



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

November 5, 2019

Mr. Robert Bement
Executive Vice President Nuclear/
Chief Nuclear Officer
Arizona Public Service Company
P.O. Box 52034, MS 7602
Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3 –
INTEGRATED INSPECTION REPORT 05000528/2019003, 05000529/2019003,
AND 05000530/2019003 AND INDEPENDENT SPENT FUEL STORAGE
INSTALLATION (ISFSI) INSPECTION REPORT 07200044/2019002

Dear Mr. Bement:

On September 30, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Palo Verde Nuclear Generating Station, Units 1, 2, and 3. On October 11, 2019, the NRC inspectors discussed the results of this inspection with Ms. Maria Lacal and other members of your staff. The results of this inspection are documented in the enclosed report.

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

If you contest the violation or significance or severity of the violation documented in this inspection report, 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 Palo Verde.

If you disagree with a 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 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/

John L. Dixon, Jr., Chief
Reactor Projects Branch D
Division of Reactor Projects

Docket Nos. 05000528, 05000529
05000530, and 07200044
License Nos. NPF-41, NPF-51, and
NPF-74

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3 –
 INTEGRATED INSPECTION REPORT 05000528/2019003, 05000529/2019003,
 AND 05000530/2019003 AND INDEPENDENT SPENT FUEL STORAGE
 INSTALLATION (ISFSI) INSPECTION REPORT 07200044/2019002 –
 November 5, 2019

DISTRIBUTION:

SMorris, RA
 MShaffer, DRA
 AVegel, DRP
 TInverso, DRP
 MHay, DNMS
 LHowell, DNMS
 RLantz, DRS
 GMiller, DRS
 JBraisted, DRP
 GWarnick, DNMS
 DCylkowski, RC
 JQuichocho, RIV/OEDO
 VDricks, ORA
 JWeil, OCA
 SLingam, NRR
 AMoreno, RIV/CAO
 BMaier, RSLO
 RAzua, IPAT
 JDixon, DRP
 CPeabody, DRP
 DYou, DRP
 RBywater, DRP
 YDubay, DRP
 BCorrell, IPAT
 PJayroe, IPAT
 MHerrera, DRMA
 R4Enforcement

DOCUMENT NAME: R:_REACTORS_PV\2019\PV 2019003-IR-CAP.docx

ADAMS ACCESSION NUMBER: ML19310G838

<input checked="" type="checkbox"/> SUNSI Review JDixon		<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive		<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	
OFFICE	SRI:DRP/D	RI:DRP/D	RI:DRP/D	EB2	OB
NAME	CPeabody	DYou	RBywater	NTaylor	GWerner
SIG	CAP	DDY	RLB	NHT	GEW
DATE	10/28/19	10/25/19	10/28/19	10/30/19	10/29/2019
OFFICE	RCB	IPAT	RIV/DNMS/RxIB	EB1	RIV/DRP/BC
NAME	MHaire	RAzua	GWarnick	VGaddy	JDixon
SIG	MSH	RVA	GGW	VGG	JLD
DATE	10/29/19	10/30/19	10/30/19	10/30/19	11/5/19

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers: 05000528, 05000529, 05000530, and 07200044

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

Report Numbers: 05000528/2019003, 05000529/2019003, 05000530/2019003, and
07200044/2019002

Enterprise Identifier: I-2019-003-0013 and 1-2019-002-0085

Licensee: Arizona Public Service Company

Facility: Palo Verde Units 1, 2, and 3

Location: Phoenix, AZ 85072-2034

Inspection Dates: July 1, 2019 to September 30, 2019

Inspectors: C. Peabody, Senior Resident Inspector
D. You, Resident Inspector
R. Bywater, Resident Inspector
D. Reinert, PhD, Reactor Inspector
L. Brookhart, Senior ISFSI Inspector
J. Braisted, Senior Project Engineer
B. Correll, Reactor Inspector
J. Nicholson, Senior Health Physicist
J. Dykert, Health Physicist
N. Fields, Health Physicist
W. Smith, Health Physicist
J. Reynoso, Resident Inspector, Diablo Canyon
J. Tapp, Transportation & Storage Safety Inspector

Approved By: John L. Dixon, JR, Chief
Reactor Projects Branch D
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection and an independent spent fuel storage installation inspection at Palo Verde Nuclear Generating Station, Units 1, 2, and 3, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

Failure to Incorporate Design Requirements to Inspect Manholes for the Diesel Generator Fuel Oil Storage Vaults into the Preventive Maintenance Program			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000530/2019003-01 Open/Closed	[P.2] - Evaluation	71111.01
The inspectors reviewed a self-revealed Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to correctly translate the design basis of the facility into procedures. Specifically, the licensee failed to implement a suitable testing program to inspect manholes installed in a plant modification intended to prevent water intrusion into the diesel generator fuel oil storage vaults.			

Additional Tracking Items

None.

PLANT STATUS

Unit 1 operated at or near full power for the inspection period.

Unit 2 entered the inspection period at full power. On August 16, 2019, the switchyard protective circuitry spuriously opened the Unit 2 output breakers causing a reactor trip. Unit 2 restarted on August 19, 2019, and returned to full power for the remainder of the inspection period.

Unit 3 operated at or near full power for the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515, Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Summer Readiness Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated summer readiness of offsite and alternate alternating current (AC) power systems on August 13, 2019.

