



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
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MAR 23 2010

Randall K. Edington, Executive  
Vice President, Nuclear/CNO  
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Arizona Public Service Company  
P.O. Box 52034, Mail Stop 7602  
Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION - NRC TRIENNIAL FIRE  
INSPECTION REPORT 05000528/2010006, 05000529/2010006, AND  
05000530/2010006

Dear Mr. Edington:

On February 12, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Palo Verde Nuclear Generating Station. The enclosed inspection report documents the inspection results, which were discussed in an exit meeting on February 12, 2010, with Mr. L. Cortopossi, Plant Manager, Nuclear Operations, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

A handwritten signature in black ink, appearing to read "N. O'Keefe".

Neil O'Keefe, Chief  
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Division of Reactor Safety

Arizona Public Service Company

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Docket No. 50-528; 50-529; 50-530  
License No. NPF-41; NPF-51; NPF-74

Enclosure: Inspection Report No. 05000528/2010006, 05000529/2010006, 05000530/2010006  
w/Attachment

cc w/Enclosure:

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 50-528; 50-529; 50-530

License: NPF-41; NPF-51; NPF-74

Report Nos.: 05000528/2010006, 05000529/2010006, 05000530/2010006

Licensee: Arizona Public Service Company

Facility: Palo Verde Nuclear Generating Station, Units 1, 2, and 3

Location: 5951 S. Wintersburg Road  
Tonopah, Arizona

Dates: January 25 through February 12, 2010

Team Leader: J. Mateychick, Senior Reactor Inspector, Engineering Branch 2

Inspectors: H. Freeman, Senior Reactor Inspector, Technical Support Branch  
N. Okonkwo, Reactor Inspector, Engineering Branch 2  
G. Tutak, Reactor Inspector, Division of Reactor Projects Branch B  
E. Uribe, Reactor Inspector, Engineering Branch 2

Approved By: Neil O'Keefe, Branch Chief  
Engineering Branch 2  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR ; 05000528/2010006, 05000529/2010006, 05000530/2010006; January 25 through February 12, 2010; Arizona Public Service Company; Palo Verde Nuclear Generating Station, Units 1, 2, and 3: Triennial Fire Protection Team Inspection.

The report covered a two-week triennial fire protection team inspection by specialist inspectors from Region IV. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

None.

## REPORT DETAILS

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R05 Fire Protection (71111.05T)

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure 71111.05T, "Fire Protection (Triennial)," at the Palo Verde Nuclear Generating Station. The inspection team evaluated the implementation of the approved fire protection program in selected risk-significant areas, with an emphasis on the procedures, equipment, fire barriers, and systems that ensure the post-fire capability to safely shutdown the plant.

Inspection Procedure 71111.05T requires the selection of three to five fire areas for review. The inspection team used the fire hazards analysis section of the Palo Verde Nuclear Generating Station Fire Probabilistic Risk Analysis to select the following five fire areas (inspection samples) for review:

Fire Zone 5A	Train A Engineered Safety Features Switchgear Room
Fire Zone 42B	Train B Electrical Penetration Room
Fire Zone 12	Communications Room
Fire Zone 13	Inverter Room
Fire Zone 14	Lower Cable Spreading Room

The inspection team evaluated the licensee's fire protection program using the applicable requirements, which included plant Technical Specifications, Operating License Conditions 2.C.(7), 2.F, and 2.C.(6) for Units 1, 2 and 3, respectively, NRC safety evaluations, 10 CFR 50.48, and Branch Technical Position 9.5-1. The team also reviewed related documents that included the Final Safety Analysis Report (FSAR), Section 9.5; Technical Requirements Manual (TRM); the fire hazards analysis; and the post-fire safe shutdown analysis.

Specific documents reviewed by the team are listed in the attachment. Five inspection samples were completed.

#### .01 Protection of Safe Shutdown Capabilities

##### a. Inspection Scope

The team reviewed the piping and instrumentation diagrams, safe shutdown equipment list, safe shutdown design basis documents, and the post-fire safe shutdown analysis to verify that the safe shutdown methodology had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for equipment in the selected fire areas. The team also reviewed and observed walkdowns of the procedures for achieving and maintaining safe shutdown in the event of a fire to verify that the licensee properly implemented the safe shutdown analysis provisions.

