U.S. Department of Homeland Security Region IX 1111 Broadway, Suite 1200 Oakland, CA 94607-4052



FEB 1 0 2017

Mr. Kriss Kennedy Regional Administrator U.S. Nuclear Regulatory Commission Region IV 1600 East Lamar Boulevard Arlington, Texas 76011

Dear Mr. Kennedy:

I am forwarding a copy of the final After Action Report and Improvement Plan for the Medical Services exercise held on November 16, 2016, for the Palo Verde Nuclear Generating Station (PVNGS). The purpose of this exercise was to assess the level of state and local preparedness in responding to a radiological emergency. This final exercise report and improvement plan was prepared in coordination with the PVNGS Offsite Response Organizations.

No Level 1 or Level 2 Findings were identified in this exercise for the Offsite Response Organizations within the state of Arizona. No Plan Issues were identified. No Findings or Plan Issues remain open from previous exercises.

Based on the evaluation of the November 16, 2016 exercise, the offsite radiological emergency response plans for the state of Arizona and the affected local jurisdictions, site-specific to PVNGS, can be implemented; and are adequate to provide reasonable assurance that appropriate measures can be taken off-site to protect the health and safety of the public in the event of a radiological emergency at PVNGS.

Therefore, the Code of Federal Regulations, Title 44 § 350 approval of the offsite radiological emergency response plans and preparedness for the state of Arizona, site-specific to PVNGS, will remain in effect.

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Mr. Kriss Kennedy Page 2

If you have any questions or need additional information, please contact me at (510) 627-7100. Your staff may also contact Paul Anderson, PVNGS Site Specialist, at (510) 627-7093; or Johanna Johnson, Acting Regional Assistance Committee Chair, at (510) 627-7164.

Sincerely,

Annal

Robert J. Fenton

**Regional Administrator** FEMA Region IX

Enclosure

- cc: NRC Headquarters Document Control Desk US Nuclear Regulatory Commission Washington, DC 20555-0001
  - Vanessa Quinn, Chief Radiological Emergency Preparedness Branch **FEMA** Headquarters



# Palo Verde Nuclear Generating Station After Action Report/ Improvement Plan

Exercise Date - November 16, 2016

Radiological Emergency Preparedness Program (REPP)



Publication Date: February 9, 2017

After Action Report/Improvement Plan

Palo Verde Nuclear Generating Station

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## **EXECUTIVE SUMMARY**

The U.S. Department of Homeland Security's (DHS) Federal Emergency Management Agency (FEMA), Region IX, National Preparedness Division, Technological Hazards Branch, evaluated a Medical Services exercise for emergency offsite response organizations (ORO) and the Banner Estrella Medical Center (BEMC) on November 16, 2016. BEMC is situated outside the Palo Verde Nuclear Generating Station (PVNGS) Plume Exposure Pathway Emergency Planning Zone (EPZ). The findings in this report contain the final FEMA evaluation results, with final determinations made by the FEMA Region IX Acting Regional Assistance Committee (RAC) Chair, and approval by the Regional Administrator for FEMA Region IX.

The purpose of the Medical Services exercise, as part of the FEMA Radiological Emergency Preparedness Program (REPP), is to assess the ability of OROs to implement plans and procedures for the protection of the public in the event of a radiological incident at PVNGS. The Medical Services exercise was held in accordance with FEMA's policies and guidance for the implementation of state and local ORO radiological emergency response plans and procedures.

The scenario and Extent of Play (EOP) agreement were reviewed by the acting FEMA RAC Chair and approved for use in this exercise. The evaluation resulted in no Level 1 or Level 2 Findings (previously called deficiencies and areas requiring corrective action, respectively). There were no findings from previous Medical Services exercises which required correction.

In summary: The OROs adequately demonstrated their capability to implement their plans and procedures, and therefore provided confirmation of reasonable assurance that measures can be taken to protect the health and safety of the public in the event of a radiological incident at PVNGS.