Impending Severe Weather Sample (IP Section 03.03) (2 Samples)

- (1) The inspectors evaluated continued readiness during a period of heightened seismic activity on July 5, 2019.
- (2) The inspectors evaluated readiness for impending adverse weather conditions for severe dust storm and thunderstorm warnings on September 25, 2019.

External Flooding Sample (IP Section 03.04) (1 Sample)

- (1) The inspectors evaluated readiness to cope with external flooding on September 25, 2019.

71111.04Q - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 2 essential chilled water B on July 18, 2019
- (2) Unit 2 swing battery charger BD on July 24, 2019
- (3) Unit 3 auxiliary feedwater B on September 30, 2019

71111.05Q - Fire Protection

Quarterly Inspection (IP Section 03.01) (4 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Unit 1, 2, and 3 corridor building 120' elevation on July 12, 2019
- (2) Unit 3 main control room on July 19, 2019
- (3) Unit 1 reactor trip switchgear and control element drive mechanism control room on September 10, 2019
- (4) Unit 1 upper cable spreading room on September 11, 2019

71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated Unit 2 operator performance during plant startup following the short notice outage on August 19, 2019.

Licensed Operator Regualification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated a licensed operator continuing training simulator examination scenario and job performance measure examination on September 12, 2019. The inspectors assessed the performance of the operators and the control room simulator.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness Inspection (IP Section 02.01) (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Emergency lighting return to 10 CFR 50.65(a)(2) following closeout of dual-lite charge card replacement on September 26, 2019
- (2) Instrument air maintenance rule functional failure criteria change review on September 26, 2019

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Unit 2 engineered safety features actuation system B power supply replacement on August 5, 2019
- (2) Unit 2 control element drive mechanism control system power switch assembly replacement on August 8 to 9, 2019
- (3) Unit 2 diesel generator A outage concurrent with emergent switchyard maintenance on September 23 to 24, 2019

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 02.02) (4 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Unit 1 essential ventilation system battery room D functionality with leakage through backdraft damper 1MHJBM61 on July 22, 2019
- (2) Unit 3 safety injection tank 1B with erratic narrow range level instrument on August 1, 2019
- (3) Unit 1 recirculation line void analysis on August 29, 2019
- (4) Unit 3 main steam line rad monitor 140 loss of communication on September 12, 2019

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (2 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) DMWO 4623203 Magnastor dry cask storage system – modification of fuel building components on August 13, 2019
- (2) SP-1338 essential spray pond bypass line/margin recovery modification on September 16, 2019

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the following post-maintenance tests:

- (1) 73ST-9CL03, Unit 2 containment airlock door seal leak test after replacement of the containment personnel airlock door seal on July 25, 2019

- (2) 73ST-9XI53, Unit 1 high pressure safety injection header A to reactor coolant loop 2B valve SIA-UV-627 stroke time test following in-service test maintenance on August 27, 2019
- (3) 73ST-9XI53, Unit 1 high pressure safety injection header A to reactor coolant loop 1B valve SIA-UV-647 stroke time test following in-service test maintenance on August 27, 2019
- (4) 36ST-9SE13, Unit 2 excore startup channel system test after replacement of a 5 volt power supply, on September 3, 2019
- (5) 36ST-9SB13, Unit 1 supplementary protection system D test after replacement of the test adjust voltage potentiometer R102 on September 4, 2019
- (6) 73ST-9CH06 and 73ST-9CH02, Unit 1 charging pump test B after 12-month and 24-month preventative maintenance on September 9 to 12, 2019

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated a Unit 2 forced outage due to an electrical grid lockout on August 16 to 19, 2019.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

- (1) Unit 1 recirculation actuation signal A line fill check on August 8, 2019
- (2) Unit 1 supplementary protection system D functional test on September 4, 2019
- (3) Unit 2 boron dilution alarm system functional test on September 5, 2019

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

- (1) Emergency response organization drill on September 24, 2019.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS06: Emergency AC Power Systems (IP Section 02.05) (3 Samples)

- (1) Unit 1 (April 1, 2018 through August 31, 2019)
- (2) Unit 2 (April 1, 2018 through August 31, 2019)
- (3) Unit 3 (April 1, 2018 through August 31, 2019)

MS07: High Pressure Injection Systems (IP Section 02.06) (3 Samples)

- (1) Unit 1 (April 1, 2018 through August 31, 2019)
- (2) Unit 2 (April 1, 2018 through August 31, 2019)
- (3) Unit 3 (April 1, 2018 through August 31, 2019)

MS08: Heat Removal Systems (IP Section 02.07) (3 Samples)

- (1) Unit 1 (April 1, 2018 through August 31, 2019)
- (2) Unit 2 (April 1, 2018 through August 31, 2019)
- (3) Unit 3 (April 1, 2018 through August 31, 2019)

MS09: Residual Heat Removal Systems (IP Section 02.08) (3 Samples)

- (1) Unit 1 (April 1, 2018 through August 31, 2019)
- (2) Unit 2 (April 1, 2018 through August 31, 2019)
- (3) Unit 3 (April 1, 2018 through August 31, 2019)

MS10: Cooling Water Support Systems (IP Section 02.09) (3 Samples)

- (1) Unit 1 (April 1, 2018 through August 31, 2019)
- (2) Unit 2 (April 1, 2018 through August 31, 2019)
- (3) Unit 3 (April 1, 2018 through August 31, 2019)

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) Determination of the extent of condition of discrepancies between times assumed in the probabilistic risk assessment and demonstrated simulator validation times within the time critical operator action program.