The team focused on the following functions that must be ensured to achieve and maintain post-fire safe shutdown conditions: (1) reactivity control capable of achieving and maintaining cold shutdown reactivity conditions, (2) reactor coolant makeup capability to maintain reactor coolant sub-cooling margin, (3) reactor heat removal capable of achieving and maintaining decay heat removal, (4) supporting systems capable of providing all other services necessary to permit extended operation of equipment necessary to achieving and maintaining cold shutdown conditions, and (5) process monitoring capable of providing direct readings to perform and control the above functions.

The team reviewed the separation of safe shutdown cables, equipment, and components within the same fire areas, and reviewed the methodology for meeting the requirements of 10 CFR 50.48, Appendix A to Branch Technical Position 9.5-1, and 10 CFR Part 50, Appendix R, Section III.G. Specifically, the team evaluated whether at least one post-fire safe shutdown success path remained free of fire damage in the event of a fire in the selected areas. The evaluation focused on the cabling of selected components for the chemical volume and control system and the auxiliary feedwater system. The team selected a sample of components whose inadvertent operation or failure to operate resulting from fire damage could significantly affect the capability credited in the safe shutdown analysis. In addition, the team reviewed license basis documentation, such as NRC safety evaluation reports, the Palo Verde Nuclear Generating Station Final Safety Analysis Report, submittals made to the NRC by the licensee in support of NRC review of their fire protection program, and approved deviations from NRC regulations, to verify that the licensee met license commitments.

b. Findings

No findings of significance were identified.

.02 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to observe the material condition and configuration of the installed fire area boundaries (including walls, fire doors, and fire dampers) and verify that the electrical raceway fire barriers were appropriate for the fire hazards in the area. The team compared the installed configurations to the approved construction details, supporting fire tests, and applicable license commitments.

The team reviewed installation, repair, and qualification records for a sample of penetration seals to ensure the fill material possessed an appropriate fire rating and that the installation met the engineering design. The team also reviewed similar records for the rated fire wraps to ensure the material possessed an appropriate fire rating and that the installation met the engineering design.

b. Findings

No findings of significance were identified.



.03 Active Fire Protection

a. Inspection Scope

The team reviewed the design, maintenance, testing, and operation of the fire detection and suppression systems in the selected fire areas. The team verified the manual and automatic detection and suppression systems were installed, tested, and maintained in accordance with the National Fire Protection Association code of record or approved deviations, and that each suppression system was appropriate for the hazards in the selected fire areas.

The team performed a walkdown of accessible portions of the detection and suppression systems in the selected fire areas. The team also performed a walkdown of major system support equipment in other areas (e.g., fire pumps, carbon dioxide supply system, and Halon supply systems) to assess the material condition of these systems and components.

The team reviewed the electric and diesel fire pump flow and pressure tests to verify that the pumps met their design requirements. The team reviewed the fire main hydraulic testing to verify that the fire water system capability met the design requirements. The team also reviewed the halon and carbon dioxide suppression systems tests to verify that the systems are capable of meeting their design requirements.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed pre-fire plans and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and operations personnel to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability. In addition, the team inspected fire brigade equipment to determine operational readiness for fire fighting.

The team observed an unannounced fire drill, conducted on February 10, 2010, and the subsequent drill critique using the guidance contained in Inspection Procedure 71111.05AQ, "Fire Protection Annual/Quarterly." The team observed fire brigade members fight a simulated fire in the turbine-driven auxiliary feedwater pump room (Fire Zone 72), located in main steam support structure. The team verified that the licensee identified problems, openly discussed them in a self-critical manner at the drill debrief, and identified appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient fire fighting equipment was brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other areas; (7) smoke removal operations; (8) utilization of pre-planned strategies; (9) adherence to the pre-planned drill scenario; and (10) drill objectives.

b. Findings

No findings of significance were identified.

