UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E LAMAR BLVD
ARLINGTON, TX 76011-4511

April 15, 2014

Mr. 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 NUCEAR GENERATING STATION – NRC COMPONENT DESIGN BASIS INSPECTION REPORT 05000528/2013009, 05000529/2013009, AND 05000530/2013009

Dear Mr. Edington:

On February 7, 2014, 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 on February 7, 2014, with Mr. R. Bement, Senior Site Vice President, and other members of your staff. After additional in-office inspection, a final telephonic exit meeting was conducted on April 2, 2014, with Mr. J. Cadogan, Vice President, Nuclear Engineering 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.

Five NRC-identified findings of very low safety significance (Green) were identified during this inspection. All of the findings were determined to involve violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCV's) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest these non-cited violations, you should provide a 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 DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Palo Verde Nuclear Generating Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305. In addition, if you disagree with the characterization of the cross-cutting aspect assigned to any finding in this report, you should

provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC Resident Inspector at Palo Verde Nuclear Generating Station. 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 NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Thomas R. Farnholtz, Branch Chief
Engineering Branch 1
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000528/2013009,
05000529/2013009, and 05000530/2013009
w/Attachment: Supplemental Information

cc w/ encl:
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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000528, 05000529, 05000530
License:	NPF-41, NPF-51, NPF-74
Report Nos.:	05000528/2013009, 05000529/2013009, 05000530/2013009
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 13 through April 2, 2014
Team Leader:	R. Kopriva, Senior Reactor Inspector, Engineering Branch 1
Inspectors:	C. Hale, Reactor Inspector, Engineering Branch 1 I. Anchondo, Reactor Inspector, Plant Support Branch 2 B. Jose, Senior Reactor Inspector, Engineering Branch 2, Region III C. Osterholtz, Senior Operations Examiner, Operations Branch
Accompanying Personnel:	W. Sherbin, Mechanical Contractor Beckman and Associates S. Gardner, Electrical Contractor, Beckman and Associates
Approved By:	Thomas R. Farnholtz, Chief Engineering Branch 1

SUMMARY

IR 05000528/2013009, 05000529/2013009, 05000530/2013009; 01/13 through 04/02/2014; Palo Verde Nuclear Generating Station; baseline inspection, NRC Inspection Procedure 71111.21, "Component Design Basis Inspection"

The report covers an announced inspection by a team of five regional inspectors and two contractors. Five findings were identified. All of the findings were of very low safety significance (Green). The final significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process." Findings for which the significance determination process 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.

Cornerstone: Mitigating Systems

- Green. 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 [H.7]. (Section 1R21.2.1)

- Green. 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 [H.14]. (Section 1R21.2.8)

- Green. 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. (Section 1R21.2.9)

- Green. 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 [H.3]. (Section 1R21.2.16)

Cornerstone: Barrier Integrity

- Green. 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 [H.1]. (Section 1R21.2.11)

REPORT DETAILS

1. REACTOR SAFETY

Inspection of component design basis verifies the initial design and subsequent modifications and provides monitoring of the capability of the selected components and operator actions to perform their design basis functions. As plants age, their design basis may be difficult to determine and important design features may be altered or disabled during modifications. The plant risk assessment model assumes the capability of safety systems and components to perform their intended safety function successfully. This inspectable area verifies aspects of the Initiating Events, Mitigating Systems and Barrier Integrity cornerstones for which there are no indicators to measure performance.

1R21 Component Design Basis Inspection (71111.21)

To assess the ability of the Palo Verde Nuclear Generating Station, Units 1, 2, and 3 equipment and operators to perform their required safety functions, the team inspected risk-significant components and the licensee's responses to industry operating experience. The team selected risk-significant components for review using information contained in the Palo Verde Nuclear Generating Station, Units 1, 2, and 3 probabilistic risk assessments and the U. S. Nuclear Regulatory Commission's (NRC) standardized plant analysis risk model. In general, the selection process focused on components that had a risk achievement worth factor greater than 1.3 or a risk reduction worth factor greater than 1.005. The items selected included components in both safety-related and non-safety-related systems including pumps, circuit breakers, heat exchangers, transformers, and valves. The team selected the risk-significant operating experience to be inspected based on its collective past experience.

.1 Inspection Scope

To verify that the selected components would function as required, the team reviewed design basis assumptions, calculations, and procedures. In some instances, the team performed calculations to independently verify the licensee's conclusions. The team also verified that the condition of the components was consistent with the design basis and that the tested capabilities met the required criteria.

The team reviewed maintenance work records, corrective action documents, and industry operating experience records to verify that licensee personnel considered degraded conditions and their impact on the components. For the review of operator actions, the team observed operators during simulator scenarios, as well as during simulated actions in the plant.

The team performed a margin assessment and detailed review of the selected risk-significant components to verify that the design basis have been correctly implemented and maintained. This design margin assessment considered original design issues, margin reductions because of modifications, and margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as failed performance test results; significant corrective actions; repeated maintenance; 10 CFR 50.65(a)1 status; operable, but degraded conditions; NRC resident inspector

input of problem equipment; system health reports; industry operating experience; and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in-depth margins.

The inspection procedure requires a review of 15 to 25 total samples that include risk-significant and low design margin components, containment related components, and operating experience issues. The sample selection for this inspection was sixteen components, two of which was associated with containment; seven operating experience items; and four event based activities associated with the components. The selected inspection and associated operating experience items supported risk-significant functions including the following:

a. Electrical power to mitigation systems: The team selected several components in the electrical power distribution systems to verify operability to supply alternating current (ac) and direct current (dc) power to risk-significant and safety-related loads in support of safety system operation in response to initiating events such as loss of offsite power, station blackout, and a loss-of-coolant accident with offsite power available. As such, the team selected:

   - Essential spray pond motor driven Pumps 'A' and 'B'.
   - Startup Transformers, NAN-X01, NAN-X02, and NAN-X03.
   - Essential chill water pumps.
   - Buried cable to the gas turbine generators.
   - Emergency diesel generator control relays.
   - Emergency diesel generator control room essential exhaust Fan HDA-J01 and emergency diesel generator engine room essential supply Fan HDA-A01.
   - Sequencers and engineered safety features actuation signal system motor driven rotary relays.

b. Components that affect large-early-release-frequency (LERF): The team reviewed components required to perform functions that mitigate or prevent an unmonitored release of radiation. As such, the team selected the following components:

   - Containment electrical penetrations.
   - Containment airlock door seals.

c. Mitigating systems needed to attain safe shutdown: The team reviewed components required to perform the safe shutdown of the plant. As such, the team selected:

   - Auxiliary feedwater pump discharge Valves HV0031 and UV0035.
   - Essential spray ponds.

- Electrolytic capacitors.

- Motor driven auxiliary feedwater Pump AFB-P01.

- Turbine driven auxiliary feedwater pump room essential air cooling Unit HAA-Z04.

- Motor driven auxiliary feedwater Pump AFP-P01.

- Operator action to align reactor makeup water tank to the auxiliary feedwater pump suction.

.2 Results of Detailed Reviews for Components

.2.1 Essential Spray Pond Motor Driven Pumps ‘A’ and ‘B’

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with essential spray pond motor driven Pumps ‘A’ and ‘B’ to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure that the equipment was capable of performing its desired design basis function. Specifically, the team reviewed:

- Component maintenance history and corrective action program reports to verify the monitoring of potential degradation.

- Calculations for electrical distribution, system load flow, voltage drop, short-circuit, and electrical protection to verify that bus capacity and voltages remained within minimum acceptable limits.

- The protective device settings and circuit breaker ratings to ensure adequate selective protection coordination of connected equipment during worst-case short circuit conditions.

- Procedures for circuit breaker preventive maintenance, inspection, and testing to compare maintenance practices against industry and vendor guidance.

- Quarterly and comprehensive inservice testing results and performance trending.

- Vendor documents for system annubar flow sensors.

- System thermal performance calculation.

- Spray pond system hydraulic analysis calculation.

- Vendor pump curves comparison with current pump performance.

- Operability determinations perform in the previous three years.

- Health reports, work orders, and corrective action program documents.

