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FEMA

JAN 29 2013

Mr. Elmo Collins, Jr.
Regional Administrator
U.S. Nuclear Regulatory Commission, Region IV
1600 East Lamar Boulevard
Arlington, Texas 76011-8064

Dear Mr. Collins:

Enclosed with this letter is a copy of the final After Action Report for the Medical Exercise, held on November 15, 2012, 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 was prepared by the U.S. Department of Homeland Security's Federal Emergency Management Agency, Region IX, Radiological Emergency Preparedness Program staff.

No deficiencies were identified during this exercise for the state of Arizona and the affected local jurisdictions. No Areas Requiring Corrective Action (ARCA) were identified as a result of the exercise. Two ARCAs from previous exercises were successfully demonstrated and closed.

Based on the evaluation of the November 15, 2012 Medical 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 offsite to protect the health and safety of the public, in the event of a radiological emergency at PVNGS.

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

I would also like to take this opportunity to acknowledge the many individuals who participated in this successful exercise. Their dedication to this program was clearly evident.

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If you have questions or need additional information, please contact me at (510) 627-7100. Your staff may also contact Mr. Paul Anderson, PVNGS Site-Specialist, at (510) 627-7093, or Mr. Richard Grundstrom, Regional Assistance Committee Chairperson, at (510) 627-7240.

Sincerely,

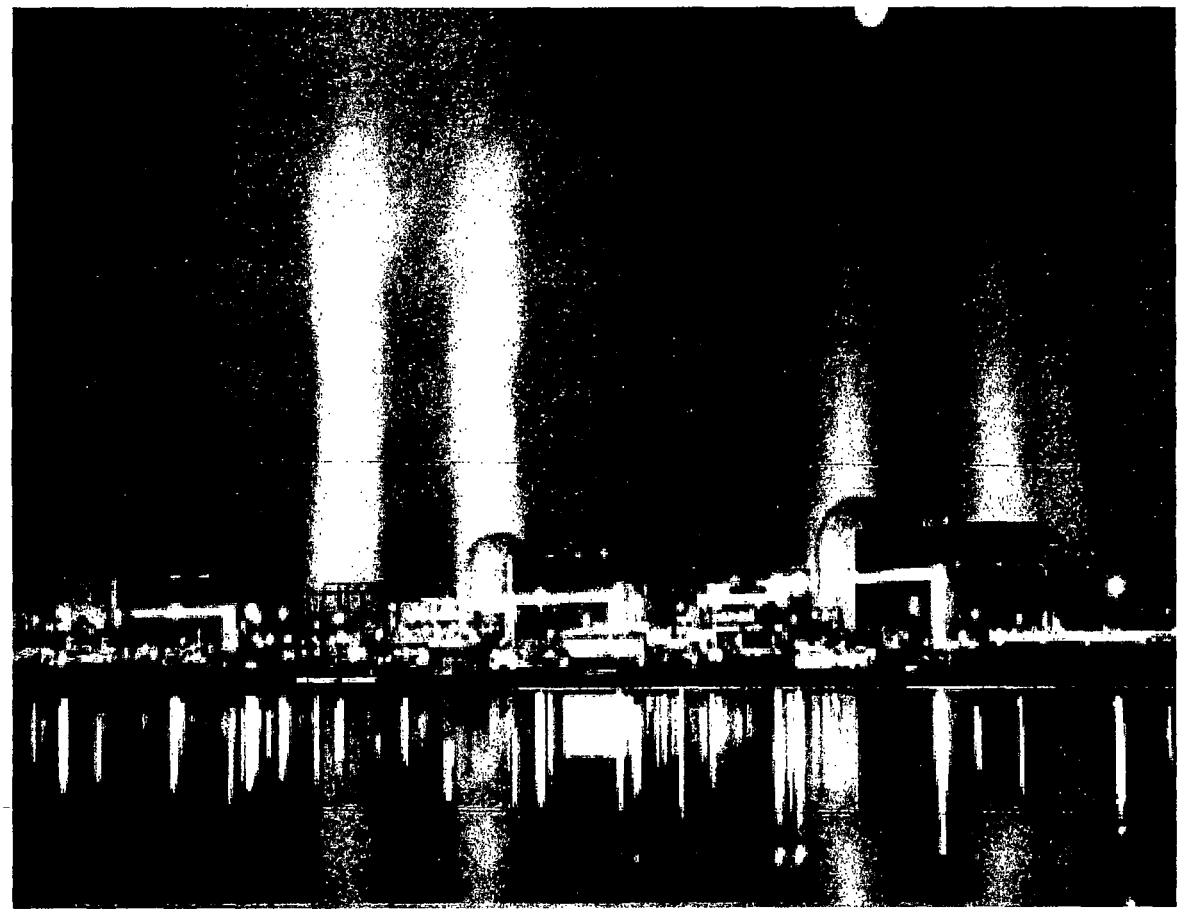
Nancy Ward

Nancy Ward
Regional Administrator
FEMA Region IX

Enclosure

cc: NRC Headquarters Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Vanessa Quinn, Chief
Radiological Emergency Preparedness Branch
FEMA Headquarters



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

Exercise Date - November 15, 2012

Radiological Emergency Preparedness (REP) Program

FEMA

*Published January 22, 2013*

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Palo Verde Nuclear Generating Station

# After Action Report/Improvement Plan

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# Executive Summary

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) National Preparedness Division (NPD) - Technological Hazards Branch (THB) in Region IX evaluated an off-site medical services exercise for the Banner Estrella Medical Center (BEMC) on November 15, 2012 in the Plume Exposure Pathway Emergency Planning Zone (EPZ) around the Palo Verde Nuclear Generating Station (PVNGS). The purpose of the exercise was to assess the level of state and local preparedness in response to a radiological emergency. This exercise was held in accordance with FEMA's policies and guidance concerning the exercise of state and local Radiological Emergency Response Plans (RERP) and procedures.

The most recent biennial exercise at this site was conducted on March 1-3, 2011. The most recent medical services exercise for the Banner Medical Center Complex was on November 1, 2011. The qualifying emergency preparedness exercise was conducted on April 1, 1981.

