



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

May 10, 2017

Robert Bement  
Executive Vice President, Nuclear/CNO  
Mail Station 7602  
Arizona Public Service Company  
P.O. Box 52034  
Phoenix, AZ 85072-2034

**SUBJECT: PALO VERDE NUCLEAR GENERATING STATION – NRC INTEGRATED INSPECTION REPORT 05000528/2017001, 05000529/2017001, AND 05000530/2017001, AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) INSPECTION REPORT 07200044/2017001**

Dear Mr. Bement:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Palo Verde Nuclear Generating Station Units 1, 2, and 3. On April 12, 2017, the NRC inspectors discussed the results of this inspection with Mr. J. Cadogan and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement; and the NRC resident inspector at the Palo Verde Nuclear Generating Station.

If you disagree with the cross-cutting aspect assignment 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at the Palo Verde Nuclear Generating Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

*/RA/*

Geoffrey B. Miller, Branch Chief  
Project Branch D  
Division of Reactor Projects

Docket Nos.:  
50-528, 50-529, 50-530, 07200044

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

Enclosure:  
Inspection Report 05000528/2017001,  
05000529/2017001, 05000530/2017001,  
and 07200044/2017001

w/Attachments:

1. Supplemental Information
2. Information Request for the Radiation Safety Team Inspection

PALO VERDE NUCLEAR GENERATING STATION – NRC INTEGRATED INSPECTION  
 REPORT 05000528/2017001, 05000529/2017001, 05000530/2017001, AND INDEPENDENT  
 SPENT FUEL STORAGE INSTALLATION (ISFSI) INSPECTION REPORT 07200044/2017001

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000528, 05000529, 05000530, 07200044

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

Report: 05000528/2017001, 05000529/2017001, 05000530/2017001, and  
07200044/2017001

Licensee: Arizona Public Service Company

Facility: Palo Verde Nuclear Generating Station

Location: 5801 South Wintersburg Road  
Tonopah, AZ 85354

Dates: January 1 through March 31, 2017

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J. Drake, Senior Reactor Inspector  
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Approved By: Geoffrey B. Miller  
Chief, Project Branch D  
Division of Reactor Projects

Enclosure

## SUMMARY

IR 05000528, 529, 530/2017001, 07200044/2017001; 1/1/2017 – 3/31/2017; PALO VERDE NUCLEAR GENERATING STATION INTEGRATED INSPECTION REPORT; MAINTENANCE RISK ASSESSMENTS AND EMERGENT WORK CONTROL

The inspection activities described in this report were performed between January 1 and March 31, 2017, by the resident inspectors at Palo Verde Nuclear Generating Station and inspectors from the NRC's Region IV office and other NRC offices. One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. The significance of inspection findings is indicated by their color (i.e., Green, greater than Green, White, Yellow, or Red), determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated July 2016.

### Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green, non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the failure to establish procedure instructions for work authorization denials or deferrals. Specifically, this led to a 60 day extended unavailability of the diverse auxiliary feedwater actuation system when corrective maintenance was inappropriately deferred by the operations department.

Failure to provide adequate procedural guidance in the event of a denied work authorization, a circumstance anticipated to occur, is a performance deficiency. The performance deficiency is more than minor, because it affected the equipment performance attribute of the Mitigating Systems Cornerstone objective to ensure the availability and reliability of equipment that responds to an initiating event. Specifically, because the corrective maintenance was not performed in a timely manner, both trains of the diverse auxiliary feedwater actuation system remained in bypass for an additional 60 days whereby the system was not capable of performing its required safety function. The inspectors evaluated the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions," Section A, Question 2, which required a detailed risk evaluation because the finding involved a loss of system safety function. A Region IV senior reactor analyst performed a detailed risk assessment of the finding and determined that the finding was of very low safety significance (Green). The inspectors determined that the finding had a cross-cutting aspect in the human performance area of Work Management. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, the Unit Operations Manager's decision to deny the work authorization was based on conservative but faulty assumptions, and if other work groups with greater specific technical knowledge had been involved, the corrective maintenance likely would have proceeded [H.5]. (Section 1R13)

## PLANT STATUS

Units 1, 2, and 3 operated at full power for the entire inspection period.

## REPORT DETAILS

### 1. REACTOR SAFETY

**Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R04 Equipment Alignment (71111.04)

##### .1 Partial Walk-Down

###### a. Inspection Scope

The inspectors performed four partial system walk-downs of the following risk-significant systems:

- January 13, 2017, Unit 3 Technical Specification 3.8.1 required offsite power circuits during diesel generator B extended allowed outage time
- January 25, 2017, Unit 3 turbine driven auxiliary feedwater system
- March 6, 2017, Unit 2 diesel fuel oil storage and transfer system A
- March 20, 2017, Unit 3 125V DC Class 1E electrical distribution system B and D

The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems. They visually verified that critical portions of the systems were correctly aligned for the existing plant configuration.

These activities constituted four partial system walk-down samples as defined in Inspection Procedure 71111.04.

###### b. Findings

No findings were identified.

##### .2 Complete Walk-Down

###### a. Inspection Scope

On January 10, 2017, the inspectors performed a complete system walk-down inspection of the Station Blackout Generators. The inspectors reviewed the licensee's procedures and system design information to determine the correct system lineup for the existing plant configuration. The inspectors also reviewed open condition reports, in-process design changes, and other open items tracked by the licensee's operations and engineering departments. The inspectors then visually verified that the system was correctly aligned for the existing plant configuration.

These activities constituted one complete system walk-down sample, as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

**1R05 Fire Protection (71111.05)**

Quarterly Inspection

a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on six plant areas important to safety:

- January 4, 2017, Unit 3 lower cable spreading room and corridor building, Fire Zone 14
- January 6, 2017, Unit 3 essential switchgear room A and seismic gap, Fire Zone 86A and 6A
- January 31, 2017, Unit 1 turbine-driven auxiliary feedwater pump room, Fire Zone 72
- February 16, 2017, Unit 2 containment spray pump room A, Fire Zone 30A
- March 7, 2017, Unit 2 main control room, Fire Zone 17
- March 21, 2017, Unit 1 main turbine bearings, Fire Zones TB9 and TB10

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted six quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

**1R06 Flood Protection Measures (71111.06)**

a. Inspection Scope

On March 15, 2017, the inspectors completed an inspection of the station's ability to mitigate flooding due to internal causes. After reviewing the licensee's flooding analysis,

the inspectors chose one plant area containing risk-significant structures, systems, and components (SSCs) that were susceptible to flooding:

- Unit 2, diesel generator rooms A and B

The inspectors reviewed plant design features and licensee procedures for coping with internal flooding. The inspectors walked down the selected areas to inspect the design features, including the material condition of seals, drains, and flood barriers. The inspectors evaluated whether operator actions credited for flood mitigation could be successfully accomplished.

In addition, on January 10, 2017, the inspectors completed an inspection of underground bunkers susceptible to flooding. The inspectors selected three underground bunkers that contained risk-significant or multiple-train cables whose failure could disable risk-significant equipment:

- Unit 2 essential spray pond system A electrical cable vault (2EMHAKEM08)
- Unit 2 essential spray pond system B electrical cable vault (2EMHBKEM08)
- Unit 2 essential engineered safety features transformer area electrical cable vault (2EMHKNBM32)

The inspectors observed the material condition of the cables and splices contained in the bunkers and looked for evidence of cable degradation due to water intrusion. The inspectors verified that the cables and vaults met design requirements.

These activities constituted completion of one flood protection measures sample and three bunker/manhole samples, as defined in Inspection Procedure 71111.06.

b. Findings

No findings were identified.

**1R07 Heat Sink Performance (71111.07)**

a. Inspection Scope

On February 27, 2017, the inspectors completed an inspection of the readiness and availability of risk-significant heat exchangers. The inspectors observed the licensee's inspection of the Unit 3 diesel generator A jacket water heat exchanger and the material condition of the heat exchanger internals. Additionally, the inspectors walked down the jacket water heat exchanger to observe its performance and material condition.

These activities constituted completion of one heat sink performance annual review sample, as defined in Inspection Procedure 71111.07.

b. Findings

No findings were identified.



## **1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)**

### **.1 Review of Licensed Operator Requalification**

#### **a. Inspection Scope**

On February 17, 2017, the inspectors observed simulator training for an operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance.

These activities constituted completion of one quarterly licensed operator requalification program sample, as defined in Inspection Procedure 71111.11.

#### **b. Findings**

No findings were identified.

### **.2 Review of Licensed Operator Performance**

#### **a. Inspection Scope**

On February 23, 2017, the inspectors observed the performance of on-shift licensed operators in the Unit 3 main control room. At the time of the observations, the plant was in a period of heightened risk due to troubleshooting activities on the control element drive mechanism system. The inspectors observed the operators' performance of the pre-job brief and the control room oversight and communications of the activity.

In addition, the inspectors assessed the operators' adherence to plant procedures, including Procedure 40DP-9OP02, "Conduct of Shift Operations," and other operations department policies.

These activities constituted completion of one quarterly licensed operator performance sample, as defined in Inspection Procedure 71111.11.

#### **b. Findings**

No findings were identified.

### **.3 Biennial Review**

The licensed operator requalification program involves two training cycles that are conducted over a 2-year period. In the first cycle, the annual cycle, the operators are administered an operating test consisting of job performance measures and simulator scenarios. In the second part of the training cycle, the biennial cycle, operators are administered an operating test and a comprehensive written examination.

To assess the performance effectiveness of the licensed operator requalification program, the inspectors reviewed both the written examination and operating test quality and observed licensee administration of an annual requalification test while on-site. The operating tests observed included 15 job performance measures and four scenarios that were used in the current biennial requalification cycle. These observations allowed the

inspectors to assess the licensee's effectiveness in conducting the operating test to ensure operator mastery of the training program content and to determine if feedback of performance analyses into the requalification training program was being accomplished.

On December 23, 2016, the licensee informed the inspectors of the completed cycle results for Palo Verde Nuclear Generating Station for both the written examinations and the operating tests:

- 17 of 17 crews passed the simulator portion of the operating test
- 95 of 95 licensed operators passed the simulator portion of the operating test
- 95 of 95 licensed operators passed the job performance measure of the operating test
- 94 of 95 licensed operators passed the written examination

The individual that failed the written examination was remediated, retested, and passed their retake examination.

The inspectors observed examination security measures in place during administration of the examinations (including controls and content overlap) and reviewed any remedial training and re-examinations, if necessary. The inspectors also reviewed medical records of eight licensed operators for conformance to license conditions and the licensee's system for tracking qualifications and records of license reactivation for three operators.

The inspectors reviewed simulator performance for fidelity with the actual plant and the overall simulator program of maintenance, testing, and discrepancy correction.