- Pump baseline requirements per ASME OM Code during quarterly and comprehensive testing.

- Technical specifications and bases document.

- System modification documents and system drawings.

b. Findings

Failure to Translate Design Basis Requirements for Establishing Operability of the Spray Pond System

Introduction. The team identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," involving 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.

Description. While performing the inspection of spray pond Pump 2MSPAP01, the team identified a concern related to increased vibration of the pump. The licensee had identified the increase in vibration and decided that the vibrations were significant enough to perform an operability determination associated with the spray pond pump. The spray pond pumps are part of the spray pond system which at the Palo Verde Nuclear Generating Station is the ultimate heat sink. The operability determination used a mission time of 26 days. The team questioned the spray pond system mission time identified in the operability determination because the licensee's updated final safety analysis report credited the ultimate heat sink for a 30-day mission time for a design basis accident. Further review showed that operability determinations of the spray pond system in the previous three years also credited a 26-day mission time.

The licensee is committed to Regulatory Guide 1.27, "Ultimate Heat Sink For Nuclear Power Plants," which provides NRC's position and states, in part, "The ultimate heat sink should be capable of providing sufficient cooling for at least 30 days (a) to permit simultaneous safe shutdown and cool down of all nuclear reactor units that it serves and to maintain them in a safe shutdown condition, and (b) in the event of an accident in one unit, to limit the effects of that accident safely, to permit simultaneous and safe shutdown of the remaining units, and to maintain them in a safe shutdown condition." If not able to meet the 30-day inventory, it further states, "A cooling capacity of less than 30 days may be acceptable if it can be demonstrated that replenishment or use of an alternate water supply can be effected to assume the continuous capability of the sink to perform its safety functions, taking into account the availability of replenishment equipment and limitations that may be imposed on freedom of movement following an accident or the occurrence of severe natural phenomena." The licensee calculated that the current inventory of the ultimate heat sink (essential spray ponds) would last for 26 days. In a letter dated December of 1981, the NRC determined that a 26-day water supply in the essential spray ponds was acceptable, given that the licensee provide further discussion on providing a supplemental water source to reach the 30-day mission time. In a letter

to the NRC, dated June 17, 1982, the licensee provided a discussion on the water source to be used after the spray pond is depleted. The NRC documented its review of this proposal in Safety Evaluation Report Supplement 3, concluding that the licensee's approach was acceptable.

The team was informed that all three units at the Palo Verde Nuclear Generating Station had been licensed for an inventory of 26 days without makeup as documented in updated final safety analysis report Section 9.2.5, "Ultimate Heat Sink" (refer to Section 1R21.2.11 of this report). Having met the provisions for less than 30 days of cooling capacity, the licensee stated that it had met the intent of Regulatory Guide 1.27. The team concluded that while the updated final safety analysis report justified the 26-day inventory availability without makeup under the described conditions, the licensee was still required to meet the 30-day system availability established by Regulatory Guide 1.27 and Safety Evaluation Report Supplement 3.

Further review identified that Appendix K of Procedure 40DP-9OP26, "Operations PVAR Processing and Operability Determination/Functional Assessment," was used to determine operability in specific situations. The appendix referenced Engineering Calculation 13-NS-C088, "Mission Times for EW, SP, SI, AF, and DG systems," which provided the mission time of the spray pond system and other safety-related systems. The team established, through multiple interviews, that licensee personnel involved in performing operability determinations used this calculation to reference the mission time of the spray pond system. The team identified multiple instances where operability determinations had used a mission time of 26 days to justify the component's operability. For instance, Palo Verde Action Request (PVAR) 4089905 provided an operability determination where the licensee calculated the total loss of inventory of the spray pond through a half-inch crack to be approximately 36,000 ft^3 over 26 days. The licensee concluded, per design basis Calculation 13-MC-SP-307, Revision 8, that the spray pond had an acceptable, available loss of inventory of approximately 42,050 ft^3. The team determined that the loss of inventory over the required 30 days would be approximately 41,550 ft^3. While still within the calculated margin, the operability determination had nonconservative results, with minimal margin left. With the licensee's approach that they only need to account for a 26-day mission time for operability of certain systems or components, this could lead to more significant nonconservative results in the future.

Analysis. 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 System 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 [H.7].

Enforcement. 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." Contrary to the above, prior to February 7, 2014, the licensee failed to establish measures to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Specifically, 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. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000528; 529; 530/2013009-01, "Failure to Translate Design Basis Requirements for Establishing Operability of Spray Pond System."

.2.2 Startup Transformers NAN-X01, NAN-X02, and NAN-X03

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with Startup Transformers NAN-X01, NAN-X02, and NAN-X03 to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Transformer protection scheme.

- Coordination of over current protection with the 525 kV switchyard over current protection.

- Maintenance and operating procedures.

- Observed Tan-Delta testing of some of the secondary power cables.

b. Findings

No findings were identified.

.2.3 Containment Electrical Penetrations

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with containment electrical penetrations to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Circuit breaker short circuit calculations.
- Sizing calculations.
- Coordination studies.
- Voltage drop calculations.
- Circuit breaker maintenance activities.
- Vendor recommendations for the electrical penetration maintenance and testing.
- Leak rate test procedures and recently performed leak rate test results.

b. Findings

No findings were identified.

.2.4 Essential Chill Water Pumps

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the essential chill water pumps to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews to ensure that the equipment was capable of performing its desired design basis function. Specifically, the team reviewed:

- Quarterly and comprehensive inservice testing results and performance trending.

- System water requirement calculations to determine required flow for auxiliary building and control building heating, ventilation, and air conditioning systems.

- System hydraulic calculation for predicted available net positive suction head based on minimum expansion tank level and maximum water temperature.

- Corrective action documentation associated with system pump leakage.

- Preventive maintenance and operator walkdown records.

- Vendor documentation.

- Health reports, work orders, and corrective action program documents.

- Circuit breaker short circuit calculations.

- Coordination studies.

- Over current relay setting sheets.

- Voltage drop calculations.

- Circuit breaker maintenance activities.

- Preventive maintenance activities for the pump motors and circuit breakers were verified to maintain the system capable of fulfilling its required safety functions.

b. Findings

No findings were identified.

.2.5 Buried Cable to the Gas Turbine Generators

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with buried cables to the gas turbine generators to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired functions. Specifically, the team reviewed:

- Cable submergence history.

- Related action requests and corrective actions.

- Work orders related to buried cable tests.

- Single line drawings of the gas turbine switchgear.

b. Findings

No findings were identified.

.2.6 Auxiliary Feedwater Pump Discharge Valves HV0031 and UV0035

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the auxiliary feedwater pump discharge Valves HV0031 and UV0035 to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform the desired function. Specifically, the team reviewed:

- Motor operated valve thrust and torque calculations.
- Thermal overload relay setpoints.
- Thermal protection methodology.
- Thrust and torque margin during degraded voltage conditions.
- 120 Vac control voltage calculation.

b. Findings

No findings were identified.

.2.7 Emergency Diesel Generator Control Relays

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with emergency diesel generator control relays to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Timing logic for the emergency diesel generator output breaker to ensure technical specification required capability on an actual or simulated loss of offsite power signal in conjunction with an actual engineered safety features actuation signal that sheds loads, auto starts the emergency diesel generator, and sequences loads onto the emergency bus. This included both circuits for (1) partially loaded emergency diesel generator, and (2) overloaded emergency diesel generator.

- Relay logic to ensure certain non-critical emergency diesel generator trip relays are isolated on a loss of voltage signal, depending on the loading of the emergency diesel generator at time of signal.

- Preventive maintenance activities for the time delay control relays to ensure they are tracked for degrading conditions and the replacement strategy meets an industry recognized schedule.

b. Findings

No findings were identified.

.2.8 Emergency Diesel Generator Control Room Essential Exhaust Fan HDA-J01 and Emergency Diesel Generator Engine Room Essential Supply Fan HDA-A01

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, calculations, vendors manual, and action requests associated with the emergency diesel generator control room essential exhaust Fan HDA-J01 and emergency diesel generator engine room essential supply Fan HDA-A01 to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Emergency diesel generator room heat load calculations used to determine the required flow rate of the emergency diesel generator room exhaust fan.