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## **SECTION 1: EXERCISE OVERVIEW**

## **1.1 Exercise Details**

**Exercise Name** 

Palo Verde Nuclear Generating Station Medical exercise

**Type of Exercise** 

Medical Services

#### **Exercise Date**

November 16, 2016

Program

U.S. Department of Homeland Security, FEMA REP Program

Scenario Type

Radiological Emergency

## **1.2 Exercise Planning Team Leadership**

U.S. Department of Homeland Security, FEMA, Region IX

Paul Anderson, Site Specialist

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Arizona Radiation Regulatory Agency

Toby Morales, Emergency Response Program Manager

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Maricopa County Sheriff's Office Brad Dunn, Detective B Dunn@mcso.maricopa.gov Maricopa County Sheriff's Office Rob Kalinowski, Detective R Kalinowski@mcso.maricopa.gov City of Buckeye Fire Department Travis Rand, Battalion Chief trand@buckeyeaz.gov Buckeye Valley Fire District Preston Hundley, Battalion Chief Fs324@cox.net **Tonopah Valley Fire District** John Teixeira, Chief jteixeira@tonopahfire.org Arizona Public Service, Palo Verde Nuclear Generating Station David Crozier, Senior Emergency Preparedness Coordinator David.Crozier@aps.com Banner Estrella Medical Center Tiffany Brizendine, Emergency Management Program Manager Tiffany.Brizendine@bannerhealth.com

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## **1.3 Participating Organizations**

Agencies and organizations of the following jurisdictions participated in the PVNGS exercise:

State Jurisdictions

Arizona Radiation Regulatory Agency

Arizona Department of Emergency and Military Affairs

**County Jurisdictions** 

Maricopa County Department of Emergency Management

**Risk Jurisdictions** 

City of Buckeye Fire Department

Buckeye Valley Fire District

Tonopah Valley Fire District

Maricopa County Sheriff's Office

Private Organizations

Banner Estrella Medical Center

Air Evac Services, Inc.

Palo Verde Nuclear Generating Station

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## **SECTION 2: EXERCISE DESIGN SUMMARY**

## 2.1 Exercise Purpose and Design

FEMA Region IX evaluated the PVNGS Medical Services exercise to assess the capabilities of the OROs to implement their radiological emergency response plans and procedures to protect the public health and safety during a simulated emergency at PVNGS on November 16, 2016. The extent of play for this exercise included two scenarios. One scenario included emergency medical response to a PVNGS employee who was injured and contaminated as a result of an industrial accident. The second scenario included emergency medical response to a member of the public who became injured and contaminated while evacuating from the EPZ in response to a declared incident at PVNGS.

Medical Services exercises are conducted to provide the opportunity to evaluate and assess emergency plans, associated implementing procedures, facilities and equipment that would be used in an emergency response. The OROs demonstrated this implementation and FEMA evaluated the effectiveness of their plans and procedures in accordance with the Code of Federal Regulations (CFR), Title 44 § 350 (October 2015) and the FEMA REP Program Manual (January 2016).

## 2.2 Exercise Activities, Criteria and Capabilities

This Medical Services exercise demonstrated the OROs ability to assess and respond to an emergency incident and to coordinate efforts to protect the health and safety of the public.

Activities for this exercise were conducted at multiple locations in accordance with the extent of play. For the onsite scenario, a contaminated injured PVNGS employee was initially treated onsite by the PVNGS Fire Department medical staff then transported by Air Evac air ambulance to the Banner Estrella Medical Center. Emergency Department staff set up a radiation control area and treated the patient. For the offsite scenario, a contaminated, injured evacue called 911

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for medical response. The Maricopa County Sheriff's Office (MCSO) coordinated with Phoenix Fire Dispatch for emergency medical services. The Tonopah Valley Fire District was dispatched as primary response with support from the Buckeye Valley Fire District for medical transport, the City of Buckeye Fire Department for HAZMAT support and the Arizona Radiation Regulatory Agency for radiological support. MCSO provided security at the evacuee's location.

Exercise activities terminated when the evacuee was received at the Banner Estrella Medical Center Emergency Department and the Buckeye Valley Fire District ambulance was verified to be free of contamination for return to service.

