorage with calculation 13-CC-ZQ-E01
1JRCBPT0102B	18	Przr pressure (required for RPS/SIAS)	Verified anchorage with Detail 1 on SDOC N001-1301-00698
1JRCBPT104	18	SDC RCS pressure interlock	Verified anchorage with Detail 1 on SDOC N001-1301-00698
1JRCDPT106	18	SDC RCS pressure interlock	Verified anchorage with Detail 1 on SDOC N001-1301-00698
1JSGCLT1113C	18	SG-E01A WR level (required for AFAS)	Verified anchorage with Detail 1 on SDOC N001-1301-00698
1JSINPT391	18	HPSI long-term recirc loop 1 pressure xmtr	Verified anchorage with Detail 2 on Drawing 13-J-01D-0119
1EPGBL32	2	480 V LC32 bus	Clearance to cable tray (1/16") determined to be adequate; evaluation acceptable
1EPGBL36	2	480 V LC36 bus	No comment
1EPHBM34	1	480 V MCC M34	Environmental enclosure clearance to building steel (1-1/2") and cable tray (3/8"), and to the MCC internally (1/2") determined to be adequate; potential S-hook interaction determined to have no impact; evaluations acceptable

Area Walkdown Description	Observations
Area: Aux, 100', A-127	C02, C03, C04 all within close proximity to J wall. C01 is within 1/8" at top to wall. Licensing Basis Evaluation: Per EQCF D95-0038 (Ref. 65), all ZAA and ZAB cabinets were analyzed with finite element methodology and determined to be rigid. Therefore, the as-built gap is sufficient.
Area: Aux, 40', A-D15	No comment
Area: AUX, 70', A-B21	Light fixtures (3 with open s-hooks) could fall on 1" piping but cannot damage piping
Area: Control,100', J-109	No comment
Area: Control,140', Inner Horseshoe	No comment – suspended ceiling is Category I, no seismic interactions
Area: DG, 100', G-104	No comment – good housekeeping and heater meets seismic requirements
Area: Fuel Bldg, 140' SFP Proximity	Numerous housekeeping issues along south and west walls. One potential impact with Category I duct on west wall
Area: MSSS, 140', C-302	Flexible conduit between MSIV and building steel. Licensing Basis Evaluation: Review of photographs from walkdowns indicated that flexible conduit could withstand MSIV movement due to SSE since valve is well-supported within very close proximity. Accordingly, differential movement between the MSIV and the building steel will be negligible. Therefore, there is no adverse seismic concern.
Area: SP, 140', Y-124	No comment
Area: Yard, 93', CST proximity	Light near DMWT judged to not be a hazard
Area : CTMT, 100, 1JCHEHV239 Proximity	No comment

Table 6-1: SWC and AWC Peer Review Samples from Seismic Walkdown Inspection for Unit 1

Area : CTMT, 120, 1JRCDPT106 Proximity	Photographs labeled "U1 Outage NTTF 2" are inconsistent with the labeling used elsewhere in the report; corrected in Appendix B.
Area : CTMT, 80, 1JSINPT391 Proximity	No comment
Area : CTMT, 140, Pressurizer Cube	No comment

6.4 REVIEW OF LICENSING BASIS EVALUATIONS

Appendix D provides a list of the potentially adverse seismic conditions identified during the Unit 1 Seismic Walkdowns and Area Walk-Bys and how they were addressed. If a PVAR was generated, it is referenced in Appendix D. Messrs. Djordjevic and Douglas conducted an interview with the SWE inspection team on August 23, 2012, to discuss the issues identified to determine if, in the opinion of the peer reviewers, any of them potentially challenged the current licensing basis of the plant.

As noted in Section 5, there were 45 potentially adverse seismic conditions identified in either the equipment Seismic Walkdowns or the Area Walk-Bys requiring evaluation with respect to their seismic licensing basis. Not all potentially adverse conditions were resolved. The peer reviewers performed a review of all completed licensing basis evaluations and the walkdown team's decisions for entering these potentially adverse seismic conditions into the plant's CAP. Thirty-eight (38) of the licensing basis evaluations determined that the potentially adverse conditions were ultimately found to be in compliance with the current licensing basis. Of the remaining seven (7) potentially adverse seismic conditions that were entered into the plant's CAP, six (6) involved follow-up verification of the as-built anchorage configuration with plant documentation and one (1) involved potential interaction between storage material and Seismic Category I ducting in the spent fuel pool area. The peer reviews of Sections 4.3 and 5, and Appendix D led the peer reviewers to conclude that the licensing basis evaluations carefully compared the actual as-found plant configurations to the current licensing basis documentation in order to assess configuration compliance with the Palo Verde design basis, and the decisions for entering conditions into the plant's CAP complied with the expectations of the SWG.

CAP Status Review

The peer reviewers performed a review of the status of items that were entered into the plant's CAP as a result of the Seismic Walkdowns (see Table 6-2). This supplement submittal report was found to appropriately reflect these updates.

Table 6-2: Table of CAP Status from Seismic Walkdown Inspection for Unit 1

CAP	Item	CAP Status
PVAR 4221593	Area: FUEL 100' large waste bin located approximately 12" from a safety-related J-box (1EZF1AAKJ01)	Action completed. Housekeeping issue corrected.
PVAR 4219492	1EPNBD26 unlatched door	Action completed. Condition corrected.
PVAR 4250333	1JSGBHV0185 gap of approximately 1/16" between SOV 1SGB-HY185B and tube steel	Action completed. Evaluated using existing calculation 13-MC-SG-0515. Condition corrected.
PVAR 4214832	Bookcases in the zone of influence of the main control boards	Action completed. Bookcases removed in all three units.

Table 6-2: Table of CAP Status from Seismic Walkdown Inspection for Unit 1

CAP	Item	CAP Status
PVAR 4221758	1MEWBE01 slightly loose nut on E saddle anchor bolt	Action completed. Evaluated as no impact on seismic capability and no operability impact. Condition corrected.
PVAR 4221593	Area: FUEL 140' Seismic Category I duct along W wall with storage material that could potentially impact the duct	Action completed. All improperly restrained items were corrected.
PVAR 4220252	1JRMNB02 anchorage configuration could not be readily verified against CLB documentation	As-found condition meets CLB as evaluated against Sheet 49 of existing calculation 13-CC-ZQ-J01. EDC 2013-00470 will update Calculation 13-CC-ZQ-J01 to enhance documentation.
PVAR 4220252	1JRMNB04 anchorage configuration could not be readily verified against CLB documentation	As-found condition meets CLB as evaluated against Sheet 50 of existing calculation 13-CC-ZQ-J01. EDC 2013-00470 will update Calculation 13-CC-ZQ-J01 to enhance documentation.
PVAR 4275110	1MHFAJ01 anchorage configuration could not be readily verified against CLB documentation	As-found condition meets CLB as evaluated within existing NCR CF-01260.
PVAR 4293568	1MHJBZ03 leaking solder joint on the DS piping north of the AHU .	Joint evaluated as no potential for spray hazard to safety related equipment; Working action plan to correct the leaking joint.
PVAR 4275110	1MPCAE01 anchorage configuration could not be readily verified against CLB documentation	As-found condition meets CLB as evaluated in existing calculation 13-CC-ZQ-M001.
PVAR 4275110	1MECBE01 anchorage configuration could not be readily verified against CLB documentation	Evaluated using calculation 13-CC-ZJ-0085. No impact on seismic capability and no operability impact. As-found configuration will be documented on EDC 2013-00470.
PVAR 4275110	1MHFBJ01 anchorage configuration could not be readily verified against CLB documentation	As-found condition meets CLB as evaluated within existing NCR CF-01260.
PVAR 4275110	1MPCBE01 anchorage configuration could not be readily verified against CLB documentation	As-found condition (no torque on sliding support nuts and 2 middle bolts not installed) meets CLB as evaluated in existing calculation 13-CC-ZQ-M001.
PVAR 4220895	1MPCBE01 E saddle SW bolt nut is loose with gap	Action completed. As-found condition (gap and missing washer) has been corrected to meet CLB.
PVAR 4293568	Area: CTRL J-A05 spray hazard concern from HJB-Z03	Joint evaluated as no potential for spray hazard to safety related equipment; Working action plan to correct the leaking joint.

6.5 REVIEW SUBMITTAL REPORT

The entire final submittal report has been reviewed by Messrs. W. Djordjevic and G. Douglas and found to meet the requirements of EPRI TR-1025286 – Seismic Walkdown Guidance (Reference 1). The update submittal report has been reviewed by Messrs. W. Djordjevic and G. L. Douglas and found to meet the requirements of EPRI TR-1025286 - Seismic Walkdown Guidance (Reference 1).

7. IPEEE VULNERABILITIES

A summary of IPEEE vulnerabilities is available in Palo Verde Nuclear Generating Station Individual Plant Examination of External Events report (Reference 3). Per Reference 3, no seismic vulnerabilities were determined to exist at PVNGS-1 and no significant changes to plant design were required in order to demonstrate the ability to mitigate the Review Level Earthquake (RLE). All observations identified from the IPEEE walkdowns were resolved prior to issuing of the IPEEE report on June 1, 1995.

Table 4-1 of PVNGS CORR 94-001-506 (Reference 62) had documented items to review for the Seismic IPEEE prescreening and walkdown of all three units; and Table 3-4 of Reference 3 summarized the resolution of these original walkdown concerns. The IPEEE report (Reference 3) concluded that all components have capacities exceeding the 0.3g peak ground acceleration of the RLE. However, action was taken to improve the seismic capacity of the bookcases located behind the control cabinets in the Unit 3 Control Room. The existing anchorage was determined to be marginal, and additional anchorage was provided prior to issuing of the IPEEE report to resolve the concern. While the condition was also noted for the same bookcases in Unit 1 per Reference 62, the IPEEE report did not specify action to provide additional anchorage for these bookcases.

As noted in Section 4.2, the SWT reviewed the IPEEE report prior to conducting walkdowns. Similar observations noted in the IPEEE report regarding the Control Room bookcases were also noted for review during these walkdowns. The SWT reviewed Detail 35 of 13-A-ZYD-0034 (Reference 57), which specifies 23 metal screws fastening the bookcases in all three units to the metal stud wall. The SWT and licensing basis reviewers determined that, although the as-installed anchorage for the Unit 1 bookcase did not comply with this detail, the demand forces were adequately low to preclude failure; therefore, no adverse spatial interaction was identified. As a result of this observation, PVAR 4214832 was generated and PVNGS removed these bookcases from the zone of influence of the main control boards in all three units.

8. REFERENCES

1. EPRI Technical Report 1025286, Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic, dated June 2012
2. Drawing 13-I-ZZI-0001.R011, "Site Work Management System (SWMS) Equipment Database."
3. CORR 102-03407, "Palo Verde Nuclear Generating Station – IPEEE."
4. Design Basis Manual DBM AF, "Auxiliary Feedwater System," Revision 22.
5. Design Basis Manual DBM CH, "Chemical and Volume Control System," Revision 21.
6. Design Basis Manual DBM DF/DG/PE, "Diesel Generator, Class 1E Standby Generation, Fuel Oil Storage and Transfer System," Revision 23.
7. Design Basis Manual DBM EC, "Essential Chilled Water System," Revision 13.
8. Design Basis Manual DBM EW, "Essential Cooling Water System," Revision 23.
9. Design Basis Manual DBM FW, "Feedwater System," Revision 13.
10. Design Basis Manual DBM HA, "Auxiliary Building HVAC System," Revision 17.
11. Design Basis Manual DBM HC, "Containment Building HVAC System," Revision 9.
12. Design Basis Manual DBM HD, "HVAC - Diesel Generator Building," Revision 12.
13. Design Basis Manual DBM HP, "Containment Hydrogen Control System," Revision 13.
14. Design Basis Manual DBM MA, "Main Generation System," Revision 8.
15. Design Basis Manual DBM NA, "13.8 kV AC Non-Class 1E Power System," Revision 10.
16. Design Basis Manual DBM NC, "Nuclear Cooling Water System," Revision 19.
17. Design Basis Manual DBM NE, "Station Blackout Topical," Revision 18.
18. Design Basis Manual DBM PB, "Class 1E 4.16 kV Power System," Revision 13.
19. Design Basis Manual DBM PG, "Class 1E 480 VAC Power Switchgear System," Revision 11.
20. Design Basis Manual DBM PH, "Class 1E 480V Power - MCC," Revision 11.
21. Design Basis Manual DBM PK, "Class 1E 125 VDC Power System," Revision 17.
22. Design Basis Manual DBM PN, "Class 1E Instrument AC Power System," Revision 10.
23. Design Basis Manual DBM QD, "Emergency Lighting System," Revision 10.
24. Design Basis Manual DBM RC, "Reactor Coolant System," Revision 29.
25. Design Basis Manual DBM SA, "Engineered Safety Features Actuation System," Revision 16.
26. Design Basis Manual DBM SB, "Reactor Protection System," Revision 18.
27. Design Basis Manual DBM SF-FWCS, "Feedwater Control System," Revision 6.
28. Design Basis Manual DBM SF-SBCS, "Steam Bypass Control System," Revision 6.
29. Design Basis Manual DBM SG, "Main Steam," Revision 31.
30. Design Basis Manual DBM SI, "Safety Injection System," Revision 33.
31. Equipment Qualification (EQ) Files EQDF EQ-PM, Equipment Qualification Program Manual, Revision 21.

32. Palo Verde Nuclear Generating Station Units 1, 2, and 3 Updated Final Safety Analysis Report, Revision 17, June 2013.

33. Westinghouse Calculation CN-RAM-11-019, "Validation of Probabilistic Risk Assessment Model Conversion for Palo Verde Nuclear Generating Station," September 2012 (Westinghouse Proprietary Class 2).

34. Interim Version of the Westinghouse Seismic PRA Database (Microsoft Access® database file "APS-SPRA.mdb," dated August 22, 2012).

35. Design Basis Manual DBM PC "Fuel Pool Cooling and Cleanup System," Revision 18.

36. Drawing Number 01-M-PCP-0001, "P & I Diagram, Fuel Pool Cooling and Cleanup System," Revision 27.

37. Drawing Number 01-P-PCF-0501, "Fuel Building Spent Fuel Pool Cooling and Cleanup System Isometric," Revision 4.

38. Drawing Number 01-P-PCF-0502, "Fuel Building Isometric Spent Fuel Pool Cooling and Cleanup System," Revision 2.

39. Drawing Number 01-P-PCF-0503, "Fuel Building Spent Fuel Pool Cooling and Cleanup System Isometric," Revision 0.

40. Drawing Number 01-P-PCF-0504, "Fuel Building Spent Fuel Pool Cooling and Cleanup System Isometric," Revision 0.

41. Institute of Electric and Electronic Engineers Standard IEEE 344-71, "Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."

42. Design Criteria Manual DCM-PGD, "Project General Design Criteria," Revision 24.

43. Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," Revision 1, December 1973.

44. Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," Revision 0, October 1973.

45. Regulatory Guide 1.29, "Seismic Design Classification," Revision 1, August 1973.

46. Institute of Electric and Electronic Engineers Standard IEEE 344-75, "Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."

47. EPRI Report NP-6041-SL, "A Methodology for Assessment of Nuclear Power Plant Seismic Margin (Revision 1)," Revision 1.

48. WCAP-17679-NP, "Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1," Revision 0, November 2012.

49. Not used.

50. NRC 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."

51. Bechtel Topical Report BC-TOP-4-A, Rev. 3, "Seismic Analysis of Structures and Equipment for Nuclear Power Plants," November 1974.

52. Not used.

53. Design Basis Manual DBM-C5, "Seismic Topical," Revision 4.

54. Procedure 30DP-9WP11, "Scaffolding Instructions," Revision 24.
55. Specification 13-CN-0380, "Installation Specification for Seismic Cat IX and Non-Seismic Scaffolding," Revision 20.
56. Procedure 30DP-0WM12, "Housekeeping," Revision 20.
57. Drawing 13-A-ZYD-0034, "Transient Material Restraint Details," Revision 20.
58. Calculation 13-CC-ZZ-0309, "Transient Material Analysis," Revision 5.
59. Drawing 13-E-ZAL-0011, "Lighting Fixture Mounting," Revision 31.
60. Calculation 13-CC-ZJ-0120, "Concrete Block Walls," Revision 5.
61. Calculation 13-CC-ZA-0140, "Hatches and Penetrations," Revision 7.
62. Correspondence 94-001-506, "Transmittal of Report Prescreening and Walkdown of PVNGS for Seismic IPEEE."
63. "Dynamics of Structures, Theory and Application to Earthquake Engineering," Anil K. Chopra, University of California at Berkeley.
64. Not used.
65. PVNGS Documents used for Anchorage Configuration Verification and Licensing Basis Evaluations
    a. Calculation Number 13-CC-ZQ-E001, "Seismic Qualification Evaluation – Electrical Equipment," Revision 5.
    b. Calculation Number 13-CC-ZQ-J001, "Seismic Qualification Evaluation – Control Equipment," Revision 6.
    c. Calculation Number 13-CC-ZQ-M001, "Seismic Qualification Evaluation – Mechanical Equipment," Revision 8.
    d. Drawing Number 13-C-OOA-0001, "Civil-Structural Generator Notes," Revision 24.
    e. Drawing Number 13-C-OOA-0011, "Anchor Bolt Schedule and Details," Revision 9.
    f. Drawing Number 13-C-SPS-0376, "Nuclear Service Spray Ponds Sections and Details Sht 1," Revision 11.
    g. Drawing Number 13-C-ZAS-0240, "Auxiliary Building Equipment Foundation Details Sht 1," Revision 10.
    h. Not used.
    i. Drawing Number 13-C-ZAS-0241, "Auxiliary Building Equipment Foundation Details Sht 2," Revision 9.
    j. Drawing Number 13-C-ZAS-0242, "Auxiliary Building Equipment Foundation Details Sht 3," Revision 11.
    k. Drawing Number 13-C-ZAS-0243, "Auxiliary Building Equipment Foundation Details Sht 4," Revision 13.
    l. Drawing Number 13-C-ZAS-0245, "Auxiliary Building Equipment Foundation Details Sht 5," Revision 8.
    m. Drawing Number 13-C-ZCS-0703, "MSSS Concrete Sections and Details," Revision 8.
    n. Drawing Number 13-C-ZCS-0705, "MSSS Floor Inserts and Penetrations," Revision 20.

o. Drawing Number 13-C-ZFS-0187, "Fuel Building Concrete Sections & Details," Revision 11.
p. Drawing Number 13-C-ZGS-0110, "Diesel Generator Building Diesel Generator Foundation Plan Sections and Details," Revision 5.
q. Drawing Number 13-C-ZGS-0116, "Diesel Generator Building Concrete Section and Details Sht 2," Revision 7.
r. Drawing Number 13-C-ZJS-0580, "Control Building Misc Steel Platforms and Details Sht 1," Revision 6.
s. Drawing Number 13-J-01D-0103, "Auxiliary Building Isometric HCA-PT-351A and HCA-PT-352A Sensing Lines," Revision 4.
t. Drawing Number 13-J-01D-0104, "Sensing Lines for HCC-PT-351C and 352-C Auxiliary Building," Revision 3.
u. Drawing Number 13-J-01D-0173, "MSSS Building Iso Sensing Line SGA-PT308, 315; SBG-PT301, 321," Revision 6.
v. Drawing Number 13-J-04D-0118, "MSSS ISO AFA-FT-40A and AFB-FT-41A Sensing Lines," Revision 2.
w. Drawing Number 13-J-ZZS-0157, "Seismic Category I Instrument Mtg. Support for 12"W x 24"H Plate with Unistrut," Revision 6.
x. Log Number 13-10407-A216-12, "Wyle Job No. 44815 – Seismic Test of Compact Ceiling Light Module and an Incandescent Light Module," Revision A.
y. SDOC Number E051-00047, "Qualification Report for Class 1E Battery Charger," Revision 10.
z. SDOC Number E054-0070, "Class 1E Inverter IEEE 323 and 324 Qualification Report," Revision 7.
aa. SDOC Number E105-00011, "Outline Line Voltage Regulator 25KVA," Revision 17.
bb. SDOC Number EN050B-A00015, "General Arrangement 28-Cell Battery Rack Sht. 3," Revision 5.
cc. SDOC Number J601A-00274, "Nuclear Qualification Test Report for Modulating Atmospheric Dump Valve," Revision 0.
dd. SDOC Number M598-01433, "Mounting and Wiring Detail for Q Class HVAC Instruments," Revision 21.
ee. Calculation Number 13-MC-SG-0515, "MSSS Main Steam Bypass And Atmospheric Dump Lines," Revision 14.
ff. EPRI Report 1014608, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems, Revision to 1007896," December 2006.
gg. Drawing Number 13-E-ZAL-0011, "Lighting Fixture Mounting Detail Sheet 1," Revision 32.
hh. Drawing Number 13-E-ZFL-0001, "Fuel Handling Building Lighting & Communications El. 100 ft, & El. 120 ft, Level 1&2," Revision 14.
ii. Equipment Qualification Control Form (EQCF) D95-0038, "Restraints for Aux. Relay Cabinets."
jj. Calculation Number 13-MC-WC-0502, "Normal Chilled Water Supply System," Revision 4.

kk. Drawing Number 01-P-WCF-0201, "Aux Bldg Iso Norm Chld Wtr Sys Norm Chlrs To Cont Bldg," Revision 0.

ll. SDOC Number N001-0502-00322, "Bridge Assembly SFHM V-CE-14439, 3-22-81," Revision 4.

mm. SDOC Number N001-0502-00326, "Trolly Hoist Assy SFHM V-CE-14439, 3-22-81," Revision 6.

nn. Calculation Number 13-CC-ZG-0070, "Diesel Generator Building Equipment Supports," Revision 6.

oo. Drawing Number 01-E-ZGL-0001, "Diesel Generator Bldg. Lighting & Communications Plans at El.100'-0"&115'-0"," Revision 8.

pp. Drawing Number 13-J-ZZS-0143, "Seismic Category 1 Instrument Mtg. Support for 12"w x18"h Plate with Unistrut," Revision 7.

qq. Drawing Number 13-J-ZZS-0147, "Seismic 1 Instrument Mounting Support 5," Revision 3.

rr. Drawing Number 13-C-ZJS-0102, "Control Building Area J1D Concrete and Steel Plans for El. 74' and 100'," Revision 10.

ss. Field Change Request Number 66708C, "Cont Bldg AR JIA&B PL @ E-100."

tt. Westinghouse Calculation CN-RAM-12-015, "Palo Verde Seismic Probabilistic Risk Assessment – Model Development," November 2012 (Westinghouse Proprietary Class 2).

uu. Westinghouse Calculation CN-RAM-12-022, "Palo Verde Seismic Probabilistic Risk Assessment – Quantification," December 2012 (Westinghouse Proprietary Class 2).

vv. SDOC Number N001-1303-00057, "Std Spec Reac Brkr Swtgr System Com Ltr Log 66,72," Revision 3.

ww. Drawing Number 13-J-01D-119, "Containment Bldg Isometric SIB-PT-391 Sensing Line," Revision 3.

xx. Nonconformance Report CF-01260, "Anchor Bolt Out of Tolerance."

yy. SDOC Number N001-1301-00698, "Wall Rack Assembly V-CE-17414, 23NO82," Revision 13."

APPENDIX A - SEISMIC WALKDOWN CHECKLISTS (SWCs)

This appendix provides only the SWCs from the at-power Seismic Walkdowns performed from July 30 through August 6, 2012, that were revised related to FAQ 4.20, plus the SWCs resulting from the 1R17 refueling outage Seismic Walkdowns performed from April 6 through April 7, 2013, and subsequently on April 30, 2013. The SWCs from the at-power Seismic Walkdowns that are not contained herein can be found in Appendix A of Reference 48 ("Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1").

APPENDIX C - PEER REVIEW CHECKLISTS

There was no change to this appendix. The SWEL Peer Review Checklist can be found in Appendix C of Reference 48 ("Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1").

APPENDIX D - LICENSING BASIS EVALUATIONS SUMMARY

Item EQID	Item Description	Problem Description	PVAR No. (if issued)[6]	NTTF Status[7]	Resolution
1JGRBUV0002	(LLRT) RDT/GAS Surge Header Isolation Valve (Outside Containment)	Noted 1/8" gap from operator to 1" copper pipe. SOV is mounted on 1" pipe rigidly supported, but frequency shall be checked in transverse direction of SOV to determine if gap is adequate.	n/a	Y	Licensing Basis Evaluation: Both the SOV and the adjacent copper piping are immediately supported transversely, and the transverse frequency of SOV may therefore be taken as rigid. Accordingly, the gap is judged to be adequate; not an adverse seismic condition. SSC meets CLB.
1JSGBHV0178	Atmospheric dump valve HV-178	Noted approximately 1/16" clearance between soft air tubing instrument on lower part of valve and rigid conduit mounted separately. Verify whether gap is acceptable.	n/a	Y	Licensing Basis Evaluation: Per LBE for 1JSGBHV0185, maximum pipe displacement of 0.085" is considered for parent pipe of valve HV0178 by similarity. This is greater than the approximately 1/16" (0.0625 ") gap as found in the field. However, upon reinspection of the component photographs, it is noted that the receptacle receiving the air tubing is cantilevered off the valve body, and therefore has inherent flexibility. Given the flexibility of the air tubing receiving receptacle, it is concluded that the as-found gap of 1/16" is acceptable and not an adverse seismic condition. SSC meets CLB.

[6] PVAR denotes Palo Verde Action Request which is the entry document for the PVNGS corrective action program.

[7] NTTF Status denotes conclusions of LBE for the condition. Y- Condition was found to conform to the Current License Basis. N- Condition is either a Non-Conforming Condition or a Potential Non-Conforming Condition