- Vendor specifications for the fan were reviewed to ensure the fan was sized to the required air exhaust flow rate.

- Periodic fan air flow performance test results were reviewed to ensure the installed equipment performed as specified by the design and vendor documents.

- Seismic qualification documents of the fan assembly and installation were reviewed to ensure the fan would function after a seismic event.

- Preventive and corrective maintenance records were reviewed to ensure the exhaust fan was properly maintained.

b. Findings

Deficiencies in Emergency Diesel Generator Engine Room and Control Room Ventilation Air Flow Testing and Evaluation

Introduction. The team identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, “Test Control,” involving the failure to establish a test program to ensure that the emergency diesel generator engine room exhaust fans and the

emergency diesel generator control room supply fans flow test results were evaluated to incorporate the requirements and acceptance limits contained in applicable design documents.

Description. The emergency diesel generator control room is cooled by a once-through outside air supply fan. The air picks up heat from the control cabinets and is exhausted through a door louver into the emergency diesel generator engine room, mixed with the emergency diesel generator engine room air, and is then exhausted to the outside by the emergency diesel generator engine room exhaust fan. The team noted that in Calculation 13-MC-HD-0052, "Diesel Generator Equipment Control Room Cooling Load Calculation, Essential Conditions," Revision 4, the required air flow rate for the supply fan was 13,058 cubic feet per minute, with an installed capacity of 13,700 cubic feet per minute.

The emergency diesel generator engine room is cooled by outside air drawn through louvers and mixed in the room with emergency diesel generator control room air, and then exhausted by a fan mounted in the emergency diesel generator engine room ceiling. The team noted that in Calculation 13-MC-HD-0053, "Diesel Generator Room Heat Load and Temperature Calculation During Essential Condition," Revision 4, the required air flow rate for the exhaust fan was 121,000 cubic feet per minute, whereas the installed capacity was 127,300 cubic feet per minute.

The fans are air flow tested every 5 years using Procedure 33TI-9HD01, "DG Building HVAC System Performance Testing," Revision 5. The team reviewed the June 2013 testing results for both fans performed under Work Order 3880523 and determined that the measured air flow rates did not verify that the design basis requirements were met for either fan. In particular, the measured air flow for the emergency diesel generator control room supply fan was 17,927 cubic feet per minute. But 27,948 cubic feet per minute was measured passing through the door louver into the emergency diesel generator engine room. Since no air flows into the emergency diesel generator control room other than from the supply fan, the air flow measured exhausting through the door louver should be the equal to the air flow delivered into the room by the supply fan. No explanation was recorded in the work order to explain how the air flow through the door louver could be 10,021 cubic feet per minute higher than what is delivered to the room. Secondly, the acceptance criteria for required air flow is 9200 cubic feet per minute, which, per Calculation 13-MC-HD-0052, page 13, is for a clogged filter loaded during a 30-day dust storm. The measured air flow is a function of filter differential pressure, yet there was no factor for correction of the air flow related to the measured filter differential pressure.

The team reviewed the testing for the emergency diesel generator engine room exhaust fan performed under the same work order. The measured air flow was recorded as the sum of the air flowing through the inlet grating in the wall plus the air flowing into the room from the emergency diesel generator control room door louvers, which was listed as 189,942 cubic feet per minute intake plus 27,948 cubic feet per minute from emergency diesel generator control room door, for a total of 209,890 cubic feet per minute. The test acceptance criterion was listed on the same page as 105,000 cubic feet per minute.

The team determined that the emergency diesel generator engine room exhaust fan was not capable of removing 209,890 cubic feet per minute exhaust flow, based on a review

of fan vendor Drawing SDOC-M590-00689, dated September 2, 1981. The installed motor is rated at 100 horsepower and draws 80 horsepower at design airflow. The drawing indicated the fan is rated at 127,000 cubic feet per minute. A review of work order history indicated there were no changes to air flow system resistance or fan motor horsepower. Thus, the fan should have been operating near its design flow rate.

The team determined that the measured air flow tests had recorded fan flow rates that were too high to be valid. The licensee failed to question these test results and instead made an operability assessment simply because the test results were greater than the specified acceptance criteria. The test results applied to all three units. However, based on results of more accurate testing performed in 2006, the team concluded that the fans were operable. This conclusion was based on determining that no significant maintenance had been performed on the fan systems since the 2006 tests.

Analysis. 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 [H.14].

Enforcement. 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." Contrary to the above, in June 2013, the licensee failed to establish a test program 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, 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. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000528; 529; 530/2013009-02, "Deficiencies in Emergency Diesel Generator Engine Room and Control Room Ventilation Air Flow Testing and Evaluation."

.2.9 Essential Spray Ponds

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the essential spray ponds to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Design basis manual.
- Surveillance procedures and results for spray pond level and temperature.
- Seismic qualification report, vendor manual, inservice test procedure, and operating procedure for cross-tie valves.
- Structural monitoring reports and condition assessment and service life estimate reports.
- Concrete wall and slab calculations and thermal performance calculations.
- Piping and instrumentation diagrams and civil plan drawings.
- Vendor manuals and preventative maintenance work instructions for the emergency well spare pump and motor.
- Work orders and regulatory commitments documents.

b. Findings

Failure to Establish Adequate Procedures for an Alternate Source of Spray Pond Inventory

Introduction. The team identified a Green, non-cited violation of Technical Specification 5.4.1, "Procedures," involving the failure to establish emergency procedures to provide make-up water to the essential spray pond beyond its 26 day water inventory.

Description. NRC Regulatory Guide 1.27, "Ultimate Heat Sink For Nuclear Power Plants," Revision 2, provides guidance for ensuring adequate cooling capacity of an

ultimate heat sink. The regulatory guide states that the ultimate heat sink should be capable of providing sufficient cooling for at least 30 days to permit safe plant shutdown. A water supply of less than 30 days may be acceptable if it can be demonstrated that replenishment can be effected to ensure the continuous capability of the ultimate heat sink to perform its safety functions. The ultimate heat sink at Palo Verde is an essential spray pond with 26 days of water inventory. In a meeting with the licensee in December of 1981, the NRC determined that a 26-day water supply in the essential spray ponds was acceptable, given that the licensee provide further discussion on the water source and effects of the initiating event, and that the licensee "establish operating and maintenance procedures that provide assurance that these additional sources of water can be used in the event they are needed."

In a letter to the NRC, dated June 17, 1982, the licensee provided a discussion on the water source to be used after the spray pond is depleted. The licensee postulated that a safe shutdown earthquake occurred, rendering each of the three wells onsite inoperable. The initial action would be to determine the extent of damage done to these wells and associated equipment and the time to place any one of the damaged wells in service. For this situation, the licensee committed to have a spare pump and motor on site. If the existing wells could not be restored to service, the licensee would take action to construct a new well. Regarding the procedures for these actions, the licensee wrote, "Information including alternate routes to the site from Phoenix (or possible equipment air lifts) along with specific items to be stored on site and inspection information will be detailed in the final procedure." The NRC documented its review of this proposal in Safety Evaluation Report, Supplement 3, concluding that the licensee's approach was acceptable, and re-stating that the applicant had committed to proceduralize the actions to be followed to ensure the continued capability of the spray ponds.

