



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

January 3, 2017

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

**SUBJECT: PALO VERDE NUCLEAR GENERATING STATION – NRC TEAM INSPECTION  
REPORT 05000528/2016009; 05000529/2016009; AND 05000530/2016009**

Dear Mr. Bement:

On November 18, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Palo Verde Nuclear Generating Station, Units 1, 2, and 3. On December 30, 2016, the NRC inspectors discussed the results of this inspection with Mr. George Andrews, Director, Nuclear Regulatory Affairs, and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

The inspection examined activities conducted under your license as they relate to the implementation of mitigation strategies and spent fuel pool instrumentation orders (EA-12-049 and EA-12-051) and Emergency Preparedness Communication, Staffing, and Multi-Unit Dose Assessment Plans, your compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and records, observation of activities, and interviews with station personnel.

The NRC inspectors did not identify any findings or violations of more than minor significance associated with this inspection.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public

R. Bement

- 2 -

Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

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

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

Enclosure:  
Inspection Report 05000528/2016009  
05000529/2016009, 05000530/2016009  
w/ Attachment: Supplemental Information

R. Bement

- 2 -

Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

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

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

Enclosure:  
Inspection Report 05000528/2016009  
05000529/2016009, 05000530/2016009  
w/ Attachment: Supplemental Information

DISTRIBUTION:  
See next page

**ADAMS ACCESSION NUMBER: ML17004A044**

<input checked="" type="checkbox"/> SUNSI Review By: JRG		ADAMS <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive		<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available		Keyword: NRC-002	
OFFICE	SPE:DRP/A	PE:RIII/DRP	PE:DRS/IPAT	RI:DRP/PV	BC:DRP/D				
NAME	RAlexander	BBartlett	EUribe	DReinert	GMiller				
SIGNATURE	<i>/RA/</i>	<i>/RA/</i>	<i>/RA/</i>	<i>/RA/</i>	<i>/RA/</i>				
DATE	12/16/16	12/19/16	12/16 /16	12/16/16	12/30/16				

**OFFICIAL RECORD COPY**

Letter to Robert Bement from Geoffrey Miller dated January 3, 2017

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION – NRC TEAM INSPECTION  
REPORT 05000528/2016009; 05000529/2016009; AND 05000530/2016009

DISTRIBUTION:

Regional Administrator (Kriss.Kennedy@nrc.gov)  
Deputy Regional Administrator (Scott.Morris@nrc.gov)  
DRP Director (Troy.Pruett@nrc.gov)  
DRP Deputy Director (Ryan.Lantz@nrc.gov)  
DRS Director (Anton.Vegel@nrc.gov)  
DRS Deputy Director (Jeff.Clark@nrc.gov)  
Senior Resident Inspector (Charles.Peabody@nrc.gov)  
Resident Inspector (David.You@nrc.gov)  
Resident Inspector (Dustin.Reinert@nrc.gov)  
PV Administrative Assistant (Yvonne.Dubay@nrc.gov)  
Branch Chief, DRP/D (Geoffrey.Miller@nrc.gov)  
Senior Project Engineer, DRP/D (John.Dixon@nrc.gov)  
Project Engineer, DRP/D (Brian.Parks@nrc.gov)  
Project Engineer, DRP/D (Jan.Tice@nrc.gov)  
Public Affairs Officer (Victor.Dricks@nrc.gov)  
Project Manager (Siva.Lingam@nrc.gov)  
Team Leader, DRS/IPAT (Thomas.Hipschman@nrc.gov)  
RITS Coordinator (Marisa.Herrera@nrc.gov)  
ACES (R4Enforcement.Resource@nrc.gov)  
Regional Counsel (Karla.Fuller@nrc.gov)  
Project Engineer, DRS/IPAT (Eduardo.Uribe@nrc.gov)  
Senior Congressional Affairs Officer (Jenny.Weil@nrc.gov)  
RIV Congressional Affairs Officer (Angel.Moreno@nrc.gov)  
RIV/ETA: OEDO (Jeremy.Bowen@nrc.gov)  
RIV RSLO (Bill.Maier@nrc.gov)  
ROPreports