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
1JSGBHV0185	Atmospheric dump valve HV-185	Noted 1/16" clearance between SOV SGB-HY185B mounted on the back of SGB-HV185 and building tube steel. Verify whether gap is acceptable.	n/a	Y	Licensing Basis Evaluation: From preliminary inspection of calculation 13-MC-SG-0515 (Ref. 65), valve 1SGBHV185 located on line SG-084 would move approximately 0.085" during an SSE event, which is greater than the approximately 1/16" (0.0625") gap as found in the field. With the gap closing, the solenoid mounting channel will incur damage but not the solenoid valve itself. Given the presence of conduit and tubing positively connected to the solenoid valve and the low mass of the solenoid itself, it is reasonable to conclude that solenoid functionality would not be impaired even if the mounting channel shears off due to impact. SSC meets CLB. Although it is concluded that the safety functionality of 1SGBHY185S and parent component 1SGBHV185 would not be affected due to gap closure during an SSE event, it is recommended that either the HSS member be cut or the mounting channel be repositioned to ensure a minimum gap of ½" in order to preclude impact. PVAR 4250333 was entered into the CAP system to document the observation and resolution. APS reports this is not a non-conforming condition. To improve seismic margin, this condition was corrected by performing maintenance to increase gap to an acceptable value. Operability Determination concluded that the valve remained Operable.
1MHJBM02	motor-operated damper	Noted an approximately 1/2" clearance between damper enclosure and fire piping support steel. Support duct is braced in N/S direction about 12-15' W of damper. Verify whether clearance is adequate or damper box is not a soft target.	n/a	Y	Licensing Basis Evaluation: Review of Section 3.4.1 of EPRI Report 1014608 (Ref. 65) indicates that braced duct runs may have an estimated lower-bound frequency of 10 Hz. This falls well out of the flexible range of the PVNGS response spectra; accordingly, a 1/2" gap is judged to be sufficient; not an adverse seismic condition. SSC meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued)[6]	NTTF Status[7]	Resolution
1MHJBM03	motor-operated damper	Noted approximately 1/4" gap between damper axle and brace angle for fire piping. Duct is diagonally braced at this location and appears rigid longitudinally. Verify whether 1/4" gap is adequate.	n/a	Y	Licensing Basis Evaluation: Given rigid support immediately adjacent to the damper and low response levels at 100' CTRL elevation, 1/4" gap is judged to be more than adequate; not an adverse seismic condition. SSC meets CLB.
1EPKBM42	DC power to TCB1 control circuit	Observed 1-1/8" clearance between SW corner and rigidly connected light in the N-S direction. Verify whether clearance is adequate or whether equipment is sensitive to impact.	n/a	Y	Licensing Basis Evaluation: The frequency of the MCC in its weak direction can conservatively be taken as 5 Hz and the rigidly connected light at 33 Hz. From the SSE response spectra using 4% damping in accordance with the UFSAR for welded structures, the corresponding MCC acceleration at 5 Hz for 4% damping on the 100' CTRL elevation is 1.51 g (= 1.35 * sqrt(5%/4% damping)) whereas the ZPA at 120' for the light is 0.54g. The estimated maximum relative displacement is 0.95 in (= 1.6*1.51g * 386.4 / (2*pi*5 Hz)^2 + 1.6*0.54g *386.4 / (2*pi*33 Hz)^2)), which is less than the gap provided. Therefore, there is no interaction concern; not an adverse seismic condition. SSC meets CLB.
1MPCAP01	Fuel pool cooling pump 1	Observed large, flat panel lighting fixture mounted over pump site glass. Verify whether light has adequate strength so as to preclude fall and potentially site glass impact.	n/a	Y	Licensing Basis Evaluation: Per 13-E-ZFL-0001 (Ref. 65) and Detail 1 of 13-E-ZAL-0011 (Ref. 65), lights are mounted to the ceiling with 1/4" Hilti Kwik Bolts. Given that these fasteners have considerably more capacity than the demand of the light under seismic excitation, the connection is ductile and there is no impact/fall hazard; not an adverse seismic condition. SSC meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued)[6]	NTTF Status[7]	Resolution
1MEWBE01	EW "B" heat exchanger	1) Noted slightly loose nut on E saddle anchor bolt. Verify whether this is an acceptable condition per CLB documentation.	4221758	N	1) Licensing Basis Evaluation: Per APS, Unit 1 EW HX does not have documentation allowing for gap; therefore nut was discovered in a degraded condition and PVAR 4221758 was generated. APS reports that PVAR (related work) indicates - The nine effective bolts on the sliding end support maintain the ability to resist tensile loads. No adverse seismic condition exists. APS reports this is a non-conforming condition. Operability Determination concluded that the EW HX remained Operable. Supplemental Report Update: APS reports that SSC as-found condition (loose nut) has been corrected to meet CLB.
		2) Also noted a relief line on the top of the HX that may be subjected to overstress due to differential motion between floors. The 10" run on 1" dia. pipe may be subject to differential motion due to separate rigid supports mounted to different building levels. Verify whether either there is no functionality concern from losing the relief line or the pipe stress is not excessive due to differential motion.			2) Licensing Basis Evaluation: With regards to the relief valve piping supports, re-inspection of photos shows a threaded connection at the relief valve. This is judged to be the weak point and would fail prior to the valve-to-heat-exchanger welded connection. Therefore, differential support movement between the building floors poses no adverse seismic concern. SSC meets CLB. APS reports this is not a non-conforming condition.
Area: AUX A-127	AREA WALK BY	Cabinets ZAB-C01, -C02, -C03, -C04, -C05 were observed to all be within close proximity of S wall. The minimum gap is 1/8" on top of cabinet -C01. Verify whether maximum displacement is small enough so as to prevent impact.	n/a	Y	Licensing Basis Evaluation: Per EQCF D95-0038 (Ref. 65), all ZAA and ZAB cabinets were analyzed with finite element methodology and determined to be rigid. Therefore, the as-built gap is sufficient; not an adverse seismic condition. SSCs meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
Area: AUX A-A09	AREA WALK BY	Noted a safety-related MOV (1JWCAUV0062) and SOV (HCAUV46) w/ approximately 1/4" clearance. The SOV is rigidly supported off of Containment steel. The flexibility of the MOV relative to the SOV could not be verified in the field. Action shall be taken to determine whether gap is adequate.	n/a	Y	Licensing Basis Evaluation: Calculation 13-MC-WCF-0502 (Ref. 65) indicates that the 10" pipe running to 1JWCAUV0062 is fixed at Containment Penetration 61. From Drawing 01-P-WCF-0201 (Ref. 65), 1JWCAUV0062 is located approximately 4 ft from the penetration. Given the small span and large diameter pipe, the displacement of 1JWCAUV0062 is judged to be reasonably less than 1/4". Regarding relative displacement to HCAUV46, this SOV is immediately supported rigidly by steel braced off of Containment and is accordingly negligible. Therefore, the 1/4" gap is judged to be acceptable; not an adverse seismic condition. SSC meets CLB.
Area: CTRL Outer Horseshoe	AREA WALK BY	1.) Noted flexibly supported lighting will impact a smoke detector that is nearly flush with cabinet 1JSHCC02. Given the flexibility, the SWT judged SSE excitation to cause impact from the light to cabinet1JSHCC02. Action needed to determine if essential relays or sensitive equipment is inside. 2.) Noted 1-1/2" gap between 1JSABC06 and 1JSABC04 in E-W direction. Determine whether gap is adequate. 3.) Noted 3/4" gap between 1JZJBC02A and 1JESAC01 in E-W direction. Determine whether gap is adequate.	n/a	Y	Licensing Basis Evaluations Regarding Item 1.), 1JSHCC02 does not contain sensitive equipment required for safety-related functionality (from PVNGS PRA Group per CN-RAM-12-015 and CN-RAM-12-022, Ref. 65); therefore low mass impact due to lighting is determined to have no adverse seismic effect on functionality of equipment. SSC meets CLB. Licensing Basis Evaluation: Regarding Items 2.) and 3.), inspection of heavy steel framing and wide footprints leads to a conservative lower-bound frequency estimate of 10 Hz for all equipment. The associated acceleration at the 140' level for the SSE is 0.95g (witness 0.95g = 0.85g * sqrt(5%/4%)). The estimated maximum relative displacement between cabinets is 0.30 inches (=2 * 1.6 * 0.95g *386.4 / (2*pi*10 Hz)^2). Therefore, the gaps are sufficient; not an adverse seismic condition. SSCs meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
Area: FUEL 140'	AREA WALK BY	1) Verify whether the Spent Fuel Pool Handling Machine (1MZFNM03) has support designed to prevent uplift off of tracks.	4221593	N	1) Licensing.Basis Evaluation: Spent Fuel Handling Machine 1MZFNM03 SDOCs N001-0502-00322 and N001-0502-00326 (Ref. 65) indicates that uplift is resisted by members on the handling machine that engage grooves on the inside of the rail. Therefore, there is no overturning hazard; SSC meets CLB.
		2) Also noted Seismic Category I duct along W wall with storage material that could potentially impact the duct. Alerted PVNGS Engineering and Operations of condition. PVAR 4221593 generated to reconcile the equipment adjacent to the duct.			2) Licensing Basis Evaluation: The NTTF Status is designated "N" for PVAR 4221593 which was issued for storage material that could potentially impact SC-1 duct along W-wall. APS reports that PVAR (related work) indicates - All improperly restrained items were corrected. No adverse seismic condition exists. APS reports this was a non-conforming condition that was corrected on the spot, therefore no Operability Determination was necessary.
Area: FUEL SFP Cooling Room	AREA WALK BY	Observed large flat panel lighting suspend from single vertically cantilevered rod above potentially soft targets of safety-related equipment. Verification is required to determine whether connections of lighting are adequate so as to preclude impact.	n/a	Y	Licensing Basis Evaluation: Per 13-E-ZFL-0001 (Ref. 65) and Detail 1 of 13-E-ZAL-0011, lights are mounted to the ceiling with 1/4" Hilti Kwik Bolts. Given that these fasteners have considerably more capacity than the demand of the lights under seismic excitation, the connection is ductile and there is no impact/fall hazard; not an adverse seismic condition. This configuration meets CLB.
Area: MSSS C-302	AREA WALK BY	Observed flexible conduit pinched between SGE-UV170 (MSIV) and building steel. Flex conduit runs to junction box SGBJ16. Verify whether enough flexibility is present in conduit to accommodate differential motion.	n/a	Y	Licensing Basis Evaluation: Review of photographs from walkdowns indicates that flexible conduit could withstand MSIV movement due to SSE since valve is well-supported within very close proximity. Accordingly, differential movement between the MSIV and the building steel will be negligible. Therefore, there is no adverse seismic condition. SSC meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
Area: DG G-104	AREA WALK BY	Observed DS piping on E and W walls under large heaters and lights. Verify these objects are securely anchored to preclude fall and potential line rupture that would result in spray hazard.	n/a	Y	Licensing Basis Evaluation: Heater verified as Seismic Cat IX per Calculation 13-CC-ZG-0070 (Ref. 65) and is therefore no interaction hazard; SSC meets CLB. Diesel Generator lighting plan 01-E-ZGL-0001 (Ref. 65) indicates that the light fixture is mounted per Detail 1 of 13-E-ZAL-0011. This detail specifies a 1/4" kwik bolt mounted junction box that supports a 3/4" conduit stem. Given that these fasteners have considerably more capacity than the demand of the lights under seismic excitation, the connection is ductile and there is no impact/fall hazard; not an adverse seismic condition. This configuration meets CLB.
1JRMNB02	SDHX A outlet temperature	13-CC-ZQ-J01 (Ref. 65) calls for 8" welds at 4' o.c, which varies from the as-installed configuration observed in the field. Verify as-installed anchorage configuration meets CLB documentation.	n/a	Y	Licensing Basis Evaluation: Further review of 13-CC-ZQ-J01 Sheet 49 (Ref. 65) shows that the as-installed configuration observed during the walkdown matches the "as-required" configuration indicated in the CLB documentation. SSC meets CLB. PVAR 4220252 generated by PVNGS to update the "as-installed" configuration indicated on Sheet 53 to reflect the field configuration. APS reports this is not a non-conforming condition, but does identify a minor documentation deficiency. Supplemental Report Update: APS reports that EDC 2013-00470 will update Calculation 13-CC-ZQ-J01 to correct document inconsistency.
1JRMNB04	Pressurizer temperature	Observed additional 3" weld that does not match 13-CC-ZQ-J01 (Ref. 65). Verify as-installed configuration meets CLB documentation.	n/a	Y	Licensing Basis Review: Further review of 13-CC-ZQ-J01 Sheet 50 shows that the walkdown as-built configuration matches the "as-required" configuration. SSC meets CLB. PVAR 4220252 generated by PVNGS to update the "as-installed" configuration indicated on Sheet 54 to reflect the field configuration. APS reports this is not a non-conforming condition, but does identify a minor documentation deficiency. Supplemental Report Update: APS reports that EDC 2013-00470 will update Calculation 13-CC-ZQ-J01 to correct document inconsistency.
1JHCBPT0352B	Containment pressure	Verify 1/2" bolts with spring nuts for plate connection to Unistrut per CLB documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration verified per Note 1 on DWG 13-J-ZZS-0143 and 13-J-ZZS-0147 (Refs. 65) ; SSC meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
1MHFAJ01	Fuel Building AHU	Bolts were noted surpassing the document-indicated max projection (4" max required versus 5" found in field). Verify whether this condition is documented as being evaluated.	4275110	N	Licensing Basis Evaluation: As-installed configuration could not readily be verified against CLB documentation. PVAR 4275110 generated to reconcile the configuration discrepancy. APS reports that PVAR (related work) indicates - This condition was analyzed within NCR CF-01260 which concluded the equipment will not be adversely affected by anchor bolts out of elevation tolerance; No adverse seismic condition exists. APS reports this is a potential non-conforming condition which will be addressed in PVNGS CAP. An Operability Determination concluded that the SSC remained Operable. Supplemental Report Update: APS reports that SSC meets CLB (NCR CF-01260) therefore this is not a non-conforming condition; no corrective action required.
1MHJBZ03	ESF switchgear room "B" EAHU	1.) Noted cracks in pad near anchorage on north side. Verify whether pad has reinforcing that develops in the floor slab. 2.) Additionally noted a leaking solder joint on the DS piping north of the AHU. Verify whether spray hazard is plausible for AHU.	n/a	Y	1.) Licensing Basis Evaluation: Section D of 13-C-ZJS-0102 (Ref. 65) confirms that #6 ties @ 12" e.w. are doweled from the pad into the base slab; therefore anchorage is adequate; not an adverse seismic condition. SSC meets CLB. 2.) Licensing Basis Evaluation: Regarding the leaking solder joint, combination of support near the joint, relatively low pressure in the line, and distance of safety-related equipment from the piping leads to judgment that leaking joint poses no spray hazard to the equipment; PVAR 4293568 issued to address leaking joint. SSC meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
1MPCAE01	Fuel pool cooling heat exchanger 1	On the W saddle, as-installed configuration was without 2 middle bolts indicated on the drawing. Verify whether as-installed configuration meets CLB documentation.	4275110	N	Licensing Basis Evaluation: As-installed configuration could not readily be verified against CLB documentation. PVAR 4275110 generated to reconcile the configuration discrepancy. APS reports that PVAR (related work) indicates calculation 13-CC-ZQ-M001 page 24 (Ref. 65) approves as found installation, no adverse seismic condition. APS reports this is not a non-conforming condition. A Functional Assessment determined that the SSC remained Functional. Supplemental Report Update: APS reports that SSC meets CLB (Calculation 13-CC-ZQ-M001 page 24; Ref. 65) therefore this is not a non-conforming condition; no corrective action required.
1EPEBG02	Emergency diesel generator "B"	Dowels per Detail G of 13-C-ZGS-110 (Ref. 65) were not installed and anchor bolts on main engine exceeded max projection (5-7/8" versus 5-1/4" required). Verify whether CLB documentation exists allowing for deviation.	n/a	Y	Licensing Basis Evaluation: Regarding dowels, inspection of 13-C-ZGS-0110 (Ref. 65) and walkdown photos reveals that the dowels are 2" in diameter with an air-gap at center. This reflects the as-found configuration. Therefore, there is no adverse anchorage concern; SSC meets CLB. Regarding projection, inspection of Section 4 on DWG 13-C-ZGS-0110 (Ref. 65) reveals that the as-found projection allows for full thread engagement into anchor bolt sleeves. Therefore, there is no adverse anchorage concern as bolt meets seismic licensing basis. SSC meets CLB.
1EPKCM43	DC power to TCB1 control circuit	As-installed configuration does not meet 13-CC-ZQ-E01 (Ref. 65). Verify whether as-built meets CLB.	n/a	Y	Licensing Basis Evaluation: As-installed configuration confirmed per Sheet 95-98 of 13-CC-ZQ-E01 (Ref. 65); SSC meets CLB.
1EPKCN43	Inverter for shutdown cooling isolation valve 1JSICUV653	As-installed configuration did not meet field documentation. Verify whether anchorage meets CLB documentation.	n/a	Y	Licensing Basis Evaluation: Per Sheet 169 on 13-CC-ZQ-E01 and FCR 66708C (Ref. 65), 1/4" channel-to-embed fillet welds are documented, which was verified in the field; SSC meets CLB.
1EPNCN13	DC/AC inverter "C"	As-installed configuration does not meet 13-CC-ZQ-E01 (Ref. 65). Verify whether installation meets CLB documentation.	n/a	Y	Licensing Basis Evaluation: Review of FCR 66708C (Ref. 65) confirms that the channels were to be welded with 1/4" fillet welds to the embeds, which is reflected in the field; SSC meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
1JHCBPT0351B	Containment pressure	Verify 1/2" bolts with spring nuts for plate connection to Unistrut per CLB documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration verified per Note 1 on DWG 13-J-ZZS-0143 (Ref. 65) and 13-J-ZZS-0147 (Ref. 65); SSC meets CLB.
1JHCDPT0351D	Containment pressure	Verify 1/2" bolts with spring nuts for plate connection to Unistrut per CLB documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration verified per Note 1 on DWG 13-J-ZZS-0143 (Ref. 65) and 13-J-ZZS-0147 (Ref. 65); SSC meets CLB.
1MCHEP01	Charging pump 3	Measured 4-1/4" bolt projections but had no documentation in field on drawings to verify this dimension as conforming with CLB documentation. Action required to verify projection as adequate.	n/a	Y	Licensing Basis Evaluation: Further review of 13-C-ZAS-0241 Detail 1 (Ref. 65) indicates an anchor bolt T.O.S. of 101'-0" with a pad T.O.C. of 100'-8". Therefore, the maximum projection is 4" from top of pad. 1/4" discrepancy is judged acceptable given typical 1/8" tolerance on both the concrete slab finish and bolt placement in additional to 1/8" measurement error; condition meets CLB.
1MECBE01	Essential chiller "B"	Anchorage documentation taken to field shows a maximum bolt projection of 11" whereas the as-installed condition varies from 11.5" - 12". In addition, equipment pad is installed at a height of 5" versus 6" specified on drawing. Verify whether as-installed configuration matches CLB documentation.	4275110	N	Licensing Basis Evaluation: As-installed configuration could not readily be verified against CLB documentation. PVAR 4275110 generated to reconcile the configuration discrepancy. APS reports – that PVAR (related work) indicates a 1" reduction in embedment depth has insignificant impact to as designed bolt interaction ratio = 0.093 ref. Calculation 13-CC-ZJ-0085 (Ref. 65) page 10, no adverse seismic condition exists. APS reports this is a potential non-conforming condition. An Operability Determination concluded that the SSC remained Operable. Supplemental Report Update: APS reports that configuration documentation determined to be non-conforming. As-found configuration will be documented on EDC 2013-00470.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
1MHFBJ01	Fuel Building AHU	Bolts were noted surpassing the document-indicated max projection. Verify whether this condition is documented as being evaluated.	4275110	N	Licensing Basis Evaluation: As-installed configuration could not readily be verified against CLB documentation. PVAR 4275110 generated to reconcile the configuration discrepancy. APS reports that PVAR (related work) indicates - This condition was analyzed within NCR CF-01260 (Ref. 65) which concluded the equipment will not be adversely affected by anchor bolts out of elevation tolerance; No adverse seismic condition exists. APS reports this is a potential non-conforming condition. An Operability Determination concluded that the SSC remained Operable. Supplemental Report Update: APS reports that SSC meets CLB (NCR CF-01260, Ref. 65) therefore this is not a non-conforming condition; no corrective action required.
1MPCBE01	Fuel pool cooling heat exchanger 2	On the E saddle, the SW bolt nut is loose with gap so that bolt is not capable of withstanding tensile loading. Additionally, the washer for the SE bolt of the E saddle is not installed; E saddle has 1 nut with a gap to the washer; on W saddle, 2 middle bolts are not installed. For these concerns, check for documentation permitting these discrepancies.	4220895, 4275110	N	Licensing Basis Evaluation: PVAR 4220895 generated to document loose nut. In addition, as-installed configuration could not readily be verified against CLB documentation. PVAR 4275110 generated to reconcile the configuration discrepancy. APS reports – that PVAR (related work) indicates as-found condition -2 middle bolts not installed - is the approved design (Calculation 13-CC-ZQ-M001; Ref. 65); no torque required for sliding support nuts; seven effective bolts on sliding support are capable of resisting tensile loads. No adverse seismic condition exists. APS reports this is a potential non-conforming condition. A Functional Assessment concluded that the SSC remained Functional. Supplemental Report Update: APS reports that SSC as-found condition (gap and missing washer) has been corrected to meet CLB. Conditions of "no torque" on sliding support nuts and "2 middle bolts not installed" meets CLB (Calculation 13-CC-ZQ-M001; Ref. 65). No further corrective actions required.