The inspectors completed one inspection sample of the biennial licensed operator requalification program, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

**1R12 Maintenance Effectiveness (71111.12)**

Routine Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed three instances of degraded performance or condition of safety-significant SSCs:

- January 26, 2017, shutdown cooling system valves (Unit 2 SI-653, Unit 2 SI-185, and Unit 1 SI-185), return to (a)(2) monitoring status
- February 23, 2017, diesel generator system (Unit 3 diesel generator B master rod failure), (a)(1) evaluation, placement, and goal setting

- February 23, 2017, reactor coolant system (Unit 2 pressurizer safety valve lift set point failures) (a)(1) evaluation and rejection for continued (a)(2) monitoring

The inspectors reviewed the extent of condition of possible common cause SSC failures and evaluated the adequacy of the licensee's corrective actions. The inspectors reviewed the licensee's work practices to evaluate whether these may have played a role in the degradation of the SSCs. The inspectors assessed the licensee's characterization of the degradation in accordance with 10 CFR 50.65 (the Maintenance Rule), and verified that the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule.

These activities constituted completion of three maintenance effectiveness samples, as defined in Inspection Procedure 71111.12.

b. Findings

No findings were identified.

**1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)**

a. Inspection Scope

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- January 16, 2017 - January 22, 2017, Unit 3 weekly risk assessment, elevated risk levels due to extended diesel generator B unavailability and associated compensatory risk management actions
- January 30, 2017 - February 5, 2017, Unit 1 weekly risk assessment, elevated risk levels due to high pressure safety injection valve maintenance, as well as containment spray and essential chilled water surveillance tests

The inspectors verified that these risk assessment were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the result of the assessments.

The inspectors also observed portions of three emergent work activities that had the potential to cause an initiating event, to affect the functional capability of mitigating systems, or to impact barrier integrity:

- December 4, 2016 - February 23, 2017, Unit 2 diverse auxiliary feedwater actuation system bypassed for troubleshooting
- February 23, 2017, Unit 2 pressurizer spray valve 100F troubleshooting and repair
- February 23, 2017, Unit 3 control element assembly 80 failed timer card replacement

The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected SSCs.

These activities constituted completion of five maintenance risk assessments and emergent work control inspection samples, as defined in Inspection Procedure 71111.13.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of Technical Specification 5.4.1.a, for the failure to establish, implement, and maintain procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A. Specifically, the licensee did not establish or maintain adequate procedure instructions for work authorization denials or deferrals, which led to a 60 day extended unavailability of the diverse auxiliary feedwater actuation system when corrective maintenance was inappropriately deferred by the operations department.

Description. On December 4, 2016, Unit 2 control room operators received alarm SAYS94, DAFAS-A Test/Trouble. The operators followed alarm response procedure 40AL-9RK5B, "Panel B05B Alarm Responses," Revision 22, which instructed the operators to place both diverse auxiliary feedwater actuation system (DAFAS) channels A and B in bypass to prevent an inadvertent actuation at power. The alarm response procedure also instructed the operators to initiate a condition report for Instrumentation and Controls (I&C) Department to troubleshoot and correct the system circuitry. The operators immediately initiated condition report 16-19349 to request a corrective maintenance work order to troubleshoot and repair the DAFAS system. On December 7, 2016, I&C initiated Corrective Maintenance Work Order (CMWO) 4843803 to conduct the troubleshooting and on December 13, 2016, assigned it to the fix it now (FIN) team. When the FIN team requested work authorization from the operations department, the authorization was denied by the Unit 2 Operations Manager because of an extended Diesel Generator outage on Unit 3.

The inspectors reviewed the applicable station procedure 40DP-9WP01, "Operations Processing of Work Orders," Revision 32. The procedure assigns the following responsibilities to the Unit Operations Managers (UOM) in Step 2.3.1: Authorize the release of Work Orders for their respective units; and ensure that out of service equipment is returned to service in a timely manner. The inspectors also reviewed section 4.6 of the same procedure which provides instructions for performing impact review and release authorizations and did not find any supporting guidance for the UOM in performing the responsibilities detailed in Step 2.3.1. Furthermore, neither the inspectors nor the licensee located any guidance that provided instructions for contingencies when a release authorization is denied or prohibited by the UOM.

Inspector interviews with the Unit 2 Operations Manager determined that he did not have adequate technical justification for deferring the maintenance. His decision was based on incorrect assumptions which over-estimated the initiating events risk of the activity, when in fact the maintenance could be performed safely online with very low risk impact to the operating plant (green risk management action level). The I&C FIN team, system engineer, maintenance rule experts, and risk assessment staff were all aware that the work could be performed safely at power but were never consulted as part of the deferral

process. No station procedure directed the UOM to consult others to ensure that his decision to defer maintenance was correct.

Discussions between the Unit 2 Operations Manager and the FIN team continued from December 15, 2016, until February 7, 2017, when the Unit 2 DAFAS CMWO was approved. The FIN team replaced two faulty fiber optic modems inside the DAFAS control cabinet, which cleared the error and the system entered a two day monitoring period in bypass to ensure that the trip and trouble alarm did not return. When the operators repositioned the DAFAS 1A bypass key on February 9, 2017, the alarm returned, so the operators left the system in bypass and requested an amendment to the CMWO to correct the bypass key issue. The bypass key was worked on February 17, 2017, and the operators opted for an extended five day monitoring period with the system remaining in bypass. The DAFAS system was fully restored on February 23, 2017.

Analysis. Failure to provide adequate procedural guidance in the event of a denied work authorization, a circumstance anticipated to occur, is a performance deficiency. The performance deficiency is more than minor, because it affected the equipment performance attribute of the Mitigating Systems Cornerstone objective to ensure the availability and reliability of equipment that responds to an initiating event. Specifically, because the corrective maintenance was not performed in a timely manner, both trains of the diverse auxiliary feedwater actuation system remained in bypass for an additional 60 days whereby the system was not capable of performing its required safety function. The inspectors evaluated the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions," Section A, Question 2, which requires a detailed risk evaluation because the finding involved a loss of system safety function. A Region IV senior reactor analyst performed a detailed risk evaluation of the finding and determined that the finding was of very low safety significance (Green).

For the detailed risk evaluation, the analyst modeled anticipated transient without scram events where the auxiliary feedwater system would always fail due to the failure of the diverse auxiliary feedwater actuation system. To accomplish this, the analyst created a basic event representing the failure of the diverse auxiliary feedwater actuation system and inserted the basic event under fault tree AFW-A, "Auxiliary Feedwater System," which is a fault tree used exclusively for anticipated transient without scram events. This new basic event for failure of the diverse auxiliary feedwater actuation system was set to "TRUE," to model the condition. Manual initiations of the diverse auxiliary feedwater actuation system and the auxiliary feedwater system were not credited. The analyst assumed an exposure period of 80 days. These assumptions yielded an increase in core damage frequency of  $3.8E-7$ /year from internal events. Contributions from external events were qualitatively screened because of the relatively low initiating event frequencies relative to the initiating event frequency of the dominant initiator (transients). As a result, the total increase in core damage frequency was estimated to be very low safety significance (Green). Using Appendix H, "Containment Integrity Significance Determination Process," of Manual Chapter 0609, the analyst determined that the increase in large early release frequency was  $3.5E-9$ /year, or of very low safety significance (Green). Dominant initiators were transients which became anticipated transients without scram. Safety relief valves and the negative moderator temperature coefficient of the reactor remained to mitigate the increase in core damage frequency.

Palo Verde SPAR Model, Version 8.50, was run on SAPHIRE Version 8.1.5 with 1.0E-12 truncation to estimate the increase in core damage frequency for internal events.

The inspectors determined that the finding had a cross-cutting aspect in the human performance area of Work Management. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, the Unit Operations Manager's decision to deny the work authorization was based on conservative but faulty assumptions, and if other work groups had been involved, the corrective maintenance would have proceeded prior to exceeding the system Maintenance Rule performance criterion for unavailability [H.5].

Enforcement. Palo Verde Technical Specification 5.4.1.a requires that procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, shall be established, implemented, and maintained. Section 1C of Appendix A requires procedures for equipment control. The licensee established, in part, procedure 40DP-9WP01 to meet the regulatory guide requirement. Contrary to the above, until April 11, 2017, procedure 40DP-9WP01 did not adequately establish or implement a procedure for equipment control in the event of a work authorization denial. As a result, required corrective maintenance on the diverse auxiliary feedwater actuation system was not promptly performed. The licensee initiated corrective actions under condition report 17-04957 to evaluate necessary revisions to the applicable station processes and procedures. Because the finding is of very low safety significance, and has been entered into the licensee corrective action program, it is being treated as a non-cited violation in accordance with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000529/2017001-01 "Failure to establish station procedure instructions for deferred work authorizations."

## **1R15 Operability Determinations and Functionality Assessments (71111.15)**

### **a. Inspection Scope**

The inspectors reviewed seven operability determinations and functionality assessments that the licensee performed for degraded or nonconforming SSCs:

- January 12, 2017, Common Unit, functionality assessment of station blackout generator #2 cold start capability following ignition system fuel adjustments
- January 17, 2017, Unit 1 operability determination of spurious starts of diesel generator A and high pressure safety injection pump A
- February 8, 2017, Unit 3 operability determination of diesel generator B reliability testing requirements following engine overhaul
- February 21, 2017, Unit 3 operability determination of scaffolding impact on the Class 1E battery room B and D exhaust fans
- March 14, 2017, Unit 3 operability determination of diesel generator B following a review of applicable technical specification component condition records
- March 17, 2017, Unit 3 operability determination of main steam isolation valve 170 low nitrogen pre-charge pressure indication

- March 31, 2017, Unit 2 operability determination of diesel generator B broken bolt from 9R air manifold

The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded SSC to be operable or functional, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability or functionality. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability or functionality of the degraded SSC.

These activities constituted completion of seven operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

**1R18 Plant Modifications (71111.18)**

a. Inspection Scope

On March 28, 2017, the inspectors reviewed a temporary modification to install accelerometers on the Unit 1 shutdown cooling suction valve from reactor coolant loop 1A (SI-UV-0651) for vibration monitoring during operating cycle 20.

The inspectors verified that the licensee had installed this temporary modification in accordance with technically adequate design documents. The inspectors verified that this modification did not adversely impact the operability or availability of affected SSCs. The inspectors reviewed design documentation and plant procedures affected by the modification to verify the licensee maintained configuration control.

These activities constituted completion of one sample of temporary modifications, as defined in Inspection Procedure 71111.18.

b. Findings

No findings were identified.

**1R19 Post-Maintenance Testing (71111.19)**

a. Inspection Scope

The inspectors reviewed seven post-maintenance testing activities that affected risk-significant SSCs:

- January 28, 2017, Unit 3 diesel generator B 2-hour minimum loaded run followed by crank case inspection and hot torques
- February 7, 2017, Unit 3 diesel generator B 8-hour gradual incremental loaded run, hot torques, and fuel rack adjustments
- February 10, 2017, Unit 3 diesel generator B full load reject test

- February 23, 2017, Unit 2 pressurizer spray valve 100F troubleshooting and repair
- March 9, 2017, Unit 2 low pressure safety injection pump A suction valve rotor setting adjustment
- March 14, 2017, Unit 3 main steam isolation valve 170 accumulator pressure transmitter re-calibration
- March 17, 2017, diesel driven fire pump A start and run following starting motor and gland stud replacement

The inspectors reviewed licensing- and design-basis documents for the SSCs and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected SSCs.

