# Palo Verde 1
# 1Q/2015 Plant Inspection Findings

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## Initiating Events

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## Mitigating Systems

**Significance:** G Dec 31, 2014
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
**Failure to Verify the Adequacy of the Design of the Diesel Fuel Oil Cooler**
Green. The inspectors reviewed a self-revealing Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" for the station's failure to adequately review the suitability of materials of the diesel fuel oil cooler. Specifically, the Unit 2 "A" diesel generator fuel oil cooler design allowed for the interface of two dissimilar metals which promoted galvanic corrosion. This corrosion ultimately affected the structural integrity of the cooler which rendered the "A" essential spray pond inoperable. In response to this, the licensee has replaced all six of the fuel oil cooler covers and initiated a design change to remove the fuel oil cooler from service. The licensee has entered the issue into the corrective action program as Condition Report Disposition Request 4543394.

The failure to verify the adequacy of the design of the diesel fuel oil cooler was a performance deficiency. The performance deficiency is more than minor because it affected the equipment performance attribute of the Mitigating Systems cornerstone to ensure the availability, reliability, capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the Unit 2 "A" diesel fuel oil cooler design allowed for the interface of two dissimilar metals which promoted galvanic corrosion. The corrosion ultimately affected the structural integrity of the cooler which rendered the Unit 2 "A" spray pond inoperable. In accordance with NRC Inspection Manual 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The finding screened to a detailed risk evaluation because it involved a potential loss of one train of safety related equipment for longer than the technical specification allowed outage time. A Region IV senior reactor analyst performed the detailed risk evaluation. The change to the core damage frequency was 1.5E-7/year (Green). The dominant core damage sequences included loss of offsite power events that lead to station blackout conditions. The gas turbine generators and the auxiliary feedwater system helped to minimize the risk. The inspectors determined this finding has no cross-cutting aspect because it is not indicative of current performance.
Inspection Report# : 2014005 *(pdf)*

**Significance:** G Sep 30, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Failure to Provide Adequate Technical Justification for Operability**
Green. The inspectors identified a Green non-cited violation of 10 CFR Part 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure of operations and engineering personnel to follow station procedures to provide an adequate technical justification for continued operation of a degraded structure, system, or component. Specifically, after discovering that the turbine driven auxiliary feedwater pump exhaust line did not have any tornado missile protection, operators performed an immediate operability determination and declared the system

operable. The inspectors challenged this evaluation and determined the licensee did not provide adequate technical justification for continued operation with this condition because: (1) the evaluation relied on a probabilistic risk assessment that assumed the turbine driven auxiliary feedwater pump fails due to impact from a tornado-born missile, and (2) the evaluation assumed that the results of a future analysis would provide satisfactory results. In response to the inspector's operability concerns, plant personnel subsequently completed an analysis that provided a reasonable expectation that the turbine driven auxiliary feedwater pump would be able to perform its safety function if impacted by a tornado-born missile. The licensee entered this issue into the corrective action program as Palo Verde Action Request 4255816.

The inspectors concluded that the failure of plant personnel to adequately evaluate the operability of a safety-related structure, system, or component was a performance deficiency. The inspectors concluded the performance deficiency is more than minor because it affected the equipment performance attribute of the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors performed the initial significance determination for the performance deficiency using NRC Inspection Manual 0609, Appendix A, Exhibit 4, "External Events Screening Questions," dated July 1, 2012. The finding required a detailed risk evaluation because the turbine driven auxiliary feedwater pump is one train of a system that supports a risk significant function. Therefore, a Region IV senior reactor analyst performed a bounding detailed risk evaluation. The change to the core damage frequency was 7E-10/year (Green). The dominant core damage sequences included a tornado induced loss of offsite power initiating event, failure of the turbine driven auxiliary feedwater pump, and random failures of the motor driven auxiliary feedwater pumps. The low frequency for the tornado induced loss of offsite power initiating event helped to minimize the risk significance. The inspectors determined this finding has a cross-cutting aspect in the area of human because the licensee failed to utilize a conservative bias in its evaluation of the missing tornado missile protection, considering the risk significance of the turbine driven auxiliary feedwater pump and lack of any technical evaluation [H.14] (Section 1R15).

Inspection Report# : 2014004 *(pdf)*

**Significance:** G Sep 30, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Failure to Translate Design Basis Requirements for Establishing Operability of Spray Pond System**
Green. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to correctly translate the mission time of the essential spray pond system into a procedure used to determine operability. In response to the inspectors' concerns, the licensee re-evaluated essential spray pond operability determinations that had used the erroneous 26-day mission time and concluded that acceptable margin was available to ensure the system would remain operable for the 30-day mission time. The licensee entered this issue into the corrective action program as Palo Verde Action Request 4550539.

