



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

March 8, 2013

Randall K. Edington, Executive
Vice President, Nuclear/CNO
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 05000528/2013008, 05000529/2013008, AND
05000530/2013008

Dear Mr. Edington:

On February 14, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Palo Verde Nuclear Generating Station, Units 1, 2, and 3. The enclosed inspection report documents the inspection results, which were discussed in an exit meeting on February 14, 2013, with Mr. D. Mims, Senior Vice-President, Regulatory and Oversight, 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, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the NCV in this report, you should provide a written response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Senior Resident Inspector at the Palo Verde Nuclear Generating Station.

R. Edington

- 2 -

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,

/RA/

Geoffrey B. Miller, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-528, 50-529, 50-530
License Nos. NPF-41, NPF-51, NPF-74

Enclosure:
NRC Inspection Report 05000528/2013008,
05000529/2013008, and 05000530/2013008
w/Attachment: Supplemental Information

Electronic Distribution for Palo Verde Nuclear Generating Station

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ADAMS: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		<input checked="" type="checkbox"/> SUNSI Review Complete		Reviewer Initials: JMM	
		<input checked="" type="checkbox"/> Publicly Available		<input checked="" type="checkbox"/> Non-Sensitive JMM	
		<input type="checkbox"/> Non-publicly Available		<input type="checkbox"/> Sensitive	
EB2/SRI	EB2/RI	EB2/RI	EB2/RI	C:DRP/E	C: EB2
JMMateychick	BKCorrell	NPOkonkwo	SRachen	DBAllen	GBMiller
/RA/	/RA/	/RA/	/E/	/RA/	GAP/for
3/4/013	2/26/13	2/27/13	3/4/13	3/4/13	3/8/13

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 50-528, 50-529, 50-530

License: NPF-41, NPF-51, NPF-74

Report Nos.: 05000528/2013008, 05000529/2013008, 05000530/2013008

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 28 thru February 14, 2013

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

Inspectors: S. Achen, Reactor Inspector, Engineering Branch 2
B. Correll, Reactor Inspector, Engineering Branch 2
N. Okonkwo, Reactor Inspector, Engineering Branch 2

Accompanying Personnel: C. Speer, Reactor Inspector, Engineering Branch 2

Approved By: Geoffrey B. Miller, Branch Chief
Engineering Branch 2
Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000528/2013008; 05000529/2013008; 05000530/2013008; 01/28/2013 – 02/14/2013; Palo Verde Nuclear Generating Station; Triennial Fire Protection Team Inspection.

The report covered a two-week triennial fire protection team inspection by four specialist inspectors from Region IV. One Green finding, which was a non-cited violation (NCV), was evaluated by the inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process (SDP) does not apply may be Green or be assigned a severity level after NRC management review. 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

None

B. Licensee-Identified Violations

A violation of very low safety significance that was identified by the licensee has been reviewed by the inspectors. Corrective actions taken by the licensee have been entered into the licensee's corrective action program. This violation and the associated corrective action tracking number are listed in Section 4OA7 of this report.

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 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 Individual Plant Examination of External Events to select the following four risk-significant fire zones in three fire areas (inspection samples) in Unit 2 for review:

- Fire Area I Fire Zone 7A Channel A DC equipment room
- Fire Area II Fire Zone 5B Train B engineered safety feature switchgear room
- Fire Area II Fire Zone 10B Train B remote shutdown room
- Fire Area XVI Fire Zone 47A Channel A electrical penetration room

The inspection team evaluated the licensee's fire protection program using the applicable requirements, which included plant Technical Specifications, Operating License Condition 2.C.(5), 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; the fire hazards analysis; and the post-fire safe shutdown analysis.

Specific documents reviewed by the team are listed in the attachment. Three 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 licensee properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for fires in the selected fire areas. The team observed walk-downs of the procedures used for achieving and maintaining safe shutdown in the event of a fire to verify that the procedures properly implemented the safe shutdown analysis provisions.

For each of the selected fire areas, the team reviewed the separation of redundant safe shutdown cables, equipment, and components located within the same fire area. The team also reviewed the licensee's method for meeting the requirements of 10 CFR 50.48; Branch Technical Position 9.5-1, Appendix A; 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 addition, the team verified that the licensee met applicable license commitments.

b. Findings

No findings 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 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 automatic detection systems and the manual and automatic 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, Halon supply systems and

carbon dioxide supply systems) to assess the material condition of these systems and components.