FEMA wishes to acknowledge the efforts of the many individuals from the private organizations who participated in this medical exercise. Protecting the public health and safety is the full-time job of some of the exercise participants and an additional assigned responsibility for others. Still others have willingly sought this responsibility by volunteering to provide vital emergency services to their communities. Cooperation and teamwork of all the participants were evident during this exercise.

This report contains the evaluation of the medical services exercise. The local organizations, except where noted in this report, demonstrated knowledge of their emergency response plans and procedures and adequately implemented them. There were no Areas Requiring Corrective Actions (ARCA) identified as a result of this exercise. No ARCAs remain uncorrected from previous medical exercises.

# Section 1: Exercise Overview

## 1.1 Exercise Details

**Exercise Name**

Palo Verde Nuclear Generating Station Medical Exercise

**Exercise Date**

November 15, 2012

**Program**

Department of Homeland Security/FEMA Radiological Emergency Preparedness Program

**Scenario Type**

Radiological Emergency

## 1.2 Exercise Planning Team Leadership

U.S. Department of Homeland Security, Federal Emergency Management Agency
Paul Anderson, Site Specialist

Arizona Division of Emergency Management
Bill Wolfe, Radiological Emergency Preparedness Program Coordinator

Arizona Radiation Regulatory Agency
Toby Morales, Emergency Response Program Manager

Maricopa County Department of Emergency Management
John Padilla, Emergency Services Planner

Arizona Public Service, Palo Verde Nuclear Generating Station
David Crozier, Senior Emergency Planning Coordinator

Banner Estrella Medical Center
Michael Clark, Emergency Preparedness Coordinator

## 1.3 Participating Organizations

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

State Jurisdictions
- Arizona Radiation Regulatory Agency

Risk Jurisdictions
- Buckeye Police Department
- Buckeye Valley Fire Department
- Buckeye Fire Department
- Maricopa County Sheriff's Office

Private Organizations
- Banner Estrella Medical Center
- Air Evac, Inc.
- Palo Verde Nuclear Generating Station

# Section 2: Exercise Design Summary

## 2.1 Exercise Purpose and Design

FEMA NPD - THB in Region IX evaluated an off-site medical services exercise for the BEMC on November 15, 2012 in the EPZ around the PVNGS. The purpose of the exercise was to assess the level of State and local preparedness in response to a radiological emergency. This exercise was held in accordance with FEMA's policies and guidance concerning the exercise of state and local RERPs and procedures.

## 2.2 Exercise Objectives, Capabilities and Activities

The exercise objective was to evaluate the Off-site Response Organizations (OROs) ability to implement their RERPs and procedures to safely transport and medically treat injured radiologically contaminated persons.

The exercise was designed to demonstrate the ORO's capability to respond in accordance with evaluation area criteria listed in the FEMA Radiological Emergency Preparedness (REP) Program Manual, April 2012 and associated core capabilities from the U.S. Department of Homeland Security, National Preparedness Goal, September 2011:

Evaluation Area 1 – Emergency Operations Management: Core Capability – Operational Coordination.
Evaluation Area 3 – Protective Action Implementation: Core Capability – Response Health and Safety.
Evaluation Area 6 – Support Operations, Facilities: Core Capability – Public Health and Medical Services.

The ORO activities in this exercise included:

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 prepared body maps of the contaminated areas, stabilized the patient and wrapped the patient in blankets for transport by air ambulance to the BEMC.

Air Evac, Inc. (Air Evac) picked up the patient and transported the patient to BEMC. Air Evac monitored the patient and maintained radio contact with BEMC during transport.

BEMC secured a transportation corridor from the helipad to its trauma room. BEMC setup a Radiation Control Area (RCA) to contain radioactive material during the process of decontaminating the patient and to control the radioactive exposure to emergency workers. BEMC demonstrated their ability to monitor, decontaminate and treat a contaminated and injured person.

The Buckeye Police Department (Buckeye PD) responded to the report of a vehicle accident involving a second contaminated injured person. This second injury occurred when an evacuee was injured while changing a flat tire. The evacuee was complying with an evacuation order that was issued because of a radiological release from PVNGS. After securing the accident scene, Buckeye PD requested Emergency

Medical System (EMS) response from Buckeye Valley Fire District (BVFD) and radiological contamination control response from the Arizona Radiation Regulatory Agency (ARRA).

BVFD assessed the vehicle accident scene, implemented contamination control procedures and provided medical response. After assessment, BVFD transported the contaminated injured patient to BGSMC by ground ambulance. BVFD transferred the contaminated injured patient to hospital staff for medical treatment and additional decontamination.

## 2.3 Scenario Summary

The transport, radiological monitoring, contamination control and decontamination for two persons who were contaminated and injured was demonstrated. One injured person was a PVNGS employee transported to BEMC by air ambulance; the other person was a member of the public living within the 10-mile EPZ who was transported to BEMC by ground ambulance. A brief summary of both of the scenarios follows.

An injured and contaminated PVNGS employee received initial radiological monitoring, decontamination and triage prior to transport by air ambulance to BEMC. PVNGS conducted the onsite portion of this exercise, up to but not including transport in an onsite exercise evaluated by the U.S. Nuclear Regulatory Commission (NRC). BEMC received this injured person at the facility's helipad, transferred the patient to the treatment area, and demonstrated contaminated injury monitoring and handling procedures up to the point where the injured person was able to be transferred to a ward for further medical treatment.

In the second scenario, a member of the public residing in the 10-Mile EPZ encountered a health related issue while evacuating the area in response to an incident at PVNGS. A husband and wife couple was informed to evacuate but were delayed for personal reasons. They evacuated the EPZ by their personal vehicle while a release of radioactive materials was in progress. The exterior of their vehicle was contaminated by the plant release. In the course of evacuation, the vehicle had a flat tire. The husband injured his arm while changing the flat tire, transferring contamination from the tire to his hands.

The evacuee's wife called the emergency response phone number. Local law enforcement responded along with an engine from the Town of Buckeye Fire Department as support. The Buckeye Fire Department, not evaluated in this exercise, requested EMS support and radiological monitoring support. Law enforcement secured the accident scene. The Maricopa County Sheriff's Office (MCSO) set up a simulated On Scene Command Post that was not evaluated by FEMA for this exercise. The BVFD provided the requested EMS support. After initial medical assessment, BVFD determined that ground ambulance transportation was appropriate for this patient. BVFD monitored radiation levels, determined areas of contamination and stabilized the patient for transport while practicing appropriate emergency worker exposure control.