The team reviewed Appendix B to emergency plan Procedure EP-0903, "Accident Assessment," which is the existing procedure to accomplish the tasks committed to in Safety Evaluation Report, Supplement 3. The purpose of the accident assessment procedure is listed as "Instruction for performing offsite dose calculations" and "Instruction for estimating core damage." These purposes do not reflect instructions for restoring a well to service, or drilling a new well, and the procedure is an emergency plan procedure to be implemented from an emergency facility rather than an operating procedure, as the NRC discussed in 1981. The procedure itself, Appendix B, "Ultimate Heat Sink Considerations," consists of a list of 11 statements for consideration in securing a dependable water supply, but does not provide appropriate steps with adequate detail to perform the task. For example, the procedure does not contain any instructions for equipment mobilization, well pump and motor installation, piping from the well to the ultimate heat sink, or a means to power the drill or pump. The procedure, as written, also contains inaccuracies. The procedure says to reference Bechtel Drawing Number 13-C-ZVA-005 for well site selections; however, the drawing does not contain any potential well site selections. The procedure also says to ensure that the spare pump has been adequately maintained under preventive maintenance Task 054390; however, this preventive maintenance task number was incorrect. The team discovered that in 2007 the licensee had taken corrective actions in response to questions regarding whether or not Palo Verde would be able to construct a well in the timeframe needed to supply water to the essential spray ponds. These corrective actions included a technical specification document that specified the work to be accomplished to install a new water supply and a technical memorandum detailing the potential risks in meeting the schedule; however, these documents were never incorporated into procedures.

The licensee documented these procedural inadequacies in their corrective action program as Palo Verde Action Requests (PVAR) 4496901, 4497291, 4498167, and 4499085.

Analysis. 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.

Enforcement. 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. Contrary to the above, prior to January 24, 2014, the licensee did not have written procedures established, implemented, and maintained as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978, for combating emergencies and other significant events. Specifically, 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. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000528; 529; 530/2013009-03, "Failure to Establish Adequate Procedures for an Alternate Source of Spray Pond Inventory."

.2.10 Electrolytic Capacitors

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and

action requests associated with electrolytic capacitors to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Replacement frequency schedule and work instructions for preventive maintenance.
- Procedures for the storage, preventive maintenance, and reforming of electrolytic capacitors.
- Material engineering evaluation reports for the shelf life and storage temperature of capacitors.
- Instrumentation and control shop and warehouse walkdown.
- Vendor manuals for systems containing electrolytic capacitors.
- Operating experience.

b. Findings

No findings were identified.

.2.11 Containment Airlock Door Seals

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the containment airlock door seals to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Design basis manual.
- Surveillance procedures and results for seal leak test and personnel airlock barrel test.
- Containment leakage rate testing program reports.
- Vendor manual and stress test report for personnel airlocks.
- Apparent cause evaluations and engineering design change and modification packages for doors and seals.
- Technical specifications and bases documents.
- Operability determinations and control room logs for seal leak tests.

- Work orders.

b. Findings

Failure to Follow Surveillance Testing Procedure

Introduction. The team identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” involving the failure to follow Procedure 73DP-9ZZ14, “Surveillance Testing,” which required maintenance personnel to write a Palo Verde Action Request (PVAR) upon the failure of a surveillance test. Specifically, on three separate occasions, maintenance personnel failed to write a Palo Verde action request after the containment airlock door seals exceeded the acceptance criteria for leakage.

Description. The team reviewed surveillance test results for the containment airlock door seals. Each unit has two containment personnel airlocks, each with an inner and outer door. The seals for the doors are required to be tested within seven days of any door closure. The team also reviewed a list of operability determinations and Palo Verde action requests for the door seals. During this documentation review, the team discovered that five failed seal tests between 2010 and 2012 did not appear to have associated Palo Verde action requests or operability determinations. Discussing this concern with the licensee, the team determined that one of the failed tests occurred when the plant was in Mode 5 where the seal test was not required, and one of the failed tests was a satisfactory test and was incorrectly documented in the database. For the remaining three failed seal tests, the licensee did not document the failures by generating Palo Verde action requests or performing formal operability determinations.

The surveillance testing program is governed by Procedure 73DP-9ZZ14, “Surveillance Testing,” and the seals are tested per Procedure 73ST-9CL03, “Containment Airlock Door Seal Leak Test.” The seal leak test is a unique surveillance test in that maintenance personnel have to dress out for containment in order to perform the test, and do not spend any more time than necessary in the area to minimize personnel exposure. The seal leak test procedure also contains contingencies for a failed test, such as latch bracket adjustments on the door and seal cleaning, and then the seal is retested. For the three failed tests in question, the technician performing the test called the control room where operators declared the door inoperable and entered the correct technical specification limiting condition for operation, worked through the contingencies to either clean the seals or adjust the latch brackets on the door, re-performed the test with a satisfactory result, and called the control room again where operators declared the door operable and exited the limiting condition for operation. Procedure 73DP-9ZZ14, “Surveillance Testing,” Section 3.6.1, specifically requires station personnel to generate a Palo Verde action request for a failed step or for out-of-tolerance data. Additionally, section 2.10 lists the responsibilities of the test performer, one of which states, “initiate PVAR(s) if test results are abnormal.” Procedure 73ST-9CL03, “Containment Airlock Door Seal Leak Test,” Step 8.1.4, also directs test performers to enter the Palo Verde action request number in the surveillance test log if a Palo Verde action request was initiated as a result of a failure or deficiency. After exiting containment, maintenance personnel should have written a Palo Verde action request to document the failed surveillance and any adjustments that were made in order to get the seals to pass the surveillance test.

Initiation of a Palo Verde action request is important because a number of programs use the corrective action program to identify surveillance test failures. The surveillance test program owner reviews Palo Verde action requests written for surveillance test failures to identify performance trends. The generation of a Palo Verde action request also initiates the formal documented operability determination, providing operations with pertinent information so that proper documentation and determination of operability can be performed as required. The Palo Verde action requests are also used to inform apparent cause evaluations and to document the specific adjustments that were made to the containment doors in order to correct the condition and obtain successful surveillance test results. Without this information it is difficult to determine the cause of the door seal failures. Additionally, Palo Verde action requests are searched by the system engineer for consideration of functional failures under the maintenance rule.

The team also reviewed apparent cause evaluation CRDR 4078014 that the licensee had completed as a result of a previous NRC issued non-cited violation for the failure of maintenance personnel to write Palo Verde action requests for conditions adverse to quality. The apparent cause evaluation did not identify these three instances of maintenance personnel failing to write Palo Verde action requests in their extent of condition review and therefore the corrective actions from the apparent cause evaluation did not specifically address the condition where maintenance personnel failed to write Palo Verde action requests for failed surveillances.

<u>Analysis</u>. 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 [H.1].

<u>Enforcement</u>. 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.” Contrary to the above, between November 5, 2010, and September 17, 2012, the licensee failed to accomplish activities affecting quality as prescribed by documented instructions, procedures, and drawings. Specifically, 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. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000528; 529; 530/2013009-04, "Failure to Follow Surveillance Testing Procedure."

.2.12 Motor Driven Auxiliary Feedwater Pump AFB-P01

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the motor driven auxiliary feedwater Pump AFB-P01 to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Calculations.
- Corrective action program reports to verify the monitoring and correction of potential degradation, operability evaluations, and root and apparent cause evaluations.
- System design criteria.
- Piping and instrumentation diagrams.
- System operating instructions.
- System quarterly functional tests.
- Technical specifications and bases documents.
- Vendor documentation.
- Work orders.

b. Findings

No findings were identified.

.2.13 Turbine Driven Auxiliary Feedwater Pump Room Essential Air Cooling Unit HAA-Z04

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the turbine driven auxiliary feedwater pump room essential air cooling unit HAA-Z04 to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Room cooling load calculations used to size the air coil assembly.
- Vendor specifications for the fan coil unit were reviewed to ensure the unit was sized to the required cooling load.
- Flow balance results for the chilled water flow to the coil were reviewed to ensure sufficient cooling water is delivered to the unit in order to remove the design heat load.
- Seismic qualification documents of the chilled water coil assembly and installation were reviewed to ensure the unit would function after a seismic event.
- The team inspected the cooling unit equipment area to assess the material condition of the coil assembly.

b. Findings

No findings were identified.

.2.14 Motor Driven Auxiliary Feedwater Pump AFP-P01

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the motor driven auxiliary feedwater Pump AFP-P01 to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Hydraulic analyses were reviewed to verify adequacy of net positive suction head and verify adequacy of surveillance test acceptance criteria for pump minimum discharge pressure at the required flow rate.
- Calculations related to the potential for vortexing at the pump inlet piping in the condensate storage tank were reviewed to ensure the adequacy of the pump inlet conditions.