These activities constituted completion of seven post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors observed eight risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the SSCs were capable of performing their safety functions:

In-service tests:

- January 26, 2017, Unit 3 essential spray pond pump A in-service test
- February 28, 2017, Unit 1 spent fuel pool cooling pump A in-service test

Reactor coolant system leak detection tests:

- March 2, 2017, Unit 3 elevated reactor coolant system leak rates observed

Other surveillance tests:

- January 12, 2017, station blackout generator #1 and #2 surveillance test
- January 18, 2017, Unit 1 reactor trip switchgear breaker D functional test
- January 23, 2017, Unit 3 diesel generator A surveillance test
- February 9, 2017, Unit 3 diesel generator B 24-hour fully loaded surveillance run
- March 1, 2017, SR 3.0.2 invocation and applicability during the current in-service testing program interval

The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, and that the results of



the test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

These activities constituted completion of eight surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

**1EP1 Exercise Evaluation (71114.01)**

a. Inspection Scope

The inspectors observed the March 7, 2017, biennial emergency preparedness exercise to verify the exercise acceptably tested the major elements of the emergency plan and provided opportunities for the emergency response organization (ERO) to demonstrate key skills and functions. The exercise demonstrated the licensee's capability to implement its emergency plan by simulating:

- An operating basis earthquake affecting all three units
- A reactor coolant system leak on Unit 1 which escalated and required safety injection
- Escalation of the reactor coolant leak to a loss of coolant accident on Unit 1
- Failures in the Unit 1 containment spray system which prevented spraying the containment
- A pressure-induced failure of a Unit 1 containment penetration seal, creating a unfiltered monitored radiological release to the environment
- Dose assessment results which required additional protective action recommendations be made to offsite authorities

During the exercise the inspectors observed activities in the control room simulator and the following dedicated emergency response facilities:

- Technical Support Center
- Operations Support Center
- Emergency Operations Facility
- Joint Information Center

The inspectors focused their evaluation of the licensee's performance on the risk-significant activities of event classification, offsite notification, recognition of offsite dose consequences, and development of protective action recommendations.

The inspectors also assessed recognition of, and response to, abnormal and emergency plant conditions, the transfer of decision-making authority and emergency function responsibilities between facilities, on-site and offsite communications, protection of emergency workers, emergency repair evaluation and capability, and the overall implementation of the emergency plan to protect public health and safety, and the environment. The inspectors reviewed the current revision of the facility emergency plan, emergency plan implementing procedures associated with operation of the licensee's emergency response facilities, procedures for the performance of associated emergency functions, and other documents as listed in the attachment to this report.

The inspectors attended the post-exercise critiques in each emergency response facility to evaluate the initial licensee self-assessment of exercise performance. The inspectors also attended the formal presentation of critique items to plant management on March 21, 2017.

The inspectors reviewed the scenarios of previous biennial exercises and licensee drills, conducted between April 2015 and February 2017, to determine whether the March 7, 2017, exercise was independent and avoided participant preconditioning, in accordance with the requirements of 10 CFR Part 50, Appendix E, IV.F(2)(g). The inspectors also compared observed exercise performance with corrective action program entries and after-action reports for drills and exercises conducted between April 2015 and February 2017 to determine whether identified weaknesses had been corrected in accordance with the requirements of 10 CFR 50.47(b)(14), and 10 CFR Part 50, Appendix E, IV.F.

The inspectors discussed the integrated exercise with staff at the Federal Emergency Management Agency (FEMA), Region IX, to determine whether the exercise scenario supported the FEMA exercise evaluation objectives and the results continued to support that participants could adequately protect the health and safety of the public.

These activities constituted one exercise evaluation sample as defined in Inspection Procedure 71114.01.

b. Findings

No findings were identified.

**1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)**

a. Inspection Scope

The inspectors performed an in-office review of Palo Verde Nuclear Generating Station Emergency Plan, Revision 58. This revision updated course references for emergency plan training to non-ERO workers, and updated population demographic data for the area surrounding the plant.

This revision was compared to its previous revision, to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q)(3) and 50.54(q)(4). The inspectors verified that the revision did not

reduce the effectiveness of the emergency plan. This review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection.

These activities constitute completion of one emergency action level and emergency plan changes sample as defined in Inspection Procedure 71114.04.

b. Findings

No findings were identified.

**1EP8 Exercise Evaluation – Scenario Review (71114.08)**

a. Inspection Scope

The licensee submitted the preliminary exercise scenario for the March 7, 2017, biennial exercise to the NRC on January 5, 2017, in accordance with the requirements of 10 CFR Part 50, Appendix E, IV.F(2)(b). The inspectors performed an in-office review of the proposed scenario to determine whether it would acceptably test the major elements of the licensee's emergency plan, and provide opportunities for the ERO to demonstrate key skills and functions. The inspectors discussed the preliminary scenario with staff at the Federal Emergency Management Agency (FEMA), Region IX, to determine whether the preliminary scenario supported the FEMA exercise evaluation objectives.

These activities constituted completion of one exercise scenario evaluation sample as defined in Inspection Procedure 71114.08.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstones: Public Radiation Safety and Occupational Radiation Safety**

**2RS5 Radiation Monitoring Instrumentation (71124.05)**

a. Inspection Scope

The inspectors evaluated the accuracy and operability of the radiation monitoring equipment used by the licensee to monitor areas, materials, and workers to ensure a radiologically safe work environment. This evaluation included equipment used to monitor radiological conditions related to normal plant operations, anticipated operational occurrences, and conditions resulting from postulated accidents. The inspectors interviewed licensee personnel, walked down various portions of the plant, and reviewed licensee performance associated with radiation monitoring instrumentation, as described below:

- The inspectors performed walk downs and observations of selected plant radiation monitoring equipment and instrumentation, including portable survey instruments, area radiation monitors, continuous air monitors, personnel

contamination monitors, portal monitors, and small article monitors. The inspectors assessed material condition and operability, evaluated positioning of instruments relative to the radiation sources or areas they were intended to monitor, and verified performance of source checks and calibrations.

- The inspectors evaluated the calibration and testing program, including laboratory instrumentation, whole body counters, post-accident monitoring instrumentation, portal monitors, personnel contamination monitors, small article monitors, portable survey instruments, area radiation monitors, electronic dosimetry, air samplers, and continuous air monitors.
- The inspectors assessed problem identification and resolution for radiation monitoring instrumentation. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constitute completion of the three required samples of radiation monitoring instrumentation, as defined in Inspection Procedure 71124.05.

b. Findings

No findings were identified.

**2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)**

a. Inspection Scope

The inspectors evaluated whether the licensee maintained gaseous and liquid effluent processing systems and properly mitigated, monitored, and evaluated radiological discharges with respect to public exposure. The inspectors verified that abnormal radioactive gaseous or liquid discharges and conditions, when effluent radiation monitors are out-of-service, were controlled in accordance with the applicable regulatory requirements and licensee procedures. The inspectors verified that the licensee's quality control program ensured radioactive effluent sampling and analysis adequately quantified and evaluated discharges of radioactive materials. The inspectors verified the adequacy of public dose projections resulting from radioactive effluent discharges. The inspectors interviewed licensee personnel and reviewed licensee performance in the following areas:

- During walkdowns and observations of selected portions of the radioactive gaseous and liquid effluent equipment, the inspectors evaluated routine processing and discharge of effluents, including sample collection and analysis. The inspectors observed equipment configuration and flow paths of selected gaseous and liquid discharge system components, effluent monitoring systems, filtered ventilation system material condition, and significant changes to effluent release points.
- Calibration and testing program for process and effluent monitors, including National Institute of Standards and Technology (NIST) traceability of sources,

primary and secondary calibration data, channel calibrations, set-point determination bases, and surveillance test results.

- Sampling and analysis controls used to ensure representative sampling and appropriate compensatory sampling. Reviews included results of the inter-laboratory comparison program and effluent releases made with inoperable radiation monitors.
- Instrumentation and equipment, including effluent flow measuring instruments, air cleaning systems, and post-accident effluent monitoring instruments.
- Dose calculations for effluent releases. The inspectors reviewed a selection of radioactive liquid and gaseous waste discharge permits and abnormal gaseous or liquid tank discharges, and verified the projected doses were accurate. The inspectors also reviewed 10 CFR Part 61 analyses and methods used to determine which isotopes were included in the source term. The inspectors reviewed land use census results, offsite dose calculation manual changes, and significant changes in reported dose values from previous years.
- Problem identification and resolution for radioactive gaseous and liquid effluent treatment. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constitute completion of the six required samples of radioactive gaseous and liquid effluent treatment program, as defined in Inspection Procedure 71124.06.

b. Findings

No findings were identified.

**2RS7 Radiological Environmental Monitoring Program (71124.07)**

a. Inspection Scope

The inspectors evaluated whether the licensee's radiological environmental monitoring program quantified the impact of radioactive effluent releases to the environment and sufficiently validated the integrity of the radioactive gaseous and liquid effluent release program. The inspectors also verified that the licensee continued to implement the voluntary NEI/Industry Ground Water Protection Initiative. The inspectors reviewed or observed the following items:

- The inspectors observed selected air sampling and dosimeter monitoring stations, sampler station modifications, and the collection and preparation of environmental samples. The inspectors reviewed calibration and maintenance records for selected air samplers, composite water samplers, and environmental sample radiation measurement instrumentation, and inter-laboratory comparison program results. The inspectors reviewed selected events documented in the annual environmental monitoring report and significant changes made by the licensee to the offsite dose calculation manual as the result of changes to the

land census. The inspectors evaluated the operability, calibration, and maintenance of meteorological instruments and assessed the meteorological dispersion and deposition factors. The inspectors verified the licensee had implemented sampling and monitoring program sufficient to detect leakage from structures, systems, or components with credible mechanism for licensed material to reach ground water, and reviewed changes to the licensee's written program for identifying and controlling contaminated spills/leaks to groundwater.

- Groundwater protection initiative (GPI) implementation, including assessment of groundwater monitoring results, identified leakage or spill events and entries made into 10 CFR 50.75 (g) records, licensee evaluations of the extent of the contamination and the radiological source term, and reports of events associated with spills, leaks, and groundwater monitoring results.
- Problem identification and resolution for the radiological environmental monitoring program. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constitute completion of the three required samples of radiological environmental monitoring program, as defined in Inspection Procedure 71124.07.

b. Findings

No findings were identified.

**2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)**

a. Inspection Scope

The inspectors evaluated the effectiveness of the licensee's programs for processing, handling, storage, and transportation of radioactive material. The inspectors interviewed licensee personnel and reviewed the following items:

- Radioactive material storage, including waste storage areas including container labeling/marketing and monitoring containers for deformation or signs of waste decomposition.
- Radioactive waste system, including walk-downs of the accessible portions of the radioactive waste processing systems and handling equipment. The inspectors also reviewed or observed changes made to the radioactive waste processing systems, methods for dewatering and waste stabilization, waste stream mixing methodology, and waste processing equipment that was not operational or abandoned in place.
- Waste characterization and classification, including radio-chemical sample analysis results for radioactive waste streams and use of scaling factors, calculations to account for difficult-to-measure radionuclides, and processes for

waste classification including use of scaling factors and 10 CFR Part 61 analyses.