The failure to ensure that design basis information associated with the mission time of the essential spray pond system was correctly translated into a procedure used to determine operability was a performance deficiency. This performance deficiency was more than minor because if left uncorrected, it had the potential to lead to a more significant safety concern. Specifically, the failure to use the correct mission time when determining operability could establish nonconservative results that could lead to the essential spray pond system not being able to meet its design safety function. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. This finding has a cross-cutting aspect in the area of human performance because the licensee failed to create and maintain complete, accurate, and

up-to-date documentation. Specifically, after initially recognizing the adverse condition, the licensee did not document a standing order or temporary procedure change to prevent operability evaluations from using the incorrect essential spray pond mission time [H.7]. (Section 1R15).

Inspection Report# : 2014004 *(pdf)*

**Significance:** G Sep 30, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Component Design Basis Inspection**
Green. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to assure the adequacy of degraded voltage relay setpoints. Specifically, the team identified that the licensee failed to perform calculations to demonstrate the voltage setpoints for the installed degraded voltage relays would afford adequate voltage to safety-related loads during worst case accident loading.

The failure to assure the adequacy of degraded voltage relay setpoints for voltage and the time delay by performing adequate voltage drop calculations was a performance deficiency. This finding is more than minor because it was associated with the design control attribute of the Mitigating Systems cornerstone and it adversely impacted to the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events. Specifically, the failure to properly ensure that safety-related electrical devices had adequate voltage could impact their safety function. The basis for this conclusion was that despite the non-conservative voltage inputs to voltage calculations and, therefore, loss of design margin for available voltage, there was still adequate voltage for the circuits to perform their safety function based on worst case voltage as demonstrated in the updated calculations. The licensee developed design basis calculations for its DVR voltage setpoints and committed to addressing the technical basis and interim actions in a commitment letter for their corrective actions. There is no cross-cutting aspect associated with this finding because it is a historical condition and not indicative of current performance. (Section 1R21)
Inspection Report# : 2014004 *(pdf)*

**Significance:** G Apr 02, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Failure to Translate Design Basis Requirements for Establishing Operability of the Spray Pond System**
The team identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, "Measures shall be established to assure that applicable regulatory requirements and the design basis, are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled." Specifically, prior to February 7, 2014, the licensee used Engineering Calculation 13-NS-C088, "Mission Times for EW, SP, SI, AF, and DG systems," for establishing a 26-day mission time of the spray pond system instead of a 30-day availability time as required by Regulatory Guide 1.27, "Ultimate Heat Sink For Nuclear Power Plants," and approved in their safety evaluation report. Consequently, spray pond system operability determinations performed per Procedure 40DP-9OP26, "Operations PVAR Processing and Operability Determination/ Functional Assessment," used the incorrect mission time. In response to this issue, the licensee performed a review of the operability determinations in question using 30 days for the mission time and confirmed that the spray pond system remained operable and maintained an adequate safety margin. This finding was entered into the licensee's corrective action program as Palo Verde Action Request (PVAR) 4500910.

The team determined that the failure to ensure that design basis information associated with the mission time of the spray pond system was correctly translated into a procedure used to determine operability was a performance deficiency. This performance deficiency was more than minor because it adversely affected the Mitigating Systems

Cornerstone attribute of Equipment Performance and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to use the correct mission time when determining operability was a significant deficiency of design control in that operability determination evaluations could establish nonconservative results that could lead to the spray pond system not being able to meet its design safety function. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. This finding had a cross-cutting aspect in the area of human performance because the licensee implemented an engineering study with inaccurate information establishing the incorrect mission time used in operability determinations for the spray pond system.
Inspection Report# : 2013009 *(pdf)*

**Significance:** G Apr 02, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Deficiencies in Emergency Diesel Generator Engine Room and Control Room Ventilation Air Flow Testing and Evaluation**
The team identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," which states, in part, "A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents." Specifically, in June, 2013, the licensee failed to evaluate performance test results when high air flow measurements from the emergency diesel generator engine room and control room ventilation air flow performance tests contained values that were beyond the capability of the equipment. Consequently, the condition of the higher measured airflow had not been evaluated to determine if the test results were valid. In response to this issue, the licensee confirmed that the equipment had remained operable, based on the review of more accurate testing performed in 2006. This finding was entered into the licensee's corrective action program as Palo Verde Action Request (PVAR) 4500070.

The team determined that the failure to establish and incorporate adequate air flow acceptance criteria into the emergency diesel generator control room supply fan and engine room exhaust fan performance tests was a performance deficiency. This performance deficiency was more than minor because it adversely affected the Mitigating Systems Cornerstone attribute of Equipment Performance and affected the cornerstone objective to ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to incorporate adequate acceptance criteria into the safety-related equipment performance tests was a significant deficiency of test control which could cause unacceptable fan performance conditions to go undetected. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. This finding had a cross-cutting aspect in the area of human performance because the licensee failed to use decision-making practices that emphasize prudent choices over those that are simply allowable.