Electronic Distribution for Palo Verde Nuclear Generating Station

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000528, 05000529; 05000530

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

Report: 05000528/2016009; 05000529/2016009; and 05000530/2016009

Licensee: Arizona Public Service Company

Facility: Palo Verde Nuclear Generating Station, Units 1, 2, and 3

Location: 5801 South Wintersburg Road  
Tonopah, AZ 85354

Dates: November 14 - 18, 2016

Inspectors: R. Alexander, Sr. Project Engineer (Team Leader)  
B. Bartlett, Project Engineer, Region III  
D. Reinert, PhD, Resident Inspector  
E. Uribe, Project Engineer

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

## SUMMARY

IR 05000528/2016009, 05000529/2016009, and 05000530/2016009; 11/14/2016 – 11/18/2016; Palo Verde Nuclear Generating Station, Units 1, 2, and 3; Temporary Instruction 2515/191, Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans issued December 23, 2015.

The inspection covered a one week inspection by two inspectors from the Region IV office, one inspector from the Region III office, and one of the assigned resident inspectors. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

A. NRC-Identified and Self-Revealing Findings

None

B. Licensee-Identified Violations

None

## REPORT DETAILS

### 4. Other Activities

#### 4OA5 Other Activities (TI 2515/191)

The objective of Temporary Instruction (TI) 2015/191 "Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans" is to verify that licensees have adequately implemented the mitigation strategies as described in the licensee's Final Integrated Plan (ADAMS Accession No. ML15364A034) and the NRC's plant safety evaluation (ADAMS Accession No. ML16088A261) and to verify that the licensee installed reliable water-level measurement instrumentation in their spent fuel pools. The purpose of this TI is also to verify the licensees have implemented Emergency Preparedness (EP) enhancements as described in their site-specific submittals and NRC safety assessments, including multi-unit dose assessment capability and enhancements to ensure that staffing is sufficient and communications can be maintained during such an event.

The inspection verifies that plans for complying with NRC Orders EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (ADAMS Accession No. ML12229A174) and EA-12-051, Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation (ADAMS Accession No. ML12056A044) are in place and are being implemented by the licensee. Additionally, the inspection verifies implementation of staffing and communications information provided in response to the March 12, 2012 request for information letter and multiunit dose assessment information provided per COMSECY-13-0010, Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned, dated March 27, 2013 (ADAMS Accession No. ML12339A262).

The team discussed the plans and strategies with plant staff, reviewed documentation, and where appropriate, performed plant walk downs to verify that the strategies could be implemented as stated in the licensee's submittals and the NRC staff prepared safety evaluation. For most strategies, this included verification that the strategy was feasible, procedures and/or guidance had been developed, training had been provided to plant staff, and required equipment had been identified and staged. Specific details of the team's inspection activities are described in the following sections.

#### 1. Mitigation Strategies for Beyond-Design-Basis External Events

##### a. Inspection Scope

The team examined the licensee's established guidelines and implementing procedures for the beyond-design-basis mitigation strategies. The team assessed how the licensee coordinated and documented the interface/transition between existing off-normal and Emergency Operating Procedures with the newly developed mitigation strategies. The team selected a number of mitigation strategies and conducted plant walk downs with licensed operators and responsible plant staff to assess: the adequacy and completeness of the procedures; familiarity of operators with the procedure objectives

and specific guidance; staging and compatibility of equipment; and the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios.