.04 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The team performed plant walkdowns and document reviews to verify that redundant trains of systems required for hot shutdown, which are located in the same fire area, would not be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the team verified that:

- A fire in one of the selected fire areas would not directly, through production of smoke, heat, or hot gases, cause activation of suppression systems that could potentially damage all redundant safe shutdown trains.
- A fire in one of the selected fire areas or the inadvertent actuation or rupture of a fire suppression system would not directly cause damage to all redundant trains (e.g., sprinkler-caused flooding of other than the locally affected train).
- Adequate drainage is provided in areas protected by water suppression systems.

b. Findings

No findings of significance were identified.

.05 Alternative Shutdown Capability

a. Inspection Scope

Review of Methodology

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings, electrical drawings, the Final Safety Analysis Report, and other supporting documents to verify that hot and cold shutdown could be achieved and maintained for fires in areas where the licensee's post-fire safe shutdown strategy relies on manipulating shutdown equipment from outside the control room. The team verified that hot and cold shutdown could be achieved and maintained, with or without offsite power available. The team also verified that the safe shutdown analysis properly identified the components and systems needed to achieve and maintain safe shutdown conditions.

Plant walkdowns were conducted to verify that the plant configuration was consistent with the description contained in the safe shutdown and fire hazards analyses. The team focused on ensuring the adequacy of systems selected for reactivity control, reactor coolant makeup, reactor decay heat removal, process monitoring instrumentation, and support systems functions.

The team also verified that the systems and components credited for shutdown would remain free from fire damage. Finally, the team verified that the transfer of control from the control room to the alternative shutdown location would not be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

#### Review of Operational Implementation

The team verified that the licensed and non-licensed operations personnel received training on alternative shutdown procedures. The team also verified that sufficient personnel to perform a safe shutdown are trained and available onsite at all times, exclusive of those assigned as fire brigade members.

The team performed a timed walkthrough of Procedure 40AO-9ZZ19, "Control Room Fire," Revision 23, with licensed and non-licensed operations personnel to determine the adequacy of the procedure and to evaluate their ability to implement the procedure. The team evaluated whether the operations personnel could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits. Time-critical actions were verified including restoring electrical power, establishing control at the remote shutdown and local shutdown panels, establishing reactor coolant makeup, and establishing decay heat removal.

The team reviewed the time-critical manual actions identified by the licensee needed to support alternate shutdown from outside the control room, included in Calculations 13-MC-FP-0316, "10 CFR 50 Appendix R Manual Action Feasibility," Revision 11, and 13-MC-FP-0317, "10 CFR 50 Appendix R Operational Considerations," Revision 8, which provided the bases for these critical times. The review compared the simulated completion times recorded during the procedure walk-through to the analytical values to verify that the operators could implement the procedure as intended.

The team also reviewed the operability and periodic testing of the alternative shutdown transfer capability, instrumentation, and control functions. The team selected a centrifugal charging pump circuit for in-depth review of the isolation capability from outside the control room. This review included circuit review, isolation device coordination and functionality, and reviews of surveillance tests demonstrating the isolation capability of the control circuits to verify that the tests are adequate to demonstrate the functionality of the alternative shutdown capability.

#### b. Findings

No findings of significance were identified.

### .06 Circuit Analysis

#### a. Inspection Scope

The team reviewed the post-fire safe shutdown analysis to verify that the licensee had identified all circuits that may impact safe shutdown. On a sample basis, the team verified that cables for equipment required to achieve and maintain hot shutdown conditions in the event of fire in selected fire zones had been properly identified. The

team verified that these cables had either been adequately protected from the potentially adverse effects of fire damage, mitigated with approved manual operator actions, or analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown. In order to accomplish this, the team reviewed electrical schematics and cable routing data for power and control cables associated with each of the selected components. The evaluation focused on the cabling of selected components for the auxiliary feed water system, and the chemical and volume control system. The specific components selected for review are listed in the attachment.