71153 – Follow-up of Events and Notices of Enforcement Discretion

Event Follow-up (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated the Unit 2 reactor trip and licensee's response on August 16, 2019.

OTHER ACTIVITIES – OTHER ACTIVITIES

60854 - Preoperational Testing of an ISFSI

Preoperational Testing of an ISFSI (1 Sample)

- (1) An independent spent fuel storage installation (ISFSI) inspection was conducted at Palo Verde Nuclear Generating Station (Palo Verde) on August 13 to 16, 2019, and

September 16 to 19, 2019, by a team of NRC inspectors from Region 1, Region 3, Region 4, and an individual from NRC Headquarters' Division of Spent Fuel Management. The Palo Verde ISFSI is licensed as a general Part 72 licensee. The licensee had been utilizing the NAC Universal Multi-Purpose Canister System (UMS), approved under Certificate of Compliance (CoC) 72-1015, Amendment 5, and NAC UMS Final Safety Analysis Report (FSAR), Revision 11, to load and store spent fuel at their ISFSI. At the time of the on-site inspection, Palo Verde's ISFSI pad contained 152 NAC ventilated concrete casks (VCCs), each containing the steel transportable storage container (TSC) with a capacity for 24 pressurized water reactor (PWR) spent fuel assemblies.

Under the provisions of 10 CFR 72.210 and 10 CFR 72.212, Palo Verde elected to adopt and utilize a different storage system to store spent fuel casks at their ISFSI. The licensee selected the NAC, Magnastor System under CoC 72-1031, Amendment 7, and FSAR Revision 10. The Magnastor TSC has the capacity to store 37 PWR spent fuel assemblies in each VCC.

On September 16 to 19, 2019, the purpose of the inspection was to observe and evaluate the licensee's pre-operational testing and training exercises required to be performed by a general licensee prior to use of the system to load spent fuel assemblies. The NAC Magnastor CoC 72-1031, Appendix A, Technical Specification (TS) 5.8 contained a list of loading, closure, handling, unloading, and transfer operational dry runs that are required to be performed prior to the first loading of a Magnastor cask. Specifically, during the September inspection dates, the NRC inspectors observed Palo Verde perform the following demonstrations to meet TS 5.8:

- TSC unloading operations, which included reflooding the canister in the cask loading pit (CLP), (TS 5.8.n)
- Hydrostatic pressure testing of the TSC in the CLP (TS 5.8.g)
- Moving a VCC into the fuel handling building (FHB) on the rail car (TS 5.8.a)
- Vacuum drying and helium backfilling of the TSC in the CLP (TS 5.8.g)
- Passive Magnastor Transfer Cask (PMTc) movement through the designated load path from the CLP to installation on the VCC with installed Transfer Adapter (TS 5.8.f, 5.8.h, and 5.8.i)
- Transfer of the TSC from the PMTC to the VCC such that the shield doors were closed (TS 5.8.j)
- Transfer of the TSC from the VCC to the PMTC to demonstrate unloading operations (TS 5.8.m)
- PMTC movement through the designated load path into CLP (TS 5.8.b)
- VCC lid assembly installation (TS 5.8.k)
- Transport of the VCC via rail car from the FHB to the VCC transfer pad (TS 5.8.l)
- Transport of the VCC via vertical cask transporter (VCT) from the VCC transfer pad to the ISFSI (TS 5.8.l)

Palo Verde successfully completed the above listed pre-operational activities and fully demonstrated that the procedures, programs, and training related to those dry cask storage operations had been successfully integrated into its site operations. The inspectors did not identify any issues of concern requiring documentation. The licensee previously performed demonstrations to meet parts of TS 5.8.g (welding,

sealing, and non-destructive examination) as documented in a prior NRC inspection report 05000528/2019001, 05000529/2019001, 05000530/2019001, and 07200044/2019001 (ADAMS Accession No. ML19122A295). The licensee still has a number of demonstrations that are required to be completed before utilization of the Magnastor system. Those demonstrations are projected to be performed in late 2019.

60856 - Review of 10 CFR 72.212(b) Evaluations

Review of 10 CFR 72.212(b) Evaluations (1 Sample)

- (1) From August 13 to 16, 2019, the NRC ISFSI inspection team performed a review to evaluate the licensee's program implementation for inclusion of the use of the Magnastor system into the site's existing 10 CFR Part 50 and Part 72 programs. The inspection scope included a review of the licensee's programs for heavy loads, emergency planning, fire protection, quality assurance, radiation protection, and record retention.