The injured person was cocooned for transport by ground ambulance and transported to BEMC. ARRA provided radiological monitoring support. The accident scene remained secured until ARRA determined that law enforcement could release the accident scene for cleanup.

BEMC demonstrated the receipt and handling of this contaminated injury up to the point of treatment and decontamination in the treatment area. Treatment at BEMC was demonstrated with the PVNGS patient.

# 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 15, 2012 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 on the basis of its demonstration of criteria delineated in exercise evaluation areas contained in the FEMA REP Program Manual, April 2012. Detailed information on the exercise evaluation area criteria and the Extent of Play used in this exercise are found in Appendix C of this report.

## 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)

D – Deficiency assessed

A – ARCA(s) assessed or unresolved ARCA(s) from prior exercise(s)

P - A planning issue was identified

N – Not Demonstrated (Reason explained in Appendix C, Extent of Play)

# Table 3.1 – Summary of Exercise Evaluation

| DATE: 2011-11-01<br>SITE: Palo Verde Nuclear Generating Station, AZ<br>M: Met, A: ARCA, D: Deficiency, P: Plan Issue, N: Not Demonstrated | | BEMC | Air Evac | ARRA | BVFD | BPD |
|---|---|---|---|---|---|---|
| Emergency Operations Management | | | | | | |
| Mobilization | 1a1 | M | M | M | M | M |
| Facilities | 1b1 | | | | | |
| Direction and Control | 1c1 | M | M | | M | M |
| Communications Equipment | 1d1 | M | M | M | M | M |
| Equip & Supplies to support operations | 1e1 | M | M | M | M | M |
| Protective Action Decision Making | | | | | | |
| Emergency Worker Exposure Control | 2a1 | | | | | |
| Radiological Assessment and PARs | 2b1 | | | | | |
| Decisions for the Plume Phase -PADs | 2b2 | | | | | |
| PADs for protection of special populations | 2c1 | | | | | |
| Rad Assessment and Decision making for the Ingestion Exposure | 2d1 | | | | | |
| Rad Assessment and Decision making concerning Relocation, Reentry, and Return | 2e1 | | | | | |
| Protective Action Implementation | | | | | | |
| Implementation of emergency worker exposure control | 3a1 | M | M | M | M | M |
| 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 | | | | | | |
| 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 | | | | | |
| Emergency information and instructions for the public and the media | 5b1 | | | | | |
| Support Operations/Facilities | | | | | | |
| Mon / decon of evacuees and EWs, and registration of evacuees | 6a1 | | | | | |
| Mon / decon of emergency worker equipment | 6b1 | | | | | |
| Temporary care of evacuees | 6c1 | | | | | |
| Transportation and treatment of contaminated injured individuals | 6d1 | M | M | M | M | M |

# 3.3 Evaluation Summaries

### 3.3.1 Arizona Jurisdictions

#### 3.3.1.1 Arizona Radiation Regulatory Agency

ARRA demonstrated its capability to provide technical support to secure an accident scene involving radiological contamination. One ARRA staff member responded to the simulated scene where a resident got injured and contaminated while evacuating the EPZ. The resident passed through an airborne plume of radioactive material being released from PVNGS, exited the EPZ, had a flat tire, and injured his arm while changing the tire. Local law enforcement responded to the simulated accident scene. The fire department responded with EMS support. ARRA responded based on a request from law enforcement to provide technical assistance. The primary task for the ARRA responder was to determine if there was contaminated material that should be impounded until decontamination operations could be conducted.

The responder had multiple communications systems available. There was a hand held radio and an ARRA cell phone in the equipment kit which he had brought to the scene. Both were tested and were operational throughout the exercise. In addition to the communication equipment, the responder had dosimetry, potassium iodide KI, and radiation monitoring instrumentation and personal protective equipment.

The primary radiation detection instrument used was a count rate meter with a pancake probe. Before using the instrument, the responder determined that the instrument was within calibration and performed a response check using the Cs-137 source attached to the instrument. The responder determined that the response was within the range specified on the label of the instrument. The response information was logged on the appropriate ARRA form. The personal electronic dosimeter was also within calibration and was set to automatically alarm at two settings for integrated dose and dose rate. These alarm points were the ARRA procedural response doses and dose rates. The automatic alarms allowed the responder to concentrate on the task at hand rather than watching his dosimetry.

After the injured contaminated patient was transported to the hospital, the ARRA responder monitored the victim's vehicle. He used excellent technique by starting to monitor at about 10 feet from the vehicle and moving in a circular pattern while approaching the vehicle. The controller provided contamination readings of 6,000 counts per minute (cpm) on the hood and fenders of the vehicle. The interior was also contaminated. The ARRA responder secured approval from the wife of the injured evacuee to move the vehicle to the ARRA Radiological Emergency Assistance Team (REAT) Forward location for decontamination.

For this capability the following REP criteria were met: 1.a.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1

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.

a. MET: 1.a.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1
b. AREAS REQUIRING CORRECTIVE ACTION: None

c. DEFICIENCY: 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 Department

The Buckeye Valley Fire Department (BVFD) demonstrated the capability to respond to a vehicle accident that involved a radiologically contaminated injured person, to medically treat the injured person and to transport the injured person to an appropriate medical facility. The BVFD was dispatched from Phoenix Dispatch along with the Buckeye Police Department (BPD). The Town of Buckeye Fire Department provided support to BVFD.

BVFD firefighters received a safety briefing from the MCSO before entering the accident scene. The MCSO briefed the first responders using a new written procedure that was specific to a contaminated scene on precautions for potential radiological contamination. The briefing included issuing an electronic self-reading dosimeter to the BPD officer. The BPD officer was instructed that the dosimeter had alert signals and a turn back alarm at 200 mRem. The officer was instructed to contact the Incident Commander if it alarmed. The BPD officer established an inner security perimeter at the scene. The dosimeter provided initial group dosimetry for responders at the scene including BVFD. All first responders on scene had permanent record dosimeters that were issued and maintained by ARRA. These actions clear previous ARCAs 45-11-1e1-A-1 and 45-11-3a1-A-2.