- Shipment preparation, including packaging, surveying, labeling, marking, placarding, vehicle checking, driver instructing, and preparation of the disposal manifests.
- Shipping records for LSA I, II, III, SCO I, II, Type A, or Type B radioactive material or radioactive waste shipments.
- Problem identification and resolution for radioactive solid waste processing and radioactive material handling, storage, and transportation. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constitute completion of the six required samples of radioactive solid waste processing, and radioactive material handling, storage, and transportation program, as defined in Inspection Procedure 71124.08.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security**

**40A1 Performance Indicator Verification (71151)**

.1 Unplanned Scrams per 7000 Critical Hours (IE01)

a. Inspection Scope

The inspectors reviewed licensee event reports (LERs) for the period of January 1, 2016 through December 31, 2016, to determine the number of scrams that occurred. The inspectors compared the number of scrams reported in these LERs to the number reported for the performance indicator. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams per 7000 critical hours performance indicator for Units 1, 2, and 3 respectively, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Unplanned Power Changes per 7000 Critical Hours (IE03)

a. Inspection Scope

The inspectors reviewed operating logs, corrective action program records, and monthly operating reports for the period of January 1, 2016 through December 31, 2016, to determine the number of unplanned power changes that occurred. The inspectors compared the number of unplanned power changes documented to the number reported for the performance indicator. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned power outages per 7000 critical hours performance indicator for Units 1, 2, and 3 respectively, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Unplanned Scrams with Complications (IE04)

a. Inspection Scope

The inspectors reviewed the licensee's basis for including or excluding in this performance indicator each scram that occurred between January 1, 2016, and December 31, 2016. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams with complications performance indicator for Units 1, 2, and 3 respectively, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.4 Drill/Exercise Performance (EP01)

a. Inspection Scope

The inspectors reviewed the licensee's evaluated exercises, emergency plan implementations, and selected drill and training evolutions that occurred between January 2016 and December 2016 to verify the accuracy of the licensee's data for classification, notification, and protective action recommendation opportunities. The inspectors reviewed a sample of the licensee's completed classifications, notifications, and protective action recommendations to verify their timeliness and accuracy. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.



These activities constituted verification of the drill/exercise performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.5 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspectors reviewed the licensee's records for participation in drill and training evolutions between January 2016 and December 2016 to verify the accuracy of the licensee's data for drill participation opportunities. The inspectors verified that all members of the licensee's ERO in the identified key positions had been counted in the reported performance indicator data. The inspectors reviewed the licensee's basis for reporting the percentage of ERO members who participated in a drill. The inspectors reviewed drill attendance records and verified a sample of those reported as participating. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

These activities constituted verification of the ERO drill participation performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.6 Alert and Notification System Reliability (EP03)

a. Inspection Scope

The inspectors reviewed the licensee's records of alert and notification system tests conducted between January 2016 and December 2016 to verify the accuracy of the licensee's data for siren system testing opportunities. The inspectors reviewed procedural guidance on assessing alert and notification system opportunities and the results of periodic alert and notification system operability tests. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

These activities constituted verification of the alert and notification system reliability performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

## 40A2 Problem Identification and Resolution (71152)

### .1 Routine Review

#### a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the licensee's condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee's problem identification and resolution activities during the performance of the other inspection activities documented in this report.

#### b. Findings

No findings were identified.

### .2 Annual Follow-up of Selected Issues

#### a. Inspection Scope

The inspectors selected two issues for an in-depth follow-up:

- On January 15, 2017, station blackout generator system reliability

The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to address the conditions.

- On March 16, 2017, maintenance activities deferred for Unit 3 license amendment 200

The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to address the condition.

These activities constituted completion of two annual follow-up samples as defined in Inspection Procedure 71152.

#### b. Findings

No findings were identified.

## 40A5 Other Activities

### .1 Operation of an Independent Spent Fuel Storage Installation (ISFSI) at Operating Plants (60855.1)

#### a. Inspection Scope

A routine ISFSI inspection was conducted of the Palo Verde Nuclear Generating Station (Palo Verde) ISFSI on February 26 - March 2, 2017, by an NRC Region IV Division of Nuclear Materials Safety inspector and two Division of Spent Fuel Management inspectors from NRC Headquarters. The inspectors observed and evaluated select licensee loading, processing, and heavy load procedures associated with the licensee's current dry fuel storage loading campaign. The inspectors performed a review of the dry fuel storage records for the 18 transportable storage canisters (TSCs) loaded at the ISFSI since the last NRC inspection to verify that the licensee had loaded fuel in accordance with the NAC-UMS Universal Storage System Certificate of Compliance (CoC) Technical Specification (TS) approved contents. Documents reviewed included TSC loading plans and records containing fuel assembly specific information, such as fuel assembly serial numbers, decay heat (kW), cooling time (years), average U-235 enrichment (%), burn-up values (MWd/MTU), and other information. The canister contents reviewed during the inspection were found to meet all fuel requirements specified in the CoC.

The inspectors reviewed documentation related to maintenance of the cask handling crane, the annual maintenance of the licensee's special lifting devices, and the calibration records for pressure gauges associated with fuel processing for dry cask storage. The inspectors were provided documents that demonstrated the cask handling crane was inspected on an annual basis in accordance with the requirements of the American Society of Mechanical Engineers (ASME) B30.2 standards prior to the current dry fuel loading campaign. The annual maintenance as required by American National Standards Institute (ANSI) N14.6 for special lifting devices was completed for the following special lifting devices: the SAFLIFT and the canister shield lift rig. The SAFLIFT is a device used at Palo Verde to interface between the cask handling crane main hook and the transfer cask. The SAFLIFT facilitates the transfer of the TSC from the transfer cask into the vertical concrete cask (VCC) where the TSC is stored. Documentation reviewed included work order 4688400 and associated non-destructive examination records associated with the testing. All equipment passed the magnetic particle, liquid penetrant, and dimensional testing.

The Palo Verde ISFSI was located outside of the reactor site protected area and resided within its own protected area, approximately 0.5 miles east of the Unit 2 reactor building. The inspectors assessed the radiological conditions of the Palo Verde ISFSI through the review of the most recent radiological survey and two years of thermoluminescent dosimeter (TLD) monitoring data from around the ISFSI pad. A radiation protection technician accompanied the NRC inspectors during their inspection of the ISFSI pad and VCCs. The pad was properly posted as a radioactive materials area. The NRC inspector carried a Ludlum Model-19 sodium-iodide survey meter (NRC #033906, calibration due July 13, 2017) and recorded confirmatory measurements on the ISFSI pad. The radiological conditions in and around the ISFSI were as expected for 142 currently loaded spent fuel storage casks. The Palo Verde ISFSI had 12 concrete pads, each with a capacity for 28 VCCs. Currently, five pads were fully loaded and a sixth pad

had the two most recently loaded casks. The radiation levels on the pad ranged from background levels (approximately 3  $\mu\text{R}/\text{h}$ ) at the entrance to the outer fence (farthest from the loaded casks) to 1.2 mR/h between the two most recently loaded VCCs. The perimeter areas of the pads with spent measured from 50 – 200  $\mu\text{R}/\text{h}$ . All accessible areas outside of the ISFSI fell below the 10 CFR 20.1502(a)(1) limit for unmonitored individuals of 500 mrem per year. Annual Radiological Environmental Operating Reports (AREORs) for Palo Verde were reviewed for the previous two years, and were produced by the Radiological Environmental Monitoring Program (REMP). Palo Verde's REMP was responsible for measuring direct radiation impacts at 50 TLD monitoring locations at both onsite and offsite locations. The TLD monitoring location with closest proximity to the ISFSI at the site boundary (TLD #17) documented the dose equivalent to any real individual located outside the site controlled area as being well below the 10 CFR 72.104(a)(2) requirement of less than 25 mrem per year above background, due to the influence of the ISFSI.

An on-site review of the Quality Assurance (QA) audit and surveillance reports related to dry cask storage activities at Palo Verde was performed by the NRC inspectors. The QA audit report resulted in three Condition Reports (CRs) for issues determined to be adverse to quality. NRC inspectors reviewed the corrective actions described in the three CRs to ensure that the identified deficiencies were properly categorized based on their safety significance and properly resolved. The deficiencies had been properly categorized and resolved by the licensee. NRC inspectors reviewed vendor surveillance documents related to vendor inspections performed by Palo Verde personnel at NAC Industries facilities located in Norcross, GA and Ogden, UT. Notably, the vendor surveillance records documented several nonconformances related to a TSC being manufactured for use at Palo Verde. The nonconformances were adequately addressed by the vendor through removal and replacement of the nonconforming sections. The other QA surveillance reviewed by the NRC documented routine vendor inspection items. Lastly, NRC inspectors reviewed a list of ISFSI and cask handling crane CRs that were issued since the previous NRC inspection in February 2015. Of the list, 10 CRs were selected for closer review. The CRs reviewed by NRC were related to a variety of problems that arose during routine ISFSI operations. The CRs reviewed by NRC were well documented and properly categorized based on the safety significance of the identified conditions. The corrective actions taken were appropriate for the situations. Based on the types of issues raised, the licensee demonstrated suitable attention to detail and a low threshold for problem identification. No NRC safety concerns were identified related to the audit report, vendor surveillances, or CRs reviewed.

The NRC inspectors reviewed NAC-UMS Universal Storage System daily temperature surveillance records from three randomly selected months to ensure that the NAC CoC TS 3.1.6 cask temperature surveillance requirements were being met for fuel stored on the Palo Verde ISFSI pad. The inspectors found that all the reviewed documentation demonstrated the licensee performed the required temperature surveillances with no abnormalities reported.

The licensee's 10 CFR 72.212 Evaluation Report was reviewed to verify site characteristics were still bounded by the NAC-UMS Universal Storage System's design basis. Palo Verde's 10 CFR 72.212 Evaluation Report at the time of the inspection was Revision 11, dated January 13, 2013. No revisions had been performed to the

10 CFR 72.212 Evaluation Report since the last NRC routine ISFSI inspection. As such, the Palo Verde ISFSI was found to be still bounded by the NAC-UMS design basis.

The licensee's 10 CFR 72.48 screenings and evaluations for ISFSI program changes since the last NRC routine ISFSI inspection were reviewed to determine compliance with regulatory requirements. The 10 CFR 72.48 screens reviewed by NRC were primarily for basic maintenance activities associated with the ISFSI. Palo Verde had performed one 10 CFR 72.48 safety evaluation to reduce the TSC shield lid weld size from 3/8" to 5/16". The evaluation determined that NRC approval would not be required to decrease the TSC shield lid weld size down to 5/16" from 3/8". An evaluation from the vendor, NAC, was used in support of their conclusion.