### 2.2.1 FEMA REP Exercise Demonstration Criteria

#### Evaluation Area 1 – Emergency Operations Management:

Criterion 1.a.1: OROs use effective procedures to alert, notify, and mobilize emergency personnel and activate facilities in a timely manner. (NUREG-0654/FEMA-REP-1, A.1.a, e; A.3, 4; C.1, 4, 6; D.4; E.1, 2; H.3, 4)

Criterion 1.d.1: At least two communication systems are available, at least one operates properly, and communication links are established and maintained with appropriate locations. Communications capabilities are managed in support of emergency operations. (NUREG-0654/FEMA-REP-1, F.1, 2)

Criterion 1.e.1: Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI) and other supplies are sufficient to support emergency operations. (NUREG-0654/FEMA-REP-1, H.7, 10; I.7, 8, 9; J.10.a, b, e: J.11, 12; K3.a; K.5.b).

### Evaluation Area 3 – Protective Action Implementation:

Criterion 3.a.1: The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans/procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record

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the readings on the appropriate exposure record or chart. OROs maintain appropriate recordkeeping of the administration of KI to emergency workers. (NUREG-0654/FEMA-REP-1, J.10.e; K.3.a, b; K.4).

### Evaluation Area 6 – Support Operations, Facilities:

Criterion 6.d.1: The facility/ORO has the appropriate space, adequate resources and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals. (NUREG-0654/FEMA-REP-1, F.2; H.10; K.5.a, b; L.1, 4).

### 2.2.2 U.S. Department of Homeland Security Core Capabilities

The Offsite Response Organizations demonstrated the core capabilities from the U.S. Department of Homeland Security's National Preparedness Goal, (September 2015) that are associated with the REP demonstration criteria. Core capabilities are organized by five mission areas: Prevention, Protection, Mitigation, Response and Recovery. These five mission areas serve as an aid in organizing our national preparedness activities and enabling integration and coordination across core capabilities. The mission areas are interrelated and require coordination to be effective. The core capabilities of Planning, Public Information and Warning, and Operational Coordination span all mission areas. This Medical Services exercise also demonstrated core capabilities in the specific mission areas of Protection, Mitigation and Response.

### Protection Mission Area:

Protection includes the capabilities to safeguard the homeland against acts of terrorism and manmade or natural disasters. Associated activities include:

• Develop protection plans that identify critical objectives based on planning requirements, provide a complete and integrated picture of the sequence and scope of the tasks to achieve the planning objectives, and implement planning requirements within the time frame contemplated within the plan using available resources for protection-related plans.

• Implement, exercise, and maintain plans to ensure continuity of operations.

Protection Mission Area core capabilities were met by the demonstration of REP Program criterion 1.a.1, 1.e.1, 3.a.1, and 6.d.1.

### Mitigation Mission Area:

Mitigation includes those capabilities necessary to reduce the loss of life and property by lessening the impact of disasters. Associated diverse activities include:

- Build and sustain resilient systems, communities, and critical infrastructure and key
  resources lifelines so as to reduce their vulnerability to natural, technological, and
  human-caused threats and hazards by lessening the likelihood, severity, and duration of
  the adverse consequences.
- Assess risk and disaster resilience so that decision makers and responders can take informed action to reduce their entity's risk and increase their resilience.

Mitigation Mission Area core capabilities were met by the demonstration of REP Program criterion 3.a.1, and 6.d.1.

### Response Mission Area:

Response emphasizes saving and sustaining lives, stabilizing the incident, rapidly meeting basic human needs, establishing a safe and secure environment, and supporting the transition to recovery. Associated activities include:

- Mobilize all critical resources and establish command, control, and coordination structures within the affected community and other coordinating bodies in surrounding communities and across the Nation.
- Enhance and maintain command, control and coordination structures, consistent with the National Incident Management System.