The team reviewed the electric fire pump and diesel fire pumps flow and pressure tests to verify that the pumps met their design requirements. The team also reviewed the halon suppression system and carbon dioxide suppression system functional tests to verify that the system capability met the 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 plant operators 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 12, 2013, 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 Unit 3 Control Building. 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 firefighting techniques; (4) sufficient firefighting 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 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 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 from outside the control room for fires that require evacuation of the control room, with or without offsite power available.

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 safe 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 coordinated fuses and isolation transfer switches for alternative shutdown control circuits).

Review of Operational Implementation

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

A walkthrough of the post-fire safe shutdown procedure with licensed and non-licensed operators was performed to determine the adequacy of the procedure. The team verified that the operators could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits. Time critical actions that were verified included restoring electrical power, establishing control at the remote shutdown and local shutdown panels, establishing reactor coolant makeup, and establishing decay heat removal.

The team also reviewed the periodic testing of the alternative shutdown transfer capability and instrumentation and control functions to verify that the tests were adequate to demonstrate the functionality of the alternative shutdown capability.

b. Findings

No findings were identified.

.06 Circuit Analysis

a. Inspection Scope

The team reviewed the post-fire safe shutdown analysis to verify that the licensee identified the circuits that may impact the ability to achieve and maintain safe shutdown. The team verified, on a sample basis, that the licensee properly identified the cables for equipment required to achieve and maintain hot shutdown conditions in the event of a fire in the selected fire areas. The team verified that these cables were either adequately protected from the potentially adverse effects of fire damage or were analyzed to show that fire induced circuit faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown. The team reviewed the circuits associated with the following components:

- 1J-CHB-UV-515, CVCS Letdown Line to Regenerative Heat Exchanger
- 1J-CHB-UV-505 CVCS RCP Controlled Bleed-off to Volume Control Tank
- IM-RCE-B01, B09, A14 & 1M-RCE-A16, B10, Reactor Coolant System Pressurizer Backup Heaters
- 2J-SIA-HV-685 & 2J-SIB-HV-694 Low Pressure Safety Injection Cross Connect Valves
- 2J-SIA-UV-651 Shutdown Cooling Isolation Valve

For this sample, the team reviewed electrical elementary and block diagrams and identified power, control, and instrument cables necessary to support their operation. In addition, the team reviewed cable routing information to verify that fire protection features were in place as needed to satisfy the separation requirements specified in the fire protection license basis.

b. Findings

No findings 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 communication systems were available, operable, and adequate for the performance of designated activities. The team verified the capability of the communication systems to support the operators 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 identified that a Unit 3 Turbine Building fire would disable all three unit's radio system, however, radio-to-radio communications or sound powered phones would not be affected. The team discussed system design, testing, and maintenance, and conducted a communication system visual inspection with the system engineer.

b. Findings

No findings 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 an in-plant walkthrough of the alternative shutdown procedure.

The team verified that the licensee installed emergency lights with an 8-hour capacity, or had credited appropriate emergency DC powered lights to meet the requirements of Appendix R, Section III.J. The team verified that the licensee maintained the emergency light batteries in accordance with industry standards, and tested and performed maintenance in accordance with plant procedures and industry practices. The team verified through a sample of maintenance records that emergency DC lights, and battery operated lights were repaired within appropriate times. The team verified through in-plant inspections and engineering calculation reviews that required access and egress routes, and manual actions of safe shutdown components were adequately illuminated with emergency lighting fixtures.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The team verified that the licensee identified repairs needed to reach and maintain cold shutdown and had dedicated repair procedures, equipment, and materials to accomplish these repairs. The team noted that the licensee did not have proceduralized repairs as part of their cold shutdown strategy or credited the repair of equipment to reach cold shutdown based on the safe shutdown methodology implemented. The licensee stated that “as long as at least one train of safe shutdown equipment remains free of fire damage, then PVNGS can reach and maintain cold shutdown conditions without repairs.”

b. Findings

No findings 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 were identified.

.11 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee’s implementation of guidance and strategies intended to maintain or restore core, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire as required by Section B.5.b of the Interim Compensatory Measures Order, EA-02-026, dated February 25, 2002, and 10 CFR 50.54(hh)(2).