- Inservice testing results were reviewed to verify acceptance criteria were met and performance degradation would be identified.

- The licensee responses and actions related to NRC Bulletin 88-04, “Potential Safety-Related Pump Loss,” were reviewed to assess implementation of operating experience related to pump minimum flow requirements and pump to pump interaction.

- The inspectors reviewed condensate storage tank volume calculations to ensure the motor driven auxiliary feedwater pump in conjunction with the turbine driven auxiliary feedwater pump had an adequate safety-grade water supply.

- Technical specifications and bases document.

b. Findings

No findings were identified.

.2.15 Operator Action to Align Reactor Makeup Water Tank to the Auxiliary Feedwater Pump Suction

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and action requests associated with the operator action to align the reactor makeup water tank to the auxiliary feedwater pump suction to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. In a beyond design basis event that the condensate storage tank is lost as a water source to the auxiliary feedwater pumps, an alternate water source that can be used is the inventory in the reactor makeup water tank. Specifically, the team reviewed:

- Procedures and drawings used to align the reactor makeup water tank to the auxiliary feedwater pump suction flow path, including piping vent procedures.

- A walkdown was performed to ensure that the flow path could be aligned without any obstructions to the operator.

- Hydraulic analyses, including the potential for vortex formation, and pump net positive suction head requirements were reviewed to ensure the auxiliary feedwater pump suction requirements were met.

- The team observed maintenance personnel performing ultrasonic tests of piping segments of the suction flow path where the reactor makeup water tank piping meets the condensate suction piping to ensure the lines were water solid.

b. Findings

No findings were identified.

.2.16 Sequencers and Engineered Safety Features Actuation Signal System Motor Driven Rotary Relays

a. Inspection Scope

The team reviewed the updated safety analysis report, design basis documents, the current system health report, selected drawings, maintenance and test procedures, and condition reports associated with sequencers and the engineered safety features actuation signal system to ensure design basis requirements and specifications were met. The team also performed walkdowns and conducted interviews with system engineering personnel to ensure the capability of this component to perform its desired design basis function. Specifically, the team reviewed:

- Logic circuit drawings to verify load shed and load sequencing signals are in accordance with design.
- Sequencer maintenance activities and testing procedures were reviewed to ensure the engineered safety features actuation signal system operability is maintained during on-line testing in accordance with the updated final safety analysis report.
- Vendor’s manual for the engineered safety features actuation signal system cabinet from which the sequencer receives its actuation signal to verify site testing is in accordance with manufacturer’s recommendations.
- Vendor manual for the engineered safety features actuation signal system cabinet in which the sequencer resides to ensure the sequencer surveillance procedures meet manufacturer’s recommendations to demonstrate sequencer performance.
- Industry practices and reliability evaluations to ensure properly scheduled maintenance activities for component and system reliability.

b. Findings

Improper Extension of Surveillance Interval for Surveillance Requirements Associated with the Engineered Safety Features Actuation Signal (ESFAS) System Sequencer and Relays

Introduction. The team identified a Green, non-cited violation of Technical Specification 5.5.18, “Surveillance Frequency Control Program,” involving the failure to follow NEI 04-10, “Risk-Informed Method for Control of Surveillance Frequencies,” Revision 1, when extending the surveillance test intervals for each train of the engineered safety features actuation signal system from 18 months to 18 months on a staggered basis (36 months for each train).

Description. The team reviewed motor-driven rotary relays and the sequencer associated with the Engineered Safety Features Actuation Signal (ESFAS) system.

The team reviewed licensee document RCTSAI 7673 which addressed an NRC commitment concerning the engineered safety features actuation signal system. RCTSAI 7673 refers to a letter, dated December 3, 1981, which addresses concerns regarding the sequencer. Consequently, the licensee committed to "the BOP ESFAS system will be fully tested at least every 18 months at the time of refueling." The engineered safety features actuation signal system consists of two trains, an 'A' Train and a 'B' Train. This regulatory commitment then became an obligation when the licensee incorporated it into their plant-specific technical specifications.

Between 2000 and 2003, the licensee reviewed original regulatory commitments. The licensee recognized that the engineered safety features actuation signal system commitment had been elevated to a technical specification obligation and that any modifications to that action must be addressed using 10 CFR 50.90 as opposed to being addressed using the licensee's commitment management program. However, the licensee did not disposition the original regulatory commitment to remove it from the database of open/active commitments. This meant that the original commitment was still in force, along with the technical specification obligation. The licensee then revised the Palo Verde technical specification for the engineered safety features actuation signal system using 10 CFR 50.90, to remove the action associated with the commitment (i.e., the 18-month engineered safety features actuation signal system surveillance test frequency) from the technical specifications to a licensee controlled document (the Surveillance Frequency Control Program). Per NEI 99-04, "Guidelines for Managing NRC Commitment Changes," the licensee determined that the commitment could be deleted since it had been elevated to an obligation in the technical specifications. This was an incorrect conclusion since the surveillance requirements associated with the commitment had been removed from the technical specifications using 10 CFR 50.90, and now resided in the licensee-controlled Surveillance Frequency Control Program.

Technical Specification 5.5.18, "Surveillance Frequency Control Program", 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." This process allows the licensee to change surveillance test frequencies using a risk-informed method, excluding prohibitive NRC commitments. Step 1 of NEI 04-10 requires all commitments made to the NRC to be collected and reviewed. Step 2 requires a check to be made to determine if the NRC commitments can be changed. Step 3 specifies that the licensee can change commitments using a method acceptable to the NRC, e.g., NEI 99-04, "Guidelines for Managing NRC Commitment Changes," Revision 0.

In 2013, through the use of the Surveillance Frequency Control Program, the licensee generated the Surveillance Test Risk-Informed Documented Evaluation (STRIDE) Program. STRIDE document numbers PVN-I-0007, Revision 1, and PVN-O-0015, Revision 0, were generated to extend the surveillance intervals for the engineered safety features actuation signal system from once every 18 months to an alternating 18-month frequency. This meant that, at the scheduled time, the licensee would test one train of the engineered safety features actuation signal system and then, 18 months later, would test the second train. This resulted in extending the time between testing a particular

train to 36 months. At this time, per the Surveillance Frequency Control Program, the licensee performed a 10 CFR 50.59 screen for extending the engineered safety features actuation signal system surveillance test frequency identified in Procedure 01DP-0RS03. The 10 CFR 50.59 screen determined that no further review was required citing the Surveillance Frequency Control Program as the justification. This created a repetitive cycle. Specifically, the Surveillance Frequency Control Program requires a 10 CFR 50.59 screen/evaluation to change a commitment and the licensee referred back to the Surveillance Frequency Control Program to screen out the commitment, creating a repetitive loop. The licensee then performed a probabilistic risk analysis and based the surveillance test frequency extension on the results.

When making the 2013 Surveillance Frequency Control Program change associated with the engineered safety features actuation signal system, the licensee failed to comply with Technical Specification 5.5.18.b because they failed to follow Step 1 of the NEI 04-10 guidance by not collecting and reviewing all commitments made to the NRC, and Steps 2 and 3 of the NEI 04-10 guidance by not evaluating the commitment as required by NEI 99-04, "Guidelines for Managing NRC Commitment Changes," Revision 0.

Analysis. 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 [H.3].

Enforcement. 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." Contrary to the above, prior to February 3, 2014, the licensee failed to ensure that changes of the frequencies listed in the Surveillance Frequency Control Program were made in accordance with NEI 04-10. Specifically, 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. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000528; 529; 530/2013009-05, "Improper Extension of Surveillance Interval for Surveillance Requirements Associated with the Engineered Safety Features Actuation Signal System Sequencer and Relays."

.3 Results of Reviews for Operating Experience

.3.1 Inspection of NRC Information Notice 2013-14: "Potential Design Deficiency in Motor-Operated Valve Control Circuitry"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2013-14: "Potential Design Deficiency in Motor-Operated Valve Control Circuitry" to verify the licensee performed an applicability review and took appropriate corrective actions, if appropriate, to address the concerns. The team verified that the licensee's review adequately addressed the issues in the information notice.

b. Findings

No findings were identified.