Item EQID	Item Description	Problem Description	PVAR No. (if issued)[6]	NTTF Status[7]	Resolution
Area: AUX A-227	AREA WALK BY	Verify whether vibration mounts on HAN-Z02A/Z02B have adequate seismic stops so as to preclude anchor failure and possible water line rupture.	n/a	Y	Licensing Basis Evaluation: Per APS, potential impacts of flooding/spray hazards are mitigated by the enclosed protective cabinets (designed as drip-proof per SDOC N001-1303-00057 (Ref. 65)), which house the reactor trip breakers and the distance from the AHUs. All potential flooding /spray hazards were resolved. The configurations meet CLB.
Area: CTRL J-A05	AREA WALK BY	See spray hazard concern from 1MHJBZ03 (p. D-8).	n/a	Y	Licensing Basis Evaluation: Given the combination of support near the joint, relatively low pressure in the line, and distance of safety-related equipment from the piping, the SWT judged that leaking joint poses no spray hazard to safety-related equipment. PVAR 4293568 issued to address leaking joint. The configuration meets CLB.
1EPKDM44	DC power to TCB1 control circuit	Anchorage consists of channels inverted and welded to MCC base. Inverted channels anchored with 5/8" Concrete Expansion Anchors. Verify as-installed configuration is consistent with plant documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration is consistent with Sheet 95 of 13-CC-ZQ-E01 (Ref. 65). SSC meets CLB.
1EPNDN14	DC/AC inverter "D"	Inverter tube base members are welded on three sides each to sleeper channels. Verify as-found weld pattern meets anchorage configuration documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration is consistent with 13-CC-ZQ-E01 (Ref. 65). SSC meets CLB.
1JRCBPT0102B	Pressurizer pressure transmitter (required for RPS/SIAS)	Mounted to common rack that is welded to steel embeds. Verify as-built weld-to-embed pattern.	n/a	Y	Licensing Basis Evaluation: As-installed configuration is consistent with Detail 1 on SDOC N001-1301-00698 (Ref. 65). SSC meets CLB.
1JRCBPT104	SDC RCS pressure interlock	Transmitter is mounted to steel rack with 1JRCBPT102. Verify as-built weld-to-embed pattern meets plant documentations.	n/a	Y	Licensing Basis Evaluation: As-installed configuration is consistent with Detail 1 on SDOC N001-1301-00698 (Ref. 65). SSC meets CLB.
1JRCDPT106	SDC RCS pressure interlock	Pressure transmitter is mounted to steel rack welded to embed plates. Verify as-built meets anchorage configuration documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration is consistent with Detail 1 on SDOC N001-1301-00698 (Ref. 65). SSC meets CLB.

Item EQID	Item Description	Problem Description	PVAR No. (if issued) [6]	NTTF Status [7]	Resolution
1JSGCLT1113C	SG-E01A WR level (required for AFAS)	Transmitter mounted on steel rack that is welded to steel embeds. Verify as-built configuration meets plant documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration is consistent with Detail 1 on SDOC N001-1301-00698 (Ref. 65). SSC meets CLB.
1JSINPT391	HPSI Long-term recirc loop 1 pressure transmitter	Typical column-mounted transmitter plate bolted to two horizontal P1000 Unistrut members that are in turn welded at top and bottom at four locations to column flanges. Verify as-built configurations meets plant documentation.	n/a	Y	Licensing Basis Evaluation: As-installed configuration is consistent with Detail 2 on Drawing 13-J-01D-0119 (Ref. 65). SSC meets CLB.

APPENDIX E - QUALIFICATIONS

This appendix contains only the qualifications of new personnel involved with the 1R17 refueling outage Seismic Walkdowns performed from April 6 through April 7, 2013, and the subsequent walkdowns performed on April 30, 2013. The qualifications of personnel involved with the at-power Seismic Walkdowns performed from July 30 through August 6, 2012, can be found in Appendix E of Reference 48 ("Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1").

CORY T. FIGLIOLINI, E.I.T.

EDUCATION

2009 - 2010 University of Glasgow, Glasgow, Scotland, United Kingdom
University of Edinburgh, Edinburgh, Scotland, United Kingdom
Joint Master of Science, Structural Engineering & Mechanics (M.Sc.)

2004 – 2009 Worcester Polytechnic Institute, Worcester, Massachusetts
Bachelor of Science, Civil and Environmental Engineering (BSCE)

REGISTRATION AND AFFILIATIONS

Engineer in Training, Massachusetts, Certificate No. 22279

PROFESSIONAL CAPABILITIES

Structural analysis and design of steel, concrete, and masonry structures using IBC and UBC
Dynamic analysis of structures for seismic, vibration, blast, fluid, and wind loads
Competed 5-day SQUG training course for walkdown and fragility analysis of nuclear facilities and their components
Completed 5-day ASME Power Piping Design and Fabrication training course
Risk and hazard analysis
Construction support and inspection

PROFESSIONAL HISTORY

2010 – Present Stevenson and Associates, Goodyear, Arizona
Engineer

PROJECT EXPERIENCE SUMMARY

Seismic Fragility Projects

Mr. Figliolini has planned and performed Seismic Walkdowns and fragility analyses of structures and components for use in probabilistic risk assessments. On these projects, he has walked down both Safety Related and non-Safety Related structures, systems and components in all areas of the power block. Mr. Figliolini has conducted seismic analyses of electrical and mechanical equipment anchorages, storage tanks, and civil structures including containment.

Security Projects

Mr. Figliolini has performed structural modifications to existing structures for hardened alarm stations and security related equipment supports. He has performed blast analyses to determine the vulnerability of security structures.

Piping Projects

Mr. Figliolini has worked on Safety Related piping analyses and modifications which include assessment and conversion of piping analysis models, screening and review of piping supports, and modifications to piping supports.

SQUG

Certificate of Achievement

This is to Certify that

Cory Figliolini

has Completed the SQUG Walkdown Screening and Seismic Evaluation Training Course Held Date July 11 thru 15, 2011

Phil Gazda — Stevenson & Associates
Instructor Name, Instructor Company
SQUG Instructor

Douglas P. Brown — NextEra Energy Point Beach
Representative Name, Representative Company
SQUG Member Representative

APPENDIX F – PVNGS UNIT 1 SWEL REPORT

This appendix is attached to reflect the changes made in Revision 2 and Revision 3 of the SWEL transmittal associated with the 1R17 refueling outage Seismic Walkdowns performed from April 6 through April 7, 2013, and afterward on April 30, 2013. Please see the "Revision History" on page F-3 for a complete explanation. The Revision 0 and Revision 1 SWEL transmittals for the at-power Seismic Walkdowns performed from July 30 through August 6, 2012, can be found in Appendix F of Reference 48 ("Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1").

Westinghouse

Seismic Walkdown Equipment List, Revision 3 In Response to NTTF Recommendation 2.3: Seismic

Palo Verde Nuclear Station Unit 1

Rolando Perez Rolando Perez 5/24/13
Equipment Selection Personnel Lead Date

Derek Seaman 5/29/13
Equipment Selection Personnel Date

Randall Eimar Eimar, Randall G(Z34606) Digitally signed by Eimar, Randall G(Z34606) DN: cn=Eimar, Randall G(Z34606) Date: 2013.06.07 12:10:41 -07'00'
Station Operations Date

Revision History

Revision 0 of this document provides the Seismic Walkdown Equipment List (SWEL) developed prior to the Palo Verde Nuclear Generating Station (PVNGS) At-Power Seismic Walkdowns performed between Monday, July 30th, 2012 and Friday, August 3rd, 2012. The SWEL contained a total of 131 components (125 SWEL 1 & 6 SWEL 2).

Revision 1 of this document updates the "Major New or Replacement Equipment" column of the SWEL 1 table included in Attachment 1 and Table 3-2 of Attachment 3. The information related to "Major New or Replacement Equipment" was revised as a result of an error found in the Microsoft Excel® spreadsheet that was used track and implement the SWEL selection process. This error did not result in a change to the Base List or SWEL data.

Revision 2 of this document revises the SWEL 1 table provided in Attachment 1 to document changes required for the refueling outage 1R17 walkdown activities performed from April 6 through April 9, 2013. Train C was inaccessible during refueling outage 1R17. Therefore, the following Train C electrical components were substituted with their counterpart from Train D, which were selected from Base List 1:

- 1EPKCD23 was substituted with sister component 1EPKDD24.
- 1EPKCM43 was substituted with sister component 1EPKDM44
- 1EPNCN13 was substituted with sister component 1EPNDN14.

These components were inspected to fulfill Frequently Asked Question (FAQ) 4.20 regarding the supplemental inspection of electrical cabinets.

These substitutions did not affect the number of SWEL items and since the replacements were performed with equipment of the same type, the revised SWEL 1 still satisfied the Reference 1 guidance. That is, component type, along with other attributes, remain adequately represented on the SWEL.

Revision 3 of this document removes SWEL 1 item 14 (1MCHEE01). This item was removed for radiological safety considerations. It was identified as inaccessible in a locked high-radiation area. A new item was not selected to replace 1MCHEE01 since the resulting equipment list still satisfied the Reference 1 guidance. That is, all attributes remain adequately represented on the SWEL.

Seismic Walkdown Equipment List (SWEL)

A listing of structures, systems, and components (SSCs) that will be inspected during the walkdown, the Seismic Walkdown Equipment List (SWEL), has been prepared in advance of the walkdown effort.

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 {Reference 1}, was utilized to develop the SWEL for Palo Verde Nuclear Generating Station Unit 1.

The SWEL is comprised of two groups of items:

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

APS Operations and Design Engineering Staff Members participated in the selection of the SSCs comprising the SWEL and provided inputs and assistance to the Equipment Selection Personnel to find the data associated with the equipment considered. The interchange of information between the Equipment Selection Personnel and the APS Staff Members included:

- Weekly status meetings for review of the SWEL progress.
- Verification of equipment information through APS's SWMS Database system.
- Discussions with Operations relative to recent upgrades and changes to the plant that might be relevant to the SWELs.
- Discussions with Design Engineering and Operations to select equipment with operational experience relevant to SWEL selection.
- Provided System Health Reports and Design Basis Manuals for review by the Equipment Selection Personnel.

Details describing the process for Selection of SSCs to produce the SWEL have been provided to APS in the form of a formal presentation, given on July 18, 2012. Additionally, details describing the process for Selection of SSCs to produce the SWEL are provided in the "Selection of SSCs" section of the Submittal Report.