The inspectors reviewed the strategies to verify that they continued to maintain and implement procedures, maintain and test equipment necessary to properly implement the strategies, and ensure station personnel are knowledgeable, trained, and capable of implementing the procedures. The inspectors visually inspected the fire truck with

remote controlled extension ladder mounted spray nozzle, B.5.b equipment storage trailer, storage lockers strategically located within the plant that contained materials and equipment necessary to implement B.5.b strategies, and other equipment used to implement the strategies to ensure the availability and material readiness of the equipment. The licensee implemented their strategies in accordance with Procedure 79IS-9ZZ05, "PVNGS Severe Accident Management Guidelines," Revision 13. The inspectors selected the following two specific strategies for this inspection sample:

- Depressurization of Steam Generators and Feed from Circulating Water Canal
- External Spent Fuel Pool Makeup

The inspectors completed two samples.

b. Findings

No findings 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 were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

Closed: Licensee Event Report 05000528; 529; 530/2012-005-00, "Condition Prohibited by Technical Specifications Due to Remote Shutdown System Control Circuit Deficiencies"

The licensee identified that control circuit isolation features in the remote shutdown system did not properly isolate three circuits from potential effects of a control room fire. The licensee has revised Procedure 40AO-9ZZ19, "Control Room Fire," to address this finding. The enforcement aspects of this finding are discussed in Section 4OA7.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented the inspection results to Mr. D. Mims, Senior Vice-President, Regulatory and Oversight, and other members of the licensee staff at an exit meeting on February 14, 2013. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a non-cited violation.

License Condition 2.C.(6), "Fire Protection," requires the licensee to maintain in effect all provisions of the approved fire protection program described in listed regulatory documents. Supplemental Safety Evaluation Report 5 states "the alternative shutdown capability for PVNGS 1-3 complies with the requirements of Section III.L of Appendix R and, therefore, is acceptable." Title 10 CFR Part 50, Appendix R, Section III.L.3 requires that the alternative shutdown capability shall be independent of the specific fire area. Contrary to the above, the design of three circuits in the remote shutdown system was not independent from the effects of fire damage in the case of a fire in the control room. The licensee entered this deficiency in their corrective action program as Palo Verde Action Request 4311694 and Palo Verde Action Request 4329210 and issued Licensee Event Report 05000528; 529; 530/2012-005-00. The licensee has revised Procedure 40AO-9ZZ19, "Control Room Fire," to address this finding.

The finding was evaluated for safety significance using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Attachment 1. The finding was assigned a low degradation rating due to the performance and reliability of the remote shutdown following a control room evacuation being minimally impacted by the finding. Based on the low degradation rating, the finding screened as having a very low safety significance (Green) in Phase 1, Task 1.3.1, "Qualitative Screening for All Finding Categories," Question 1.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

N. Aaronscooke, Engineer, Nuclear Regulatory Affairs
D. Agazzi, Fire Captain, Fire Department
R. Anderson, Mechanic Team Member, Fire Protection Maintenance
G. Andrews, Department Leader, Operations
G. Archambault, Supervisor, Communications
K. Atkinson, Shift Manager, Performance Improvement
D. Baldwin, Senior Evaluator, Nuclear Assurance
D. Barnes, Director, Nuclear Regulatory Affairs
S. Beckman, Senior Engineer, Design Electrical
L. Berberich, Audit Team Leader, Nuclear Assurance
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C. Coles, Department Leader, Security Operations
D. Crane, Consultant
P. Custodio, Electrical Engineer, Fire Protection Engineering
J. Delgado, Auxiliary Operator
C. Denny, Electrical Team Member, Fire Protection Maintenance
S. Dodd, Fire Marshal, Fire Department
E. Dutton, Director, Nuclear Assurance
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 A. Wheeler, Director, Performance Improvement
 J. Wieser, Engineer, Design Electrical
 R. Wilfred, Department Leader, Operations

NRC personnel

M. Baquera, Resident Inspector
 T. Brown, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

None

Closed

05000528; 529; 530/2012-005-00	LER	Condition Prohibited by Technical Specifications Due to Remote Shutdown System Control Circuit Deficiencies (Section 4OA3)
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LIST OF DOCUMENTS REVIEWED

CABLE ROUTING DATA

<u>Component</u>	<u>Component</u>	<u>Component</u>	<u>Component</u>	<u>Component</u>
2EZA2AATXAE	SIB-UV-652	1J-CHB-UV-515	1M-RCE-A05	1M-RCE-A14
1M-RCE-A16	1M-RCE-B01	1M-RCE-B09	1M-RCE-B10	2E-PBB-S04

CALCULATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
01-EC-PH-0255	120 VAC Control Circuits	02
01-EC-PK-0209	125 V DC Protection: Class 1E	00
02-EC-MA-0221	A.C. Distribution	13
13-EC-FP-0004	10 CFR50 Appendix R Safe Shutdown Cable Identification and Analysis	10
13-EC-FP-203	Technical Input for Safe Shutdown Coordination Study	05
13-EC-PB-0110	Protective Device Coordination: Fire Protection	11
13-JS-A033	10 CFR50 Appendix R Communication Systems Evaluation for PVNG Station 1,2, &3	12
13-MC-FP-0315	10 CFR50 Appendix R Safe Shutdown Equipment List	12 & 13
13-MC-FP-0316	10 CFR50 Appendix R Manual Action Feasibility	12
13-MC-FP-0317	10 CFR50 Appendix R Operational Considerations	9
13-MC-FP-0318	10 CFR50 Appendix R III.G/III.L Compliance Assessment	12
13-MC-FP-0320	10 CFR50 Appendix R Multiple Spurious Operations Analysis	0
13-MC-FP-0321	Regulatory Guide 1.189 Multiple Spurious Operations Fire Modeling Assessment	0
333-DC-Section 0	Diablo Canyon Unit1&2 Fuse Selection	0
2008-10898	B.5.b Hydraulic Analysis-Appendix 3 – CST Make-up	7B
2008-11292	B.5.b Hydraulic Analysis-Appendix 1 – SFP Make-up	7B
A-759	Final List of Manual Valve Stroke Times	11/20/90
A0-MC-FP-0803	B.5.b Hydraulic Analysis	2
MEE-03907	Substitution Evaluation of Exide Type 3CC-5 Batteries With Enersys Type 3CC-5M Batteries	0

DRAWINGS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
01-E-CHB-039, Sheet 1	Elementary Diagram, Regenerative Heat Exchanger to Aux Spray valve 1J-CHB-HV-205	13
01-E-CHB-039, Sheet 2	Elementary Diagram, Regenerative Heat Exchanger to Aux Spray valve 1J-CHB-HV-203	13
01-E-CHB-072	Chemical & Volume Control System RWT Gravity Feed Line to Charging Pump Suction 1J-CHE-HV-536	8
01-E-CHF-072	Control Wiring Diagram, Chemical & Volume Control System RWT Gravity Feed Line to Charging Pump Suction 1J-CHE-HV-536	0
01-J-CHL-031	Control Logic Diagram Chemical & Volume Control Sys., RWT Gravity Feed to Charging Pumps Suction Vlv.	4
01-E-NGA-010	480V Non-Class 1E Power System Load Center 1E- NGN-L10	5
01-E-NHA-010	480V Non-Class 1E Power System Motor Control Center 1E-NHN-M10	23
01-E-RCB-010, Sheet 2	Elementary Diagram Reactor Coolant System Pressurizer Backup Heaters IM-RCE-B01, B09, A14 & IM-RCE-A16, B10, A05	10
01-E-SGB-022	Steam Gen No. 1 Line 2 Atmospheric Dump Valve 1J-SGB-022	8
01-E-SGB-013, Sheet 1	Steam Traps Isolation Valves 1J-SGB-UV-1135A & 1J-SGB-UV-1135B	7
01-E-CHB-015	Elementary Diagram Chemical & Volume Control System RCP controlled Bleedoff to VCT Valve 1J-CHB- UV-505	6
01-E-CHB-031	Elementary Diagram Chemical & Volume Control System Letdown line to Regen Heat Exch valve 1J- CHB-UV-515	6
01-E-ZZ1-0004	Electrical Protection Database	23
02-E-PBA-001	Single line Diagram 4.16KV Class 1E Power Systems switchgear 2E-PBA-S03	10
02-E-PBA-002	Single line Diagram 4.16KV Class 1E Power Systems switchgear 2E-PBA-S04	11
02-E-PEB-001, Sheet 1	Elementary Diagram, Stand-by Generator System Diesel Generator 2E-PEA-G01 4.16KV Breaker	13