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- Establish physical access through appropriate transportation corridors and deliver required resources to save lives and to meet the needs of disaster survivors.
- Identify, assess, and mitigate worker health and safety hazards and disseminate health and safety guidance and resources to response and recovery workers.
- Deliver medical countermeasures to exposed populations.

Response Mission Area core capabilities were met by the demonstration of REP Program criteria 1.a.1, 1.d.1, 1.e.1, 3.a.1, and 6.d.1.

## 2.3 Scenario Summary

This section contains summaries of the simulated sequence of events that formed the basis for the ORO's emergency response during the Medical Services exercise on November 16, 2016. On September 26, 2016, FEMA approved the scenarios and extent of play as adequate to demonstrate the REP Program evaluation criteria and associated capabilities for treatment of contaminated, injured persons. There were two scenarios in this exercise.

In the first scenario, the PVNGS Fire Department provided initial treatment for a contaminated, injured person at the plant. Due to the extent of the patient's injuries, the PVNGS Fire Department and radiation protection technicians prepared body maps of the contaminated areas, stabilized the patient and prepared the patient for transport by air ambulance to the BEMC. Activities leading up to transport were demonstrated in the onsite PVNGS March 24, 2016, Health Physics and Contaminated Injury Drill.

The Air Evac, air ambulance helicopter medical crew met the PVNGS Fire Department onsite to accept the patient for transportation to the hospital. Air Evac medical staff confirmed the patient's vital signs and contamination levels with the PVNGS Fire Department. Patient transfer included written documentation of the patient's condition and areas that were identified as contaminated. Contaminated areas were wrapped with a plastic material to prevent the spread of contamination. Wrapping protected the Air Evac medics from contamination as they loaded the

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patient in the helicopter for transport to BEMC. Air Evac maintained radio contact with BEMC during air transport. Radio communications included the anticipated arrival time at the BEMC helipad.

When BEMC Security received the call from the Air Evac dispatch regarding the inbound contaminated, injured patient, the Emergency Center Clinical Manager was notified. A Code Magenta staff response procedure was activated. BEMC setup a Radiation Control Area (RCA) to contain radiological material during the process of decontaminating the patient and to control the radiological exposure to emergency workers. The BEMC ER staff assessed the patient's medical condition. ER staff demonstrated patient care and decontamination procedures in the ER RCA prior to admitting the patient to the hospital ward.

The second scenario involved a delivery driver within the 10-mile EPZ during a declared General Emergency. The public was notified to evacuate the area around PVNGS for two miles, and out to four miles in sectors N, P and Q. The delivery driver ignored the sirens and did not listen to evacuation instructions on his radio. On his lunch break, he turned on his radio, heard the evacuation orders and became distressed because of the length of time he had been in the evacuated area. He called 911 and complained of chest discomfort, trouble breathing and lightheadedness.

The Maricopa County Sheriff's Office (MCSO) responded to the 911 call. MCSO contacted Phoenix Fire dispatch for fire department emergency medical system (EMS) support. The Tonopah Valley Fire District (TVFD) responded as the closest fire department to the incident. TVFD requested hazardous materials support from the City of Buckeye Fire Department and the Arizona Radiation Regulatory Agency. TVFD requested ambulance transport for the injured, contaminated evacuee from the Buckeye Valley Fire District (BVFD). The TVFD responders received an emergency worker radiation safety briefing, read from the firetruck computer, while they were in route to the assist the injured evacuee.

The BVFD provided a medically staffed ambulance to transport the patient to BEMC. BVFD

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briefed the BEMC on the patient's condition and provided medical treatment in route. On arrival at the BEMC, the BVFD provided a record of the patient's medical condition and a body map of contaminated areas to hospital ER staff. The second scenario ended when the patient was transferred to BEMC.

#### 2.3.1 Extent of Play Agreement Summary

The Extent of Play Agreement identified the conditions that were used to develop, conduct, control and evaluate the PVNGS 2016 Contaminated Injury Exercise, as agreed to by the PVNGS, AZDEMA, ARRA, MCDEM, MCSO, BVFD, TVFD, City of Buckeye Fire Department, BEMC and FEMA Region IX.