References

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

Attachments

1) Seismic Walkdown Equipment List 1
2) Seismic Walkdown Equipment List 2
3) SWEL Sort Tables

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?	Comments
							Equipment Class	System Type	Major new or replacement equipment?	Environment (Temp, °F) (I for "Inside"or O for "Outside")	IPEEE vulnerability enhancement?		
1	1JAFBFT0041A	Auxiliary feedwater flow	MSSS	Yes	Yes	PC DHR	Inst. Rack (18)	AF	No	140 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
2	1JAFBFT0041B	Auxiliary feedwater flow	MSSS	Yes	Yes	PC DHR	Inst. Rack (18)	AF	No	140 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
3	1JAFBHV0030	SG-E01A reg valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	No	104 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
4	1JAFBHV0031	SG-E01B reg valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	No	104 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
5	1MAFBP01	AF pump "B"	MSSS	Yes	Yes	PC DHR	Horz. Pump (5)	AF	No	104 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
6	1JAFBUV0034	SG-E01A isolation valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	Yes	104 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
7	1JAFBUV0035	SG-E01B isolation valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	Yes	104 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
8	1JAFCUV0036	SG-E01A isolation valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	Yes	104 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
9	1JCHBHV0530	RWT outlet to SI train "B"	AUX	Yes	Yes	RC IC DHR	MOV (8)	CH	No	104 (I)	No	No	
10	1MCHBP01	Charging pump 2	AUX	Yes	Yes	RC PC IC	Horz. Pump (5)	CH	No	104 (I)	No	No	
11	1JCHBPSL0218	Train B For Charging Pump 1MCHEP01 Suction Line Pressure Switch	AUX	Yes	Yes	RC IC	Inst. Rack (18)	CH	No	104 (I)	No	No	
12	1JCHBUV0924	Regenerative Heat Exchanger Outlet To Pass Line Isolation Globe Valve	AUX	Yes	Yes	RC IC	SOV (8)	CH	No	104 (I)	No	No	
13	1JCHCLT0203C	RWT level (required for RAS)	YARD	Yes	Yes	DHR	Inst. Rack (18)	CH	No	113 (O)	No	No	
~~14~~	~~1MCHEE01~~	~~Regenerative heat exchanger~~	~~CTMT~~	~~Yes~~	~~Yes~~	~~PC~~	~~Heat Exchanger (21)~~	~~CH~~	~~No~~	~~120 (I)~~	~~No~~	~~Yes~~	**This item was removed from SWEL 1.**

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?	Comments
							Equipment Class	System Type	Major new or replacement equipment?	Environment (Temp, °F) (I for "Inside"or O for "Outside")	IPEEE vulnerability enhancement?		
15	1JCHEHV0239	Charging Line To Reactor Coolant Loop 2A Isolation Globe Valve	CTMT	Yes	Yes	RC IC	POV (7)	CH	No	120 (I)	No	Yes	
16	1JCHEHV0532	RWT suction iso (fails open on loss of air)	AUX	Yes	Yes	RC PC	POV (7)	CH	No	104 (I)	No	No	
17	1JCHEHV0536	RWT suction isolation	AUX	Yes	Yes	RC PC	MOV (8)	CH	No	104 (I)	No	No	
18	1MCHEP01	Charging pump 3	AUX	Yes	Yes	RC PC IC	Horz. Pump (5)	CH	No	104 (I)	No	No	
19	1MCHET01	RWT (refueling water tank)	Yard	Yes	Yes	RC PC IC DHR	Tank (21)	CH	No	113 (O)	No	No	
20	1JCPBUV0005A	Containment Power Access Purge Supply Isolation Butterfly Damper	CTMT	Yes	Yes	CF	MOV (8)	CP	No	120 (I)	No	Yes	
21	1MCTET01	CST (condensate storage tank)	Yard	Yes	Yes	PC DHR	Tank (21)	CT	No	113 (O)	No	No	
22	1MDGBF03	DG "B" air intake structure	DG	Yes	Yes	RC PC IC DHR	Other (0)	DG	Yes	140 (I)	No	No	
23	1MDGBX01A	Starting air accumulator	DG	Yes	Yes	RC PC IC DHR	Tank (21)	DG	No	140 (I)	No	No	
24	1MDGBX01B	Starting air accumulator	DG	Yes	Yes	RC PC IC DHR	Tank (21)	DG	No	140 (I)	No	No	
25	1MECBE01	Essential chiller "B"	CTRL	Yes	Yes	RC PC IC DHR	Chiller (11)	EC	No	80 (I)	No	No	
26	1MECBP01	Circulating water pump "B"	CTRL	Yes	Yes	RC PC IC DHR	Horz Pump (5)	EC	No	80 (I)	No	No	
27	1MECBT01	EC expansion tank "B"	CTRL	Yes	Yes	RC PC IC DHR	Tank (21)	EC	No	80 (I)	No	No	
28	1JECBTV0030	Control room "B" EAHU flow reg valve	CTRL	Yes	Yes	PC IC DHR	POV (7)	EC	No	80 (I)	No	No	
29	1MEWBE01	EW "B" heat exchanger	AUX	Yes	Yes	PC IC DHR	Heat Exchanger (21)	EW	No	104 (I)	No	No	
30	1MEWBP01	EW pump "B"	AUX	Yes	Yes	PC IC DHR	Horz Pump (5)	EW	No	104 (I)	No	No	
31	1MEWBT01	EW "B" surge tank	AUX	Yes	Yes	PC IC DHR	Tank (21)	EW	No	104 (I)	No	No	
32	1JGRBUV0002	(LLRT) RDT/GAS Surge Header Isolation Valve (Outside Containment)	AUX	Yes	Yes	CF	SOV (8)	GR	No	104 (I)	No	No	
33	1MHAAZ04	AFW pump room "A" EAHU	AUX	Yes	Yes	PC IC DHR	AHU (10)	HA	No	104 (I)	No	No	Although Train "A", the AHU's are of greater importance due to cascading Tech Specs. HAAZ04 was selected as a representitive piece of equipment for the new interpretation of Tech Specs.
34	1JHCBPT0351B	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No	

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?	Comments
							Equipment Class	System Type	Major new or replacement equipment?	Environment (Temp, °F) (I for "Inside"or O for "Outside")	IPEEE vulnerability enhancement?		
35	1JHCBPT0352B	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No	
36	1JHCBUV0044	Discharge Sampling From RU-1 Containment Isolation Valve	CTMT	Yes	Yes	CF	SOV (8)	HC	No	120 (I)	No	Yes	
37	1JHCBUV0047	Inlet Sampling To RU-1 Containment Isolation Valve	CTMT	Yes	Yes	CF	SOV (8)	HC	No	120 (I)	No	Yes	
38	1JHCDPT0351D	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No	
39	1JHCDPT0352D	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No	
40	1MHDBA01	DG "B" room EAHU fan	DG	Yes	Yes	PC IC DHR	Fan (9)	HD	No	140 (I)	No	No	
41	1MHDBJ01	DG "B" room essential exhaust fan	DG	Yes	Yes	PC IC DHR	Fan (9)	HD	No	140 (I)	No	No	
42	1MHJBF04	Control room EAHU (fan, filters and HX)	CTRL	Yes	Yes	PC IC DHR	AHU (10)	HJ	No	80 (I)	No	No	
43	1MHJBJ01A	DC room "D" essential exhaust fan	CTRL	Yes	Yes	PC IC DHR	Fan (9)	HJ	No	80 (I)	No	No	
44	1MHJBJ01B	DC room "B" essential exhaust fan	CTRL	Yes	Yes	PC IC DHR	Fan (9)	HJ	No	80 (I)	No	No	
45	1MHJBM02	motor-operated damper	CTRL	Yes	Yes	PC IC DHR	MOV (8)	HJ	No	80 (I)	No	No	
46	1MHJBM03	motor-operated damper	CTRL	Yes	Yes	PC IC DHR	MOV (8)	HJ	No	80 (I)	No	No	
47	1MHJBM31	Air-operated damper	CTRL	Yes	Yes	PC IC DHR	POV (7)	HJ	No	80 (I)	No	No	
48	1MHJBM58	Air-operated DC room "B" isolation	CTRL	Yes	Yes	PC IC DHR	POV (7)	HJ	No	80 (I)	No	No	
49	1MHJBM67	Air-operated computer room DP	CTRL	Yes	Yes	PC IC DHR	POV (7)	HJ	No	80 (I)	No	No	
50	1JHJBTIC0124	Control room temp indicating controller	CTRL	Yes	Yes	PC IC DHR	Temp Sensor (19)	HJ	No	80 (I)	No	No	
51	1MHJBZ03	ESF switchgear room "B" EAHU	CTRL	Yes	Yes	PC IC DHR	AHU (10)	HJ	No	80 (I)	No	No	
52	1MHJBZ04	DC room "B" EAHU	CTRL	Yes	Yes	PC IC DHR	AHU (10)	HJ	No	80 (I)	No	No	
53	1EPBBS04	4.16 kV bus S04	CTRL	Yes	Yes	RC PC IC DHR CF	Med. Volt SWGR (3)	PB	Yes	80 (I)	No	No	
54	1EPEBG02	Emergency diesel generator "B"	DG	Yes	Yes	RC PC IC DHR	Eng. Gen. (17)	PE	No	140 (I)	No	No	
55	1EPGBL32	480 V LC32 bus	CTRL	Yes	Yes	RC PC DHR	Low Volt. SWGR (2)	PG	No	80 (I)	No	No	
56	1EPGBL34	480 V LC34 bus	CTRL	Yes	Yes	RC PC DHR	Low Volt. SWGR (2)	PG	No	80 (I)	No	No	
57	1EPGBL36	480 V LC36 bus	CTRL	Yes	Yes	RC PC DHR	Low Volt. SWGR (2)	PG	No	80 (I)	No	No	
58	1EPHBM32	480 V MCC M32	CTRL	Yes	Yes	RC PC DHR	MCC (1)	PH	No	80 (I)	No	No	
59	1EPHBM34	480 V MCC M34	AUX	Yes	Yes	RC PC DHR	MCC (1)	PH	No	104 (I)	No	No	
60	1EPHBM36	480 V MCC M36	AUX	Yes	Yes	RC PC DHR	MCC (1)	PH	No	104 (I)	No	No	

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?	Comments
							Equipment Class	System Type	Major new or replacement equipment?	Environment (Temp, °F) (I for "Inside"or O for "Outside")	IPEEE vulnerability enhancement?		
61	1EPHBM38	480 V MCC M38	AUX	Yes	Yes	RC PC DHR	MCC (1)	PH	No	104 (I)	No	No	
62	1EPKBD22	LC 34 control power	CTRL	Yes	Yes	RC PC DHR	Dist Panel (14)	PK	No	80 (I)	No	No	
63	1EPKBF12	DC battery "B"	CTRL	Yes	Yes	RC PC DHR	Battery Rack (15)	PK	No	80 (I)	No	No	
64	1EPKBH12	Battery charger "B"	CTRL	Yes	Yes	RC PC DHR	Battery Chg (16)	PK	No	80 (I)	No	No	
65	1EPKBM42	DC power to TCB1 control circuit	CTRL	Yes	Yes	RC PC	MCC (1)	PK	No	80 (I)	No	No	
66	1EPKDD24	DC distribution panel D24	CTRL	Yes	Yes	RC PC DHR	Dist Panel (14)	PK	No	80 (I)	No	Yes	
67	1EPKCF13	DC battery "C"	CTRL	Yes	Yes	RC PC DHR	Battery Rack (15)	PK	No	80 (I)	No	Yes	
68	1EPKDM44	DC power to TCB1 control circuit	CTRL	Yes	Yes	RC PC	MCC (1)	PK	No	80 (I)	No	Yes	
69	1EPKCN43	Inverter For Shutdown Cooling Isolation Valve 1JSICUV653	CTRL	Yes	Yes	DHR	Inverter (16)	PK	No	80 (I)	No	No	
70	1EPKDN44	Inverter For 1JSIDUV654 Shutdown Cooling B Return Inside Containment Isolation Valve	CTRL	Yes	Yes	CF	Inverter (16)	PK	No	80 (I)	No	No	
71	1EPNBD26	Power to PPS "B" instrumentation	CTRL	Yes	Yes	RC PC IC DHR	Dist Panel (14)	PN	No	80 (I)	No	No	
72	1EPNBN12	DC/AC inverter "B"	CTRL	Yes	Yes	PC IC DHR CF	Inverter (16)	PN	No	80 (I)	No	No	
73	1EPNBV26	120 V vital ac voltage regulator "B"	CTRL	Yes	Yes	PC IC DHR CF	Other (0)	PN	No	80 (I)	No	No	
74	1EPNCD27	Power to PPS "C" instrumentation	CTRL	Yes	Yes	RC PC IC DHR	Dist Panel (14)	PN	No	80 (I)	No	No	
75	1EPNDN14	DC/AC inverter "D"	CTRL	Yes	Yes	PC IC DHR CF	Inverter (16)	PN	No	80 (I)	No	Yes	
76	1EPNDV28	120 V vital ac voltage regulator "D"	CTRL	Yes	Yes	PC IC DHR CF	Other (0)	PN	No	80 (I)	No	No	
77	1JRCBHV0105	Pressurizer and Reactor Vessel Head Vent To Reactor Drain Tank Globe Valve	CTMT	Yes	Yes	PC	SOV (8)	RC	No	120 (I)	No	Yes	
78	1JRCBHV0108	Pressurizer Vent To Reactor Drain Tank Globe Valve	CTMT	Yes	Yes	PC	SOV (8)	RC	No	120 (I)	No	Yes	
79	1JRCBHV0109	Pressurizer Vent To Reactor Drain Tank Globe Valve	CTMT	Yes	Yes	PC	SOV (8)	RC	No	120 (I)	No	Yes	