.3.2 Inspection of NRC Information Notice 2011-01: "Commercial Grade Dedication Issues Identified During NRC Inspections"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2011-01: "Commercial Grade Dedication Issues Identified During NRC Inspections" to verify the licensee performed an applicability review and took appropriate corrective actions, if appropriate, to address the concerns. The team verified that the licensee's review adequately addressed the issues in the information notice.

b. Findings

No findings were identified.

.3.3 Inspection of NRC Information Notice 2012-11: "Age-Related Capacitor Degradation"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2012-11: "Age-Related Capacitor Degradation" to verify the licensee performed an applicability review and took appropriate corrective actions, if appropriate, to address the concerns. The team verified that the licensee's review adequately addressed the issues in the information notice.

b. Findings

No findings were identified.

.3.4 Inspection of NRC Information Notice 2010-10: "Implementation of a Digital Control System Under 10 CFR 50.59"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2010-10: "Implementation of a Digital Control System Under 10 CFR 50.59" to verify the licensee perform an applicability review and took appropriate corrective actions, if appropriate, to address the concerns. The team verified that the licensee's review adequately addressed the issues in the information notice.

b. Findings

No findings were identified.

.3.5 Inspection of NRC Information Notice 2012-17: "Inappropriate use of Certified Materials Test Report Yield Stress and Age-Hardened Concrete Compressive Strength in Design Calculations"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2012-17: "Inappropriate use of Certified Materials Test Report Yield Stress and Age-Hardened Concrete Compressive Strength in Design Calculations" to verify the licensee performed an applicability review and took appropriate corrective actions, if appropriate, to address the concerns. The team verified that the licensee's review adequately addressed the issues in the information notice.

b. Findings

No findings were identified.

.3.6 Inspection of NRC Information Notice 2012-06: "Ineffective Use of Vendor Technical Recommendations"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2012-06: "Ineffective Use of Vendor Technical Recommendations" to verify that the licensee performed an applicability review, and if necessary, took appropriate corrective actions. The licensee reviewed a total of six existing procedures associated with vendor interaction, record keeping, and maintenance activities to verify barriers existed to prevent ineffective use of vendor recommendations. The team verified that the licensee's review adequately addressed the issues in the information notice.

b. Findings

No findings were identified.

.3.7 Inspection of NRC Information Notice 2013-12: "Improperly Sloped Instrument Sensing Lines"

a. Inspection Scope

The team reviewed the licensee's evaluation of Information Notice 2013-12: "Improperly Sloped Instrument Sensing Lines" to verify the licensee performed an applicability review and took appropriate corrective actions, if appropriate, to address the concerns. The team verified that the licensee's review adequately addressed the issues in the information notice.

b. Findings

No findings were identified.

.4 Results of Reviews for Operator Actions

The team selected risk-significant components and operator actions for review using information contained in the licensee's probabilistic risk assessment. This included components and operator actions that had a risk achievement worth factor greater than two or Birnbaum value greater than 1E-6.

a. Inspection Scope

For the review of operator actions, the team observed operators during simulator scenarios associated with the selected components as well as observing simulated actions in the plant. The selected operator actions were:

- Close refueling water tank outlet Valves CHA-HV-531 and CHB-HV-530 following recirculation actuation signal actuation (scenario).
- Following a multiple steam generator tube rupture, initiate a cool down and equalize reactor coolant system pressure with affected steam generator pressure (scenario).

- Upon confirmation of a fire in the lower cable spreading room, locally trip reactor coolant pump, and control power breakers in order to maintain seal integrity (scenario and job performance measure).

- Following a reactor trip with loss of heat sink, depressurize steam generators, and supply feedwater with the condensate pumps (scenario).

b. Findings

No findings were identified.

4 OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

The team reviewed Palo Verde action requests associated with the selected components, operator actions, and operating experience notifications. Any related findings are documented in prior sections of this report.

4OA6 Meetings, Including Exit

On February 7, 2014, the team leader presented the preliminary inspection results to Mr. R. Bement, Site Vice-President, and other members of the licensee's staff. On April 2, 2014, the team leader presented the final inspection results to Mr. J. Cadogan, Vice President, Nuclear Engineering, and other members of the licensee's staff. The licensee acknowledged the findings during each meeting. While some proprietary information was reviewed during this inspection, no proprietary information was included in this report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Albrigo, Engineering Leader. Design Engineering
S. Banks, Time Critical Actions Simulator Operator, Operations
R. Bement, Senior Vice President, Site Operations
L. Berg, Engineering Lead, E-FIN
B. Berryman, Vice President, Site Operations and General Plant Manager
W. Borrero, Senior Engineer, Consulting Engineering
R. Busto, Balance of Plant Lead Engineer, System Engineering
D. Buth, Lead Mechanical Engineer, Design Engineering
W. Butler, Engineer III, Design Engineering
J. Cadogan, Vice President, Nuclear Engineering
R. Doyle, Senior Engineer, Design Engineering - Electrical
A. Edgley, Secondary Lead Engineer, System Engineering
D. Elkington, Senior Consultant, Nuclear Regulatory Affairs
M. Fladager, Department Leader, Performance Improvement.
D. Gibbs, CDBI Coordinator, Support
D. Hautala, Nuclear Regulatory Affairs,
T. Hook, Section Leader, Probabilistic Risk Assessment
M. Hooshmand, Engineering Leader, Design Engineering
K. House, Director, Design Engineering
M. Hypse, Consulting Engineer, Design Engineering
S. Kane, Engineer III, Probabilistic Risk Assessment
C. Karlson, Section Leader, Design Engineering
E. Kozo, Engineer III, Design Engineering
M. Lacal, Vice President, Operations Support
N. Lossing, I&C Lead Engineer, System Engineering
D. Macedonia, NSSS Lead Engineer, Systems Engineering
M. McGhee, Department Leader, Nuclear Regulatory Affairs
T. McGhee, CDBI Coordinator, Support
M. McKinley, Senior Engineer, Design Engineering - Instrument and Controls
M. Meyer, Senior Engineer, Design Engineering
G. Montgomery, Senior Engineer, Design Engineering
F. Oreshack, Nuclear Regulatory Affairs, Compliance Consultant
T. Romay, Control Room Supervisor, Operations
J. Shannon, Lead Civil Engineer, Design Engineering
J. Tolar, Senior Engineer, NSSS Mechanical Design Engineering
R. Trujillo, NIRM, CDBI Support
C. Wanderll, Senior Consulting Engineer, Design Engineering
D. Willis, I&C Lead Engineer, Design Engineering

NRC Personnel

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

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000528/529/530/2013009-001	NCV	Failure to Translate Design Basis Requirements for Establishing Operability of the Spray Pond System. (Section 1R21.2.1)
05000528/529/530/2013009-002	NCV	Deficiencies in Emergency Diesel Generator Engine Room and Control Room Ventilation Air Flow Testing and Evaluation. (Section 1R21.2.8)
05000528/529/530/2013009-003	NCV	Failure to Establish Adequate Procedures for an Alternate Source of Spray Pond Inventory. (Section 1R21.2.9)
05000528/529/530/2013009-004	NCV	Failure to Follow Surveillance Testing Procedure. (Section 1R21.2.11)
05000528/529/530/2013009-005	NCV	Improper Extension of Surveillance Interval for Surveillance Requirements Associated with the Engineered Safety Features Actuation Signal System Sequencer and Relays. (Section 1R21.2.16)

LIST OF DOCUMENTS REVIEWED

Section 1R21: Component Design Basis Inspection (71111.21)

Calculations

Number	Title	Revision
01-EC-PB-0200	AC Over Current Protection; Class 1E	10
02-EC-MA-0221	AC Distribution	13
02-EC-PB-0200	AC Overcurrent Protection Class 1E	9
02-EC-PH-0255	120 Vac Control Circuits Voltage Drop Calculation	3
02-EC-PK-0207	DC Battery Sizing and Minimum Voltage	10
02-EC-ZA-300	ZG Bldg Trays Cable Ampacities	1
13-CC-SP-0015	Essential Spray Pond Concrete Wall & Slab Design	8
13-EC-PA-210	Power Cable Ampacities	4
13-EC-PA-212	Cable Capacity Under Short Circuits	0
13-EC-PH-0254	MOV Thermal Protection Methodology	13
13-EC-PH-250	Overload Relay Heater Sizing	2