The BVFD Engine Company was the first to approach the evacuee. They wore full fire fighting personal protective clothing, self-breathing apparatus and a Thermo Scientific FH 40GL survey meter equipped with an open faced probe for contamination. The Engine Company quickly evaluated the scene by triage interview of the evacuee. Other members of the Engine Company surveyed the scene for radioactivity. The Fire Captain quickly recognized that the evacuee vehicle was a large source of radioactivity that effected the evaluation of the patient. The evacuee was safely moved a short distance away and the BVFD Emergency Medical Technicians (EMT) performed a medical evaluation of the evacuee. The evacuee was determined to be medically stable. He had a laceration to his arm and possible heart weakness. A contamination survey found that the evacuee had general body contamination of 4,000 cpm and 4,500 cpm on the laceration.

Sterile water was used to quickly but effectively irrigate the laceration. The lacerated arm was wrapped with an absorbent bandage and a plastic biohazard bag. The patient/evacuee was wrapped in blankets on a gurney to contain contamination. A biohazard face mask was placed over his mouth and nose. After the evacuee was secured in the aid vehicle, the BVFD EMTs removed the full firefighting personal protective clothing and put on plastic boots, latex gloves and bio masks.

During transport, the BVFD EMTs transmitted evacuee vitals, injury evaluation, contamination levels and the estimated time of arrival to the BEMC emergency room. Information was transmitted to BEMC using a

Smart Phone. A medical chart was filled out and transmitted electronically using a 'tablet' device. The EMTs turned the patient over to BEMC staff with thorough patient medical information.

For this capability the following REP criteria were met: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1

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.

a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1
b. AREAS REQUIRING CORRECTIVE ACTION:
c. DEFICIENCY: None
d. PLAN ISSUES: None
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES - RESOLVED: 1.e.1, 3.a.1

ISSUE NO.: 45-11-1e1-A-1

ISSUE: The Engine Company was equipped with a radiation detection instrument, a Ludlum Model 2241-2 instrument /44-9 probe that had been calibrated on January 16, 2009 and expired on January 16, 2010.

CORRECTIVE ACTION DEMONSTRATED: BVFD demonstrated that its radiation detection equipment was operating properly and had a current calibration information sticker and calibration date.

ISSUE NO.: 45-11-3a1-A-2

ISSUE: The Engine Company from Buckeye Valley Fire District did not have Permanent Record Dosimeters and none of the Emergency Responders had Direct Reading Dosimeters as required by NUREG 0654, K.3. They were not aware of the Environmental Protection Agency (EPA) Protective Action Guides (PAG) and without direct reading dosimetry they had no way of determining if any of the EPA PAGs were being exceeded. Arizona has adopted a 0.2 R reporting value to help manage emergency worker exposure.

CORRECTIVE ACTION DEMONSTRATED: BVFD demonstrated appropriate use of permanent record dosimeters. The emergency workers demonstrated knowledge of appropriate radiological exposure control.

g. PRIOR ISSUES - UNRESOLVED: None

### 3.3.2.2 Town of Buckeye Police Department

The Buckeye Police Department demonstrated the capability to respond to an accident scene that included a contaminated injured person and to manage the radiological exposure to its officers in the performance of their duty. An on-duty officer, while on patrol, received a report through dispatch (simulated) of an injured motorist and disabled car. The officer was instructed to report to the On Scene Command Post set up for the PVNGS emergency. Upon arrival at the On Scene Command Post, the MCSO provided the officer with an update on the details of the reported incident and the status of the emergency. The officer was also updated on radiological safety information.

The officer was issued an electronic Canberra Ultra Radiac dosimeter, last calibrated on January 12, 2012. According to the MCSO Deputies who issued the dosimeter, it was set to alert at the administrative reporting limit of 0.2 R and to alarm at the turn-back value of 5 R. MCSO provided adequate instruction on how to turn on the unit, properly read the exposure rate and total exposure, and what to do if an alarm was heard. The deputy advised that if the alarm was heard, the officer should contact the On Scene Command Post for proper instruction. The MCSO assured the officer the alarm did not mean eminent danger, but necessary instruction would be provided. The deputy was advised to read the exposure every 15-minutes and report the reading to their supervisor. The officer was instructed to report to the decontamination center if necessary at the completion of the mission. The deputies also explained that, even though not used during this exercise, Thermoluminescent Dosimeters and potassium iodide (KI) would be issued at the On Scene Command Post, if necessary. The MCSO deputy advised the BPD officer to contact the On Scene Command Post if additional information or equipment may be needed. The Officer had limited Personal Protection Equipment. A respirator and gloves were donned prior to entering the area. The Officer possessed all necessary equipment needed for normal police officer response to an injured person and disabled vehicle.

After being briefed, the officer responded to the accident site with emergency medical personnel from the Buckeye Valley Fire Department. The Officer used BPD radios as the primary communication system during the exercise. The Officer was in communication with dispatch (simulated by contact with the on-duty Lieutenant) throughout the exercise. Backup communication was demonstrated via cellular telephone when the Officer contacted the BPD Lieutenant to deal with the potentially contaminated vehicle.

The officer was in charge of securing the area of the accident site. Initial contact was made with the injured person and needed information was relayed to the emergency medical responders before they approached the victim. The Officer kept a safe distance and asked the victim what happened and about his injuries. The victim reported he was evacuating as ordered and had a flat tire, fainted, and hurt his arm and was bleeding. The BPD Officer assured the victim several times that help was onsite and advised him to keep pressure on his wound. The information from the victim was provided to the responding fire department handling emergency medical treatment and transport. Once the victim was triaged and readied for transport, the firefighters updated the Officer on the status of the victim's contamination and injury and that he would be transported to Banner Estrella Medical Center.

After the victim was treated and left for the hospital, additional resources were required from the Arizona Radiation Regulatory Agency (ARRA). The officer radioed dispatch and asked them contact ARRA to

assist with monitoring and custody with the potentially contaminated vehicle. The officer maintained site security until turning over the scene and vehicle to ARRA.

Throughout the exercise the officer kept dispatch (simulated by contact with the on-duty Lieutenant) updated of the status of the response. Dispatch was provided with dose readings received every fifteen minutes.