The 2016 Contaminated Injury exercise was designed to establish a learning environment for players to exercise their plans and procedures for responding to a radiologically contaminated, injury. The 2016 Contaminated Injury exercise was conducted on November 16, 2016, beginning Onsite at 0700 MST and Offsite at 0800 MST. Exercise play was scheduled for approximately five hours respectively or until the Exercise Director and Controllers determined that the exercise objectives had been met at each venue. This exercise was evaluated to determine if Offsite Response Organizations, state, local and first responders, could implement their plans and procedures to protect the health and safety of the public in the event of an incident at the PVNGS.

FEMA approved the Extent of Play Agreement on September 26, 2016.

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## 2.3.2 Scenario Timeline

First scenario, injured PVNGS worker.

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07:43	Ambulance called	PVNGS Security called for an Air Evac ambulance to
		transport a contaminated, injured employee. The
		employee was injured in an industrial accident. Onsite
:		response prior to transport was completed in the March
		24, 2016 PVNGS Health Physics and Contaminated
		Injury Drill.
8:13	Offsite Response	The PVNGS Fire Department EMTs completed patient
· · ·		transfer to the Air Evac medical staff including medical
(		condition and identification of contaminated areas.
		Contaminated areas were isolated with plastic wrap to
. A		prevent the spread of contamination. The Air Evac air
		ambulance lifted off for BEMC at 0813.
08:38 -	BEMC RCA	The BEMC Emergency Department RCA was ready to
09:30	· . :	receive the PVNGS patient at 0838. The Emergency
		Department team provided initial medical treatment and
		decontamination. Decontamination was completed by 0930
		and the patient was transferred to surgery. Radiation
	· ·	control technicians monitored the RCA, completed
		contamination cleanup and returned area to service.
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Second scenario, injured evacuee

8:00	Initial Conditions	An incident at PVNGS resulted in a declared General
		Emergency. The sirens were sounded. An evacuation was
		ordered for two miles around PVNGS and out to four miles
		in sectors N, P and Q. Road blocks were set up and an EAS
		message was broadcast on the radio. A delivery driver in
		Tonopah heard the sirens but thought it was just a test.

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## SECTION 3: ANALYSIS OF CAPABILITIES

## **3.1 Exercise Evaluation and Results**

Contained in this section are the results and findings of the evaluation of all jurisdictions and functional entities that participated in the November 16, 2016, Medical Services exercise, demonstrating portions of the off-site emergency response capabilities in the EPZ surrounding the PVNGS.

Each jurisdiction and functional entity was evaluated based on its demonstration of selected criteria as indicated in the Extent of Play Agreement and as outlined in the FEMA REP Program Manual (January 2016).

## **3.2 Summary Results of Exercise Evaluation**

The matrix presented in Table 3.1, on the following page presents the status of all exercise evaluation area criteria which were scheduled for demonstration during this exercise by all participating jurisdictions and functional entities. Exercise evaluation area criteria are listed by number and the demonstration status of those evaluation area criteria is indicated by the use of the following letters:

M – Met (No deficiencies or ARCAs assessed and no unresolved ARCAs from prior exercises) L1 – A Level 1 finding was identified (previously Deficiency)

L2 – A Level 2 finding was identified (Previously Area Requiring Corrective Action)

P - A Plan issue was identified

N – Not Demonstrated

The following are classifications of the types of issues that are discussed in this report:

### Level 1 Finding:

Defined in the FEMA REP Program Manual, (January 2016) as "An observed or identified inadequacy of organizational performance in an exercise that could cause a finding that offsite emergency preparedness is not adequate to provide reasonable assurance that appropriate protective measures can be taken in the event of a radiological emergency to protect the health and safety of the public living in the vicinity of a nuclear power plant."

## Level 2 Finding:

Defined in the FEMA REP Program Manual, (January 2016) as "An observed or identified inadequacy of organizational performance in an exercise that is not considered, by itself, to adversely impact public health and safety."