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
02-E-PEB-001, Sheet 2	Elementary Diagram, Stand-by Generator System Diesel Generator 2E-PEA-G01 4.16KV Breaker	13
02-E-PEB-002, Sheet 1	Elementary Diagram, Stand-by Generator System Diesel Generator 2E-PEA-G01, 2E-PEB-G02 Three Line Metering & Relaying	6
02-E-PEB-002, Sheet 2	Elementary Diagram, Stand-by Generator System Diesel Generator 2E-PEA-G01, 2E-PEB-G02 Three Line Metering & Relaying	6
02-E-PEB-003, Sheet 1	Elementary Diagram, Stand-by Generator System Diesel Generator 2E-PEA-G01, 2E-PEB-G02 Tripping and Voltage Regulation	0
02-E-PHA-003	Single Line Diagram 480V Class 1E Power System Motor Control Center 2E-PHA-003	22
02-E-PKA-001	Main Single line Diagram 125V DC Class 1E and 120V AC Vital Inst. Power System	6
02-E-PKA-002	Single line Diagram 125V DC Class 1E DC Control Center 2E-PKA-M41	17
02-E-PKA-007	Single line Diagram 125V DC Class 1E Power System DC Control Center 2E-PKD-M44 & 2E-PKD-D24	11
02-E-PNA-001	Single line Diagram 120V AC Class 1E Power System, Ungrounded Vital Instr and Control Distr Panel 2E-PNA- D25 & 2E-PNC-D27	16
02-E-RCB-020, Sheet 4	Elementary Diagram Reactor Coolant System, Reactor Coolant Vent Valve 2J-RCB-HV-108	10
02-E-SIB-013, Sheet 1	Elementary Diagram, Safety Injection Shutdown CLG System Shutdown CLG Isolation Valve 2J-SIA-UV-651	16
02-E-SIB-013, Sheet 2	Elementary Diagram, Safety Injection Shutdown CLG System Shutdown CLG Isolation Valve 2J-SIA-UV-652	5
02-E-SIB-030, Sheet 1	Elementary Diagram, Safety Injection Shutdown CLG System LPSI Pump cross connect Valve 2J-SIA-UV- 686 & 2J-SIB-HV-694	5
02-E-ZAC087	Appendix R Related Thermolag (TPE) for The Auxiliary Building Plan At Elevation 70'-0" Area ZABD	5
02-E-ZAL-002	Auxiliary Building Lighting & Communication Plan at El. 70'-0" Level B	7
02-E-ZPL-001, Sheet 1	Power Block Safe Shutdown Emergency Lighting	14

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
02-E-ZPL-002, Sheet 2	Power Block Safe Shutdown Emergency Lighting	16 and 17
02-E-ZPL-003, Sheet 3	Power Block Safe Shutdown Emergency Lighting Sheet 3	9
02-J-NCE-053 Sheet 1	Instrument Loop wiring Diagram Nuclear Cooling Water System	8
02-J-NCE-053 Sheet 2	Instrument Loop wiring Diagram Nuclear Cooling Water System	8
02-J-NCE-053 Sheet 3	Instrument Loop wiring Diagram Nuclear Cooling Water System	8
02-J-NCE-053 Sheet 4	Instrument Loop wiring Diagram Nuclear Cooling Water System	8
02-J-NCE-053 Sheet 1	Instrument Loop wiring Diagram Nuclear Cooling Water System	8
02-J-ZZE-010	Instrument Loop Diagram, Instrument Rack Power Supply Alarm and External Wiring Control Room	4
02-J-ZZE-021	Instrument Loop Diagram, Instrument Rack Power Distribution and Alarm Wiring	2
02-J-ZZL-014	List of Devices with Disconnect Switch For Hot Shutdown	4
02-M-AFP-001	P & I Diagram Auxiliary – Feedwater System	27
02-M-CHP-001	P & I Diagram Chemical and Volume Control System	29
02-M-CHP-002 Sheet 1	P & I Diagram Chemical and Volume Control System	42
02-M-CHP-003	P & I Diagram Chemical and Volume Control System	35
02-M-FPP-003	P&I Diagram Fire Protection System	15
02-M-FPP-004	P&I Diagram Fire Protection System (CO2 System)	8
02-M-FPP-006	P&I Diagram Fire Protection System	13
02-M-NCP-001	P & I Diagram Nuclear Cooling Water System	7
02-M-NCP-003	P & I Diagram Nuclear Cooling Water System	11
02-M-SGP-001	Main Steam System	73
02-M-SIP-001	P&I Diagram Safety injection & Shutdown Cooling System	39
02-M-SIP-002	P&I Diagram Safety injection & Shutdown Cooling System	30