For this capability the following REP criteria were met: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1

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.

a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1
b. AREAS REQUIRING CORRECTIVE ACTION: None
c. DEFICIENCY: 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

The Emergency Department (ED) staff at BEMC demonstrated appropriate use of dosimetry, radiation monitoring equipment, personal protective equipment and contamination control while providing medical treatment to a contaminated injured person. At 0750, a member of the BEMC Emergency Management Coordinator's (EMC) staff was notified by telephone from PVNGS that an injured individual having contamination levels up to 50,000 cpm was being transported via air ambulance to from PVNGS to BEMC. Estimated travel time to BEMC reported by ambulance personnel was 20 minutes. The EMC walked to the Clinical Care Operations office to notify the House Supervisor regarding the pending receipt of a contaminated, injured individual and briefly discussed the information reported by PVNGS. The EMC then requested a public address system announcement of a Code Magenta event.

Within a few minutes of the Code Magenta announcement, BEMC personnel began arriving at the room designated as the Radiologically Controlled Area (RCA). The facility was set up in accordance with BEMC's PVNGS Code Magenta Emergency Response Procedure. After the initial notification, the BEMC ED received a follow-up telephone call from PVNGS that decontamination attempts were mostly successful, and that the patient's contamination level had been reduced from 50,000 to 500 cpm.

BEMC Nuclear Medicine Department staff demonstrated that they could effectively manage activities necessary to properly handle the treatment of a contaminated injured individual. All involved staff communicated their planned activities when appropriate to one another in a clear and unambiguous manner. They also ensured that the individual who was logging key actions clearly received and understood the important elements of the communication exchanges.

Banner Estrella Medical Center is a large hospital facility that had adequate, properly operating communication systems. Communication links were available and maintained with PVNGS, Air Evac helicopter ambulance transport, and BVFD during the exercise. Communications capabilities were successfully managed in support of emergency operations without failure. All back-up systems were checked and were operable.

The Clinical Manager primarily relied on the commercial telephone line through the main BEMC switchboard. In an adjoining communications room, the Manager had a dedicated commercial telephone line (the Maricopa County Disaster, 'Radio' phone); the Phoenix (PHX) Fire Ring-Down Phone; a dedicated regular phone to call in prescriptions to pharmacies; and a dedicated 'Patch' phone that is utilized by all surrounding cities.

BEMC successfully demonstrated sufficient equipment, displays, dosimetry, and other supplies to support emergency operations. Radiological emergency support equipment, including dosimetry and survey instruments, was stored in a cabinet mounted on wheels located in storage room in the Emergency Department (ED). The cabinet had two doors and was approximately four feet wide by six feet high and twenty inches deep. It was maintained by PVNGS. The dosimetry consisted of 20 thermoluminescent dosimeters (TLD) and 20 electronic personal dosimeters (EPD). They were stored in a lead-lined wooden box. A poster on the wall of the Radiological Controlled Area (RCA) listed the sequence of donning and doffing personal protection equipment (PPE) for the hospital staff who would be working in the RCA. Survey instruments in the storage cabinet included two Eberline Model RM-20 survey instruments with Ludlum 44-9 pancake probes. In addition, there were two FAG Kugelfischer Model FHX731 survey meters with a range of 0.001 milliRoentgens per hour (mR/h) - 999 mR/h. The Kugelfischer instruments were each equipped with a Model FHZ731 pancake probe that was covered with a thin plastic film. The medical supplies contained in the storage cabinet included swabs, nitrile gloves, sterile saline solution, face shields, plastic aprons, and 4x4 sterile pads. Inventory lists regarding the cabinet contents were maintained by PVNGS and BEMC staff. Supplies to define the RCA and buffer zone included stanchions, rope, and yellow tape with red lettering "Caution Radiation Area." Supplies to control contamination included muslin cloth and a muslin-covered mop to wipe the floor in the path of travel to the RCA and later for cleanup and monitoring of the RCA.

The emergency support equipment cabinet was wheeled into one of the ED's emergency rooms and BEMC staff began establishing an RCA with an adjacent buffer zone. In accordance with the BEMC's PVNGS Code Magenta Emergency Response Procedure, all non-essential moveable equipment was removed from the RCA and buffer zone, and a gurney was placed in the middle of the RCA. The pad on the gurney was removed and a contamination trough was positioned in its place. The contamination trough was designed to contain and channel any body fluids or liquids used for decontamination or treatment into a yellow plastic barrel marked with multiple radiation symbols. Also, two large plastic bag-lined waste receptacles were placed inside the RCA. A boundary rope was set-up on stanchions that were positioned around the perimeter of the RCA. "Contaminated Area" signs were placed onto the boundary rope. Yellow tape was placed on the floor directly beneath the boundary rope. On the tape in red lettering was "Caution Radiation Area." The path from the air ambulance landing pad to the RCA was controlled by BEMC security guards.

A nuclear medicine technician, stationed in the RCA, assumed command and control for the activities that took place within the RCA and the adjacent buffer zone that housed administrative support activities. The technician

ensured that activities were smoothly coordinated, were performed in accordance with procedure, and communications between participants were effective. The technician responded to the ED with a Ludlum Model 14C survey instrument with a pancake probe wrapped in thin plastic. The instrument was checked against a 1-microcurie Cs137 source that was attached to the instrument's case. While the RCA was being established, the BEMC personnel who would be working in the RCA, a physician, a nurse, a nuclear medicine technician, and a PVNGS radiation protection technician to perform radiological monitoring and contamination control activities, obtained their dosimetry packets and began donning their personal protective equipment (PPE). The dosimetry packets were pre-packaged and consisted of a small plastic bag (called a "whirl pack") containing one thermoluminescent dosimeter (TLD) and one electronic personal dosimeter (EPD). The TLD and EPD identification numbers were recorded on a hospital form along with the individual's name, social security number, and date. The PPE consisted of booties, Tyvek coveralls, a lead apron worn over the coveralls, a plastic apron over the lead apron, a surgical cap, a mask, a face shield, a lead throat shield, and two pairs of sterile surgical gloves. The donning of the PPE was coordinated by the nuclear medicine technicians and was consistent with a wall-mounted poster. The three BEMC staff who would be working in the RCA were instructed to wear the dosimetry packets outside of the lead apron and underneath the plastic apron. The EPDs were set to alarm at a dose rate of 5 rem per hour and an integrated dose of 1 rem. If an individual's EPD integrated dose alarm were to actuate, meaning that an administrative dose limit had been exceeded, the individual would be replaced. A PVNGS health physics technician and a BEMC medical physicist were positioned immediately outside of the RCA entrance to provide monitoring and contamination control.