Calculations

Number	Title	Revision
13-JC-EC-209	Essential Chilled Water Pump Discharge Pressure Loops J-ECN-P-003/4 Total Loop Uncertainty Calculation	2
13-JC-SB-0202	Acceptance Criteria ESFAS Response Testing	20
13-JC-ZZ-0400	MOV Thrust and Torque Calculation for AFW Discharge MOVS 31 AND 35	0
13-MC-EC-0200	EC System Hydraulic Calculation	7
13-MC-HJ-0003	Control Building (HJ) System Heat Load and Equipment Selection Calculation (Volume 1 and 2)	8
13-MC-HS-0008	Spray Pond Ventilation and Equipment Adequacy Calculation	4
13-MC-SP-307	SP/EW System Thermal Performance Design Bases Analyses, Volume 1-3	9

Palo Verde Action Request (PVAR)

PVAR 3032910	PVAR 3393217	PVAR 40200407	PVAR 4276692	PVAR 4462453
PVAR 3033892	PVAR 3585283	PVAR 4089905	PVAR 4303703	PVAR 4483297
PVAR 3143221	PVAR 3676205	PVAR 4160870	PVAR 4327015	PVAR 4492212
PVAR 3259933	PVAR 3774509	PVAR 4221605	PVAR 4378232	PVAR 4494846
PVAR 3350712	PVAR 3796469	PVAR 4245364	PVAR 4405335	PVAR 4495239
PVAR 3352858	PVAR 3844418	PVAR 4264250	PVAR 4452352	

Condition Report Disposition Request (CRDR)

CRDR 2761657	CRDR 3144385	CRDR 3528346	CRDR 4070327	CRDR 4278817
CRDR 2852168	CRDR 3158707	CRDR 3529151	CRDR 4132493	CRDR 4298578
CRDR 2901737	CRDR 3161340	CRDR 3557126	CRDR 4136807	CRDR 4307293
CRDR 2983500	CRDR 3317532	CRDR 3680272	CRDR 4161745	CRDR 4315514

Condition Report Disposition Request (CRDR)

CRDR 2995621	CRDR 3362105	CRDR 3703245	CRDR 4220764	CRDR 4329997
CRDR 3012697	CRDR 3362153	CRDR 3715454	CRDR 4225011	CRDR 4336321
CRDR 3020250	CRDR 3397389	CRDR 3728358	CRDR 4236442	CRDR 4379002
CRDR 3035312	CRDR 3413299	CRDR 3763813	CRDR 4244393	CRDR 4383885
CRDR 3042169	CRDR 3482725	CRDR 3822162	CRDR 4245999	CRDR 4405102
CRDR 3079201	CRDR 3522125	CRDR 4043151	CRDR 4251788	CRDR 4448264
CRDR 3120274	CRDR 3528344	CRDR 4048349	CRDR 4258492	CRDR 4495161
CRDR 3131412				

Condition Report Action Item (CRAI)

CRAI 2586087	CRAI 3035315	CRAI 3431360	CRAI 3494255	CRAI 4280693
CRAI 2870348	CRAI 3144386	CRAI 3431362	CRAI 3543482	CRAI 4320242
CRAI 2870350	CRAI 3174722	CRAI 3431376	CRAI 3769612	CRAI 4349607
CRAI 2911812	CRAI 3259119	CRAI 3434521	CRAI 4245923	CRAI 4354487
CRAI 2982124	CRAI 3413924	CRAI 3444991	CRAI 4245927	CRAI 4354491
CRAI 2992426	CRAI 3420567	CRAI 3444995	CRAI 4245934	CRAI 4383886

Palo Verde Action Requests (PVARs) Initiated During Inspection

PVAR 4483297	PVAR 4495163	PVAR 4496725	PVAR 4497113	PVAR 4499123
PVAR 4493779	PVAR 4495239	PVAR 4496791	PVAR 4497290	PVAR 4499136
PVAR 4493784	PVAR 4495877	PVAR 4496901	PVAR 4497291	PVAR 4500070
PVAR 4494851	PVAR 4495936	PVAR 4496958	PVAR 4498167	PVAR 4500874
PVAR 4494846	PVAR 4496466	PVAR 4496791	PVAR 4499085	PVAR 4500910
PVAR 4494851	PVAR 4496697	PVAR 4496958	PVAR 4499119	

Design Basis Document

Number	Title	Revision
13-MC-EC-0252	EC System Water Requirements and Chiller Sizing	11
13-MC-SP-306	MINET Hydraulic Analysis of SP System	5
13-MC-SP-307	SP/EW System Thermal Performance Design Bases Analysis (Volumes 1, 2, and 3)	9
DBM-C6	Design Basis Manual, Category I Building Topical	10
DBM-CL	Design Basis Manual, Containment Integrity (Leakage and Isolation) Topical	13
DBM-DF/DG/PE	Diesel Generator, Class 1E Standby Generation, Fuel Oil Storage and Transfer System	24
DBM-SA	Engineered Safety Features Actuation System	16
DBM-SP	Design Basis Manual, Essential Spray Pond System	22

Drawings

Number	Title	Revision
01-E-HDB-0005	Elementary DG Control Rm Essential Fans	3
01-E-PEB-001	Standby generation 4.16KV Breaker	16
01-E-PHA-002	Single Line Diagram 480V Class 1E MCC 1E-PHB-M32	19
01-J-HDL-0001	Control logic DG Rm Essential Fans	1
01-M-SPP-0001	P&I Diagram Essential Spray Pond System	56
01-M-SPP-0002	P&I Diagram Essential Spray Pond System	15
01-M-SPP-001, Sh 1	Essential Spray Pond System P&ID	56
02-E-AFB-003	Elementary Diagram AFW System Isolation Valves 2J-AFB-HV-30 & 31	5

Drawings

Number	Title	Revision
02-E-AFB-005	Elementary Diagram AFW System Isolation Valves 2J-AFB-UV-34 & 35	7
02-E-PBA-001	Single Line Diagram 4.16kV Class 1E Power System Switchgear 1E-PBA-S03	12
02-E-SIB-0009	Elementary HPSI valve 2J-SIA-UV-527	3
02-E-SPB-001	Elementary Diagram Essential Spray Pond System	7
02-M-ECP-001	Essential Chilled Water System	34
13-C-SPS-375	Nuclear Service Spray Ponds Plan	14
13-C-ZVA-005	Site General Arrangement Plan Sheet 3	11
13-E-HCB-0004	Elementary Diagram Containment Fans	16
13-E-HCB-0005	Elementary Diagram Containment Fans	14
13-J-SAS-0003	BOP ESFAS Trn “A” Devices	9
13-J-SAS-0004	BOP ESFAS Trn “B” Devices	8
A0-E-NAA-006	Single Line Diagram SBOG Switchgear AE-NAN-S07	9
M018-00080	Schematic – Regulator Chassis	15
M018-00141	Control Schematic Starting sequence	25
M018-00142	Control Schematic Starting sequence	26
M018-00143	Control Schematic Starting sequence	20
M018-00144	Control Schematic Starting sequence	12
M018-00145	DG Starting sequence	4
M018-00152	Control Schematic DG Shutdown	23

Drawings

Number	Title	Revision
M018-00153	Control Schematic DG AVR	17
M018-00159	Control Schematic Generator Voltage Regulator and Tripping	18

Maintenance Action Items

32MT-9NA03 32ST-9ZZ74 RSS-01-1380

Procedures

Number	Title	Revision
01DP-ORS01	Surveillance Frequency Control Program	0
01DP-ORS02	Surveillance Test Risk Informed Documented Evaluation (STRIDE)	1
01DP-ORS03	Surveillance Interval Control	1
12DP-0MC5	Stores	29
12DP-0MC51	Supply Chain Services and Stores Foreign Material Exclusion Guidelines	3
20DP-0SK22	Protected Area Ingress and Egress Control	41
30DP-9MP08	Preventive Maintenance Program	24
30DP-9MP09	Preventive Maintenance Processes and Activities	29
32MT-9PE01	Cleaning, Inspection & Testing of the Class 1E Diesel Generator Maintenance Procedure	33
40DP-9ZZ04	Time Critical Action Program	9
40DP-9ZZ19 FAA-2G	Nuclear Administrative and Technical Manual, Operations Considerations Due to Plant Fire	26
40EP-9EO010	Standard Appendices (Appendix 44)	81