The NRC inspectors determined that the licensee had not made any modifications to the cask handling crane or SAFLIFT device since the previous NRC inspection. Therefore, there were no 10 CFR 50.59 screens or evaluations associated with the cask handling crane to review. The NRC inspectors determined that all 10 CFR 72.48 screens and evaluation were adequately evaluated by the licensee.

b. Findings

No findings were identified.

.2 Temporary Instruction 2515/192, "Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems."

a. Inspection Scope

The objective of this performance based Temporary Instruction was to verify implementation of interim compensatory measures associated with an open phase condition design vulnerability in electric power system for operating reactors. The inspectors conducted an inspection to determine if the licensee implemented the following interim compensatory measures. These compensatory measures are to remain in place until permanent automatic detection, and protection schemes are installed and declared operable for open phase condition design vulnerability. The inspectors verified the following:

- The licensee identified and discussed with plant staff the lessons-learned from the open phase condition events at the US operating plants including the Byron Station open phase condition and its consequences. This included conducting operator training for promptly diagnosing, recognizing consequences, and responding to an open phase condition.
- The licensee updated plant operating procedures to help operators promptly diagnose and respond to open phase conditions on off-site power sources credited for safe shutdown of the plant.
- The licensee established and implemented periodic walkdown activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits to detect a visible open phase condition.

- The licensee ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained. As part of the maintenance and testing activities, the licensee assessed and managed plant risk in accordance with 10 CFR 50.65(a)(4) requirements.

b. Findings

No findings were identified.

**40A6 Meetings, Including Exit**

Exit Meeting Summary

On December 12, 2016, the inspectors briefed Ms. M. Lacal, Senior Vice President, Regulatory and Oversight, and other members of the licensee's staff, of the results of the licensed operator requalification program inspection. A final telephonic exit was conducted with Ms. Lacal and other members of the licensee's staff on January 19, 2017. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On January 27, 2017, the inspectors presented the radiation safety inspection results to Mr. J. Cadogan, Senior Vice President, Nuclear Operations and Ms. M. Lacal, Senior Vice President, Regulatory and Oversight, along with other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On February 9, 2017, the inspectors discussed the in-office review of the preliminary scenario for the 2017 biennial exercise, submitted January 5, 2017, with Mr. J. Fearn, Manager, Emergency Preparedness, and other members of the licensee staff. The licensee acknowledged the issues presented.

On March 2, 2017, the NRC exited the Palo Verde ISFSI inspection by meeting with Ms. M. Lacal, Senior Vice President, Regulatory and Oversight, and other staff members. The lead inspector presented the inspection results to members of the licensee management and staff. Licensee personnel acknowledged the information presented. The inspector asked the licensee whether any materials examined during the inspection should be considered propriety. No propriety information was identified.

On March 23, 2017, the inspectors presented the results of the on-site inspection of the biennial emergency preparedness exercise conducted March 7, 2017, to Mr. J. Cadogan, Senior Vice President, Nuclear Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On March 23, 2017, the inspectors presented the Temporary Instruction 2515/192 inspection results to Mr. J. Cadogan, Senior Vice President, Nuclear Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. No proprietary information was identified.

On April 12, 2017, the resident inspectors presented the inspection results to Mr. J. Cadogan, Senior Vice President, Nuclear Operations, and other members of the licensee staff. The

licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

J. Cadogan, Senior Vice President, Nuclear Operations  
M. Lecal, Senior Vice President, Regulatory and Oversight  
G. Andrews, Director Regulatory Affairs  
R. Black, Radiation Monitoring Systems Engineer, OCS  
R. Carbonneau, Acting Director, Nuclear Assurance  
R. Davis, Director, Nuclear Security and Emergency Preparedness  
T. Dickenson, Superintendent, Radiation Protection Operations  
P. Donnelley, Senior Technician, Radiation Protection  
D. Elkington, Section Leader, Compliance  
J. Fearn, Manager, Emergency Preparedness  
K. Graham, Director, Plant Engineering  
B. Hansen, Department Leader, ISFSI Engineering  
G. Haught, Senior Technician, Radiation Protection  
D. Heckman, Consultant, Regulatory Affairs  
K. House, Director Design Engineering  
C. Kharri, Plant General Manager for Operations  
M. McGhee, Department Leader, Nuclear Regulatory Affairs  
M. McLaughlin, Plant General Manager, Site Support  
C. Moeller, Director, Technical Support (Acting)  
M. Radspinner, Department Leader, System Engineering  
B. Rash, Vice President, Engineering  
H. Ridenour, Director Maintenance  
R. Routolo, Manager, Radiation Protection (Acting)  
C. Shelton, Supervisor, Chemistry  
C. Tuma, Technician, Radiation Protection  
D. Wheeler, Director Performance Improvement

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened and Closed**

05000529/2017001-01    NCV    Failure to establish station procedure instructions for denial work authorizations (Section 1R13)

#### **Closed**

2515/192                    TI            Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (Section 4OA5)



## LIST OF DOCUMENTS REVIEWED

### Section 1R04: Equipment Alignment

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
40OP-9GT03	Station Blackout Generator 2 Operation	12
40OP-9GT02	Station Blackout Generator 1 Operation	10
40ST-9ZZ37	Inoperable Power Sources Action Statement	1
40OP-9DG02	Emergency Diesel Generator B	74
40OP-9DF01	Diesel Fuel Oil Storage and Transfer (DF)	42
40OP-9PK01	125V DC Class 1E Electrical System	35
40ST-9AF07	Auxiliary Feedwater Pump AFA-P01 Monthly Valve Alignment	6

#### Condition Reports (CRs)

17-00582	17-00546	17-00543	16-18730
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#### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
03-E-PKA-005	Single Line Diagram: 125V DC Class 1E Power System	11
03-E-PKA-007	Single Line Diagram: 125V DC Class 1E Power System	9
01-M-AFP-001	P&I Diagram: Auxiliary Feedwater System	42
01-M-DFP-0001	P&I Diagram Diesel Fuel Oil & Transfer System	13

#### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
STM01C000400	Class 125V DC Power (PK) System	0

### Section 1R05: Fire Protection

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Pre-Fire Strategies Manual	25
	Palo Verde: Updated Final Safety Analysis Report	18C

Condition Reports (CRs)

17-03146            17-03681            17-03394

Fire Component Condition Record (FSCCRs)

4868994            4742330            4868998            4871053

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Palo Verde License Amendment No. 200	January 4, 2017
	Daily Unit 3 EDG "B" Repair OCC Risk and Compliance Manager Checklist	January 4, 2017
13-NS-F001	Fire PRA – Plant Boundary and Definition and Partitioning	0

**Section 1R06: Flood Protection Measures**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
91DP-0EN31-01	Management of Sumps and Manholes Administrative Guideline	4

Calculations

<u>Number</u>	<u>Title</u>	<u>Revision</u>
13-MC-DG-0204	Diesel Generator Building Flooding Analysis	6

Work Orders (WOs)

4700354            4705532            806820

**Section 1R07: Heat Sink Performance**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
73DP-9ZZ21	Heat Exchanger Visual Inspection	6
73DP-0ZZ04	Service Water Reliability Program	10

Condition Reports (CRs)

17-02638            17-02639            17-02641            17-02664

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Palo Verde – Unit 3 02-2017: “A” EDG Lube Oil Cooler Final Results Map	
	Palo Verde – Unit 3 02-2017: “A” EDG Jacket Water Cooler Final Results Map	
	NRC Generic Letter 89-13	July 18, 1989

**Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
40DP-9OP02	Conduct of Shift Operations	69
40EP-9EO01	Standard Post Trip Actions	21
40OP-9SF01	Control Element Drive Mechanism (CEDMCS) Operation	30

Condition Reports (CRs)

17-02222

Work Orders (WOs)

4864219      4167465

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
NLR17S010301	Licensed Operator Continuing Training Simulator Scenario	January 19, 2016

**Section 1R12: Maintenance Effectiveness**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
70DP-0MR01	Maintenance Rule	42
73ST-9ZZ18	Main Steam and Pressurizer Safety Valve Set Pressure Verification	27
82DP-0PP01	Out of Tolerance Program Controls	11

Condition Reports (CRs)

17-01095          16-19318          17-01171

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
EPRI 3002005362	Safety and Relief Valve Testing and Maintenance Guide	August 2015
	Consolidated (a)(1) Documentation and Return to (a)(2) Evaluation	0
1603	Maintenance Rule (a)(1) Issue Tracking Form: EDG 3B Master Rod Failure	0
1623	Maintenance Rule (a)(1) Issue Tracking Form: 2 PSVs removed during 1R19 found to be out of tolerance	0
CRDR 2571275	Engineering Evaluation of Changes to the Reactor Coolant System Maintenance Rule Performance Criteria	September 29, 2004
CRDR 2589790	Significant Root Cause Investigation: Unit 1 Pressurizer Safety Valve High Test Result	0
N001-0607-00031	Drawing: Pressurizer Safety Valve	15
	Palo Verde Maintenance Rule Database	

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
02DP-9RS01	Operational Risk Management	1
40DP-9AP21	Protected Equipment	7
40DP-9OP19	Locked Valve, Breaker, and Component Tracking	133
33ST-9HJ03	Carbon Analysis for the Control Room Essential Nuclear Air Treatment System	12
73ST-9XI11	HPSI A Long Term Cooling Valve – Inservice Testing	1
40OP-9FT01	Feedwater Pump Turbine A	54
40OP-9FT02	Feedwater Pump Turbine B	51
73ST-9SI10	HPSI Pumps Miniflow – Inservice Test	51
73ST-9EC01	Essential Chilled Water Pumps – Inservice Test	27
73ST-9EW01	Essential Cooling Water Pumps – Inservice Test	21

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
40ST-9EC03	Essential Chilled Water and Ventilation systems Inoperable Actions Surveillance	20
40ST-9SI13	LPSI and CS System Alignment Verification	33
40DP-9ZZ17	Control of Doors, Hatches, and Floor Plugs	62
40ST-9NI01	Adjustable Power Signal Calibrations	43
36ST-9SB02	PPS Bistable Trip Units Functional Test	48
40AL-9RK5B	Panel B05B Alarm Responses	22
40DP-9WP01	Operations Processing of Work Orders	32
30DP-9WP02	Maintenance Work Order Process and Control	71
70DP-0RA05	Assessment and Management of Risk When Performing Maintenance in Modes 1 and 2	22
40DP-9RS01	Operations Department Online Nuclear Risk Management Mode 1 and 2	4

Condition Reports (CRs)

16-15134          16-19349          17-01020          17-02022

Work Orders (WOs)

4539585	4744784	4663754	4580133	4713851
4664359	4713126	4713129	4711009	4710012
4710013	4710031	4715172	4741299	4715310
4843335	4843803			

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Scheduler's Evaluation for Palo Verde Unit 1, Week of January 30, 2017 – February 7, 2017	January 19, 2017
	Scheduler's Evaluation for PV Unit 2	February 23, 2017
	Scheduler's Evaluation for PV Unit 3	January 19, 2017
	Scheduler's Evaluation for PV Unit 3	February 23, 2017

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Archived Control Room Operator Logs for Unit 1	January 30 – February 5, 2017
17-00602	Maintenance Rule (a)(1) Issue Tracking Form: Unit 2 DAFAS Unavailability Criteria Exceeded	1
Night Order	Bypassing of DAFAS (Diverse Feed Actuation System)	March 23, 2017