When the air ambulance helicopter arrived, the patient was transferred to the BEMC gurney by placing the individual and the backboard on top of BEMCs' contamination trough and gurney. The air ambulance personnel briefed BMEC staff as to the patient's condition and status, contamination location and levels, and provided the body map prepared by PVNGS.

After moving the gurney into the RCA, the physician immediately began to exam the patient. As the physician examined the patient, he verbally stated his results. These results were recorded by a nurse located in the buffer zone. Medical care took precedence over radiological monitoring and decontamination efforts. A portable X-ray unit was moved into the buffer zone immediately adjacent to the RCA. X-rays of the patient's arm were requested by the attending physician in order to assess the nature of the bone fracture. This activity was accomplished by repositioning the gurney containing the patient next to the buffer zone where the X-ray unit was located. Care was used to avoid contaminating the X-ray plates and all were monitored prior to being removed from the area. The patient and gurney were re-positioned in the center of the RCA. A hose connected the contamination trough to the yellow plastic barrel marked with multiple radiation symbols for the collection of decontamination liquids.

The patient's clothes were simulated being removed and placed in the contaminated waste container. Being careful not to interfere with the medical exam, the nuclear medicine technician began to monitor the patient for radioactive contamination. In accordance with the BEMC Procedure, 250 cpm above background was the trigger level for identifying contamination. Nasal, ear and oral swabs were collected and placed into labeled plastic bags. The bagged swabs were monitored and found to be free of contamination. At the completion of the initial medical examination, the nuclear medicine technician initiated detailed radiological monitoring of the patient. A contamination level of 500 cpm was detected on the front side of his lower legs, palm of left hand, and the upper chest/throat area, on the individual's face.

Decontamination efforts of the chest, facial area, and lower legs using saline solution and swabbing with gauze

pads were initiated. Following the decontamination procedure, the patient was again monitored. The lower legs were found to have a contamination level of 200 cpm, and another decontamination effort was begun for these areas. The chest, throat and facial areas had no contamination above background after the first decontamination effort was completed. The wrist brace was monitored and found to have a contamination level of 500 cpm. Removal of the brace was indicated following a report from the BEMC Radiology Department that there wrist bone fractures; was then removed and discarded as radioactive waste. The wrist area was swabbed with saline solution and successfully decontaminated. After the second decontamination effort for the patient's lower legs, they were found to be free of detectable contamination.

The physician then ordered the patient to be sent for a CT scan. The gurney and patient were moved to the boundary of the RCA. A second gurney was positioned in the buffer zone next to the patient. Patient transfer was accomplished by standard sheet transfer with five staff members in the buffer zone and three in the RCA. To avoid possible transfer of contamination, contact between buffer zone staff and RCA staff was carefully avoided.

Throughout the patient's examination and monitoring activities, two nurses outside the RCA recorded information from the RCA's physician, nurse, and nuclear medicine technician. One nurse tracked patient treatment on a "Physician Progress Report" for charting. A second nurse recorded radiation survey readings on a body map showing contamination levels. This nurse recorded the results of each decontamination effort, writing the time of resurvey, until all affected areas were successfully decontaminated. A third staff member handed medical supplies to RCA staff, taking care not to make any physical contact that could result in transfer of contamination.

Following the instructions for doffing PPEs that were mounted on the wall of the RCA and with guidance provided by the nuclear medicine technician, the physician successfully doffed his PPE. His dosimetry was removed, monitored, and handed to the HP in the buffer zone. The physician was carefully monitored, stepped onto the step-off pad, and exited the RCA and buffer zone. Similar processes were followed for the nuclear medicine technician and the PVNGS radiation protection technician.

An interview confirmed that all fixed equipment in the RCA would be smeared using muslin cloth and monitored. The floor would be smeared using a muslin cloth covered mop and the muslin cloth would be monitored to identify any loose contamination. The floor would then be directly monitored to identify any fixed contamination. All contaminated material, including the container of liquid waste, would be transported to PVNGS for disposal.

For this capability demonstration, the following REP criteria were met: 1.a.1, 1.c.1, 1.e.1, 3.a.1, 6.d.1

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.

a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1
b. AREAS REQUIRING CORRECTIVE ACTION: None
c. DEFICIENCY: 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, Inc.

The Air Evac ambulance crew demonstrated patient transport and treatment during the November 15, 2012 PVNGS Medical Exercise. The pilot of the Air Evac helicopter transport and two Emergency Medical Technicians (EMT) were mobilized by radio by the PHi Air Medical communications dispatcher in response to a request for helicopter ambulance transport from PVNGS. The Air Evac ambulance crew mobilized immediately. They landed at PVNGs, loaded the patient and lifted off for BEMC. The air ambulance helicopter landed at BEMC and transferred the patient to BEMC. The Air Evac ambulance crew was then monitored, determined 'clean' and released.

An interview with the Pilot confirmed that communication links were available and maintained during the flight with their main communication office in accordance with regular procedures. The Pilot had a Motorola hand-held radio and cell phone for back-up communications.

The air transport helicopter was critically sensitive to weight. Only the equipment required for safety of the crew and the transport of patient was carried on the aircraft. The Air Evac ambulance crew relied on the PVNGS Radiation Protection Technician (RPT) to provide dosimetry and instructions if needed. PVNGS had properly decontaminated the patient to safe levels and securely wrapped the patient to contain contamination during transport. The PVNGS team provided the injured person's vital information to the EMTs, including a marked contamination 'Body Map'. All detailed information on the injured person had been relayed to BEMC. Since the injured person was decontaminated to safe levels and securely wrapped by PVNGS RPTs for safe transport, dosimetry equipment and related radiological instructions were not required for the Pilot and EMTs.