The team verified that a preventive maintenance program had been established for the FLEX portable equipment and that periodic equipment inventories were in place and being conducted. Additionally, the team examined the introductory and planned periodic/refresher training provided to the Operations and Fire Protection staffs most likely to be tasked with implementation of the FLEX mitigation strategies. The team also reviewed the introductory and planned periodic training provided to the Emergency Response Organization personnel. Documents reviewed are listed in the attachment.

b. Assessment

Based on samples selected for review, the inspectors verified that the licensee satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittals and the associated safety evaluation and determined that the licensee is generally in compliance with NRC Order EA-12-049. The inspectors verified that the licensee satisfactorily:

- Developed and issued FLEX Support Guidelines (FSG) to implement the FLEX strategies for postulated external events;
- Integrated their FSGs into their existing plant procedures such that entry into and departure from the FSGs are clear when using existing plant procedures;
- Protected FLEX equipment from site-specific hazards;
- Developed and implemented adequate testing and maintenance of FLEX equipment to ensure their availability and capability;
- Trained their staff to assure personnel proficiency in the mitigation of beyond-design-basis events; and
- Developed means to ensure that the necessary off-site FLEX equipment will be available from off-site locations.

The inspectors verified that non-compliances with current licensing requirements, and other issues identified during the inspection were entered into the licensee's corrective action program.

c. Findings

No findings identified.



## 2. Spent Fuel Pool (SFP) Instrumentation

### a. Inspection Scope

The team examined the licensee's newly installed spent fuel pool instrumentation. Specifically, the inspectors verified the sensors were installed as described in the plant specific submittals and the associated safety evaluation and that the cabling for the power supplies and the indications for each channel are physically and electrically separated. Additionally, environmental conditions and accessibility of the instruments were evaluated. Documents reviewed are listed in the attachment.

### b. Assessment

Based on samples selected for review, the inspectors determined that the licensee satisfactorily installed and established control of the SFP instrumentation as described in the plant specific submittals and the associated safety evaluation and determined that the licensee is generally in compliance with NRC Order EA-12-051. The inspectors verified that the licensee satisfactorily:

- Installed the SFP instrumentation sensors, cabling and power supplies to provide physical and electrical separation as described in the plant specific submittal and safety evaluation;
- Installed the SFP instrumentation display in the location, environmental conditions and accessibility as described in the plant specific submittals; and
- Trained their staff to assure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation.

The inspectors verified that non-compliances with current licensing requirements, and other issues identified during the inspection were entered into the licensee's corrective action program.

### c. Findings

No findings identified.

## 3. Staffing and Communication Request for Information

### a. Inspection Scope

Through discussions with plant staff, review of documentation and plant walk downs, the team verified that the licensee has implemented required changes to staffing, communications equipment and facilities to support an Extended Loss of All AC Power (ELAP) scenario as described in the licensee's staffing assessment and the NRC safety assessment. The team also verified that the licensee has implemented dose assessment (including releases from spent fuel pools) capability using the licensee's site-specific dose assessment software and approach as described in the licensee's dose assessment submittal. Documents reviewed are listed in the attachment.

b. Assessment

The inspectors reviewed information provided in the licensee's multi-unit dose submittal and in response to the NRC's March 12, 2012, request for information letter and verified that the licensee satisfactorily implemented enhancements pertaining to Near-Term Task Force Recommendation 9.3 response to a large scale natural emergency event that results in an extended loss of all ac power to the site and impedes access to the site.

The inspectors verified the following:

- Licensee satisfactorily implemented required staffing change(s) to support an ELAP scenario;
- Emergency preparedness communications equipment and facilities are sufficient for dealing with an ELAP scenario; and
- Implemented dose assessment capabilities (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach.

The inspectors verified that non-compliances with current licensing requirements, and other issues identified during the inspection were entered into the licensee's corrective action program.

c. Findings

No findings identified.