Since the licensee utilized thermoset cables for most applications, the team reviewed the following cable failure modes for selected required and associated circuits:

- Spurious actuations resulting from any combination of conductors within a single multiconductor cable
- A maximum of two cables considered where multiple individual cables may be damaged by the same fire
- For cases involving direct current control circuits, the potential spurious operation resulting from failures of the control cables (even if the spurious operation requires two concurrent shorts of the proper polarity, (e.g., plus-to-plus and minus-to-minus))
- The vulnerability of three-phase power cables resulting from three-phase proper polarity hot shorts

In addition, on a sample basis, the adequacy of circuit protective coordination for safe shutdown power sources was evaluated. The specific power sources selected for review included: 4.16 kV bus PBA-S03; 480Vac Load Center E-PGA-L33; 480Vac motor control center E-PHB-M34; motor control center E-PHB-M36; 125Vdc control center 2E-PKB-M41; and 125 Vdc distribution panel 2E-PKB-D22. Also, on a sample basis, the adequacy of electrical protection provided for non-essential cables that share a common enclosure with cables of required safe shutdown equipment was reviewed to ensure that the non-essential cables are adequately protected to preclude common enclosure concerns.

b. Findings

No findings of significance were identified.

.07 Communications

a. Inspection Scope

The team inspected the contents of designated emergency storage lockers and reviewed the alternative shutdown procedure to verify that portable radio communications and fixed emergency communications systems were available, operable, and adequate for the performance of designated activities. The team verified the capability of the communication systems to support the operations personnel in the

conduct and coordination of their required actions. The team also verified that the design and location of communications equipment such as repeaters and transmitters would not cause a loss of communications during a fire. The team discussed system design, testing, and maintenance with the system engineer.

The team reviewed the adequacy of the communication system to support plant personnel in the performance of alternative post-fire safe shutdown functions and fire brigade duties. The review verified that the licensee established and maintained in working order the credited primary and backup communications. The review also verified that problems with communication equipment necessary for alternative safe shutdown support were properly categorized in the corrective action program and received the appropriate priority. Further, the team evaluated the environmental impacts such as ambient noise levels, coverage patterns, and clarity of reception. The team verified that the electrical power supplies and cable routing for the phone system would allow them to remain functional following a fire in the control room and other fire areas.

b. Findings

No findings of significance were identified.

.08 Emergency Lighting

a. Inspection Scope

The team reviewed the portion of the emergency lighting system required for alternative shutdown to verify that it was adequate to support the performance of manual actions required to achieve and maintain hot shutdown conditions and to illuminate access and egress routes to the areas where manual actions would be required. The team evaluated the locations and positioning of the emergency lights during a walkthrough of the alternative shutdown procedure.

The team verified that the licensee installed emergency lights with at least an 8-hour capacity, maintained the emergency battery-operated lights in accordance with manufacturer and industry recommendations, and tested and performed maintenance in accordance with plant procedures and industry practices. The team also reviewed the location of the emergency lights for a sample of areas to determine the adequacy of emergency lighting during control room evacuation events. The team noted that the licensee's Procedure 40AO-9ZZ19, "Control Room Fire," Revision 23, required operators to obtain a portable lantern from the emergency cabinet prior to leaving the control room.

b. Findings

No findings of significance were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed documentation to determine if any repairs were required in order to achieve cold shutdown. The team noted that the licensee did not require or credit the repair of equipment to reach cold shutdown based on the safe shutdown methodology implemented.

b. Findings

No findings of significance were identified.

.10 Compensatory Measures

a. Inspection Scope

The team verified that compensatory measures were implemented for out-of-service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems and equipment; passive fire barriers; or pumps, valves, or electrical devices providing safe shutdown functions). The team also verified that the short-term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings of significance were identified.

.11 B.5.b Inspection Activities

a. Inspection Scope

The team assessed the licensee's process for handling large fires or explosions by reviewing Procedure 79IS-9ZZ05 "PVNGS Severe Accident Management Guidelines", Revision 10. The team performed a walkdown of the external spent fuel pool makeup strategy, Procedure 79IS-9ZZ05, Appendix 9, with members of the Palo Verde fire department who would be in charge of directing or performing the strategy. In addition, the team performed an inventory of the equipment necessary to implement all of the strategies using Procedure 14FT-9FP72 "Monthly B.5.b Fire Department Equipment Inspection," Revision 2. Finally, the team verified through selected interviews of licensed operations personnel that they were familiar with and understood the procedure requirements and strategies.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

#### 4OA2 Identification and Resolution of Problems

##### Corrective Actions for Fire Protection Deficiencies

###### a. Inspection Scope

The team selected a sample of condition reports associated with the licensee's fire protection program to verify that the licensee had an appropriate threshold for identifying deficiencies. In addition, the team reviewed the corrective actions proposed and implemented to verify that they were effective in correcting identified deficiencies. The team also evaluated the quality of recent engineering evaluations through a review of condition reports, calculations, and other documents during the inspection.