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
13-E-ZZB-007	Elementary Diagram General Symbol List	13
13-P-FPG-300	Schematic Diagram Halon-1301 Fire Protection System For Remote Shutdown Rooms Train "A" and Train "B" @ 100 ft. Elevation-Control Building	3
E-13966N 13C	Class 1E-AUX Relay Cabinet E-ZAA-C05	C
E-14273-422-801	Remote Shutdown Disconnect Panel Assembly	6
M650-00669	Auxiliary Building Channel "A" Cable Trays 120' Level West Half	3
M651-00004	Fire Detection System-System "B" Detector Location – Zones 6 - 13	2
M652-00046	Low Pressure CO2 Fire Extinguishing System Schematic Arrangement	2
M652-00059	Detectors Wiring Diagram	13
7848-10003	Instrument Electrical Penetration Assembly	n/a
7848-10004	Instrument Electric Penetration	n/a
7848-20003	Instrument Electric Penetration Subassembly	n/a
7848-20004	Instrument Electric Penetration Subassembly	n/a
7848-20005	Instrument Electric Penetration Subassembly	n/a

ENGINEERING EVALUATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EDC 2008-00676	Miscellaneous Cabinet and Panel Support Calc. Emergency Services Storage Cabinet (B.5.b)	1
EER# 90-PH.016	Response to NRC Bulletin 88-10 Test program	2/25/89
EER# 90-PH-016	Molded Circuit Breakers	10/19/90

FIRE IMPAIRMENTS

4062910	4212041	3967345	4179807	4119313
4134444	4180504	4010191		

PROBLEM IDENTIFICATION REPORTS (Palo Verde Action Requests PVARs)

4265345	4296998	3992030	3825170	3821071
3556178	3638252	4256181	4264756	4311583
4036054	4349062*	4349088*	4349094*	4349253*
3436340	3675079	3676195	3676196	3682356
3930605	3930606	4345706	4338746*	4338750*
4338751*	4339420*	4339423*	4340074*	4349028*
4339339*	4339401*	4339425*	4348955*	3184687
4338704	4311694	4340004*	4340324*	4339286*
4329210	4348838*	3676196	4343141*	4349123*

*Issued as a result of inspection activities.

PROBLEM IDENTIFICATION ACTION ITEMS (CRAIs)

4312621	4312669	3825173	3821072	3706272
3565482	4030894	3679015	3679016	3825173
4256183	4281121	3157713	4062626	

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
01DP-0FP01	Control of Flammable/Combustible Liquids Storage Cabinets	0
14DP-0FP01	Fire Protection Test Program Requirement	30
14DP-0FP02	Fire System Impairments and Notifications	17
14DP-0FP09-02	Radio Use Administrative Guideline	0
14DP-0FP33	Control of Transient Combustibles	25
14DP-0FP34	Fire Watch Duties	13
14DP-0FP35	Pre-Fire Strategies Manual Control	9
14DP-0FP36	Hot Work Permit	18
14DP-0FP37	PVNGS Fire Department Incident Command System	10
14DP-0FP38	Fire Protection Test Program	12
14DP-0FP40	Fire Protection Program Responsibilities	3

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
14DP-0TR01	Fire Department Training Program Description	19
14DP-0TR02	Fire Department Training Program Administration	23
14FT-0FP04	Annual Fire Water Loop Test	20
14FT-2-FP05	Unit 2 Wet Pipe, Deluge and Pre-Action System Inspection	1
14FT-9FP04	Annual Fire Pump Test	15 and 16
14FT-9FP08	CO2 Fire Suppression System Functional Test	15
14FT-9FP10	Halon Fire Suppression System Functional Test	20
14FT-9FP61	Semi-Annual Operational Test of Appendix R and Appendix A Fire Door Closers	14
14FT-9FP70	Appendix R and Former Technical Specification Penetration Seal Surveillance	10
14FT-9FP72	Quarterly Fire Department SAMG Equipment Inspection	7
14FT-9FP72	Monthly B.5.b Fire Department Equipment Inspection	6
14FT-9FP73	Hydrostatic Testing of B.5.b Water Supply Hose	0
14FT-9FP74	Fire Water Containment Isolation Valve Surveillance	3
14FT-9FP77	Monthly Fire Department SAMG Equipment Inspection	0a
14FT-9QF01	Sound Powered Telephone Functional Test	6
32FT-9QD02	Exide Emergency Lighting System, 8 Hour Fire Protection Service Testing for 1, 2, 3EQDNN02	13
32FT-9QD20	Appendix-R Emergency Lighting Fixture Battery Discharge Test (Wall Mounted Types KE, KF, and KG)	12
32MT-9QD03	Capacity Discharge Test for Emergency Lighting Batteries QDN-F01 and QDN-F02	11
32MT-9ZZ34	Maintenance of AM-4.16-250-9H GE Magne-Blast Circuit Breakers	30
32MT-9ZZ52	Preventive maintenance Procedure Battery Charger	27
32MT-9ZZ58	Preventive maintenance of Elgar Inverters	32
32MT-9ZZ74	Molded Case Circuit Breaker Test	35
32ST-9PK01	7-Day Surveillance Test of Station Batteries	34
32ST-9PK02	92-Day Surveillance Test of Station Batteries	34
32ST-9PK03	Service Discharge Test of Class 1E Station Batteries	21