**Section 1R15: Operability Determinations and Functionality Assessments**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
40DP-9OP26	Operations Condition Reporting Process and Operability Determination/Functionality Assessment	43
43TI-3DG02	Emergency Diesel Generator B Operations for Post Maintenance Test	0, 0A, 0B, 0C
40OP-9SG01	Main Steam	76

Condition Reports (CRs)

17-00543	17-02082	15-01227	16-16660	17-01122
17-00987	17-03486	17-03551	15-04028	

Work Orders (WOs)

4846831	4633739	4846945	4839453	4633337
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
16-19864-057	Engineering Evaluation: EDG 3B Catastrophic Engine Failure Retest Plan and Basis following Extensive Maintenance	1
VTD-C628-00051	Vendor Manual: Cooper Energy Services Instruction Manual for KSV Turbocharged Diesel Generating Unit for Nuclear Power Plant Emergency Stand-by Service	15
EDC-2002-00921	Engineering Document Change: Replace Section 15 "Maintenance" (of VTD-C628-00051) with a rewrite in support of the diesel reliability initiative	January 16, 2003

RG 1.9	Regulatory Guide 1.9: Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants	3
PNL-6287	Study Group Review of Nuclear Service Diesel Generator Testing and Aging Mitigation (Technical Evaluation Report Prepared for USNRC/RES by Pacific NW National Labs)	March 1988
IEEE Std 387	IEEE Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations	1972, 1977, 1984
13-MC-HJ-0003	Control Building HVAC System (HJ) Heat Load and Equipment Adequacy Calculation	9
17-07361-002	Engineering Evaluation: U3 EDGB Retest Vibration Analysis	February 10, 2017
16-16660-0o7	Engineering Evaluation: Unit 1 Channel 'A' BOP ESFAS Inadvertent Actuation	
17-01122-003	Engineering Evaluation: Unit 3 Main Steam Isolation Valve 170 Accumulator Precharge Checks gage discrepancy	
16-10883	Level 3 Evaluation for Report 16-10883-002	
15-04028-003	Engineering Evaluation	

**Section 1R18: Plant Modifications**

Work Orders (WOs)

4742509            4750936

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Vibration Monitoring Plan: Unit 1 SI-651 MOV operator	February 3, 2016

**Section 1R19: Post-Maintenance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
43TI-3DG02	Emergency Diesel Generator B Operations for Post Maintenance Test	0C
73ST-9DG08	Class 1E Diesel Generator Load Rejection, 24-Hour Rated Load and Hot Start Test Train B	12
40FT-0FP05	Monthly Diesel Driven Fire Pump Start and Run	24

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
73ST-9SI11	Low Pressure Safety Injection Pumps Miniflow – Inservice Test	35
30DP-0AC02	Station Rework Reduction	3

Condition Reports (CRs)

17-01694	17-01696	17-01578	17-01577	17-01250
17-03535				

Work Orders (WOs)

4858553	4796619	4816820	4725960	5725961
4726782	4738894	4749087	4780702	4726736
4726781	4503568	4724707	4857996	

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Troubleshooting Game Plan: Unit 2 Pressurizer Spray Valve 100F leakby	0

**Section 1R22: Surveillance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Palo Verde License Amendment No 200	January 4, 2017
40OP-9RC03	RCS Leakage Source Determination	6
40ST-9GT02	Station Blackout Generator 1 Monthly Test	5
40ST-9GT05	Station Blackout Generator 2 Quarterly Test	5
40ST-9DG01	Diesel Generator A Test	45
40ST-9RC02	ERFDADS (Preferred) Calculation of RCS Water Inventory	54
73ST-9DG08	Class 1E Diesel Generator Load Rejection, 24 Hour Rated Load and Hot Start Test Train B	12
73ST-9SP01	Essential Spray Pond Pumps – Inservice Test	47A
73ST-9SI10	HPSI Pumps Miniflow – Inservice Test	51



Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
32ST-9SB02	18 Month Surveillance Test for Westinghouse Type DS-416 Reactor Trip Breakers	8
36ST-9SB52	RTSG Shunt and Undervoltage Trip Functional Test	11
73ST-9PC02	Fuel Pool Cooling Pumps – Comprehensive Pump Test	9
51DP-9OM03	Site Scheduling	34

Condition Reports (CRs)

17-00582	17-00546	17-00543	16-19941	17-00705
17-00902	17-01507	17-02397	17-02394	17-01810
17-01507	17-02132	17-02788	17-03005	17-03033
17-01573	17-02173			

Work Orders (WOs)

4656914	4706340
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
17-00902-004	Engineering Evaluation: Justify Changes to the Design Basis Testing Portions Of 73ST-9SP01	January 26, 2017
EDC 2017-00051	Engineering Document Change: Revise Calculation 12-MC-SP-0307 to Support Cooling at a Lower Flow and Temperature	January 26, 2017
13-MC-SP-0307	Calculation: SP/EW System Thermal Performance Design Basis Analysis	9
	NRC Reply to Industry Questions on EGM 12-001	July 6, 2012
	Enforcement Guidance Memorandum 12-001	February 24, 2012
	PVNGS Units 1, 2, and 3 Response to RIS 2015-16	February 26, 2016
	NRC Regulatory Issue Summary 2012-10	August 23, 2012
	Palo Verde Technical Specifications	May 11, 2016
	Model Safety Evaluation for Plant-Specific Adoption of TSTF-545	December 11, 2015

## Section 1EP1: Exercise Evaluation

### Procedures and Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Palo Verde Nuclear Generating Station Emergency Plan	57, 58
EP-0541	Palo Verde NAN Form	December 15, 2016
EP-0542	Follow Up Message Form	September 23, 2016
EP-0900	Emergency Response Organization Position Checklists	15
EP-0901	Classifications	19
EP-0902	Notifications	8
EP-0904	ERO/ERF Activation and Operation	5
090-05073-RB/TBW	2013 March 6 NRC Evaluated Exercise Report	March 19, 2013
40AO-9ZZ21	Acts of Nature	37
40AL-9RK7C	Panel B07C Alarm Responses	13
79IS-9SM01	Analysis of Seismic Event	26
79IS-9ZZ05	PVNGS Severe Accident Management Guidelines	20
240-02798	December 15, 2016 Alert Event Report	January 17, 2017
CRDR 4523117	Adverse Evaluation Report, Unit 1 MSIV 170 Missed Emergency Classification, Event Date: November 6, 2013	0

### Condition Reports (CRs)

15-10482	15-12160	16-00010	16-00087	16-00218	16-00922
16-01091	16-01509	16-01816	16-04928	16-06059	16-06537
16-08448	16-08533	16-14146	16-15502	16-16023	16-16709
16-16710	16-18396	16-18524	16-19932	16-19948	16-20156
17-01420	17-01493	17-01460	17-02189	17-03091	17-03106
17-03135	17-03137	17-03147	17-03149	17-03202	17-03205
17-03207	17-03211	17-03332	17-03573	17-03605	17-03684
17-03721	17-03730				

## Section 1EP4: Emergency Action Level and Emergency Plan Changes (71114.04)

No additional documents were reviewed.

**Section 1EP8: Exercise Evaluation – Scenario Review (71114.08)**

No additional documents were reviewed.

**Section 2RS5: Radiation Monitoring Instrumentation (71124.05)**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
74CH-9XC99	Calibration of the APEX Gamma Spectrometry System	3
74DP-0CH01	Laboratory Analytical Control (LAC)	24
74DP-0CH02	LAC Performance	33
74ST-9SQ20	RU-1 Calibration Test	18
74ST-9SQ21	Radiation Monitoring Calibration Test For Baseline Process Monitor	19
74ST-9SQ22	Train "A" Radiation Monitoring Calibration Test for Baseline Area Monitors	9
74ST-9SQ23	Radiation Monitoring Calibration Test for New Scope Area Monitors	15
75RP-9EQ07	Operation and Calibration of the Condenser R-Meters	8
75RP-9EQ13	Canberra Whole Body Counting System Calibration	5
75RP-9EQ45	Calibration of the Thermo Eberline Model FH 40 GL	2
75RP-9EQ66	Calibration of the Thermo Scientific Model RO-20 Ion Chamber Survey Meter	1
75RP-9ME20	Canberra Apex In-Vivo Whole Body Counting System Calibration	1

Condition Reports

15-05384	16-00010	16-01600	16-02019	16-13848
16-15947	16-01347	16-06135	16-12669	16-07049
17-00708				

### Audits and Self-Assessment

<u>Number</u>	<u>Title</u>	<u>Date</u>
2016-008	Nuclear Assurance Department Audit of Radiation Protection	September 30, 2016

### Radiation Monitoring System Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
4634303	Train "A" Radiation Monitoring Calibration Test for Baseline Area Monitors	July 14, 2016
4678072	RU-1 Calibration Test	October 24, 2016
4678073	Radiation Monitoring Calibration Test for New Scope Area Monitors	October 29, 2016
4705511	Radiation Monitoring Calibration Test For Baseline Process Monitor	January 10, 2017

### Portable Radiation Instrument Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
643	RM-20 Count Rate Meter Data Sheet	November 30, 2016
1117	AMS-4 Calibration Data Sheet	December 7, 2016
1248	FHZ 612 Teleprobe Detector Calibration Data Sheet	September 8, 2016
1406	RO-20 Meter Data Sheet	December 1, 2016
3968	Eberline Model E-520 Calibration Data Sheet	September 2, 2016
4427	PNR-4/NRD-1 Calibration Data Sheet	December 28, 2016
14363	FH 40 GL Internal Detector Calibration Data Sheet	December 2, 2016
5002011	AMP-100 Calibration Data Sheet	December 9, 2016

### Stationary Radiation Instrument Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
12019	iPCM-12 Calibration Cover Sheet	August 25, 2016
1259	PM12 Calibration Cover Sheet	December 13, 2016
2020	CM-11 Calibration Data Sheet	September 2, 2016
6720	Small Article Monitor Calibration Data Sheet	November 9, 2016
FS1	Fast Scan 1 Calibration Verification Data Sheet	February 2, 2016
FS2	FastScan 2 Calibration Verification Data Sheet	January 29, 2016

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Safety Evaluation on Containment Radiation Monitor	July 20, 1995
102-02866	Technical Justification for the Containment High-Range Radiation Monitor Calibration Methodology	March 29, 1994
Q4-2016	System Health Report – Radiation Monitoring System	January 3, 2017

**Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment (71124.06)**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
33ST-9HF01	Surveillance Testing for the Aux/Fuel Building Nuclear Air Treatment System	22
33ST-9HF03	Carbon Analysis for the Aux/Fuel Building Nuclear Air Treatment System	10
74RM-9EF20	Gaseous Radioactive Release Permits And Offsite Dose Assessment	18
74RM-9EF43	Actions for Inoperable Radiation Monitors: Preplanned Alternate Sampling Program	15a
74RM-9EF63	RU-143 Sample Operations	1
74RM-9EF65	RU-145 Sample Operations	0
74ST-9SQ21	Radiation Monitoring Calibration Test for Baseline Process Monitor	18
74ST-9SQ26	Radiation Monitoring Calibration Test for RU-143	15
74ST-9SQ27	Radiation Monitoring Calibration Test for RU-144	15
74ST-9SQ28	Radiation Monitoring Calibration Test for RU-145	15
74ST-9SQ29	Radiation Monitoring Calibration Test for RU-146	13