###### b. Findings

No findings of significance were identified.

#### 4OA6 Meetings, Including Exit

##### Exit Meeting Summary

The team presented the inspection results to Mr. L. Cortopossi, Plant Manager, Nuclear Operations, and other members of the licensee staff at an exit meeting on February 12, 2010. The licensee acknowledged the findings presented.

The inspectors confirmed that material examined during the inspection considered to be proprietary had been returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

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J. Anderson, Operations  
D. Arbuckle, Operations  
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D. Carnes, Assistant Plant Manager  
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M. Webb, Regulatory Affairs  
R. Wilferd, Department Leader, Fire Protection  
T. Young, Communications

#### NRC personnel

C. Smith, Resident Inspector



## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>	None
<u>Opened and Closed</u>	None
<u>Closed</u>	None

## LIST OF ACRONYMS

ADAMS	Agency Wide Documents Access and Management System
CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
FSAR	Final Safety Analysis Report
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PAR	Publicly Available Records

## LIST OF DOCUMENTS REVIEWED

### COMPONENTS SELECTED FOR CIRCUIT ANALYSIS AND CABLE ROUTING REVIEWS

<u>Component ID</u>	<u>Description</u>
2M-CHA-P01	Charging Pump 1
2M-CHB-P01	Charging Pump 2
2M-CHE-P01	Charging Pump 3
2J-CHA-PSL216	Charging Pump 1 Suction Line Low Pressure Trip
2J-CHA-PSL217	Charging Pump 2 Suction Line Low Pressure Trip
2J-CHA-PSL218A	Charging Pump 3 Suction Line Low Pressure Trip
2J-CHN-HV-501	Volume Control Tank Isolation Valve
2J-CHN-UV-501	Volume Control Tank Outlet Valve
2J-CHB-UV-515	CVCS Letdown line to Regen. Heat Exch. Valve
2J-CHB-UV-505	RCP Control Bleed-off to VCT Valve
CHE-HV-532	RWT gravity feed to boric acid makeup pump (BAMP) suction
CHE-HV-536	RWT gravity feed to charging pump suction
CHB-HV-203	Pressurizer Aux Spray Valve
M-AFA-P01	Motor Driven AFW Pump - Train A
M-AFB-P01	Motor Driven AFW Pump - Train B
2J-AFA-HV-32	AFW Pump A Reg Valve
2J-AFC-HV-33	AFW Pump A Reg. valve
2J-AFC-UV-36	AFW Pump A Reg. valve
2J-AFA-HV-54	AFW Turbine Trip and Throttle Valve
2J-SGA-UV134	Turbine-driven AFW pump steam supply valve
2J-SGA-UV134A	Turbine-driven AFW pump steam supply valve

<u>Component ID</u>	<u>Description</u>
2J-SGA-UV- 138	Turbine-driven AFW pump steam supply valve
2J-SGA-UV- 139	Turbine-driven AFW pump steam supply valve