Specifically, the inspection team evaluated the following:

- The licensee's structural and seismic calculations for Magnastor storage operations which included: over-head spent fuel building crane with the loaded transfer cask, loaded transfer cask in the spent fuel pool's loading area, loaded transfer cask in the stack-up configuration to support downloading of a canister into the concrete over-pack, and the structural and soil liquefaction calculations for use of the Magnastor system at the ISFSI pad
- Spent fuel selection procedure to verify the spent fuel assemblies met the approved content requirements from the Appendix B Technical Specifications
- Licensee's implementation of Palo Verde's heavy load program to encompass the Magnastor storage system
- Analyses to determine maximum weights placed on the cask handling crane during loading operations and procedures for manual operation of the hoisting system and the bridge and trolley transfer mechanisms in emergent conditions
- Evaluations that verify the new canister hoist system met the single-failure proof criteria as described in NUREG-0554, "Single Failure Proof Cranes for Nuclear Power Plants"
- Load testing documentation for the new canister hoist system for compliance with ASME B30.2 "Overhead and Gantry Cranes"
- Cask handling crane daily, periodic, and annual inspection procedures for compliance with ASME B30.2 criteria
- Design specifications and load testing documentation for all special lifting devices, including the new hoist crane system, canister lift block, and transfer cask lift trunnions for compliance with ANSI N14.6 "Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds or More"
- Licensee's implementation of Magnastor's 10 CFR Part 72 emergency planning requirements into the existing 10 CFR Part 50 Emergency Plan
- Licensee's fire and explosion hazards analysis for the ISFSI and conducted a walk-down of the heavy haul path and ISFSI to ensure all hazards had been identified and evaluated
- Radiological dose calculations to verify annual levels from ISFSI would be less than the limits specified in 10 CFR 72.104

- Licensee's ISFSI maintenance and surveillance procedures to verify compliance with requirements from the FSAR and license Technical Specifications
- Palo Verde's quality assurance program, corrective action program, and implementing procedures for incorporation of ISFSI related activities
- Palo Verde's radiation protection program for implementation of ISFSI activities, which included ALARA planning, neutron dosimetry, radiation work plans, and calibration of radiological instrumentation
- Verified the licensee had established procedures to ensure record retention requirements of 10 CFR 72.212
- Licensee's corrective action program's condition reports of issues identified for resolution since the last NRC ISFSI inspection performed in February 2019

The inspectors did not identify any issues of concern requiring documentation.

60857 - Review of 10 CFR 72.48 Evaluations

Review of 10 CFR 72.48 Evaluations (1 Sample)

- (1) The inspectors reviewed a list of 10 CFR 72.48 screenings performed by the licensee for use of the new Magnastor system. The inspectors evaluated the following:
- Selected licensee 10 CFR 72.48 screenings and associated changes, tests, or experiments
 - The process by which the licensee evaluates 10 CFR 72.48 screenings and evaluations performed by the Certificate of Compliance (CoC) holder

INSPECTION RESULTS

Failure to Incorporate Design Requirements to Inspect Manholes for the Diesel Generator Fuel Oil Storage Vaults into the Preventive Maintenance Program			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000530/2019003-01 Open/Closed	[P.2] - Evaluation	71111.01
The inspectors reviewed a self-revealed Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to correctly translate the design basis of the facility into procedures. Specifically, the licensee failed to implement a suitable testing program to inspect manholes installed in a plant modification intended to prevent water intrusion into the diesel generator fuel oil storage vaults.			
<u>Description:</u> On February 20, 2019, in preparation for quarterly inservice testing of the Unit 3 diesel generator fuel oil transfer pump B, the licensee removed the diesel generator fuel oil storage vault plug to access the vault. Upon removal of the plug, the licensee discovered and removed about 2,000 gallons of water that had accumulated inside to vault to a depth of about 19 inches. Then, when the licensee attempted to perform the diesel generator fuel oil transfer pump test, the pump power supply breaker immediately tripped when operators attempted to start the pump. With an inoperable fuel oil transfer pump, diesel generator B			

was declared inoperable and was documented in Condition Report 19-02640. During the licensee's investigation, water condensation droplets were found on vault surfaces and inside the interior of the non-watertight electrical junction boxes in the vault. Inside one of the junction boxes, the terminal board for the fuel oil transfer pump power supply cables was found corroded and saturated with water. The degraded condition resulted in a short circuit and trip of the power supply breaker.

On February 21, 2019, following a rainfall event, the licensee identified that water was entering the vault through a conduit for the diesel generator fuel oil transfer pump power supply cable. This issue was documented in condition report 19-02727.

After removing the rainwater from the vault, drying electrical components, replacing the degraded terminal board, and successfully testing the fuel oil transfer pump, diesel generator B was declared operable on February 22, 2019.

Another rainfall event occurred on February 22, 2019, and the licensee identified and removed approximately 800 gallons of water from the vault. The licensee also discovered that a nearby manhole was filled with water and when the manhole was dewatered, the leakage into the vault stopped. This issue was documented in condition report 19-02790.

The licensee initiated a Level 1 root cause evaluation for this event and identified that the manhole was installed as part of a modification intended to prevent water intrusion events into the diesel generator fuel oil storage vaults that had resulted in previous fuel oil transfer pump failures (Unit 2 fuel oil transfer pump B in April 2009 and Unit 2 fuel oil transfer pump A in September 2010).

Modification DF-1555 (DMWO 3560653) installed new duct banks with water impervious cables that sloped away from the diesel generator building and the diesel generator fuel oil storage vaults. In between these duct banks, a new manhole was installed to collect water that may have entered the conduits in the duct banks through leaking joints. Water collected in the manhole was designed to be held at an elevation below the cable conduits to prevent it from draining into the diesel generator fuel oil storage vault and impacting the transfer pump. The modification was completed for Unit 3 in June 2017. Following installation of the modification, water was found in the Unit 3 fuel oil storage vault B on three out of four quarterly vault inspections. Condition reports were initiated for each of these occurrences and some assessment was performed to identify the leak path into the vault. However, the possibility that the DF-1555 manhole was the source of the water was not considered until the February 20, 2019, event.