## Plan Issue:

Defined in the FEMA REP Program Manual, (January 2016) as "An observed or identified inadequacy in the ORO's emergency plan/procedures, rather than in the ORO's performance."

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## Table 3.1 – Summary of Exercise Evaluation

DATE: November 16, 2016 SITE: Palo Verde Nuclear Generating Station, AZ M: Met, L1: Level 1 Finding, L2: Level 2 Finding, P: Plan Issue, N: Not Demonstrated		BEMC	Air Evac	ARRA	BVFD	TVFD
Emergency Operations Management				- 51		
Mobilization	1a1	Μ				
Facilities	1b1				10.10	
Direction and Control	1c1		1.1	1.1	111	
Communications Equipment	1d1	М				
Equip & Supplies to support operations	1e1			М		
Protective Action Decision Making		and a second				Sec. 1
Emergency Worker Exposure Control	2a1			1		
Radiological Assessment and PARs	2b1					
Decisions for the Plume Phase -PADs	2b2	1.5		1		
PADs for protection of special populations	2c1				1	
Rad Assessment and Decision making for the Ingestion Exposure	2d1				•	
Rad Assessment and Decision making concerning Relocation, Reentry, and Return	2e1				•	
Protective Action Implementation	a decision de					
Implementation of emergency worker exposure control	3a1	М	М	M	М	М
Implementation of KI decision	3b1					
Implementation of protective actions for special populations - EOCs	3c1					
Implementation of protective actions for Schools	3c2					
Implementation of traffic and access control	3d1					
Impediments to evacuation are identified and resolved	3d2					
Implementation of ingestion pathway decisions - availability/use of info	3e1					
Materials for Ingestion Pathway PADs are available	3e2					
Implementation of relocation, re-entry, and return decisions.	3f1					
Field Measurement and Analysis		171220	- Stand	2200	No.	
Adequate equipment for plume phase field measurements	4a1					
Field Teams obtain sufficient information	4a2					
Field Teams manage sample collection appropriately	4a3					
Post plume phase field measurements and sampling	4b1					
Laboratory operations	4c1					
Emergency Notification and Public Info					-	
Activation of the prompt alert and notification system	5a1					
Activation of the prompt alert and notification system - Fast Breaker	5a2					
Activation of the prompt alert and notification system - Exception areas	5a3					1
Emergency information and instructions for the public and the media	5b1					
Support Operations/Facilities			N. Cher		Sec. 1	N. Con
Mon / decon of evacuees and EWs, and registration of evacuees	6a1		10		101.0	1 1 1
Mon / decon of emergency worker equipment	6b1	1.71		1. 1.		
Temporary care of evacuees	6c1	1.01		n b		
Transportation and treatment of contaminated injured individuals	6d1	M	M		M	M

## **3.3 Evaluation Summaries**

3.3.1 Arizona Jurisdictions

## 3.3.1.1 Arizona Radiation Regulatory Agency (ARRA)

ARRA demonstrated the Protect, Mitigation and Response mission area core capabilities in support of the EMS response to a radiologically contaminated, injured evacuee as listed below:

- Protect mission area: Screening, Search and Detection.
- Mitigation mission area: Threats and Hazards Identification.
- Response mission area: Environmental Response, Health and Safety.

By interview, the ARRA team would have appropriate personal protective equipment and radiation detection monitoring equipment. ARRA would monitor the vehicle and location for contamination, and determine the appropriate process to render the location safe. Contaminated vehicles and property would be identified and removed to a secure location by law enforcement.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

**REPP** criteria demonstrated:

a. MET: 1.e.1, 3.a.1
b. LEVEL 2 FINDING: None
c. LEVEL 1 FINDING: None
d. PLAN ISSUES: None
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES - RESOLVED: None
g. PRIOR ISSUES - UNRESOLVED: None

### **3.3.2 Risk Jurisdictions**

## **3.3.2.1 Buckeye Valley Fire District (BVFD)**

The BVFD demonstrated Response mission area core capabilities in support of the EMS response to a radiologically contaminated, injured evacuee as listed below:

• Response mission area: Environmental Response, Health and Safety and Operational Coordination.