Inspection Report# : 2013009 *(pdf)*

**Significance:** G Apr 02, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Failure to Establish Adequate Procedures for an Alternate Source of Spray Pond Inventory**
The team identified a Green, non-cited violation of Technical Specification 5.4.1, which states, in part, "Written procedures shall be established, implemented, and maintained covering the following activities: Part a. The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978." Section 6 of Regulatory Guide 1.33, Appendix A, requires procedures for combating emergencies and other significant events. Specifically, prior to January 24, 2014, emergency procedures to provide make-up water to the essential spray pond beyond its 26 day water inventory did not provide sufficient details and contained inaccuracies for supplying the essential spray ponds with water from the regional aquifer via a well. In response to this issue, the licensee confirmed that there had never been an event at the site for which the procedure would have been utilized. This finding was entered into the licensee's corrective action program as Palo Verde Action Requests (PVARs) 4496901, 4497291, 4498167, and 4499085.

The team determined that the failure to establish adequate procedures for an alternate source of spray pond inventory was a performance deficiency. This performance deficiency was more than minor because it adversely affected the Mitigating Systems Cornerstone attribute of Procedure Quality and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the continuous capability of the ultimate heat sink to perform its safety function beyond the 26-day inventory of the essential spray ponds was not ensured. In accordance with Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. The team determined that this finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance.

Inspection Report# : 2013009 *(pdf)*

**Significance:** G Apr 02, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Improper Extension of Surveillance Interval for Surveillance Requirements Associated with the Engineered Safety Features Actuation Signal (ESFAS) Sequencer and Relays**
The team identified a Green, non-cited violation of Technical Specification 5.5.18, "Surveillance Frequency Control Program" which states, in part, "This program provides controls for Surveillance Frequencies. The program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met." Part (b) states, "Changes of the Frequencies listed in the Surveillance Frequency Control Program shall be made in accordance with NEI 04-10, 'Risk-Informed Method for Control of Surveillance Frequencies,' Revision 1." Specifically, prior to February 3, 2014, previous regulatory commitments for the engineered safety features actuation signal system surveillance test frequencies were not properly addressed as required by Technical Specification 5.5.18.b and NEI 04-10. The licensee did not follow the guidance of NEI 04-10 when they revised the Surveillance Frequency Control Program to test each train of the engineered safety features actuation signal system from every 18 months to every 36 months. In response to this issue, the licensee confirmed that the engineered safety features actuation signal system remained operable because the system had been tested satisfactory and none of the technical specification surveillances were overdue. This finding was entered into the licensee's corrective action program as Palo Verde Action Requests (PVARs) 4500910 and

4500874.

The team determined that the failure to adequately address a regulatory commitment when extending the surveillance testing frequency associated with the engineered safety features actuation signal system was a performance deficiency. This performance deficiency was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the engineered safety features actuation signal system to respond to initiating events to prevent undesirable consequences. Specifically, the NRC commitment identified in document RCTSAI 7673 committed the licensee to: "the BOP ESFAS system will be fully tested at least every 18 months at the time of refueling." When making a change to the Surveillance Frequency Control Program associated with the surveillance test frequency of the engineered safety features actuation signal system, the licensee failed to collect and review all commitments made to the NRC as required by NEI 04-10, "Risk-Informed Method for Control of Surveillance Frequencies," Revision 1, and failed to follow the requirements of NEI 99-04, "Guidelines for Managing NRC Commitment Changes," Revision 0. In accordance with NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings
At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. This finding had a cross-cutting aspect in the area of human performance because the licensee leaders did not use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority.

Inspection Report# : 2013009 *(pdf)*

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# Barrier Integrity

**Significance:** G Apr 02, 2014
Identified By: NRC
Item Type: NCV Non-Cited Violation
**Failure to Follow Surveillance Testing Procedure**
The team identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," which states, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings." Specifically, between November 5, 2010 and September 17, 2012, the licensee failed to follow Procedure 73DP-9ZZ14, "Surveillance Testing," Step 3.6.1, "Failed Step or Out of Tolerance Data," which requires personnel to write a Palo Verde Action Request (PVAR) when a failed surveillance test is encountered. On three separate occasions, the licensee failed to initiate a Palo Verde action request when the containment air lock door seal surveillance test failed. In response to this issue, the licensee confirmed that minor maintenance had been performed on the containment air lock door seals immediately following the failure of the surveillances and the surveillances then met the procedure requirements. This finding was entered into the licensee's corrective action program as Palo Verde Action Requests (PVARs) 4499119 and 4499123.

The team determined that the failure to follow Procedure 73DP-9ZZ14, "Surveillance Testing," which required maintenance personnel to write a Palo Verde action request upon the failure of a surveillance test, was a performance deficiency. This performance deficiency was more than minor because if left uncorrected, it would lead to a more significant safety concern. Specifically, by not initiating Palo Verde action requests for failed surveillances, the

licensee missed the opportunity to enter the failures into their corrective action program, perform formal operability determinations, consider the conditions for identification of maintenance rule functional failures, identify performance trends, and ultimately, correct the adverse condition in a timely manner. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 3, "Barrier Integrity Screening Questions," the issue screened as having very low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of reactor containment and did not involve an actual reduction in function of hydrogen igniters in the reactor containment. This finding had a cross-cutting aspect in the area of human performance because licensee leaders failed to ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety.

Inspection Report# : 2013009 *(pdf)*

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

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## Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the cover letters to security inspection reports may be viewed.

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## Miscellaneous

Last modified : June 16, 2015