The licensee's investigation concluded that the Unit 3 diesel generator fuel oil storage tank manhole B was more susceptible to water ingress due to its location with respect to rainwater drainage paths from nearby buildings.

The licensee's investigation further identified that the manholes installed by DMWO 3560653 were not entered into the preventive maintenance program for inspection and dewatering of manholes. Licensee staff who would be responsible for this task were not aware of the existence of the manholes.

Corrective Actions: The licensee's corrective actions included issuing a night order requiring several items:

- Weekly inspections of the Unit 3 fuel oil storage vault B for water intrusion

- Daily inspections of the Unit 3 fuel oil storage vault B for water intrusion on days there is rainfall and for two days following rain activity
- Inspect all nine of the modification DF-1555 manholes for all three units during and for two days following rainstorms
- Document any identified water intrusion into the manholes or the Unit 3 fuel oil storage vault B in a condition report

The inspectors have verified implementation of the required inspections on and following days with rainfall.

The licensee replaced the Unit 3 fuel oil transfer pump B motor cable terminal board in the fuel oil storage vault with waterproof spliced cable connections.

The licensee added the manholes to the preventive maintenance program. Preventive Maintenance Basis document 5136008, Electrical Manholes, has been revised to include the manholes in the preventive maintenance program for periodic inspection and for inspections for water intrusion following heavy rainfall.

The licensee is going to raise the elevation of the Unit 3 diesel generator fuel oil storage tank B manhole to prevent surface water intrusion.

Corrective Action References: Condition Reports 19-02688, 19-02640, 19-02727, 19-02790

Performance Assessment:

Performance Deficiency: The failure to provide a suitable testing program to inspect the manholes installed by DMWO 3560653 following rainfall was a performance deficiency. Specifically, Action Item 4310776 was initiated during the modification impact review process to review and update testing program items that inspected hatches onsite for leaks and water accumulator. Action Item 4310779 was closed with no changes made to any existing items or creation of any new actions that would add the manholes to the preventive maintenance program.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to add the manholes to the site preventive maintenance task to inspect them periodically and after rainfall contributed to water intrusion into the Unit 3 diesel generator fuel oil transfer pump B motor cable junction box in the diesel generator fuel oil storage vault, failure of the fuel oil transfer pump during operation, and inoperability of the Unit 3 diesel generator B.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined that the finding had very low safety significance (Green) because the finding: (1) was not a design deficiency; (2) did not represent a loss of system and/or function; (3) did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time; and (4) did not result in the loss of a high safety-significant, nontechnical specification train. Specifically, the Unit 3

diesel generator B was inoperable for an exposure time of less than eight days, which is less than the 10-day outage time for an inoperable diesel generator allowed by Technical Specification 3.8.1, Condition B.

Cross-Cutting Aspect: P.2 - Evaluation: The organization thoroughly evaluates issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. The licensee failed to evaluate the cause and potential consequences of water intrusion identified during three previous inspections of the Unit 3 B diesel generator fuel oil vault after installation of modification DF-1555.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Additionally, design control measures shall provide for verifying or checking the adequacy of design such as by the performance of design reviews.

Contrary to the above, from June 2014 through February 2019, manholes installed by modification DF-1555 were not included in the preventive maintenance program for inspection and removal of accumulated water. The design review process for verifying and checking the adequacy of modification DF-1555 failed to assure this design basis was correctly translated into specifications, drawings, procedures, or instructions.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On October 9, 2019, the inspectors presented the ISFSI inspection results to Ms. Maria Lacal, Senior Vice President Regulatory and Oversight, and other members of the licensee staff.
- On October 11, 2019, the inspectors presented the integrated inspection results to Ms. Maria Lacal and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Corrective Action Documents	Condition Reports	19-13946, 19-13946, 19-13825, 19-13817, 19-13806, 19-13804, 19-13804, 19-11126, 19-11030, 19-09947, 19-05762, 19-04426, 19-02790, 19-02727, 19-02688, 19-02658, 19-02640	
	Miscellaneous		Unit 3 Night Order	03/06/2019
			PVNGS Updated FSAR	19
		2013-00044	Engineering Document Change	08/01/2017
		2590671	Preventive Maintenance Basis Electrical Manholes	
		3EZY09BKKM01	Component Data Sheet	
		4310776	Action Item	06/25/2014
		5136008	Preventive Maintenance Basis Electrical Manholes	
		DMWO 3560653 DF-1555	DFOST Vault Cable Replacement	0
		DMWO 3560653 DF-1555	DFOST Vault Cable Replacement	1
	Procedures	40AO-9ZZ21	Acts of Nature	38
		40DP-9OP34	Switchyard Administrative Control	21
		40DP-9OPA9	Outside Area Operator Logs	18
		40ST-9ZZ37	Inoperable Power Sources Action Statement	3
		73DP-0EE05	Engineering Preventive Maintenance Program	4
		73DP-0EE05	Engineering Preventive Maintenance Program	16
		81DP-0CC26	Impact Process	13
		86DP-0EE01	Reliability Centered Maintenance (RCM) Based System Reviews	10
		87DP-0CC17	Control of Engineering Data in SWMS	19
		91DP-0EN31-01	Management of Sumps and Manholes Administrative Guideline	5
71111.04Q	Corrective Action Documents	Condition Reports	19-10655, 19-10003	
	Drawings	03-M-AFP-001	P & I Diagram Auxiliary-Feedwater System	31
		2-M-ECP-001	P & I Diagram Essential Chilled Water System	31