The BVFD ambulance crew provided a gurney to transport their ambulance to the BEMC hospital. They were briefed on the patient's medical status and areas of contamination by TVFD when they received the patient. The ambulance crew understood contamination control and implemented safe handling procedures. On arrival at the BEMC hospital, the crew briefed the hospital staff on the patient's contamination levels and condition. A survey team at the hospital ensured that their ambulance was not contaminated before it was returned to service.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted below and in the Extent of Play Agreement.

**REPP** criteria demonstrated:

a. MET: 3.a.1, 6.d.1
b. LEVEL 2 FINDING: None
c. LEVEL 1 FINDING: None
d. PLAN ISSUES: None
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES - RESOLVED: None
g. PRIOR ISSUES - UNRESOLVED: None

## 3.3.2.2 Tonopah Valley Fire District (TVFD)

The TVFD demonstrated Mitigation and Response mission area core capabilities in support of the EMS response to a radiologically contaminated, injured evacuee as listed below:

•

- Mitigation mission area: Threats and Hazards Identification.
- Response mission area: Environmental Response, Health and Safety.

Emergency calls for EMS are routed through the Phoenix Fire Dispatch Center. TVFD was dispatched by the Phoenix Fire Regional Dispatch Center to assist the contaminated, injured evacuee. Firefighters providing EMS response received a radiological safety briefing in route and contacted other area fire departments for required support. They exercised appropriate safety procedures to minimize unnecessary radiological exposure or contamination. They donned full turnout gear and self-contained breathing apparatus, surveyed radiation levels as they approached the evacuee and rendered field treatment safely in accordance with accepted medical procedures. After initial treatment and identification of where the evacuee was contaminated, TVFD transferred the evacuee to the ambulance crew for transport to the BEMC hospital. TVFD provided the ambulance crew with a complete medical briefing and body map showing the areas and levels of identified contamination.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

a. MET: 1.a.1, 1.d.1, 3.a.1
b. LEVEL 2 FINDING: None
c. LEVEL 1 FINDING: None
d. PLAN ISSUES: None
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES - RESOLVED: None
g. PRIOR ISSUES - UNRESOLVED: None

### 3.3.3 Private Organizations

## **3.3.3.1 Banner Estrella Medical Center (BEMC)**

The BEMC demonstrated Mitigation and Response mission area core capabilities in support of the EMS response. BEMC coordinated closely with EMS response to the contaminated injured patient from PVNGS and the contaminated evacuee. BEMC demonstrated core capabilities as listed below:

- Mitigation mission area: Threats and Hazards Identification.
- Response mission area: Environmental Response, Health and Safety.
- Overarching core capabilities: Planning, Operational Communications and Operational Coordination.

BEMC effectively provided treatment services for injured, contaminated patients during the PVNGS Medical Services exercise conducted on November 16, 2016. When the BEMC hospital received notification that an injured contaminated PVNGS employee was in route by air ambulance, the hospital announced a Code Magenta response. Emergency Department staff created a Radiation Control Area (RCA) to treat the incoming patient. Use of the RCA protected the surrounding patient treatment areas from contamination. Radiological contamination control was rigorous and methodical while prioritizing medical care. Nuclear Medicine staff verified areas where the patient was contaminated. Swabs from the nose, ears and mouth of the patient were carefully bagged and tagged. The identified contamination was carefully removed using saline solution and catch basins. When patient decontamination was complete, the patient was transferred to surgery. Treatment team personal protective equipment was removed and isolated. The RCA was decontaminated, checked and returned to Emergency Department service.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted below and in the Extent of Play Agreement.

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REPP criteria demonstrated:

a. MET: 1.a.1, 1.d.1, 3.a.1, 6.d.1.

b. LEVEL 2 FINDING: None

c. LEVEL 1 FINDING: None

d. PLAN ISSUES: None

e. NOT DEMONSTRATED: None

f. PRIOR ISSUES - RESOLVED: None

g. PRIOR ISSUES - UNRESOLVED: None

## 3.3.3.2 Air Evac Air Ambulance

The Air Evac ambulance crew transported the injured, contaminated PVNGS employee to the BEMC hospital. This demonstrated Response mission area core capabilities in support of the EMS response as listed below:

• Response mission area: Operational Communication, Environmental Response, Health and Safety.