40A6 Exit

Exit Meeting Summary

On November 17, 2016, the inspectors presented the on-site inspection results in a management debrief to Mr. B. Rash, Vice President, Nuclear Engineering, and other members of the site staff. The inspectors completed an exit meeting with Mr. G. Andrews, Director, Nuclear Regulatory Affairs, and other members of the site staff, via telephone on December 30, 2016, who acknowledged the final results of the inspection. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

G. Andrews, Director, Nuclear Regulatory Affairs  
J. Barnes, Auxiliary Operator  
J. Chon, Manager, Information Technology  
S. Dornseif, Compliance Consultant, Nuclear Regulatory Affairs  
G. Eimar, Manager, Fukushima Initiatives Project  
D. Elkinton, Acting Section Leader, Nuclear Regulatory Affairs  
J. Fearn, Manager, Emergency Preparedness  
K. Foster, Department Leader, Fire Protection  
C. Holland, Fire Protection Maintenance  
P. Hom, Senior Consultant, Nuclear Regulatory Affairs  
D. Horton, Department Leader, Fire Department  
M. Kura, Senior Reactor Operator, Operations  
A. Martin, Auxiliary Operator  
M. Powell, Director, Fukushima Initiatives Project  
B. Rash, Vice President, Nuclear Engineering  
C. Siefert, Auxiliary Operator  
T. Weber, Department Leader, Nuclear Regulatory Affairs

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

#### **Opened and Closed**

None

## LIST OF DOCUMENTS REVIEWED

### Section 40A5: Other Activities

#### Condition Reports

15-11586	16-00512	16-02176	16-05306	16-05637
16-07956	16-07998	16-08135	16-12146	16-12339
16-12892	16-13233	16-13321	16-13600	16-13722
16-14235	16-14780	16-15379	16-15532	16-15535
16-15642	16-17580	16-17768	16-18558*	16-18587
16-18588	16-18593*	16-18636*	16-18630*	16-18638*
16-18656*	16-18666*	16-18637*	16-18669*	16-18688*
16-18694*	16-18690*	16-18697*	16-18702*	16-18722*

\* - indicates condition report written by the licensee as a result of the NRC inspection

#### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
01-P-PCF-0505	Fuel Building Isometric Spent Fuel Pool Make Up Flex	1
02-J-PCE-055	Instrument Loop Wiring Diagram Beyond Design Basis, Spent Fuel Pool	1

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
14DP-0BD01	PVNGS Portable FLEX Equipment Administrative Deployment Strategy	0
81DP-0CC05	Design and Technical Document Control	48
81DP-0EE10	Design Change Process	40
14DP-0BD02	PVNGS FLEX Equipment Status Control	2
14MT-9BD11	FLEX 800kW Diesel Generator Inspections and Tests	4
14MT-9BD51	FLEX RCS Injection Pump (Modes 1-4) Inspections and Tests	5
14MT-9BD81	FLEX Stored Consumables Items Inspection	3
14MT-9BD99	FLEX Equipment Storage Monthly Walkdown	6
36MT-9FH01	Spent Fuel Pool Instrumentation System Level and Temperature Calibration Check – Primary	1
36MT-9FH02	Spent Fuel Pool Instrumentation System Level and Temperature Calibration Check - Alternate	1

## Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
40EP-9EO01	Standard Post Trip Actions	21
40EP-9EO08	Blackout	23
40ST-9ZZM1	Operations Mode 1 Surveillance Logs	68
73DP-9XI01	Pump and Valve Inservice Testing Program	33
79IS-9ZZ07	PVNGS Extended Loss of All Site AC Guideline Modes 1-4	5
79IS-9ZZ07	PVNGS Extended Loss of All Site AC Guideline Modes 1-4	6
79IS-9ZZ07, Appendix A	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – DC Load Shed	6
79IS-9ZZ07, Appendix C	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Secondary Side Walkdown	6
79IS-9ZZ07, Appendix D	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Control Room Status of Walkdowns	6
79IS-9ZZ07, Appendix F	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Temporary Communications Strategy	6
79IS-9ZZ07, Appendix H	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Open Door List	6
79IS-9ZZ07, Appendix J	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – CST Refill Strategy	6
79IS-9ZZ07, Appendix K	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Diesel Fuel Oil Supply	6
79IS-9ZZ07, Appendix M	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Resetting AFA-P01	6
79IS-9ZZ07, Appendix N	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Local Operation of AFA-P01 Using Main Steam	6
79IS-9ZZ07, Appendix O	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – RCS Inventory Addition	6
79IS-9ZZ07, Appendix P	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – Satellite Phone Use	6
79IS-9ZZ07, Appendix Q	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – FLEX AC Power – 480V, 800kW	6
79IS-9ZZ07, Appendix R	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – FLEX Deployment	6
79IS-9ZZ07, Appendix S	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – FLEX SG Fill	6