### CALCULATIONS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
01-MC-FP-0818	Hydraulic Analysis of Fire Water System to Unit 1 Power Block	3
02-EC-MA-0221	AC Distribution	13
02-EC-PB-0200	AC Overcurrent Protection: Class 1E	8
02-MC-FP-0001	Hydraulic Analysis of Fire Water System to Unit 2 Power Block	3
03-MC-FP-0008	Hydraulic Analysis of Fire Water System to Unit 3 Power Block Vendor Sprinkler Systems	3
13-AC-ZZ-0200	Penetration Seal Qualifications	12
13-CC-FB-001	Thermo-Lag Fire Barrier Evaluation	4
13-EC-PB-0110	Protective Device Coordination – Fire Protection	10
13-EC-FP-0004	10 CFR 50- Appendix R Safe Shutdown Cable Identification & Analysis	8
13-EC-FP-0203	Technical Input for Safe Shutdown Coordination Study	5
13-EC-FP-0204	High Impedance Fault Analysis	1
13-MC-FP-0315	10 CFR 50 Appendix R Safe Shutdown Equipment List	11
13-MC-FP-0316	10 CFR 50 Appendix R Manual Action Feasibility	11
13-MC-FP-0317	10 CFR 50 Appendix R Operational Considerations	8
13-MC-FP-0318	10 CFR 50 Appendix R III.G/III.L Compliance Assessment	10

### DRAWINGS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
02-E-AFB-001	Elementary Diagram Auxiliary Feedwater System, Auxiliary Feedwater Pump 2M-AFB-P01 & Thermocouples	2
02-E-AFB-002	Elementary Diagram Auxiliary Feedwater System, Auxiliary Feedwater Pump 2M-AFN-P01 & Thermocouples	4

Number	Title	Revision
02-E-AFB-003, Sh. 1	Elementary Diagram Auxiliary Feedwater System, Aux. FDW REG Valves Pump B to SG-1 & 2, 2J-AFB-HV-30	5
02-E-AFB-003, Sh. 2	Elementary Diagram Auxiliary Feedwater System, Aux. FDW REG Valves Pump B to SG-1 & 2, 2J-AFB-HV-31	5
02-E-AFB-004	Elementary Diagram Auxiliary Feedwater System, Aux. FDW REG Valves, 2J-AFA-HV-32	5
02-E-AFB-005	Elementary Diagram Auxiliary Feedwater System, Aux. FDW ISO Valves Pmp B to SG-1 & 2, 2J-AFB-UV-34 & 2J-AFB-UV-35	6
02-E-AFB-006	Elementary Diagram Auxiliary Feedwater System, Aux. FDW REG Valves, 2J-AFB-HV-33	0, 4
02-E-AFB-007	Elementary Diagram Auxiliary Feedwater System, Aux. FDW Turb Trip & Throttle Valve 2J-AFA-HV-54 & Thermocouples.	
02-E-AFB-008	Elementary Diagram Auxiliary Feedwater System, Aux. FDW Actuation Signal Channel C initiation CKT.	0
02-E-AFB-010	Elementary Diagram Auxiliary Feedwater System, Aux. FDW Isolation Valves, 2J-AFA-UV-37	5
02-E-AFB-011	Elementary Diagram Auxiliary Feedwater System, Aux. FDW Isolation Valves, 2J-AFC-UV-36	5
02-E-CHB-002	Elementary Diagram Chemical & Volume Control System	6
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LR-PVNGS-FP-AO-M-FPP-003	P & I Diagram Fire Protection System	1
LR-PVNGS-FP-AO-M-FPP-004	P & I Diagram Fire Protection System (CO2 System)	1
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13-MS-A83	NFPA Code Applicability and Conformance Review	9
2008-00415	Engineering Document Change	6/30/2008
2005-00773	Engineering Document Change	
2007-00812	Engineering Document Change	
PVNGS-AMP-B2.1.12	PVNGS Aging Management Program Evaluation Report – Fire Protection	3
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PROBLEM IDENTIFICATION REPORTS (PVARs/CRDRs)

3424346*	3424291*	3430066*	3430128*	3430130*
3430205*	3430314*	3430345*	3430644*	3430898*
3430998*	3431083*	3431366*	3433575*	3433230*
3432244*	3434464*	3434752*	3434604*	3434204*
3434961*	3434886*	3434978*	3435299*	3435204*
3435219*	3435506*	2603699	2984287	3051927
3056025	3425513	3124081	3252081	3252082
3252083	3430898	3430998		

\* Initiated due to inspection activities.