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?	Comments
							Equipment Class	System Type	Major new or replacement equipment?	Environment (Temp, °F) (I for "Inside"or O for "Outside")	IPEEE vulnerability enhancement?		
80	1JRCBPT0102B	Przr pressure (required for RPS/SIAS)	CTMT	Yes	Yes	PC	Inst. Rack (18)	RC	No	120 (I)	No	Yes	
81	1JRCBPT104	SDC RCS pressure interlock	CTMT	Yes	Yes	DHR	Inst. Rack (18)	RC	No	120 (I)	No	Yes	
82	1JSBBC02A	I/V converter	CTRL	Yes	Yes	DHR	Inst. Rack (18)	RC	No	80 (I)	No	No	
83	1JSBCC02A	I/V converter	CTRL	Yes	Yes	DHR	Inst. Rack (18)	RC	No	80 (I)	No	No	
84	1JRCDPT106	SDC RCS pressure interlock	CTMT	Yes	Yes	DHR	Inst. Rack (18)	RC	No	120 (I)	No	Yes	
85	1JRCNTE101	Pressurizer temperature	CTMT	Yes	Yes	PC	Temp Sensor (19)	RC	No	120 (I)	No	Yes	
86	1JRDBUV0024	Isolation Containment Radwaste Sump Outlet Isolation Gate Valve	AUX	Yes	Yes	CF	MOV (8)	RD	No	104 (I)	No	No	When choosing containment isolation valves that exist for both inside and outside containment, outside was chosen.
87	1JRMBB02	RWT level	CTRL	Yes	Yes	IC	Control Panel (20)	RM	No	80 (I)	No	No	
88	1JRMBB04	RCS temperature	CTRL	Yes	Yes	RC	Control Panel (20)	RM	No	80 (I)	No	No	
89	1JRMBB05	Containment pressure	CTRL	Yes	Yes	CF	Control Panel (20)	RM	No	80 (I)	No	No	
90	1JRMBB06	Auxiliary feedwater flow	CTRL	Yes	Yes	PC DHR	Control Panel (20)	RM	No	80 (I)	No	No	
91	1JRMCB05	Containment pressure	CTRL	Yes	Yes	CF	Control Panel (20)	RM	No	80 (I)	No	No	
92	1JRMNB02	SDHX A outlet temperature	CTRL	Yes	Yes	DHR	Control Panel (20)	RM	No	80 (I)	No	No	
93	1JRMNB04	Pressurizer temperature	CTRL	Yes	Yes	PC	Control Panel (20)	RM	No	80 (I)	No	No	
94	1JSBBC03	Reactor trip breaker "B"	AUX	Yes	Yes	RC PC	Breaker Panel (2)	SB	No	104 (I)	No	No	
95	1JSGBHV0178	Atmospheric dump valve HV-178	MSSS	Yes	Yes	PC DHR	POV (7)	SG	No	124 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
96	1JSGBHV0185	Atmospheric dump valve HV-185	MSSS	Yes	Yes	PC DHR	POV (7)	SG	No	124 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
97	1JSGBPT0306	Instrument air line pressure transmitter	MSSS	Yes	Yes	PC DHR	Inst. Rack (18)	SG	No	104 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?	Comments
							Equipment Class	System Type	Major new or replacement equipment?	Environment (Temp, °F) (I for "Inside"or O for "Outside")	IPEEE vulnerability enhancement?		
98	1JSGBPV0306B	N2 supply solenoid valve	MSSS	Yes	Yes	PC DHR	SOV (8)	SG	No	124 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
99	1JSGBUV0130	SG-E01A isolation valve	MSSS	Yes	Yes	PC DHR	POV (7)	SG	Yes	124 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
100	1JSGBUV0135	SG-E01B isolation valve	MSSS	Yes	Yes	PC DHR	POV (7)	SG	Yes	124 (I)	No	No	Operations noted engineering scaffolding was recently added to the MSSS. This should be examined by area walkby.
101	1JSGCLT1113C	SG-E01A WR level (required for AFAS)	CONT	Yes	Yes	PC DHR	Inst. Rack (18)	SG	No	120 (I)	No	No	
102	1JSIAUV0651	RC loop 1 long term recirc/SDC valve	CTMT	Yes	Yes	IC DHR	MOV (8)	SI	Yes	120 (I)	No	Yes	This item is being specifically walked down due to its significance in plant history (pipe vibration).
103	1MSIBE01	SDHX "B"	AUX	Yes	Yes	DHR	Heat Exchanger (21)	SI	No	104 (I)	No	No	
104	1MSIBP01	LPSI pump "B"	AUX	Yes	Yes	DHR	Vert. Pump (6)	SI	Yes	104 (I)	No	No	
105	1MSIBP03	Containment Spray Pump B	AUX	Yes	Yes	CF	Vert. Pump (6)	SI	No	104 (I)	No	No	The CS pump was selected for walkdown per ops/engineering request.
106	1JSIBPSV0166	HPSI Long Term Recirculation Train B Pressure Relief Valve	AUX	Yes	Yes	PC DHR	Other (0)	SI	No	104 (I)	No	No	
107	1JSIBPSV0409	HPSI train "B" injection to EDT relief	AUX	Yes	Yes	IC DHR	Other (0)	SI	No	104 (I)	No	No	
108	1JSIBPSV189	RC loop 2 LTOP relief to sump	CTMT	Yes	Yes	DHR	Other (0)	SI	No	120 (I)	No	Yes	
109	1JSIBUV0614	Safety Injection Tank 2A Discharge Isolation Globe Valve	CTMT	Yes	Yes	RC IC	MOV (8)	SI	No	120 (I)	No	Yes	
110	1JSIBUV0616	RC loop 2A isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No	
111	1JSIBUV0624	Safety Injection Tank 2B Discharge Isolation Globe Valve	CTMT	Yes	Yes	RC IC	MOV (8)	SI	No	120 (I)	No	Yes	
112	1JSIBUV0626	RC loop 2B isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No	
113	1JSIBUV0636	RC loop 1A isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No	
114	1JSIBUV0646	RC loop 1B isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No	
115	1JSIBUV0665	Containment Spray Pump Recirculation To Refueling Water Tank Train B Globe Valve	AUX	Yes	Yes	CF	MOV (8)	SI	No	104 (I)	No	No	

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?	Comments
							Equipment Class	System Type	Major new or replacement equipment?	Environment (Temp, °F) (I for "Inside"or O for "Outside")	IPEEE vulnerability enhancement?		
116	1JSIBUV615	RC loop 2A LPSI isolation valve	AUX	Yes	Yes	DHR	MOV (8)	SI	No	104 (I)	No	No	
117	1JSIBUV656	RC loop 2 SDC isolation valve	AUX	Yes	Yes	DHR	MOV (8)	SI	Yes	104 (I)	No	No	
118	1JSIBUV667	HPSI pump "B" recirc iso (closes on RAS)	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No	
119	1JSIBUV676	SUMP isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	No	104 (I)	No	No	
120	1JSINPT391	HPSI long term recirc loop 1 pressure xmtr	CTMT	Yes	Yes	IC DHR	Inst. Rack (18)	SI	No	120 (I)	No	Yes	Non Class Power however kept in list because of pressure boundary considerations.
121	1MSPBP01	Spray pond pump "B"	SP	Yes	Yes	PC DHR UHS	Vert. Pump (6)	SP	No	122 (O)	No	No	
122	1MHSBJ01	Spray pond pump house exhaust fan "B"	SP	Yes	Yes	PC DHR UHS	AHU (6)	SP	No	122 (O)	No	No	Selected per ops/engineering request due to the environmental conditions
123	1JRMBB01	Main Control Board Section B01 Electrical Systems	CTRL	Yes	Yes	PC IC DHR	Control Panel (20)	RM	No	80 (I)	No	No	
124	1JSABC01	B Train ESFAS Relay Cabinets	CTRL	Yes	Yes	RC	Dist. Panel (14)	SA	No	80 (I)	No	No	
125 *	1JZJBE01	Remote Shutdown Panel	CTRL	Yes	Yes	RC PC IC DHR	Control Panel (20)	ZJ	No	80 (I)	No	No	

* The total number of SWEL 1 items is 124 instead of 125 because items 14 (1MCHEE01) was removed. The item numbers in the first column of this table were not adjusted to make it easier to compare the items listed herein to those in previous revisions of this document.

SWEL Item Number	Walkdown Equipment	Description	Equipment Class	System Type	Building	Screen #1 (Seismic Licensing Basis?)	Screen #2 (Screens In?)	Associated with Rapid Draindown?	Comment
1	1MPCAP01	Fuel pool cooling pump 1	PP	PC	Fuel Building	Yes	Yes	No	
2	1MPCAE01	Fuel pool cooling heat exchanger 1	HX	PC	Fuel Building	Yes	Yes	No	
3	1MPCBP01	Fuel pool cooling pump 2	PP	PC	Fuel Building	Yes	Yes	No	
4	1MPCBE01	Fuel pool cooling heat exchanger 2	HX	PC	Fuel Building	Yes	Yes	No	
5	1MHFAJ01	Fuel Building AHU	AHU	HF	Fuel Building	Yes	Yes	No	
6	1MHFBJ01	Fuel Building AHU	AHU	HF	Fuel Building	Yes	Yes	No	

Table 3-1: Sort of the Base List 1 data based on "System Type"

(Note: The DF (Tank), GA (SOV), IA (SOV) and ZA (Dist. Panels) systems are not represented due to the equipment types covered by each system are already well represented.)

System Type	Number of Items in Base List 1	Number of Items Selected for SWEL 1
AF	14	8
CH	29	10
CP	4	1
CT	3	1
DF	1	0
DG	14	3
EC	8	4
EW	8	3
GA	1	0
GR	2	1
HA	4	1
HC	12	6
HD	4	2
HJ	21	11
IA	1	0
PB	3	1

System Type	Number of Items in Base List 1	Number of Items Selected for SWEL 1
PE	2	1
PG	6	3
PH	8	4
PK	20	9
PN	12	6
RC	16	9
RD	2	1
RM	30	8
SA	11	1
SB	14	1
SG	40	7
SI	101	19
SP	4	2
ZA	6	0
ZJ	11	1

Table 3-2: Sort of the Base List 1 data based on "Major new or replacement equipment"

(Of the 412 items comprising Base List 1, 38 items were identified as "Major new or replacement equipment."
The following 15 items were selected for SWEL 1.)

Base List 1 Item	Walkdown Equipment	Description
115	1EPBBS04	4.16 kV bus S04
11	1JAFBUV0034	SG-E01A isolation valve
12	1JAFBUV0035	SG-E01B isolation valve
14	1JAFCUV0036	SG-E01A isolation valve
272	1JSIAUV0651	RC loop 1 long term recirc/SDC valve
303	1MSIBP01	LPSI pump "B"
312	1JSIBUV0626	RC loop 2B isolation valve
313	1JSIBUV0636	RC loop 1A isolation valve
50	1MDGBF03	DG "B" air intake structure
222	1JSGBUV0130	SG-E01A isolation valve
223	1JSGBUV0135	SG-E01B isolation valve
321	1JSIBUV667	HPSI pump "B" recirc iso (closes on RAS)
310	1JSIBUV0616	RC loop 2A isolation valve
314	1JSIBUV0646	RC loop 1B isolation valve
319	1JSIBUV656	RC loop 2 SDC isolation valve

Table 3-3: Sort of the Base List 1 data based on "Equipment Type"

(Note: Equipment type 4 (transformers) are not mentioned as they are part of larger parent equipment (i.e. switchgear, load centers). Additionally, EQ type 12 (Air Compressors) and 13 (Motor Generators) are not included as Palo Verde does not have any safety related equipment in this category.)

Equipment Type Number	Description	Number of Items in Base List 1	Number of Items Selected for SWEL 1
0	Miscellaneous	13	6
1	Motor Control Centers	13	6
2	Low Voltage Switchgear	12	4
3	Medium Voltage Switchgear	2	1
4	Transformers	0	0
5	Horizontal Pumps	11	5
6	Vertical Pumps	8	4
7	Fluid Operated Valves	23	10
8	Motor Operated Valves, Solenoid Operated Valves	115	31
9	Fans	8	4
10	Air Handlers	10	4
11	Chillers	2	1
12	Air Compressors	0	0
13	Motor Generators	0	0
14	Distribution Panels	41	5
15	Batteries on Racks	4	2
16	Battery Chargers and Inverters	12	5
17	Engine Generators	2	1
18	Instruments on Racks	74	16
19	Temperature Sensors	3	2
20	Instrumentation and Control Panels and Racks	39	9
21	Tanks and Heat Exchangers (GIP Section 7)	20	8

Table 3-4: Sort of the Base List 1 data based on "Environment (Temperature)"

(Since the PVNGS Units are located in a dry environment, it was decided to classify the environments based on the maximum design temperature of the equipment rooms. Temperature values were determined from a review of the EQ DBM and the UFSAR.)

Temperature (°F)	Number of Items in Base List 1	Number of Items Selected for SWEL 1
80	142 (All inside)	47 (All inside)
104	150 (All inside)	42 (All inside)
113	8 (2 Inside and 6 outside)	3 (All outside)
120	62 (All inside)	17 (All inside)
122	4 (All outside)	2 (All outside)
124	18 (All inside)	5 (All inside)
140	28 (All inside)	8 (All inside)

Table 3-5: Sort of the Base List 1 data based on Risk Achievement Worth (RAW) and the Availability of the Associated Train

Base List 1 Item	Walkdown Equipment	Description	RAW	Is the Train Unavailable?
45	1MCTET01	CST (condensate storage tank)	30500	No
40	1MCHET01	RWT (refueling water tank)	56.89	No
138	1EPKBF12	DC battery "B"	9.34	No
115	1EPBBS04	4.16 kV bus S04	9.32	No
10	1MAFBP01	AF pump "B"	6.44	No
122	1EPGBL34	480 V LC34 bus	4.92	No
129	1EPHBM34	480 V MCC M34	4.92	No
121	1EPGBL32	480 V LC32 bus	4.81	No
131	1EPHBM38	480 V MCC M38	4.74	No
336	1MSPBP01	Spray pond pump "B"	Low Risk	No
324	1JSIBUV676	SUMP isolation valve	Low Risk	No
123	1EPGBL36	480 V LC36 bus	Low Risk	No
130	1EPHBM36	480 V MCC M36	Low Risk	No
89	1MHDBA01	DG "B" room EAHU fan	Low Risk	No
90	1MHDBJ01	DG "B" room essential exhaust fan	Low Risk	No
128	1EPHBM32	480 V MCC M32	Low Risk	No
37	1JCHEHV0532	RWT suction iso (fails open on loss of air)	Low Risk	No
307	1JSIBPSV0409	HPSI train "B" injection to EDT relief	Low Risk	No
67	1MEWBP01	EW pump "B"	Low Risk	No
68	1MEWBT01	EW "B" surge tank	Low Risk	No
25	1JCHBHV0530	RWT outlet to SI train "B"	Low Risk	No
321	1JSIBUV667	HPSI pump "B" recirc iso (closes on RAS)	Low Risk	No
66	1MEWBE01	EW "B" heat exchanger	Low Risk	No
283	1MSIBE01	SDHX "B"	Low Risk	No

Base List 1 Item	Walkdown Equipment	Description	RAW	Is the Train Unavailable?
117	1EPEBG02	Emergency diesel generator "B"	Low Risk	No
306	1JSIBPSV0166	HPSI Long Term Recirculation Train B Pressure Relief Valve	Low Risk	No
60	1JECBTV0030	Control room "B" EAHU flow reg valve	Low Risk	No
101	1MHJBF04	Control room EAHU (fan, filters and HX)	Low Risk	No
57	1MECBE01	Essential chiller "B"	Low Risk	No
58	1MECBP01	Circulating water pump "B"	Low Risk	No
309	1JSIBUV0614	Safety Injection Tank 2A Discharge Isolation Globe Valve	Low Risk	No
311	1JSIBUV0624	Safety Injection Tank 2B Discharge Isolation Globe Valve	Low Risk	No
8	1JAFBHV0030	SG-E01A reg valve	Low Risk	No
9	1JAFBHV0031	SG-E01B reg valve	Low Risk	No
11	1JAFBUV0034	SG-E01A isolation valve	Low Risk	No
12	1JAFBUV0035	SG-E01B isolation valve	Low Risk	No
14	1JAFCUV0036	SG-E01A isolation valve	Low Risk	No
38	1JCHEHV0536	RWT suction isolation	Low Risk	No
315	1JSIBUV0665	Containment Spray Pump Recirculation To Refueling Water Tank Train B Globe Valve	Low Risk	No
143	1EPKCF13	DC battery "C"	Low Risk	No
27	1MCHBP01	Charging pump 2	Low Risk	No
146	1EPKCN43	Inverter For Shutdown Cooling Isolation Valve 1JSICUV653	Low Risk	No
151	1EPKDN44	Inverter For 1JSIDUV654 Shutdown Cooling B Return Inside Containment Isolation Valve	Low Risk	No
213	1JSGBHV0178	Atmospheric dump valve HV-178	Low Risk	No
214	1JSGBHV0185	Atmospheric dump valve HV-185	Low Risk	No
272	1JSIAUV0651	RC loop 1 long term recirc/SDC valve	Low Risk	Yes
303	1MSIBP01	LPSI pump "B"	Low Risk	No
305	1MSIBP03	Containment Spray Pump B	Low Risk	No
308	1JSIBPSV189	RC loop 2 LTOP relief to sump	Low Risk	No
310	1JSIBUV0616	RC loop 2A isolation valve	Low Risk	No
312	1JSIBUV0626	RC loop 2B isolation valve	Low Risk	No