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Procedures	40OP-9PK01	125 VDC Class 1E Electrical System	36
		40ST-9AF08	Auxiliary Feedwater Pump AFB-P01 Monthly Valve Alignment	6
	Work Orders		4976774	
71111.05Q	Corrective Action Documents	Condition Reports	19-11432, 19-11431, 19-10993	
	Drawings	13-A-ZYD-005	Door Details Sheet 1 of 2	20
		13-A076-10	Missile Resistant Doors Manually Operated	5
		13-A076-11	Missile Resistant Doors Manually Operated	8
		13-A076-3	Missile Resistant Doors Manually Operated	10
		13-A076-7	Missile Resistant Doors Manually Operated	6
	Miscellaneous		PVNGS Pre-Fire Strategies Manual	26
			PVNGS Updated FSAR	19
		13-VTD-R095-002	Ray Proof Instructions for Serial No J-318-D7 Missile Resistant, Double Leaf Swing, Manually Operated Door	2
		13-VTD-R095-003	Ray Proof Instructions for Serial No J-212-D3 Missile Resistant, Double Leaf Swing, Manually Operated Door	4
		13-VTD-R095-008	Ray Proof Instructions for Serial No J-208-D5 Missile Resistant, Single Leaf Swing, Manually Operated Door	4
		13-VTD-R095-009	Ray Proof Instructions for Serial No J-408-D8 Missile Resistant, Double Leaf Swing, Manually Operated Door	4
		DEC-00305	Install Zero International Model #322 UL Listed/Fire-Rated Weatherstripping At Meeting Stiles of Missile Resistant Doors J408, J318, and A-212	0
	Procedures	14DP-0FP33	Control of Transient Combustibles	30
		38FT-9QK19	Fire Detection/Protection System Functional and Supervised Circuits Test – Protectowire Models ACR 1615 and 1618	11
		38FT-9QK27	Fire Detection/Protection System Functional and Supervised Circuits Test – Honeywell One Detector Type Panels	7
		40DP-9ZZ17	Control of Doors, Hatches, and Floor Plugs	63
	Work Orders		3318811	
71111.11Q	Miscellaneous		Licensed Operator Continuing Training Simulator Evaluation Scenario	09/12/2019
			Licensed Operator Continuing Training Job Performance	09/12/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Measure	
	Procedures	40OP-9ZZ04	Plant Startup Mode 2 To Mode 1	77
71111.12	Corrective Action Documents	Condition Reports	19-13610, 19-02987, 17-18024, 16-03279, 15-03256, 16-02999, 16-02703, 16-02550, 16-02475, 16-01661, 15-12126, 15-09594, 15-07003, 15-06072, 15-03216	
	Miscellaneous	Issue 01383	Dual-Lite fixtures- Performance Criteria Unacceptable	5
		Issue 02069	Update Performance Criteria Basis Document for IA	0
	Procedures	32FT-9QD20	Annual Battery Discharge Testing	5
		70DP-0MR01	Maintenance Rule Program	45
	Work Orders		4831868, 4831862, 4831861, 4831859, 4831858, 4831856, 4785820, 4662164, 4659507, 4654142, 4634672, 4633817	
71111.13	Corrective Action Documents	Condition Reports	19-13825, 19-13806, 19-11297, 19-11266, 17-14046	
	Drawings	13-E-MAA-001	Main Single Line Diagram	31
	Miscellaneous		Scheduler's Evaluation of Risk for PV Unit 2	09/22-28/2019
			Palo Verde EGHV Switchyard Status 09/23/19-09/29/19	09/22-28/2019
	Procedures	40AO-9ZZ21	Acts of Nature	38
		40OP-9DG01	Emergency Diesel Generator A	80
		40OP-9SF01	Control Element Drive Mechanism Control System CEDMCS) Operation	30
	Work Orders		5158802, 5152633	
71111.15	Corrective Action Documents	Condition Reports	19-13216, 19-12547, 19-11588, 19-11496, 19-11215, 19-11154, 19-10851, 19-10645, 19-01676	
	Drawings	01-M-HJP-002	Control Building HVAC P&I Diagram	18
		03-M-SIP-002	Safety Injection and Shutdown Cooling System	38
	Miscellaneous		Technical Specifications	118
			Technical Specifications Bases	0
			Updated Final Safety Analysis Report	20
			Control Building HVAC System Design Basis Manual	19
		13-EC-HJ-PK-204	Hydrogen Generation Calculation for Class 1E Station Batteries – GNB Model NCN-33	2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		13-JC-SI-200	Safety Injection Tank Level Narrow Range Setpoint and Uncertainty Calculation	5
		13-MC-HJ-003	Control Building HVAC System (HJ) Heat Load Equipment Adequacy Calculation	10
		13-MC-HJ-264	Analysis of the Isolation Capabilities for the Control Building Isolation Dampers	0
		13-MS-B086	Development of ECCS Suction Side Piping Arc Lengths Associated with Calculated Max Void Volumes	3
		VTD-R411-010	Ruskin Manufacturing Company Operation-Maintenance Instructions and Spare Parts List for Dampers	2
	Procedures	16DP-0EP31	Emergency Preparedness Equipment Out of Service	11
		40ST-9SI04	RAS Line Fill Check	26
		40ST-9ZZM1	Operations Mode 1 Surveillance Logs	73
	Work Orders		5156164	
71111.18	Corrective Action Documents	Condition Reports	19-13273, 19-11483, 19-11472, 19-09926, 19-09299, 19-09298	
	Drawings	01-M-SPP-002	Essential Spray Pond System	22
		02-M-SPP-002	Essential Spray Pond System	18
		02-M-SPP-002	Essential Spray Pond System	19
		03-M-SPP-001	Essential Spray Pond System	66
	Miscellaneous		PVNGS Units 1, 2, & 3 EQ Program Manual	26
		13-MC-HF-901	Fuel Building Transient Analysis	6
		13-MC-HF-901	Fuel Building Transient Analysis	7
		13-MS-A152	Study for the Design Temperature Validation of Components in the Fuel Building	1
		13-NS-B081	At-Power PRA System Study for the Essential Spray Pond System	1
		2011-221	Evaluate changes made to the Spray Pond piping by DCR SP-1338 (DMWO 3304346)	01/11/ 2019
		2016-00852	Engineering Document Change for 13-MC-HF-0901	12/12/2016
		2019-0480	Engineering Document Change for 13-MS-A152	07/24/2019
		SP-1338	Bypass Line/Margin Recovery	0
	Procedures	40AC-0ZZ06	Locked Valve, Breaker, and Component Control	18