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
32ST-9PK04	Modified performance Discharge Test of Class 1E Station Batteries	37
32ST-9ZZ34	Class 1E Battery Charger 18 Months Surveillance Test	12
33FT-9FP01	Appendix R and Former Technical Specification Fire Damper Surveillance	8
33FT-9FP02	CO2 Fire Suppression System Damper Functional Test	9
33FT-9FP03	Halon Fire Suppression System Damper Functional Test	6
40AL-9RK3A	Panel BO3A Alarm Responses	30
40AO-9ZZ04	Reactor Coolant Pump Emergencies	23
40AO-9ZZ12	Degraded Electrical Power	53
40AO-9ZZ19	Control Room Fire	27
40DP-9ZZ19	Operational Considerations Due to Plant Fire	25, 26 & 27
40EP-9EO10	Standard Appendices	71
40-EP-9EO10, Appendix 18	Local ADV Operation	71
40FT-9QF02	Fire Protection Program Radio Communications In Service Performance Testing	6
40ST-9ZZ20	Remote Shutdown Disconnect Switch and Control Circuit Operability	22
41AL-1RK1C	Panel B01C Alarm Responses	39
70DP-0RA05	Assessment and Management of Risk When Performing Maintenance in Modes 1 and 2	19
73DP-0FP01	Fire Protection Test Program Requirements	30
79IS-9ZZ05	PVNGS Severe Accident Management Guidelines	13
81TD-OEE10	Design Change Process	34
PD-0AP01	Administrative Control Program	2

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ANPP-31234 TFQ/KLM	10 CFR50 Appendix R Associate Circuits-File 84-056-026; G.1.01.10	11/28/1984

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
APS Letter 102-02478-WFC/JNI	Response to NRC generic Letter 92-08	03/16/1993
APS Letter 102-02286-WFC/JNI	Response to NRC Bulletin 92-01, Supplement 1	9/28/1992
APS Letter 102-02393-WFC/JNI	10 CFR50 Appendix R New and revised Deviations letter	03/29/1993
Design Basis Manual, pages 34 and 119 of 183	SG System	31
E2	Electrical Topical Design Basis Manual	15
Licensee Event Report 93-002-00	Loss of Train "B" Diesel Generator Components Due to a Control Room Fire	0
Licensee Event Report 2012-005-00	Condition Prohibited by Technical Specifications Due to Remote Shutdown System Control Circuit Deficiencies	0
MEE-03907	Component Substitution Evaluation for Emergency Lighting Batteries	00
NEI-06-12	B.5.b Phase 2 & 3 Submittal Guideline	2
NPF5502	B.5.b Strategies for the Fire Department, Initial Training	2
NUREG-0857	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1,2, and 3	11/1981
NUREG-0857, Supplement No. 5	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1,2, and 3	11/1983
NUREG-0857, Supplement No. 6	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1,2, and 3	10/1984
NUREG-0857, Supplement No. 7	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1,2, and 3	12/1984
NUREG-0857, Supplement No. 8	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1,2, and 3	5/1985
NUREG-0857, Supplement No. 11	Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1,2, and 3	3/1987
NUREG-1852	Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire	10/2007
PCR 4312607	Procedure Change Request	02/22/2013