## PROCEDURES

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14DP-0FP01	Firewatch Requirements	10
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14FT-9FP08	CO2 Fire Suppression System Functional Test	11 & 12
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14FT-9FP65	Appendix R/FTS Fire Barrier Surveillance (for Walls, Floors/Ceilings and Raceways)	8
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18FT-9FP21	Fire Door (Appendix R) / HELB Door Functional Test – Control Building, Diesel Generator Building and MSSS Building	9
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79IS-9ZZ05	PVNGS Severe Accident Management Guidelines	10
80DP-OCC04	Nuclear Administrative & Technical Manual - Plant Numbering	9
90DP-0IP14	Adverse CRDR Evaluation	3
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Audit Report 2009-005	Fire Protection	0
Information Notice 85-09	Isolation Transfer Switches And Post-Fire Shutdown Capability	01/31/85
Inspection Procedure 71002	License Renewal Inspection	02/18/05
Job Performance Measure AO042-PL- 000-TC	Reenergize PBB-S04 with DB 'B' using Appendix E of 40AO-9ZZ19	
Job Performance Measure AO041-PL- 002	Lineup a Borated Water Source during a Control Room Fire within required time critical limit	
Job Performance Measure AO031-PL- 001	One RCP and Condensate Pump breaker tripped with 125 VDC breakers opened.	
Job Performance Measure AO030-PL- 002	Align Fire Protection Make-up to DG B	
Job Performance Measure AO018-PL- 003	Line up a Borated Water Source during Control Room Fire	
Job Performance Measure AO017-PL- 004	Line up a Borated Water Source during Control Room Fire	
Job Performance Measure AO040-PL- 002	Line up a Borated Water Source during Control Room Fire	
Job Performance Measure AO026-PL- 001	Perform primary reactor operator duties to stabilize the plant for a control room fire Appendix A of 40AO-9ZZ09	
Job Performance Measure AO005-CR- 001	Perform Steps 1 and 2 of 40AO-9ZZ19	
Job Performance Measure AO021-PL- 003-TC	Complete Appendix E of 40AO-9ZZ09 to manually start and load the 'B' EDG and to reenergize PBBB-S04 and start Spray Pond Pump SPB-P01	
Manual Chapter 2516	Policy and Guidance for the License Renewal Inspection Programs	02/18/05
NEI 95-01	Industry Guideline For Implementing The Requirements of 10 CFR Part 54 – The License Renewal Rule	6
NPL-36-01.003B	Unit 3 PVNGS Fire Department Unannounced Fire Drill "B" Shift	2/10/2010

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NUREG-0857	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3	November 1981
NUREG-0857 Supplement No. 5	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3	November 1983
NUREG-0857 Supplement No. 6	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3	October 1984
NUREG-0857 Supplement No. 7	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3	December 1984
NUREG-0857 Supplement No. 8	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3	May 1985
NUREG-0857 Supplement No. 11	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3	March 1987
Pre-Fire Strategies Manual	Pre-Fire Strategies	21
Regulatory Guide 1.188	Standard Format and Content For Applications to Renew Nuclear Power Plant Operating Licenses	1
TA-13-C07-97-007	Re-Analysis of Appendix R Events in Support of Thermal Lag Reduction Project	0
Technical Requirements Manual	Section 3.11 Fire Protection	50
13-MN-0169	Technical Specification for Procurement, Installation and Rework/Repair of Thermo-Lag Protective Envelopes	9
VTD-G185-00002	GNB Absolyte IIP Tower Modules Specifications and Installation and Operating Instructions for Absolyte IIP Batteries.	10/6/99
VTD-H249-00001	Holophane Installation & Maintenance Manual for Series 7XX182 Modular AC Power Station	10/6/99
VTD-M960-00001	Metalux Product Data for Fluorescent Lights	3/24/94
VTD-M960-00002	Metalux Product Data for 4' or 8' 2 Lamp Rapid Start Light	3/24/94

WORK ORDERS

03197635	03133762	03145352	03134725	0372977
03009928	03004868	03009725	00770950	02933235
03025832	03025833	03025834	03025835	03025837
03026909	03026910	03043389	03123876	03123878
03123879	03123910	03123912	03205590	03205591
03205592	03205593	03205594	03241095	02932020
02625122	03124081	0 2960989	03097746	03216243
03216190				