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		40DP-9OP19	Locked Valve, Breaker, and Component Tracking	138
		40DP-9OP19	Locked Valve, Breaker, and Component Tracking	139
		40DP-9OP19	Locked Valve, Breaker, and Component Tracking	139B
		40EP-9EO03	Loss of Coolant Accident	44
	Work Orders		4623203	
71111.19	Corrective Action Documents	Condition Reports	18-19377, 19-03362, 19-12322	
	Miscellaneous	73DP-9CL02	Containment Leakage Rate Testing Program	34
	Procedures	36ST-9SB13	Supplementary Protection System Functional Test	19
		36ST-9SE13	Excure Startup Channel and Boron Dilution Alarm System Calibration	37
		73ST-9CH02	Charging Pumps – Comprehensive Test	13
		73ST-9CH06	Charging Pumps – Inservice Test	35
		73ST-9CL03	Containment Airlock Door Seal Leak Test	28
		73ST-9XI53	Train A HPSI Injection and Miscellaneous SI Valves – Cycle – Inservice Test	13
	Work Orders		5077465, 5143298, 5163952, 4998952	
71111.22	Corrective Action Documents	Condition Reports	19-11496, 19-12322	
	Drawings	01-M-SIP-001	Safety Injection and Shutdown Cooling System	58
	Procedures	36ST-9SB13	Supplementary Protection System Functional Test	19
		36ST-9SE05	BDAS Functional Test	26
		40ST-9SI04	RAS Line Fill Check	26
	Work Orders		5163952, 5017203, 5012290	
71114.06	Corrective Action Documents	Condition Reports	19-09256, 19-07906	
	Miscellaneous	EP-0803 F	Protective Action Recommendation Flow Chart	
		EP-0804 E	Release Evaluation Flow Chart	
		EP-801 H	Emergency Action Level Classification Matrix – Hot Conditions	
		EP-802 H	Emergency Action Level Classification Matrix – Cold Conditions	
		EP-930 B	Emergency Action Level Classification Matrix – All Conditions	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71151		13-NS-C075	MSPI Basis Document	9
	Procedures	70DP-0PI01	Performance Index Data Mitigating Systems Cornerstone	8
71152	Corrective Action Documents	Condition Reports	13-00981, 19-00054, 19-04087, 19-05839	
	Miscellaneous	13-NS-B062	At-Power PRA Study for Human Reliability Analysis	14
	Procedures	40DP-9ZZ04	Time Critical Action (TCA) Program	13
71153	Corrective Action Documents	Condition Reports	19-11892	
	Procedures	40EP-9EO01	Standard Post Trip Actions	23
		40EP-9EO02	Reactor Trip	14
		40EP-9EO07	Loss of Offsite Power / Loss of Forced Circ	31
60854	Corrective Action Documents	Condition Reports	19-12550, 19-13535, 19-13452, 19-13436	
	Corrective Action Documents Resulting from Inspection	Condition Reports	19-13446, 19-13513, 19-13542	
	Miscellaneous		PV Unit 3 Archived Operator Log 9/19/2019	09/27/2019
		TRM 3.9.104	Fuel Building Essential Ventilation System (FBEVS)	65
	Procedures	40DP-9ZZ17	Control of Doors, Hatches and Floor Plugs	63
		78OP-9ZZ04	MAGNASTOR Cask Loading Operations	Draft X – 09/13/19
		78OP-9ZZ05	MAGNASTOR Cask Unloading Operations	Draft D – 09/13/19
	Radiation Work Permits (RWPs)	9-1306	Dry Cask Storage of Spent Fuel Assemblies Using Modular Advanced Generation Nuclear All-Purpose Storage (MAGNASTOR)	0
60856	ALARA Plans	RWP#: 1306_00	Dry Cask Storage of Spent Fuel Assemblies Using MAGNASTOR	07/09/2019
	Calculations	US52-00239-02	NUREG-0554 Compliance Matrix for APS Canister Hoist	2
		13-NC-FH-0004	Occupational Dose Rates for NAC-Magnastor Dry Storage Cask Operations	0
		13-NC-ZD-0001	ISFSI Dose Calculation Spreadsheet	5
		13-NC-ZD-0001:	ISFSI Dose Calculation Spreadsheet	05/17/2019,