Upon arrival of the air ambulance at the BEMC landing site, the BEMC Nuclear Medicine Technologist and PVNGS Radiation Protection Technician met the Pilot and EMTs and began transfer of the injured person. A well-marked, controlled path between the Emergency Department and the landing pad had been set-up by BEMC security. The helicopter, the pilot and the EMT's were then monitored by a BEMC Nuclear Medicine Technologist and determined not to be contaminated.

After the patient transfer, the total path to the Emergency Department was wiped with a Muslin covered mop and monitored with a Ludlum Model 14C survey meter with a Ludlum 44-9 pancake probe. This step ensured the detection and subsequent removal of any radiological contamination from the patient transfer.

For this capability the following REP criteria were met: 1.a.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1

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.

a. MET: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 3.a.1, 6.d.1
b. AREAS REQUIRING CORRECTIVE ACTION: None
c. DEFICIENCY: None
d. PLAN ISSUES: None
e. NOT DEMONSTRATED: None
f. PRIOR ISSUES - RESOLVED: None
g. PRIOR ISSUES - UNRESOLVED: None

# Section 4: Conclusion

FEMA evaluated an off-site medical services exercise for the BEMC on November 15, 2012 in the Plume Exposure Pathway EPZ around the PVNGS. The purpose of the exercise was to assess the level of state and local preparedness in response to a radiological emergency. This exercise was held in accordance with FEMA's policies and guidance concerning the exercise of state and local RERPs and procedures.

The exercise participants demonstrated knowledge of their emergency response plans and procedures and adequately demonstrated the ability to implement and follow those plans and procedures to protect the health and safety of the public. There were no Deficiencies and no ARCAs identified during the course of the exercise. Two ARCAs from previous exercises were satisfactorily re-demonstrated and closed as a result of exercise play. There were no prior planning issues to be closed and no planning issues were identified during this exercise.

# Appendix A: Exercise Evaluators and Team Leaders

| LOCATION | EVALUATOR | AGENCY |
|---|---|---|
| Arizona Radiation Regulatory Agency | *Joseph Keller | ICFI |
| Buckeye Valley Fire Department | Dennis Wilford | ICFI |
| Buckeye Police Department | *Joseph Keller | ICFI |
| Banner Good Samaritan Medical Center | Thomas Essig<br>*Daryl Thome | ICFI<br>ICFI |
| Air Evac, Inc. | Thomas Essig | ICFI |

* Team Leader

# Appendix B: Acronyms

| | |
|---|---|
| ARCA | Areas Requiring Corrective Action |
| ARRA | Arizona Radiation Regulatory Agency |
| BEMC | Banner Estrella Medical Center |
| BVFD | Buckeye Valley Fire Department |
| DHS | U.S. Department of Homeland Security |
| ED | Emergency Department |
| EMS | Emergency Medical System |
| EPA | US Environmental Protection Agency |
| EPD | Electronic Personal Dosimeter |
| EPZ | Emergency Planning Zone |
| FEMA | Federal Emergency Management Agency |
| GM | Geiger Mueller radiation detector |
| | |
| | |
| NMT | Nuclear Medicine Technician |
| PAG | Protective Action Guide |
| PPE | Personal Protective Equipment |
| NRC | Nuclear Regulatory Commission |
| NUREG | US Nuclear Regulatory Commission Regulation |
| OROs | Offsite Response Organizations |
| PVNGS | Palo Verde Nuclear Generating Station |
| R | Roentgen |
| RCA | Radiation Control Area |
| REP | Radiological Emergency Preparedness |
| REPP | Radiological Emergency Preparedness Program |
| RERP | Radiological Emergency Response Plan |
| SOP | Standard Operating Procedure |
| TCL | Target Capabilities List |
| TLD | Thermoluminescent Dosimeter |

# Appendix C: Extent of Play Agreement

## STATE OF ARIZONA/MARICOPA COUNTY

## OFFSITE CRITERIA & EXTENT OF PLAY

## 2012 Evaluated Contaminated Injury Exercise

## Palo Verde Nuclear Generating Station

All play, demonstrations, and interviews will be conducted in accordance with the *2011 State of Arizona – Maricopa County Offsite Emergency Response Plan for the Palo Verde Nuclear Generating Station* and other current applicable procedures, and/or checklists related to contaminated injury response unless specifically stated in this Extent of Play.

Controllers and/or Evaluators can request re-demonstration of any response activity as long as it does not impede play.

**Note:** Response activities for this exercise are occurring as part of an ongoing classified emergency at the Palo Verde Nuclear Generating Station. Responding law enforcement, medical transport and radiation control personnel would be aware that a limited area radiological release has occurred and that normal response operations for some functions (EOC activations, traffic control, field team monitoring team operations, etc.) are already active and in place.

### DEMONSTRATIONS AND ACTIVITIES

| Activity | Date | Location |
|---|---|---|
| Contaminated injury occurs at Palo Verde Nuclear Generating Station (PVNGS). Victim is transported offsite by air ambulance | November 15, 2012 | Palo Verde Nuclear Generating Station<br>5801 S. Wintersburg Road<br>Tonopah, AZ |
| Banner Estrella Medical Center (BEMC) receives and treats contaminated injury from PVNGS | November 15, 2012 | Banner Estrella Medical Center<br>9201 W. Thomas Road<br>Phoenix, AZ |
| Offsite contaminated injury occurs. Victim is transported by local ground ambulance to BEMC. | November 15, 2012 | Buckeye Municipal Airport<br>3000 S. Palo Verde Road<br>Buckeye, AZ |
| Banner Estrella Medical Center receives and treats offsite contaminated injury. | November 15, 2012 | Banner Estrella Medical Center<br>9201 W. Thomas Road<br>Phoenix, AZ |

## EVALUATION AREA 1—EMERGENCY OPERATIONS MANAGEMENT

### Sub-Element 1.a--Mobilization

**Intent:** This sub-element derives from NUREG-0654, which provides that Offsite Response Organizations (ORO) should have the capability to alert, notify, and mobilize emergency personnel and to activate and staff emergency facilities. Criterion 1.a.1: OROs use effective procedures to alert, notify, and mobilize emergency personnel and activate facilities in a timely manner. (NUREG-0654, A.4; D.3, 4; E.1, 2; H.4).