Procedures

Number	Title	Revision
40EP-9EO03	Loss of Coolant Accident	32
40EP-9EO03	Loss of Coolant Accident	32
40EP-9EO04	Steam Generator Tube Rupture	28
40EP-9EO06	Loss of All Feedwater	16
40EP-9EO09	Functional Recovery	48
40EP-9EO09	Functional Recovery	48
40OP-90P06	BOP ESFAS Sequencer Module Tests	122
40OP-9SA01	BOP ESFAS Module Operation Procedure Basis	29a
40OP-9SA01	BOP ESFAS Modules Operation	29
40ST-9ZZM1	Operations Mode 1 Surveillance Logs	62
73DP-0EE05	Engineering Preventive Maintenance Program	7
73DP-9ZZ14	Surveillance Testing	22
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73ST-9CL03	Containment Airlock Door Seal Leak Test	26
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73ST-9DG01	Class 1E DG Integrated Safeguards Test-Trn A	25
73ST-9XI44	Exercising Manual Spray Pond Valves – Inservice Test	2
81DP-0ZZ01	Civil System, Structure, and Component Monitoring Program	23
87DP-0MC09	Item Procurement Specification (IPS) Requirements	45

Procedures

Number	Title	Revision
EP-0900	Emergency Response Organization (ERO) Position Checklists	6
EP-0903	Accident Assessment	2
WSL 286985	Work Station Library Instruction, Reform Electrolytic Capacitors on Warehouse Spare Power Supplies	0

Work Orders

2604842	3780070	3872592	4011490	4341020
3746637	0380086	3914837	4081752	4462675

Miscellaneous

Number	Title	Revision Date
	Containment Leakage Rate Testing Program, Unit 2 Cycle 16 Summary Report	December 1, 2009 – May 6, 2011
	Containment Leakage Rate Testing Program, Unit 2 Cycle 17 Summary Report	May 6, 2011 – November 9, 2012
	Procedure Basis for exercising manual spray pond valves—inservice test (Procedure 73ST-9XI44)	2a
	System Health Report Spray Pond, Quarter 2 2013	June 30, 2013
	System Health Report Spray Pond, Quarter 4 2013	Dec 30, 2013
	Unit 1 Surveillance Results for SR 3.7.9.1, Spray Pond Level	July 1-5, 2013
	Unit 1 Surveillance Results for SR 3.7.9.2, Spray Pond Temperature	July 1-5, 2013
1093	SAR Change Notice, Update of Applicable Codes, Standards, and Guides to Include Current Versions	February 4, 1983
13-NS-A106	Probabilistic Risk Assessment of Tornado Missile Damage to the Station Ultimate Heat Sink	0

Miscellaneous

Number	Title	Revision Date
13-VTD-C515-0004	Conax Electric Penetration Assemblies Installation and Maintenance Manual	4
192-00417	PV letter, Part 21 report, Potter Brumfield MDR Relays	October 11, 1988
32MT-9ZZ74	Molded Case Circuit Breakers Test for Appendix R Breakers	38
40OP-9NA03	13.8kV Electrical System Operating Procedure	35
40-OP-9SP02	Essential Spray pond Train B Operation	46
65DP-0QQ01	Industry Operating Experience Review	33
87DP-0MC06	Technical Manual for Material Engineering Evaluations	25
87DP-0MC09	Item Procurement Specification Requirements	45
ANPP-21221-ACR	Letter to NRC regarding emergency make-up to the essential spray ponds	June 17, 1982
C153-00072	Stress Report Personnel Air Lock	8
COR 10-3-006	Component Observation Report, Unit 3 “A” and “B” Train Spray Pond structural monitoring above waterline	November 30, 2010
COR 12-3-002	Component Observation Report, Unit 3 “A” Train Spray Pond structural monitoring below waterline	April 27, 2012
DF-1555	Diesel Fuel Oil Transfer Pump Cable Replacement – Ductbank – Fuel Line Interference	January 17, 2014
DMWO3560653	Engr Disposition Vault Cable Replacement	November 21, 2013
DSG-ME-6.01	Centrifugal Pump Design Guide	0
E018-D67-1	GE Overload Relay Selection	February 9, 1977
EDC-2013-00269	Engineering Document Change, Increase in acceptable sludge depth for Essential Spray Ponds	9
EEQ-C515-002	Design Qualification Report of Instrumentation Electric Penetration Assemblies	0

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Number	Title	Revision Date
FR-013578	Hi-Rel Lab Failure Report	February 14, 2013
IPS-701	Thermal Capability Curves for Conax Electric Penetrations	A
J605-166	Seismic Report/Specification for Essential Spray Pond Cross Tie Valves	2
LTR 161-02927	Closure of NRC I&E Circular 78-13, “Inoperability of Service Water Pumps”	March 1, 1990
M598-1038-4	Motor Performance Data	May 12, 1982
M598-1085-4	Motor Performance Data	March 26, 1979
M721A-116-2	Motor Performance Data	April 4, 1979
MEE-00266	Material Engineering Evaluation, Shelf Life for Elastomers and Capacitors	12
MEE-02212	Material Engineering Evaluation, Commodity Substitution Evaluation	2
N001-13.06-4	ESFAS Cabinet Design Life	2
NEI 04-10	Risk-Informed Method for Control of Surveillance Frequencies	1
NUREG-0857	Safety Evaluation Report related to the operation of Palo Verde Nuclear Generating Station, Units 1, 2, and 3, Supplement 3	September 1982
PM Basis 247508	PM Basis for Series Equivalent Resistance Tests of Electrolytic Capacitors	---
PVN-I-0007	STRIDE Class 1E DG & Integrated Safeguards Test	1
RCTSAI 3484623	Regulatory Commitment, Rework/Repair Essential Spray Pond Walls	June 6, 2010
RCTSAI 7912	Regulatory Commitment, Spare pump/motor on site for replacement of site deep well pumps	October 15, 1984
S-13-0126	50.59 Screen Temp Fuel Oil Cabling	0
TMWO4297506	T-Mod on 3B EDG Fuel Oil Transfer Pump Power	0

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Number	Title	Revision Date
VTD P340-0026	Pratt Valves Instruction Manual for 8” through 24” 1400 Series Nuclear Valves	0
VTD-G063-0002	BOP ESFAS System Vendor Manual	5
VTD-G080-0644	Test Data for GE Motor on Essential Spray Pond Pumps	0
VTD-G080-0644	Test Data for Bingham – Willamette Pump and General Electric Motor on Essential Spray Ponds Pumps	May 17, 1995
VTD-P297-0013	Potter Brumfield Model MDR7063 Relay	1
VTD-T966-00001	Trentec (Formerly W.J. Woolley) Personnel Air Locks Hydraulic Power Unit Operating Maintenance Instruction	3
W117-00001	UHS Emergency Well – Technical Specifications for Drilling and Installation EPIP 99 Appendix M	0
W117-00002	UHS Emergency Well Risk Technical Memorandum – EPIP 99 Appendix M	0
WCAP-14117-NP	Reliability Assessment of Potter & Brumfield MDR Series Relays	A
WJE 2010.3947.2	Draft Report Essential Spray Ponds Above-Grade Walls Condition Assessment and Service Life Estimate	October 7, 2013
WTD U150-00001	US Electric Motors Vertical High Thrust Motor Manual	0
WTD-W931-00001	Weir-Floway 14 LKM, Deepwell Pump Bowl Assembly Curve & Information	0
WTD-W931-00002	Weir-Floway Pump Bowls Instruction Manual	0
WTD-W931-00003	Weir-Floway Well Pumps Instruction Manual	0