Base List 1 Item	Walkdown Equipment	Description	RAW	Is the Train Unavailable?
313	1JSIBUV0636	RC loop 1A isolation valve	Low Risk	No
314	1JSIBUV0646	RC loop 1B isolation valve	Low Risk	No
316	1JSIBUV615	RC loop 2A LPSI isolation valve	Low Risk	No
319	1JSIBUV656	RC loop 2 SDC isolation valve	Low Risk	No
6	1JAFBFT0041A	Auxiliary feedwater flow	Not Modeled in the PRA	No
7	1JAFBFT0041B	Auxiliary feedwater flow	Not Modeled in the PRA	No
29	1JCHBPSL0218	Train B For Charging Pump 1MCHEP01 Suction Line Pressure Switch	Not Modeled in the PRA	No
31	1JCHBUV0924	Regenerative Heat Exchanger Outlet To Pass Line Isolation Globe Valve	Not Modeled in the PRA	No
32	1JCHCLT0203C	RWT level (required for RAS)	Not Modeled in the PRA	No
34	1MCHEE01	Regenerative heat exchanger	Not Modeled in the PRA	No
35	1JCHEHV0239	Charging Line To Reactor Coolant Loop 2A Isolation Globe Valve	Not Modeled in the PRA	No
39	1MCHEP01	Charging pump 3	Not Modeled in the PRA	No
42	1JCPBUV0005A	Containment Power Access Purge Supply Isolation Butterfly Damper	Not Modeled in the PRA	No
50	1MDGBF03	DG "B" air intake structure	Not Modeled in the PRA	No
51	1MDGBX01A	Starting air accumulator	Not Modeled in the PRA	No
52	1MDGBX01B	Starting air accumulator	Not Modeled in the PRA	No
59	1MECBT01	EC expansion tank "B"	Not Modeled in the PRA	No
70	1JGRBUV0002	(LLRT) RDT/GAS Surge Header Isolation Valve (Outside Containment)	Not Modeled in the PRA	No
73	1MHAAZ04	AFW pump room "A" EAHU	Not Modeled in the PRA	Yes
79	1JHCBPT0351B	Containment pressure	Not Modeled in the PRA	No
80	1JHCBPT0352B	Containment pressure	Not Modeled in the PRA	No
81	1JHCBUV0044	Discharge Sampling From RU-1 Containment Isolation Valve	Not Modeled in the PRA	No
82	1JHCBUV0047	Inlet Sampling To RU-1 Containment Isolation Valve	Not Modeled in the PRA	No
85	1JHCDPT0351D	Containment pressure	Not Modeled in the PRA	No
86	1JHCDPT0352D	Containment pressure	Not Modeled in the PRA	No
102	1MHJBJ01A	DC room "D" essential exhaust fan	Not Modeled in the PRA	No
103	1MHJBJ01B	DC room "B" essential exhaust fan	Not Modeled in the PRA	No

Base List 1 Item	Walkdown Equipment	Description	RAW	Is the Train Unavailable?
104	1MHJBM02	motor-operated damper	Not Modeled in the PRA	No
105	1MHJBM03	motor-operated damper	Not Modeled in the PRA	No
106	1MHJBM31	Air-operated damper	Not Modeled in the PRA	No
107	1MHJBM58	Air-operated DC room "B" isolation	Not Modeled in the PRA	No
108	1MHJBM67	Air-operated computer room DP	Not Modeled in the PRA	No
109	1JHJBTIC0124	Control room temp indicating controller	Not Modeled in the PRA	No
110	1MHJBZ03	ESF switchgear room "B" EAHU	Not Modeled in the PRA	No
111	1MHJBZ04	DC room "B" EAHU	Not Modeled in the PRA	No
137	1EPKBD22	LC 34 control power	Not Modeled in the PRA	No
139	1EPKBH12	Battery charger "B"	Not Modeled in the PRA	No
141	1EPKBM42	DC power to TCB1 control circuit	Not Modeled in the PRA	No
147	1EPKDD24	DC distribution panel D24	Not Modeled in the PRA	No
150	1EPKDM44	DC power to TCB1 control circuit	Not Modeled in the PRA	No
155	1EPNBD26	Power to PPS "B" instrumentation	Not Modeled in the PRA	No
156	1EPNBN12	DC/AC inverter "B"	Not Modeled in the PRA	No
157	1EPNBV26	120 V vital ac voltage regulator "B"	Not Modeled in the PRA	No
158	1EPNCD27	Power to PPS "C" instrumentation	Not Modeled in the PRA	No
162	1EPNDN14	DC/AC inverter "D"	Not Modeled in the PRA	No
163	1EPNDV28	120 V vital ac voltage regulator "D"	Not Modeled in the PRA	No
167	1JRCBHV0105	Pressurizer and Reactor Vessel Head Vent To Reactor Drain Tank Globe Valve	Not Modeled in the PRA	No
168	1JRCBHV0108	Pressurizer Vent To Reactor Drain Tank Globe Valve	Not Modeled in the PRA	No
169	1JRCBHV0109	Pressurizer Vent To Reactor Drain Tank Globe Valve	Not Modeled in the PRA	No
170	1JRCBPT0102B	Przr pressure (required for RPS/SIAS)	Not Modeled in the PRA	No
171	1JRCBPT104	SDC RCS pressure interlock	Not Modeled in the PRA	No
172	1JSBBC02A	I/V converter	Not Modeled in the PRA	No
175	1JSBCC02A	I/V converter	Not Modeled in the PRA	No
177	1JRCDPT106	SDC RCS pressure interlock	Not Modeled in the PRA	No

Base List 1 Item	Walkdown Equipment	Description	RAW	Is the Train Unavailable?
179	1JRCNTE101	Pressurizer temperature	Not Modeled in the PRA	No
181	1JRDBUV0024	Isolation Containment Radwaste Sump Outlet Isolation Gate Valve	Not Modeled in the PRA	No
186	1JRMBB02	RWT level	Not Modeled in the PRA	No
187	1JRMBB04	RCS temperature	Not Modeled in the PRA	No
188	1JRMBB05	Containment pressure	Not Modeled in the PRA	No
189	1JRMBB06	Auxiliary feedwater flow	Not Modeled in the PRA	No
190	1JRMCB05	Containment pressure	Not Modeled in the PRA	No
192	1JRMNB02	SDHX A outlet temperature	Not Modeled in the PRA	No
193	1JRMNB04	Pressurizer temperature	Not Modeled in the PRA	No
195	1JSBBC03	Reactor trip breaker "B"	Not Modeled in the PRA	No
219	1JSGBPT0306	Instrument air line pressure transmitter	Not Modeled in the PRA	No
221	1JSGBPV0306B	N2 supply solenoid valve	Not Modeled in the PRA	No
222	1JSGBUV0130	SG-E01A isolation valve	Not Modeled in the PRA	No
223	1JSGBUV0135	SG-E01B isolation valve	Not Modeled in the PRA	No
228	1JSGCLT1113C	SG-E01A WR level (required for AFAS)	Not Modeled in the PRA	No
334	1JSINPT391	HPSI long term recirc loop 1 pressure xmtr	Not Modeled in the PRA	No
338	1MHSBJ01	Spray pond pump house exhaust fan "B"	Not Modeled in the PRA	No
355	1JRMBB01	Main Control Board Section B01 Electrical Systems	Not Modeled in the PRA	No
374	1JSABC01	B Train ESFAS Relay Cabinets	Not Modeled in the PRA	No
409	1JZJBE01	Remote Shutdown Panel	Not Modeled in the PRA	No

APPENDIX G - SWEL DEVELOPMENT TABLES

There were no changes to the equipment selected for Base List 1 (Table G-1). One item was removed from SWEL 1 (Table G-2) because it was inaccessible in a locked high-radiation area and three Train C electrical components were substituted with their counterpart from Train D because they were inaccessible during refueling outage 1R17. These changes are discussed in Section 3.4.

There were no changes to Base List 2 and SWEL 2 (Table G-3).

Table G-1: PVNGS-1 Base List 1

(Refer to Table G-1 of Reference 48, "Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1")

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
1	1JAFBFT0041A	Auxiliary feedwater flow	MSSS	Yes	Yes	PC DHR	Inst. Rack (18)	AF	No	140 (I)	No	No
2	1JAFBFT0041B	Auxiliary feedwater flow	MSSS	Yes	Yes	PC DHR	Inst. Rack (18)	AF	No	140 (I)	No	No
3	1JAFBHV0030	SG-E01A regulating valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	No	104 (I)	No	No
4	1JAFBHV0031	SG-E01B regulating valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	No	104 (I)	No	No
5	1MAFBP01	AF pump "B"	MSSS	Yes	Yes	PC DHR	Horz. Pump (5)	AF	No	104 (I)	No	No
6	1JAFBUV0034	SG-E01A isolation valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	Yes	104 (I)	No	No
7	1JAFBUV0035	SG-E01B isolation valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	Yes	104 (I)	No	No
8	1JAFCUV0036	SG-E01A isolation valve	MSSS	Yes	Yes	PC DHR	MOV (8)	AF	Yes	104 (I)	No	No
9	1JCHBHV0530	RWT outlet to SI train "B"	AUX	Yes	Yes	RC IC DHR	MOV (8)	CH	No	104 (I)	No	No
10	1MCHBP01	Charging pump 2	AUX	Yes	Yes	RC PC IC	Horz. Pump (5)	CH	No	104 (I)	No	No
11	1JCHBPSL0218	Train B For Charging Pump 1MCHEP01 Suction Line Pressure Switch	AUX	Yes	Yes	RC IC	Inst. Rack (18)	CH	No	104 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
12	1JCHBUV0924	Regenerative Heat Exchanger Outlet To Pass Line Isolation Globe Valve	AUX	Yes	Yes	RC IC	SOV (8)	CH	No	104 (I)	No	No
13	1JCHCLT0203C	RWT level (required for RAS)	YARD	Yes	Yes	DHR	Inst. Rack (18)	CH	No	113 (O)	No	No
~~14~~	~~1MCHEE01~~ **(This item was removed from SWEL 1 in this report. See Section 3.4.)**	~~Regenerative heat exchanger~~	~~CTMT~~	~~Yes~~	~~Yes~~	~~PC~~	~~Heat Exchanger (21)~~	~~CH~~	~~No~~	~~120 (I)~~	~~No~~	~~Yes~~
15	1JCHEHV0239	Charging Line To Reactor Coolant Loop 2A Isolation Globe Valve	CTMT	Yes	Yes	RC IC	POV (7)	CH	No	120 (I)	No	Yes
16	1JCHEHV0532	RWT suction iso (fails open on loss of air)	AUX	Yes	Yes	RC PC	POV (7)	CH	No	104 (I)	No	No
17	1JCHEHV0536	RWT suction isolation	AUX	Yes	Yes	RC PC	MOV (8)	CH	No	104 (I)	No	No
18	1MCHEP01	Charging pump 3	AUX	Yes	Yes	RC PC IC	Horz. Pump (5)	CH	No	104 (I)	No	No
19	1MCHET01	RWT (refueling water tank)	Yard	Yes	Yes	RC PC IC DHR	Tank (21)	CH	No	113 (O)	No	No
20	1JCPBUV0005A	Containment power access purge supply isolation butterfly damper	CTMT	Yes	Yes	CF	MOV (8)	CP	No	120 (I)	No	Yes