The air ambulance crew did not perform any independent radiation surveys. Upon arrival at the hospital, the air ambulance crew transferred the patient to the hospital staff with a summary of the patient's medical condition and the body map showing the contaminated areas.

All activities were completed in accordance with plans and procedures as they would have been in an actual emergency, except as noted in the Extent of Play Agreement.

REPP criteria demonstrated:

a. MET: 3.a.1, 6.d.1
b. LEVEL 2 FINDING: None
c. LEVEL 1 FINDING: None
d. PLAN ISSUES: None
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES - RESOLVED: None
g. PRIOR ISSUES - UNRESOLVED: None

## **SECTION 4: CONCLUSION**

FEMA evaluated the PVNGS Medical Services exercise on November 16, 2016. The purpose of the exercise was to assess the level of state and local preparedness in response to a simulated radiological incident at the commercial nuclear power plant. This exercise was held in accordance with FEMA's policies and guidance concerning the exercise of state and local plans and procedures.

The findings presented in this report are based on the evaluations of the federal evaluation team, with final determinations made by the FEMA Region IX RAC Chair and approved by the Regional Administrator.

There were no Level 1 and Level 2 findings identified in this exercise. No findings remain uncorrected from previous exercises. No plan issues were identified during this exercise. There are no open plan issues from previous exercises.

Based on the evaluation of the November 16, 2016, Medical Services exercise, the offsite radiological emergency plans and procedures, site specific to PVNGS, can be implemented, and are adequate to provide continued reasonable assurance that appropriate measures can be taken offsite to protect the health and safety of the public in the event of a radiological incident at PVNGS.

Therefore, the Title 44 CFR § 350 approval of the offsite radiological emergency response plans and procedures for the state of Arizona, site specific to PVNGS, will remain in effect.

After Action Report/Improvement Plan

Palo Verde Nuclear Generating Station

## **APPENDIX A: IMPROVEMENT PLAN**

**None Required** 

## APPENDIX B: EXERCISE EVALUATORS AND TEAM LEADERS

DATE: November 16, 2016, SITE: Palo Verde Nuclear Generating Station

LOCATION	EVALUATOR	AGENCY
Arizona Radiation Regulatory Agency	Paul Anderson	FEMA R9
Air Evac Air Ambulance	Thomas Essig	ICFI
Buckeye Valley Fire District	Carol Shepard	ICFI
Tonopah Valley Fire District	Carol Shepard	ICFI
Banner Estrella Medical Center	*Roy Smith Daryl Thome	ICFI ICFI
* Team Leader		

Radiological Emergency Preparedness Program (REPP)

## **APPENDIX C: ACRONYMS AND ABBREVIATIONS**

AZDEMA	Arizona Department of Emergency and Military Affairs
ARRA	Arizona Radiation Regulatory Agency
BEMC	Banner Estrella Medical Center
BVFD	Buckeye Valley Fire Department
CFR	Code of Federal Regulations
EMS	Emergency Medical System
EPZ	Emergency Planning Zone
FEMA	Federal Emergency Management Agency
HAZMAT	Hazardous Materials
ICFI	ICF International, a contractor to FEMA REPP
KI	Potassium Iodide
MCDEM	Maricopa County Department of Emergency Management
MCSO	Maricopa County Sheriff's Office
MST	Mountain Standard Time
NMT	Nuclear Medicine Technician
NRC	Nuclear Regulatory Commission
NUREG	US Nuclear Regulatory Commission Regulation
ORO	Offsite Response Organization
PVNGS	Palo Verde Nuclear Generating Station
RCA	Radiation Control Area
REP	Radiological Emergency Preparedness
REPP	Radiological Emergency Preparedness Program
TVFD	Tonopah Valley Fire District

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