Condition Reports

15-00783	15-00891	15-01173	15-01507	15-01781
15-01887	15-02312	15-02678	15-02820	15-03003

### Condition Reports

15-03407	15-03557	15-04731	15-04893	15-04935
15-05114	15-05384	15-06551	15-07006	15-07036
15-08740	15-10101	15-11126	15-11296	15-11695
15-11914	15-12458	15-12689	15-12815	15-13040
16-00010	16-01347	16-02762	16-03411	16-03957
16-05122	16-05821	16-06069	16-06149	16-06197
16-06669	16-08358	16-08577	16-09777	16-11114
16-11833	16-11857	16-12164	16-12669	16-12840
16-14648	16-14697	16-15947	16-16445	16-17044
16-17124	16-17676	16-19075	16-20052	

### Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
2016-008	Nuclear Assurance Department Audit of Radiation Protection	September 30, 2016
23968	NUPIC Audit	November 25, 2015

### Effluent Monitor Calibration Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
4331262	Radiation Monitoring Calibration Test for Baseline Process Monitor	April 4, 2014
4445747	Radiation Monitoring Calibration Test for RU-146	March 12, 2015
4494219	Radiation Monitoring Calibration Test for RU-143	October 9, 2015
4521241	Radiation Monitoring Calibration Test for RU-144	September 23, 2015
4548767	Radiation Monitoring Calibration Test for RU-145	December 17, 2015

### Air Cleaning System Surveillance Test Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
4407507	Carbon Analysis for the Aux/Fuel Building Nuclear Air Treatment System	October 2, 2014
4413700	Carbon Analysis for the Aux/Fuel Building Nuclear Air Treatment System	October 9, 2014

Air Cleaning System Surveillance Test Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
4444961	Surveillance Testing for the Aux/Fuel Building Nuclear Air Treatment System	December 17, 2014
4445104	Surveillance Testing for the Aux/Fuel Building Nuclear Air Treatment System	January 20, 2015
4455567	Surveillance Testing for the Aux/Fuel Building Nuclear Air Treatment System	February 5, 2015
4574169	Carbon Analysis for the Aux/Fuel Building Nuclear Air Treatment System	January 19, 2016
4580533	Carbon Analysis for the Aux/Fuel Building Nuclear Air Treatment System	February 5, 2016
4622730	Surveillance Testing for the Aux/Fuel Building Nuclear Air Treatment System	June 21, 2016

Radioactive Effluent Release Permits

<u>Number</u>	<u>Title</u>	<u>Date</u>
Unit 1	Radioactive Effluent Release Permit Summary Report	June 1, 2015 – January 7, 2017
Unit 2	Radioactive Effluent Release Permit Summary Report	June 1, 2015 – January 7, 2017
Unit 3	Radioactive Effluent Release Permit Summary Report	June 1, 2015 – January 7, 2017

Miscellaneous

<u>Title</u>	<u>Revision/Date</u>
2014 Annual Radioactive Effluent Release Report	
2015 Annual Radioactive Effluent Release Report	
Updated Final Safety Analysis Report	16
2 <sup>nd</sup> Quarter 2015 Chemistry Hot Cross Checks	June 30, 2015
4 <sup>th</sup> Quarter 2015 Chemistry Hot Cross Checks	February 29, 2016
2 <sup>nd</sup> Quarter 2016 Chemistry Hot Cross Checks	July 30, 2016

## Section 2RS7: Radiological Environmental Monitoring Program (71124.07)

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
74DP-9CY08	Radiological Monitoring Program	25
PR-0103	Environmental Monitoring	0
91DP-0EN30-01	Environmental Sampling	2
74RM-0EN02	Radiological Environmental Air Sampling	20
74RM-0EN03	Radiological Environmental Sampling	32
74RM-0EN07	Land Use Census	14
74RM-0EN09	Quarterly Radiological Environmental Sample Analysis Verification	12
77ST-9RG03	Meteorological System Calibration (Primary System)	15
77ST-9RG02	Meteorological System Calibration (Redundant System)	12

### Condition Reports

15-00990	15-01374	15-08047	15-08236	15-11875
15-12551	16-00293	16-00743	16-02479	16-02619
16-04949	16-05408	16-05908	16-12485	16-12915
16-15321	16-16919			

### Audits and Self-Assessment

<u>Number</u>	<u>Title</u>	<u>Date</u>
2016-008	Nuclear Assurance Department Audit of Radiation Protection	September 30, 2016

### Calibration and Maintenance Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
77ST-9RG02	Meteorological System Calibration (Redundant System)	May 25, 2106
77ST-9RG02	Meteorological System Calibration (Redundant System)	November 29, 2016



Calibration and Maintenance Records

<u>Number</u>	<u>Title</u>	<u>Date</u>
77ST-9RG03	Meteorological System Calibration (Primary System)	May 26, 2016
77ST-9RG03	Meteorological System Calibration (Primary System)	December 1, 2016

Groundwater Protection and Decommissioning Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Evaluation of PVNGS Groundwater Protection Program	1
13-CS-A026	Engineering Study - Groundwater Protection Risk Assessment – Structures, Systems, Components, and Work Practices	
218-03886	Decommissioning Records Review and 10 CFR50.75(g)(1) Applicability Review for 2014	August 21, 2015
218-03887	1st Quarter 2015 Decommissioning Record	August 2, 2015
218-03888	2nd Quarter 2015 Decommissioning Record	August 2, 2015
218-04093	3rd Quarter 2015 Decommissioning Record	January 5, 2017
218-04094	4th Quarter 2015 Decommissioning Record	January 5, 2017

Miscellaneous

<u>Title</u>	<u>Revision/Date</u>
2015 Annual Radioactive Effluent Release Report	April 24, 2016
Offsite Dose Calculation Manual	0
Offsite Dose Calculation Manual	1
Offsite Dose Calculation Manual	27
Radiological Environmental Operating Report 2015	April 15, 2016

**Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
75RP-9RP15	Control and Storage of Radioactive Material and Radioactive Wastes	29

## Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
76DP-0AP12	Low Level Radioactive Material Storage Facility Overview	3
76DP-0RP01	Radioactive Waste Management Program Overview	7
76DP-0RP02	Radioactive Waste Minimization Program Overview	6
76DP-0RP03	Radwaste Process Control Program	9
76DP-0RW05	Packaging and Classification of Radioactive Waste	6
76DP-0RW10	Handling and Storage of Radioactively Contaminated Chemical Waste and Mixed Waste	3
76RP-0RW03	Waste Stream Sampling and Database Maintenance	2
76RP-0RW08	High Integrity Container Receipt, Handling, Use, and Closure	4
76RP-0RW14	Radioactive Waste Inventory	5

## Condition Reports

16-03588      16-06023      16-11689      16-18579

## Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
23931	NUPIC Audit of Energy Solutions	June 12, 2015
24130	NUPIC Audit of Engineering Solutions	October 6, 2016
24248	NUPIC Audit of NAC International, Inc.	December 1, 2016
2016-008	Nuclear Assurance Department Audit of Radiation Protection	September 30, 2016

## Radioactive Material and Waste Shipments

<u>Number</u>	<u>Title</u>	<u>Date</u>
15-RW-024	Low Specific Activity Shipment to WCS	June 12, 2015
16-RW-028	Low Specific Activity Shipment to WCS	June 22, 2016
16-RW-043	Type A Package to Alaron	December 8, 2016
15-RW-054	RAMQC Shipment to WCS	October 23, 2015

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Waste Characteristic Summary; Unit 2 DAW	November 20, 2015
	Waste Characteristic Summary; Unit 3 Concentrate	May 7, 2016
	Waste Characteristic Summary; Unit 1 Resin	March 30, 2016
218-03947-MDB	Radioactive Waste Inventory	January 8, 2016
218-03983-MDB	Radioactive Waste Inventory	April 9, 2016
218-04018-MDB	Radioactive Waste Inventory	July 6, 2016
218-04036-MDB	Radioactive Waste Inventory	August 11, 2016
NBA11C000112	Lesson Plan; Packaging Radioactive Material	July 28, 2016
NBA19C000109	Lesson Plan; Shipping Radioactive Material	July 31, 2015
NGH-26	Lesson Plan; DOT Hazmat Security	
NGH-27	Lesson Plan; Hazmat Security Site Specifics	

**Section 40A1: Performance Indicator Verification**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
16DP-0EP19	Performance Indicator Emergency Preparedness Cornerstone	18
SES-0-05-K-05	Loss of LOP UV Relay/Failed SG NR Lvl Inst/Loss of PCK-M43/RCP Seal Failure/ESD	November 18, 2015
SES-0-04-M-05	Partial Load Reject/SGTR	December 4, 2015
SES-0-03-T-06	Inadvertent AFAS/ATWS/LOCA	November 30, 2016
SES-0-05-P-08	RCP Seal Failure/Control Channel Failure/ESD	November 14, 2016
EP-0901	Classifications	9

Corrective Action System Entries (Condition Reports, CRs)

2015-10482	2015-12160	2016-01816	2016-06659	2016-14146	2016-18561
2016-18563	2016-18585	2016-19546	2016-19948	2017-01460	2017-03240
2017-03301	2017-03319				

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
NEI 99-02	Regulatory Assessment Performance Indicator Guideline	7

**Section 40A2: Problem Identification and Resolution**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
33ST-9HJ02	Surveillance Testing of the Control Room Nuclear Air Treatment System	12

Condition Reports (CRs)

15-07271	16-01261	16-09465	16-18661	16-19442
16-19094	17-00242	17-02173	17-01250	17-00430
17-01213	17-01573			

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	NRC Regulatory Guide 1.52	March 1978
	U-3 STs & FTs Moved Due to U-3 DG-B Outage	February 17, 2017
	U3 ST/FT's Completed During U3 DG-B Outage Window	February 17, 2017

**Section 40A5: Other Activities**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
78OP-9ZZ02	NAC-UMS Cask Loading Operations	38
72DP-9NF01	Control of SNM Configuration, Inventory, and Reporting	51
GQP-9.0	Training, Qualification, Examination and Certification of NDE, Inspection and Testing Personnel	1
GQP-9.6	Visual Examination of Welds	15
GQP-9.2	High Temperature Liquid Penetrant Examination and Acceptance Standards for Welds, Base Materials, and Cladding	9

Procedures

PI-CNSTR-OP- PV-N-01	Closure Welding of NAC-UMS Transportable Storage Canisters at Palo Verde Nuclear Generating Station	2
40AO-9ZZ21	Acts Of Nature	37
40AL-9RK1A	Panel B01A Alarm Responses	3
40AL-9RK1B	Panel B01B Alarm Responses	3
40AL-9RK1C	Panel B01C Alarm Responses	3
40DP-9OPA9	Outside Area Operator Logs	14