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
21	1MCTET01	CST (condensate storage tank)	Yard	Yes	Yes	PC DHR	Tank (21)	CT	No	113 (O)	No	No
22	1MDGBF03	DG "B" air intake filter	DG	Yes	Yes	RC PC IC DHR	Other (0)	DG	Yes	140 (I)	No	No
23	1MDGBX01A	Starting air accumulator	DG	Yes	Yes	RC PC IC DHR	Tank (21)	DG	No	140 (I)	No	No
24	1MDGBX01B	Starting air accumulator	DG	Yes	Yes	RC PC IC DHR	Tank (21)	DG	No	140 (I)	No	No
25	1MECBE01	Essential chiller "B"	CTRL	Yes	Yes	RC PC IC DHR	Chiller (11)	EC	No	80 (I)	No	No
26	1MECBP01	Circulating water pump "B"	CTRL	Yes	Yes	RC PC IC DHR	Horz Pump (5)	EC	No	80 (I)	No	No
27	1MECBT01	EC expansion tank "B"	CTRL	Yes	Yes	RC PC IC DHR	Tank (21)	EC	No	80 (I)	No	No
28	1JECBTV0030	Control room "B" EAHU flow regulating valve	CTRL	Yes	Yes	PC IC DHR	POV (7)	EC	No	80 (I)	No	No
29	1MEWBE01	EW "B" heat exchanger	AUX	Yes	Yes	PC IC DHR	Heat Exchanger (21)	EW	No	104 (I)	No	No
30	1MEWBP01	EW pump "B"	AUX	Yes	Yes	PC IC DHR	Horz Pump (5)	EW	No	104 (I)	No	No
31	1MEWBT01	EW "B" surge tank	AUX	Yes	Yes	PC IC DHR	Tank (21)	EW	No	104 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
32	1JGRBUV0002	(LLRT) RDT/GAS Surge Header Isolation Valve (Outside Containment)	AUX	Yes	Yes	CF	SOV (8)	GR	No	104 (I)	No	No
33	1MHAAZ04	AFW pump room "A" EAHU	AUX	Yes	Yes	PC IC DHR	AHU (10)	HA	No	104 (I)	No	Yes
34	1JHCBPT0351B	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No
35	1JHCBPT0352B	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No
36	1JHCBUV0044	Discharge Sampling From RU-1 Containment Isolation Valve	CTMT	Yes	Yes	CF	SOV (8)	HC	No	120 (I)	No	Yes
37	1JHCBUV0047	Inlet Sampling To RU-1 Containment Isolation Valve	CTMT	Yes	Yes	CF	SOV (8)	HC	No	120 (I)	No	Yes
38	1JHCDPT0351D	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No
39	1JHCDPT0352D	Containment pressure	AUX	Yes	Yes	CF	Inst. Rack (18)	HC	No	104 (I)	No	No
40	1MHDBA01	DG "B" room EAHU fan	DG	Yes	Yes	PC IC DHR	Fan (9)	HD	No	140 (I)	No	No
41	1MHDBJ01	DG "B" room essential exhaust fan	DG	Yes	Yes	PC IC DHR	Fan (9)	HD	No	140 (I)	No	No
42	1MHJBF04	Control room EAHU (fan, filters and HX)	CTRL	Yes	Yes	PC IC DHR	AHU (10)	HJ	No	80 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
43	1MHJBJ01A	DC room "D" essential exhaust fan	CTRL	Yes	Yes	PC IC DHR	Fan (9)	HJ	No	80 (I)	No	No
44	1MHJBJ01B	DC room "B" essential exhaust fan	CTRL	Yes	Yes	PC IC DHR	Fan (9)	HJ	No	80 (I)	No	No
45	1MHJBM02	motor-operated damper	CTRL	Yes	Yes	PC IC DHR	MOV (8)	HJ	No	80 (I)	No	No
46	1MHJBM03	motor-operated damper	CTRL	Yes	Yes	PC IC DHR	MOV (8)	HJ	No	80 (I)	No	No
47	1MHJBM31	Pneumatic damper	CTRL	Yes	Yes	PC IC DHR	POV (7)	HJ	No	80 (I)	No	No
48	1MHJBM58	Pneumatic DC room "B" isolation	CTRL	Yes	Yes	PC IC DHR	POV (7)	HJ	No	80 (I)	No	No
49	1MHJBM67	Pneumatic computer room DP	CTRL	Yes	Yes	PC IC DHR	POV (7)	HJ	No	80 (I)	No	No
50	1JHJBTIC0124	Control room temp indicating controller	CTRL	Yes	Yes	PC IC DHR	Temp Sensor (19)	HJ	No	80 (I)	No	No
51	1MHJBZ03	ESF switchgear room "B" EAHU	CTRL	Yes	Yes	PC IC DHR	AHU (10)	HJ	No	80 (I)	No	No
52	1MHJBZ04	DC room "B" EAHU	CTRL	Yes	Yes	PC IC DHR	AHU (10)	HJ	No	80 (I)	No	No
53	1EPBBS04	4.16 kV bus S04	CTRL	Yes	Yes	RC PC IC DHR CF	Med. Volt SWGR (3)	PB	Yes	80 (I)	No	No
54	1EPEBG02	Emergency diesel generator "B"	DG	Yes	Yes	RC PC IC DHR	Eng. Gen. (17)	PE	No	140 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
55	1EPGBL32	480 V LC32 bus	CTRL	Yes	Yes	RC PC DHR	Low Volt. SWGR (2)	PG	No	80 (I)	No	No
56	1EPGBL34	480 V LC34 bus	CTRL	Yes	Yes	RC PC DHR	Low Volt. SWGR (2)	PG	No	80 (I)	No	No
57	1EPGBL36	480 V LC36 bus	CTRL	Yes	Yes	RC PC DHR	Low Volt. SWGR (2)	PG	No	80 (I)	No	No
58	1EPHBM32	480 V MCC M32	CTRL	Yes	Yes	RC PC DHR	MCC (1)	PH	No	80 (I)	No	No
59	1EPHBM34	480 V MCC M34	AUX	Yes	Yes	RC PC DHR	MCC (1)	PH	No	104 (I)	No	No
60	1EPHBM36	480 V MCC M36	AUX	Yes	Yes	RC PC DHR	MCC (1)	PH	No	104 (I)	No	No
61	1EPHBM38	480 V MCC M38	AUX	Yes	Yes	RC PC DHR	MCC (1)	PH	No	104 (I)	No	No
62	1EPKBD22	LC 34 control power	CTRL	Yes	Yes	RC PC DHR	Dist Panel (14)	PK	No	80 (I)	No	No
63	1EPKBF12	DC battery "B"	CTRL	Yes	Yes	RC PC DHR	Battery Rack (15)	PK	No	80 (I)	No	No
64	1EPKBH12	Battery charger "B"	CTRL	Yes	Yes	RC PC DHR	Battery Chg (16)	PK	No	80 (I)	No	No
65	1EPKBM42	DC power to TCB1 control circuit	CTRL	Yes	Yes	RC PC	MCC (1)	PK	No	80 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
66	1EPKDD24 (substitute for 1EPKCD23)	DC distribution panel D24	CTRL	Yes	Yes	RC PC DHR	Dist Panel (14)	PK	No	80 (I)	No	Yes
67	1EPKCF13	DC battery "C"	CTRL	Yes	Yes	RC PC DHR	Battery Rack (15)	PK	No	80 (I)	No	No
68	1EPKDM44 (substitute for 1EPKCM43)	DC power to TCB1 control circuit	CTRL	Yes	Yes	RC PC	MCC (1)	PK	No	80 (I)	No	Yes
69	1EPKCN43	Inverter for shutdown cooling isolation valve 1JSICUV653	CTRL	Yes	Yes	DHR	Inverter (16)	PK	No	80 (I)	No	No
70	1EPKDN44	Inverter For 1JSIDUV654 Shutdown Cooling B Return Inside Containment Isolation Valve	CTRL	Yes	Yes	CF	Inverter (16)	PK	No	80 (I)	No	No
71	1EPNBD26	Power to PPS "B" instrumentation	CTRL	Yes	Yes	RC PC IC DHR	Dist Panel (14)	PN	No	80 (I)	No	No
72	1EPNBN12	DC/AC inverter "B"	CTRL	Yes	Yes	PC IC DHR CF	Inverter (16)	PN	No	80 (I)	No	No
73	1EPNBV26	120 V vital ac voltage regulator "B"	CTRL	Yes	Yes	PC IC DHR CF	Other (0)	PN	No	80 (I)	No	No
74	1EPNCD27	Power to PPS "C" instrumentation	CTRL	Yes	Yes	RC PC IC DHR	Dist Panel (14)	PN	No	80 (I)	No	No
75	1EPNDN14 (substitute for 1EPNCN13)	DC/AC inverter "D"	CTRL	Yes	Yes	PC IC DHR CF	Inverter (16)	PN	No	80 (I)	No	Yes
76	1EPNDV28	120 V vital ac voltage regulator "D"	CTRL	Yes	Yes	PC IC DHR CF	Other (0)	PN	No	80 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
77	1JRCBHV0105	Pressurizer and Reactor Vessel Head Vent To Reactor Drain Tank Globe Valve	CTMT	Yes	Yes	PC	SOV (8)	RC	No	120 (I)	No	Yes
78	1JRCBHV0108	Pressurizer Vent To Reactor Drain Tank Globe Valve	CTMT	Yes	Yes	PC	SOV (8)	RC	No	120 (I)	No	Yes
79	1JRCBHV0109	Pressurizer Vent To Reactor Drain Tank Globe Valve	CTMT	Yes	Yes	PC	SOV (8)	RC	No	120 (I)	No	Yes
80	1JRCBPT0102B	Przr pressure (required for RPS/SIAS)	CTMT	Yes	Yes	PC	Inst. Rack (18)	RC	No	120 (I)	No	Yes
81	1JRCBPT104	SDC RCS pressure interlock	CTMT	Yes	Yes	DHR	Inst. Rack (18)	RC	No	120 (I)	No	Yes
82	1JSBBC02A	I/V converter	CTRL	Yes	Yes	DHR	Inst. Rack (18)	RC	No	80 (I)	No	No
83	1JSBCC02A	I/V converter	CTRL	Yes	Yes	DHR	Inst. Rack (18)	RC	No	80 (I)	No	No
84	1JRCDPT106	SDC RCS pressure interlock	CTMT	Yes	Yes	DHR	Inst. Rack (18)	RC	No	120 (I)	No	Yes
85	1JRCNTE101	Pressurizer temperature	CTMT	Yes	Yes	PC	Temp Sensor (19)	RC	No	120 (I)	No	Yes
86	1JRDBUV0024	Isolation Containment Radwaste Sump Outlet Isolation Gate Valve	AUX	Yes	Yes	CF	MOV (8)	RD	No	104 (I)	No	No
87	1JRMBB02	RWT level	CTRL	Yes	Yes	IC	Control Panel (20)	RM	No	80 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
88	1JRMBB04	RCS temperature	CTRL	Yes	Yes	RC	Control Panel (20)	RM	No	80 (I)	No	No
89	1JRMBB05	Containment pressure	CTRL	Yes	Yes	CF	Control Panel (20)	RM	No	80 (I)	No	No
90	1JRMBB06	Auxiliary feedwater flow	CTRL	Yes	Yes	PC DHR	Control Panel (20)	RM	No	80 (I)	No	No
91	1JRMCB05	Containment pressure	CTRL	Yes	Yes	CF	Control Panel (20)	RM	No	80 (I)	No	No
92	1JRMNB02	SDHX A outlet temperature	CTRL	Yes	Yes	DHR	Control Panel (20)	RM	No	80 (I)	No	No
93	1JRMNB04	Pressurizer temperature	CTRL	Yes	Yes	PC	Control Panel (20)	RM	No	80 (I)	No	No
94	1JSBBC03	Reactor trip breaker "B"	AUX	Yes	Yes	RC PC	Breaker Panel (2)	SB	No	104 (I)	No	No
95	1JSGBHV0178	Atmospheric dump valve HV-178	MSSS	Yes	Yes	PC DHR	POV (7)	SG	No	124 (I)	No	No
96	1JSGBHV0185	Atmospheric dump valve HV-185	MSSS	Yes	Yes	PC DHR	POV (7)	SG	No	124 (I)	No	No
97	1JSGBPT0306	Instrument air line pressure transmitter	MSSS	Yes	Yes	PC DHR	Inst. Rack (18)	SG	No	104 (I)	No	No
98	1JSGBPV0306B	N2 supply solenoid valve	MSSS	Yes	Yes	PC DHR	SOV (8)	SG	No	124 (I)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
99	1JSGBUV0130	SG-E01A isolation valve	MSSS	Yes	Yes	PC DHR	POV (7)	SG	Yes	124 (I)	No	No
100	1JSGBUV0135	SG-E01B isolation valve	MSSS	Yes	Yes	PC DHR	POV (7)	SG	Yes	124 (I)	No	No
101	1JSGCLT1113C	SG-E01A WR level (required for AFAS)	CONT	Yes	Yes	PC DHR	Inst. Rack (18)	SG	No	120 (I)	No	Yes
102	1JSIAUV0651	RC loop 1 long-term recirc/SDC valve	CTMT	Yes	Yes	IC DHR	MOV (8)	SI	Yes	120 (I)	No	Yes
103	1MSIBE01	SDHX "B"	AUX	Yes	Yes	DHR	Heat Exchanger (21)	SI	No	104 (I)	No	No
104	1MSIBP01	LPSI pump "B"	AUX	Yes	Yes	DHR	Vert. Pump (6)	SI	Yes	104 (I)	No	No
105	1MSIBP03	Containment Spray Pump B	AUX	Yes	Yes	CF	Vert. Pump (6)	SI	No	104 (I)	No	No
106	1JSIBPSV0166	HPSI Long-Term Recirculation Train B Pressure Relief Valve	AUX	Yes	Yes	PC DHR	Other (0)	SI	No	104 (I)	No	No
107	1JSIBPSV0409	HPSI train "B" injection to EDT relief	AUX	Yes	Yes	IC DHR	Other (0)	SI	No	104 (I)	No	No
108	1JSIBPSV189	RC loop 2 LTOP relief to sump	CTMT	Yes	Yes	DHR	Other (0)	SI	No	120 (I)	No	Yes
109	1JSIBUV0614	Safety Injection Tank 2A Discharge Isolation Globe Valve	CTMT	Yes	Yes	RC IC	MOV (8)	SI	No	120 (I)	No	Yes

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
110	1JSIBUV0616	RC loop 2A isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No
111	1JSIBUV0624	Safety Injection Tank 2B Discharge Isolation Globe Valve	CTMT	Yes	Yes	RC IC	MOV (8)	SI	No	120 (I)	No	Yes
112	1JSIBUV0626	RC loop 2B isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No
113	1JSIBUV0636	RC loop 1A isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No
114	1JSIBUV0646	RC loop 1B isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No
115	1JSIBUV0665	Containment Spray Pump Recirculation To Refueling Water Tank Train B Globe Valve	AUX	Yes	Yes	CF	MOV (8)	SI	No	104 (I)	No	No
116	1JSIBUV615	RC loop 2A LPSI isolation valve	AUX	Yes	Yes	DHR	MOV (8)	SI	No	104 (I)	No	No
117	1JSIBUV656	RC loop 2 SDC isolation valve	AUX	Yes	Yes	DHR	MOV (8)	SI	Yes	104 (I)	No	No
118	1JSIBUV667	HPSI pump "B" recirc iso (closes on RAS)	AUX	Yes	Yes	IC DHR	MOV (8)	SI	Yes	104 (I)	No	No
119	1JSIBUV676	Sump isolation valve	AUX	Yes	Yes	IC DHR	MOV (8)	SI	No	104 (I)	No	No
120	1JSINPT391	HPSI long-term recirc loop 1 pressure xmtr	CTMT	Yes	Yes	IC DHR	Inst. Rack (18)	SI	No	120 (I)	No	Yes
121	1MSPBP01	Spray pond pump "B"	SP	Yes	Yes	PC DHR UHS	Vert. Pump (6)	SP	No	122 (O)	No	No

Table G-2: PVNGS-1 SWEL 1

SWEL Item Number	Walkdown Equipment	Description	Building	Screen #1 (SC - 1 Licensing Basis?)	Screen #2 (Regular Inspections?)	Screen #3 (Safety Function Support)	Screen #4 Sample Considerations					Walkdown Deferred to Outage?
							Equipment Class	System Type	Major new or replacement equipment?	Environment Temp., °F (I for "Inside" or O for "Outside")	IPEEE vulnerability enhancement?	
122	1MHSBJ01	Spray pond pump house exhaust fan "B"	SP	Yes	Yes	PC DHR UHS	AHU (6)	SP	No	122 (O)	No	No
123	1JRMBB01	Main Control Board Section B01 Electrical Systems	CTRL	Yes	Yes	PC IC DHR	Control Panel (20)	RM	No	80 (I)	No	No
124	1JSABC01	B Train ESFAS Relay Cabinets	CTRL	Yes	Yes	RC	Dist. Panel (14)	SA	No	80 (I)	No	No
125 [1]	1JZJBE01	Remote Shutdown Panel	CTRL	Yes	Yes	RC PC IC DHR	Control Panel (20)	ZJ	No	80 (I)	No	No

[1] The total number of SWEL 1 items is 124 instead of 125 because item 14 (1MCHEE01) was removed (see discussion in Section 3.4). The item numbers in the first column of this table were not adjusted to make it easier to compare the items to those in Table G-2 of Reference 48.

Table G-3: PVNGS-1 Base List 2 (SWEL 2 is the same as Base List 2)

(Refer to Table G-3 of Reference 48, "Near-Term Task Force Recommendation 2.3 Seismic Walkdown Submittal Report for Palo Verde Nuclear Generating Station Unit 1")