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		EDC-2019-00076		09/06/2019
		13-NC-ZY-0288	Cloud Inhalation/Immersion Doses for ISFSI	1
		13-NC-ZY-0289	ISFSI Dry Cask MCNP Direct and Skyshine Plant Yard and Offsite Doses	3
		13-NC-ZY-0289: EDC 2019-00076	Doses from a Single Cask within ISFSI	05/17/2019
		13-NC-ZY-0290	Ground Contamination Levels for ISFSI	2
		30032-2001	APS Magnastor Weight & C.G. Calculation	3
		71160-2006	Concrete Cask Structural Evaluation	8
		A0-CC-ZD-0002	ISFSI - Cask Storage Pad Design	2
		RE-03-C21-2019-007	U3C21 Spent Fuel Selection for Dry Casks 153-157 Storage	0 (Draft)
	Calibration Records		Magnastor M&TE Log	
	Corrective Action Documents	Condition Reports	19-01555-008, 19-04069, 19-04510, 19-05088, 19-11163, 19-11452, 19-11714, 19-11826, 19-11827, 19-11831, 19-11842, 19-11869	
	Corrective Action Documents Resulting from Inspection	Condition Reports	19-11776, 19-11776-001, 19-11871, 19-11895, 19-11934, 19-12080, 19-12082, 19-12128, 19-12132, 19-12133, 19-12134, 19-12350, 19-12554, 19-13025	
	Engineering Changes	2017-00745	Alignment Leveling Stand (ALS) Design for NAC-Magnastor Dry Cask Storage System	1
		2019-00076	Fuel Building Laydown Load Evaluation for the Dry Cask Storage Project	A
		DMWO 4623203	Magnastor Cask Implementation	2
	Engineering Evaluations	13-CN383-A00002-2	150 Ton Spent Fuel Pool Cask Handling Crane Safety Analysis	2
		US52-00239-03	APS Canister Hoist N14.6 Compliance Matrix	1
	Fire Plans	14DP-0FP35	Pre-Fire Strategies Manual	26
		A0-MS-B022	Independent Spent Fuel Storage Installation Fire Hazards Analysis	4
		PR-0904	Fire Protection	2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Miscellaneous		PVNGS Emergency Plan	64
		222-01598-MWL	PVNGS Neutron Dosimetry Summary	11/18/1994
		ANPM-00096-MWL-96.65	Neutron Dose Rate Calibration Change	10/05/1986
		Event Reporting Manual	Event Reporting Manual	46
		30DP-0MP13	PVNGS Rigging Control	15
		30DP-0WM07	Controls for Use of Measuring and Test Equipment (M&TE)	14
		30DP-0WM17	Crane Operator Qualifications	6
		30DP-9MP11	Field Use of Rigging	42A
		30DP-9MP12	Overhead Cranes	39
		31MT-9ZC07	Miscellaneous Containment Building Heavy Loads	40
		40AO-9ZZ21	Acts of Nature	38
		72DP-9NF02	Fuel Assembly Selection for Dry Cask Storage	15
		75DC-9SF02	Radiation Protection Requirements for Magnastor Dry Cask Storage and Basis	0a (Draft)
		75RP-9RP16	Special Dosimetry	25
		78DP-0ZD01	Dry Cask Storage Documentation Tracking Requirements	7
		78OP-9FX05	Operation of the Echo-330 Ultrasonic Test Equipment	8
		78OP-9ZZ02	NAC-UMS® Cask Loading Operations	40
		78ST-1ZD01	Daily ISFSI Temperature Monitoring System	11
		81DP-0ZZ01	Civil System, Structure, and Component Monitoring Program	24
		84DP-0RM30	Record Management Control	32
		US52-00239-08	APS 55 Ton Canister Lift Factory Acceptance Test Procedure	2
		US52-00239-22	N14.6 Load Test Procedure Components of Canister Hoist	3
	Work Orders	04822962/0, 04842928/0, 04941025/0, 04857107/0, 04874581/0, 04944111	Calibrate Radiation Monitors per 74ST9SQ22 /74ST9SQ32 for Units 1, 2, and 3	2018/2019
	Work Orders	5006357/0	Perform Ultrasonic Inspections	10/23/2018
60857	Engineering	50.59 and 72.48	50.59 S-19-004, 72.48 S-19-002, NAC-19-MAG-04, NAC-19-	08/13/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Evaluations	Screenings	MAG-05, NAC-19-MAG-13, NAC-19-MAG-14, NAC-19-MAG-15, NAC-19-MAG-16	
	Procedures	87DP-0CC08	Control of Vendor Engineering Documents	28
		93DP-0LC03	Licensing Document Maintenance	28