Condition Reports (CRs)

16-19416	16-19503	16-19570	12-00112
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Work Orders (WOs)

4667223	4688400
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Disposition Requests

4269182	4497068	CRAI 4303309
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Palo Verde Action Requests

4657399	4655981	4630198	4661351	4657399
4632574	4627169	4631482	4628444	4637683

10 CFR 72.48/50.59 Screens/Evaluations Reviewed

E-16-001	S-15-001	EDC 2016-00369
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
8 MN-GTAW	PCI Energy Services ASME Section IX Welding Procedure Specification	0
01DP-0AP12	Condition Reporting Process	24
93DP-0L-C07- 01	10 CFR 50.59 and 72.48 Administrative Guideline	3
N/A	VSDS Standard Map Survey Report	February 17, 2017
2016-11	Nuclear Assurance Department Audit Plan and Report Independent Spent Fuel Storage Installation	February 3, 2017

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
SV-NAC1-16-011	Source Verification Plan	0
SV-NAC1-15-03	Source Verification Plan	0
SV-NAC1-15-012	Source Verification Plan	0
N/A	MBA Transfer Package, Attachment A	multiple
N/A	MBA Transfer Package, Attachment B	multiple
N/A	MBA Transfer Package, Attachment C	multiple
N/A	MBA Transfer Package, Attachment D	multiple
N/A	MBA Transfer Package, Attachment E	multiple
RWP 0-1314	Loaded VCC Transport Evolutions and Maintenance Activities at the ISFSI, Tasks 1-3	4
RWP 9-1305	Dry Cask Storage of Spent Fuel Assemblies Tasks 1, 30, 31, 32, 33, 34, 50, 51, and 52	4
NNR12C040900	Non-Licensed Operator Continuing Training	July 10, 2012
NLR12R040101	Licensed Operator Continuing Training	July 5, 2012
	Thermography template notes	
102-06825-DCM/RKR	Response to Request for Additional Information - NRC Bulletin 2012-01, Design Vulnerability in Electric Power System	January 31, 2014
102-06610-JJC/RKR	NRC Bulletin 2012-01, Design Vulnerability in Electric Power System	October 25, 2012

**The following items are requested for the  
Radiation Safety Team Inspection  
at  
Palo Verde Nuclear Generating Station  
January 23-27, 2017  
Inspection Report Number 50-528, 529, & 530/2017001**

Inspection areas are listed in the attachments below.

Please provide the requested information on or before **January 11, 2017**.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.01 should be in a file/folder titled "1- A," applicable organization charts in file/folder "1- B," etc.

If information is placed on *ims.certrec.com*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.

In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

If more than one inspection procedure is to be conducted and the information requests appear to be redundant, there is no need to provide duplicate copies. Enter a note explaining in which file the information can be found.

If you have any questions or comments, please contact **John O'Donnell** at **(817) 200-1441** or **[john.odonnell@nrc.gov](mailto:john.odonnell@nrc.gov)**. Also, **John O'Donnell** will be the Lead Team Inspector.

**PAPERWORK REDUCTION ACT STATEMENT**

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, control number 3150-0011.

**5. Radiation Monitoring Instrumentation (71124.05)**

Date of Last Inspection: October 2015

- A. List of contacts and telephone numbers for the following areas:
1. Effluent monitor calibration
  2. Radiation protection instrument calibration
  3. Installed instrument calibrations
  4. Count room and Laboratory instrument calibrations
- B. Applicable organization charts
- C. Copies of audits, self-assessments, vendor or NUPIC audits for contractor support and LERs, written since date of last inspection, related to:
1. Area radiation monitors, continuous air monitors, criticality monitors, portable survey instruments, electronic dosimeters, teledosimetry, personnel contamination monitors, or whole body counters
  2. Installed radiation monitors
- D. Procedure index for:
1. Calibration, use and operation of continuous air monitors, criticality monitors, portable survey instruments, temporary area radiation monitors, electronic dosimeters, teledosimetry, personnel contamination monitors, and whole body counters
  2. Calibration of installed radiation monitors
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
1. Calibration of portable radiation detection instruments (for portable ion chambers)
  2. Whole body counter calibration
  3. Laboratory instrumentation quality control
- F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, related to the following programs:
1. Area radiation monitors, continuous air monitors, criticality monitors, portable survey instruments, electronic dosimeters, teledosimetry, personnel contamination monitors, whole body counters
  2. Installed radiation monitors
  3. Effluent radiation monitors
  4. Count room radiation instruments



NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.

- G. Offsite dose calculation manual, technical requirements manual, or licensee controlled specifications which lists the effluent monitors and calibration requirements
- H. Current calibration data for the whole body counter’s
- I. Primary to secondary source calibration correlation for effluent monitors
- J. A list of the point of discharge effluent monitors with the two most recent calibration dates and the work order numbers associated with the calibrations
- K. Radiation Monitoring System health report for the previous 12 months

**6. Radioactive Gaseous and Liquid Effluent Treatment (71124.06)**

Date of Last Inspection: June 2015

- A. List of contacts and telephone numbers for the following areas:
  - 1. Radiological effluent control
  - 2. Engineered safety feature air cleaning systems
- B. Applicable organization charts
- C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:
  - 1. Radioactive effluents
  - 2. Engineered Safety Feature Air cleaning systems
- D. Procedure indexes for the following areas
  - 1. Radioactive effluents
  - 2. Engineered Safety Feature Air cleaning systems
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
  - 1. Sampling of radioactive effluents
  - 2. Sample analysis
  - 3. Generating radioactive effluent release permits
  - 4. Laboratory instrumentation quality control

- 5. In-place testing of HEPA filters and charcoal adsorbers
  - 6. New or applicable procedures for effluent programs (e.g., including ground water monitoring programs)
- F. List of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, associated with:
- 1. Radioactive effluents
  - 2. Effluent radiation monitors
  - 3. Engineered Safety Feature Air cleaning systems

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.

- G. 2015 Annual Radioactive Effluent Release Report or the two most recent reports
- H. Current Copy of the Offsite Dose Calculation Manual
- I. Copy of the 2015 and 2016 inter-laboratory comparison results for laboratory quality control performance of effluent sample analysis, or the two most recent results
- J. Effluent sampling schedule for the week of the inspection
- K. New entries into 10 CFR 50.75(g) files since date of last inspection
- L. Operations department (or other responsible dept.) log records for effluent monitors removed from service or out of service
- M. Listing or log of liquid and gaseous release permits since date of last inspection
- N. A list of the technical specification-required air cleaning systems with the two most recent surveillance test dates of in-place filter testing (of HEPA filters and charcoal adsorbers) and laboratory testing (of charcoal efficiency) and the work order numbers associated with the surveillances
- O. System Health Report for radiation monitoring instrumentation. Also, please provide a specific list of all effluent radiation monitors that were considered inoperable for 7 days or more since June 2015. If applicable, please provide the relative Special Report and condition report(s).
- P. A list of all radiation monitors that are considered §50.65/Maintenance Rule equipment
- Q. A list of all significant changes made to the Gaseous and Liquid Effluent Process Monitoring System since the last inspection. If applicable, please provide the corresponding UFSAR section in which this change was documented.
- R. A list of any occurrences in which a non-radioactive system was contaminated by a radioactive system. Please include any relative condition report(s).

**7. Radiological Environmental Monitoring Program (71124.07)**

Date of Last Inspection: June 2015

- A. List of contacts and telephone numbers for the following areas:
1. Radiological environmental monitoring
  2. Meteorological monitoring
- B. Applicable organization charts
- C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:
1. Radiological environmental monitoring program (including contractor environmental laboratory audits, if used to perform environmental program functions)
  2. Environmental TLD processing facility
  3. Meteorological monitoring program
- D. Procedure index for the following areas:
1. Radiological environmental monitoring program
  2. Meteorological monitoring program
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
1. Environmental Program Description
  2. Sampling, collection, and preparation of environmental samples
  3. Sample analysis (if applicable)
  4. Laboratory instrumentation quality control
  5. Procedures associated with the Offsite Dose Calculation Manual
  6. Appropriate QA Audit and program procedures, and/or sections of the station's QA manual (which pertain to the REMP)
- F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, related to the following programs:
1. Radiological environmental monitoring
  2. Meteorological monitoring

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.

- G. Wind Rose data and evaluations used for establishing environmental sampling locations
  - H. Copies of the 2 most recent calibration packages for the meteorological tower instruments
  - I. Copy of the 2015 Annual Radiological Environmental Operating Report and Land Use Census, and current revision of the Offsite Dose Calculation Manual, or the two most recent reports
  - J. Copy of the environmental laboratory's inter-laboratory comparison program results for 2015 and 2016, or the two most recent results, if not included in the annual radiological environmental operating report
  - K. Data from the environmental laboratory documenting the analytical detection sensitivities for the various environmental sample media (i.e., air, water, soil, vegetation, and milk)
  - L. Quality Assurance audits (e.g., NUPIC) for contracted services
  - M. Current NEI Groundwater Initiative Plan and status
  - N. Technical requirements manual or licensee controlled specifications which lists the meteorological instruments calibration requirements
  - O. A list of Regulatory Guides and/or NUREGs that you are currently committed to relative to the Radiological Environmental Monitoring Program. Please include the revision and/or date for the committed item and where this can be located in your current licensing basis/UFSAR.
  - P. If applicable, per NEI 07-07, provide any reports that document any spills/leaks to groundwater since the last inspection
- 8. Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)**  
Date of Last Inspection: June 2015
- A. List of contacts and telephone numbers for the following areas:
    1. Solid Radioactive waste processing
    2. Transportation of radioactive material/waste
  - B. Applicable organization charts (and list of personnel involved in solid radwaste processing, transferring, and transportation of radioactive waste/materials)
  - C. Copies of audits, department self-assessments, and LERs written since date of last January 2015 inspection related to:
    1. Solid radioactive waste management
    2. Radioactive material/waste transportation program

- D. Procedure index for the following areas:
1. Solid radioactive waste management
  2. Radioactive material/waste transportation
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
1. Process control program
  2. Solid and liquid radioactive waste processing
  3. Radioactive material/waste shipping
  4. Methodology used for waste concentration averaging, if applicable
  5. Waste stream sampling and analysis
- F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, January 2015 related to:
1. Solid radioactive waste
  2. Transportation of radioactive material/waste
- NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.
- G. Copies of training lesson plans for 49 CFR Part 172 subpart H, for radwaste processing, packaging, and shipping.
- H. A summary of radioactive material and radioactive waste shipments made from date of last inspection, January 2015 to present
- I. Waste stream sample analyses results and resulting scaling factors for 2015 and 2016, or the two most recent results
- J. Waste classification reports if performed by vendors (such as for irradiated hardware)
- K. A listing of all onsite radwaste storage facilities. Please include a summary *or* listing of the items stored in each facility, including the *total* amount of radioactivity and the *highest* general area dose rate.

Although it is not necessary to compile the following information, the inspector will also review:

- L. Training and qualifications records of personnel responsible for the conduct of radioactive waste processing, package preparation, and shipping