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
79IS-9ZZ07, Appendix T	PVNGS Extended Loss of All Site AC Guideline Modes 1-4 – SFP Makeup	6
79IS-9ZZ08	PVNGS Extended Loss of All Site AC Guideline Modes 5, 6, and Defueled	5
79IS-9ZZ08, Appendix L	PVNGS Extended Loss of All Site AC Guideline Modes 5, 6, and Defueled – SFP Makeup	6
13-NS-A116	Engineering Guide to NRC Post Fukushima Requirements	0

### Work Orders

4567169            4674260

### Calculations

<u>Number</u>	<u>Title</u>	<u>Revision</u>
JN350-A00080	Spent Fuel Pool Instrumentation System Channel Accuracy Analysis	0
NM1000-A00008	Spent Fuel Pool Cooling FLEX Pump Discharge Piping Pressure Drop	0
NM1000-A00048	FLEX Project Study Report For The Battery Discharge Capacity During Extended Loss of AC Power (ELAP)	1
NM1000-A00149	Witness Test Results for FLEX SG Injection Pumps	0

### Miscellaneous Documents/Reports

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
	PVNGS Diverse and Flexible Coping Strategies (FLEX) Program Plan	1
16DP-0EP25	Emergency Preparedness Training Program Description	13
Engineering Study 13-MS-B116	Essential Electrical Rooms Temperature after Extended Loss of AC Power (ELAP)	0
LTR 102-06615	Emergency Preparedness Communications Objective 2	November 9, 2012
LTR 102-06664	Response to NRC Tier 1 Near-term Task Force Recommendation 9.3 Communications Technical Issues for Resolution	February 22, 2013

Miscellaneous Documents/Reports

<u>Number</u>	<u>Title</u>	<u>Revision / Date</u>
LTR 102-06885	Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3 Docket Nos. STN 50-528, 50-529, and 50-530 Submittal of Phase 2 Staffing Assessment Report	June 11, 2014
NKASYC017200	Licensed Operator Initial Training Classroom Lesson - In Plant Communications	July 1, 2013
NLR14S050501	Licensed Operator Continuing Training - Licensed Operator Continuing Training	August 19, 2014
NLR16C050101	Licensed Operator Continuing Training - Fukushima and Flex, Modes 5, 6 and Defueled	August 16, 2016
NM1000-A00187	Strategic Alliance for FLEX Emergency Response (SAFER) Plan for Palo Verde Nuclear Generating Station	3
NM1000-A00191	National SAFER Response Center (NSRC) Equipment Technical Requirements	0
NNI02C0184	Non Licensed Operator Initial Training Classroom Lesson - In Plant Communications/Remote Multiplex System	July 2, 2015
4580242-13	Validation Plan for the Manual Operation of ADV ISO FLEX Phase 1	
4580242-21	Validation Plan for the Restoration of the SG Makeup with the FLEX Pump	
VTD-A915-00169	ABB Installation & Maintenance Instructions for Low-Voltage Power Circuit Breakers Type K-225 Thru 2000 & K-600S Thru 2000S	3
VTD-S188-00030	Siemens Instruction Manual for Multiranger 100/200	1