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
PD-0AP01, Chapter 13.0	The Administrative Control Program Document, Fire Protection	02
Palo Verde Action Request 4308717	Diesel Engine A and Motor Driven Fire Pumps Need Post Grout Alignment Adjustments	12/31/2012
QD – Emergency Lighting	Maintenance Rule Performance Criteria	3
STWO 03682774	Perform 32FT-9QD02 in Unit 2	
STWO 03460280	Perform 32FT-9QD02 in Unit 2	
STWO 03342795	Perform 32FT-9QD02 in Unit 2	
System Health Report	Fire Protection	7/01/2011-01/31/2012
Technical Requirements Manual T3.11.100	Fire Detection Instrumentation	38
Technical Requirements Manual T3.11.101	Fire Suppression Water System	46
Technical Requirements Manual T3.11.102	Spray and/or Sprinkler Systems	4
Technical Requirements Manual T3.11.103	CO2 Systems	49
Technical Requirements Manual T3.11.104	Fire Hose Stations	44
Technical Requirements Manual T3.11.105	Yard Fire Hydrants	
Technical Requirements Manual T3.11.106	Halon Systems	49
Technical Requirements Manual T3.11.107	Fire Rated Assemblies	40
Technical Specification 3.3.11	Remote Shutdown System	188

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
Technical. Specification 3.7.4 Bases	Atmospheric Dump Valves (ADVs)	
Updated Final Safety Analysis Report, Section 9.5.1	Fire Protection Systems	16B
VTD-P115-0001-2	Peerless Pump Company Vendor's Manual 2880549, Horizontal Centrifugal Pumps	9/88
2.14.2	Design Guide Low Voltage Circuit Protection	1
7N431.02.01	Protection,, Metering and Automated Control Instructions for Palo Verde Protective Device Settings	2
13-ES-A10	Emergency Lighting System Compliance with the QA Requirements	1
13-ES-A046	Diesel Generator Multiple Spurious Operations (MSO) Study	0
13-JS-A33	10 CFR 50 Appendix R Communication System Evaluation for the Palo Verde Nuclear Generating Station Units 1, 2, and 3	2
13-MN-0169	Technical Specification For Procurement, Installation and Rework/Repair of Thermo-Lag Protective Envelopes	9
13-MS-A39	Fire Damper Closure Evaluation Engineering Study	2
13-MS-A131	Manual Action Walkthrough Study	1
13-VTD-A941-0001-2	ALCAD Standby Batteries Installation & Operation Manual for Nickel Cadmium Batteries	2
13-VTD-E355-0010-2	Exide Specifications for Calcium Flat Plate Type CC Batteries	2
80DP-0CC04	Plant Numbering	12
	Individual Plant Examination of External Events for Palo Verde Nuclear Generating Station	0
	Performance Criteria Formulation Bases: QD- Emergency Lighting	3

MODIFICATIONS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
DEC-00152	Design Equivalent Change – New Equivalent Design Detail for Installation of Mechanical anchors to Diesel Driven Fire Pump (AMFPNP01A & B) and Motor Driven Fire Pump (AMFPNP02) Skids and Installation Instructions for completely Filling Skids with Epoxy Grout	1
EDC 2013-00011	Engineering Document Change – Motor Driven Fire Pump Skid	0
S-07-0301	Modification FP-1074/DMWO 2959962	1
2959962	Re-Configure Containment FPN-V197 Valve and Add 3” Rupture Disk in Support of RCTSAIs: Unit 1; Unit 2; Unit 3 (Mitigation Strategies B.5.b)	0

VENDOR DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
VTD-E155-0005	Electroswitch Corp Instrument and Control Switches for Power Industry and Heavy Duty Industrial Application (Pub. #24-1)	0
VTD-E155-0003	Electroswitch Corp Auxiliary Relay for Power Industry Application	0
VTD-E155-0009	Electroswitch Corp Handles and Accessories for Industrial and Utility Switches and Relays (Pub. #ACC)	0
VTD-E155-0001	Electroswitch Corp General Specification for Rotary Switches and Auxiliary Relays for Utility Applications (Pub. # ESC-TD-0000)	1
13-VTD-C515-004	Conax Electrical Penetration Assemblies Installation and Maintenance manual (PUB. # IPS-446)	4
13-VTD-C515-0001	Conax Electrical Penetration Assemblies Installation and Maintenance manual (PUB. # IPS-446)	3

WORK ORDERS

3428028	3811712	3428027	3460280	3442795
3538779	3437711	3538402	3175961	3682774
2947433	3248074	3484387	3538402	2572146
2578794	3830410	3418859	2706909	3519047
831872				