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

**EXTENT OF PLAY:** The following activities will be demonstrated, in some instances by interview due to exercise artificialities, during the 2012 Contaminated Injury Exercise.

1) Ground transport, local law enforcement and radiation control personnel will be pre-positioned near, but not at, the offsite accident location to minimize travel time and safety concerns.
2) Local law enforcement and ground medical/transport will be notified and respond per current 911 call and dispatch procedures (911 may be a simulated number).
3) *Air transport will be notified and respond per current Palo Verde Nuclear Generating Station medical* response procedures.
4) Medical center notification will originate from both air and ground transport using normal communications channels unless otherwise directed. Medical center mobilization will be based on current medical center facilities.
5) State radiation control personnel will be notified and respond per current procedures.

### Sub-Element 1.c--Direction and Control

**Intent:** This sub-element derives from NUREG-0654, which provides that Offsite Response Organizations (ORO) have the capability to control their overall response to an emergency.

**Criterion 1.c.1: Key personnel with leadership roles for the ORO provide direction and control to that part of the overall response effort for which they are responsible. (NUREG-0654, A.1.d; A.2.a, b).**

**EXTENT OF PLAY:** The following activities will be demonstrated, in some instances by interview due to exercise artificialities, during the 2012 Contaminated Injury Exercise.

1. Local law enforcement activities will be limited to securing the incident scene and supporting the transport of the contaminated injured individual as necessary.
2. Air and ground transport direction and control activities will be limited to medical response, radiological monitoring, and contamination and exposure control.
3. State radiation control personnel direction and control will be limited to radiological monitoring and contamination and exposure control.
4. *Medical center direction and control will be limited to emergency room operations directly related to the* facility's response to a contaminated injured individual.

### Sub-Element 1.d--Communications Equipment

**Intent:** This sub-element derives from NUREG-0654, which provides that Offsite Response Organizations (ORO) should establish reliable primary and backup communication systems to ensure communications with key emergency personnel at locations such as the following: appropriate contiguous governments

within the emergency planning zone (EPZ), Federal emergency response organizations, the licensee and its facilities, emergency operations centers (EOC), and field teams.

**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, F.1, 2).**

**EXTENT OF PLAY:** The following activities will be demonstrated, in some instances by interview due to exercise artificialities, during the 2012 Contaminated Injury Exercise.

1) Law enforcement, air and ground medical/transport and radiation control personnel communication will be limited to normal channels for notification, and unless otherwise directed.
2) Medical center communications will be limited to those systems linking the facility and air and ground transport organizations so that notification of the transport and arrival of a contaminated injured individual can occur.

**Sub-Element 1.e.1—Equipment and Supplies to Support Operations**

**Intent:** This sub-element derives from NUREG-0654, which provides that Offsite Response Organizations (ORO) have emergency equipment and supplies adequate to support the emergency response. (NUREG-0654, H.7; H.10; K.3.a)

**Criterion 1.e.1: Equipment, maps, displays, dosimetry, potassium iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654, H.7; H.10; K.3.a)**

**EXTENT OF PLAY:** The following activities will be demonstrated, in some instances by interview due to exercise artificialities, during the 2012 Contaminated Injury Exercise.

1) Air and ground medical/transport, law enforcement, and the medical center will demonstrate the availability and use of radiological monitoring, contamination control, and decontamination equipment as appropriate consistent with their role in the scenario. In those cases where a demonstration is not practical, this capability will be demonstrated by interview.
2) Air and ground medical/transport personnel will be issued dosimetry as appropriate consistent with the radiation levels in the scenario. In those cases where a demonstration is not practical, this capability will be demonstrated by interview.

## EVALUATION AREA 3—PROTECTIVE ACTION IMPLEMENTATION

### Sub-Element 3.a.1—Implementation of Emergency Worker Exposure Control

**Intent:** This sub-element derives from NUREG-0654, which provides that Offsite Response Organizations (ORO) have the capability to provide for the following: distribution, use, collection, and processing of direct-reading dosimetry and permanent record dosimetry; the reading of direct-reading dosimetry by emergency workers at appropriate frequencies; maintaining a radiation dose record for each emergency worker; and establishing a decision chain or authorization procedure for emergency workers to incur radiation exposure in excess of protective action guides, always applying the ALARA (As Low As Reasonably Achievable) principle as appropriate. (NUREG-0654, K.3.a, b)

**Criterion 3.a.1: The OROs issue appropriate dosimetry and procedures, and manage radiological exposure to emergency workers in accordance with the plans and procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. (NUREG-0654, K.3.a, b)**

**EXTENT OF PLAY:** The following activities will be demonstrated, in some instances by interview due to exercise artificialities, during the 2012 Contaminated Injury Exercise.

Individual dosimetry will be issued to air and ground medical/transport personnel and other responders as appropriate consistent with the radiation levels in the scenario. In those cases where a demonstration is not practical, this capability will be demonstrated by interview.

1) The medical center will use facility and PVNGS supplied dosimetry and monitoring equipment to manage exposure, contamination, and decontamination activities. In those cases where a demonstration is not practical, this capability will be demonstrated by interview.

## EVALUATION AREA 6—SUPPORT OPERATIONS/FACILITIES

### Sub-Element 6.d—Transportation and Treatment of Contaminated Injured Individuals

**Intent:** This sub-element derives from NUREG-0654, which provides that Offsite Response Organizations (ORO) should have the capability to transport contaminated injured individuals to medical facilities with the capacity to provide medical services. (NUREG-0654, F.2; H.10; K.5.a, b; L.1, 4)

**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, F.2; H.10; K.5.a, b; L.1,4)**

**EXTENT OF PLAY:** The following activities will be demonstrated, in some instances by interview due to exercise artificialities, during the 2012 Contaminated Injury Exercise.

1) Offsite Response Organizations (OROs) will demonstrate the capacity to transport contaminated injured individuals to the designated medical center for treatment.

   a) An air ambulance will be used to transport the victim from PVNGS to the medical center.

      i) The contaminated injury will be pre-staged at the PVNGS landing zone.
      ii) During the transportation process, the condition of the victim will remain constant. Prior to transferring the victim to the air ambulance, an evaluation of the victim's radiological condition will be conducted by Palo Verde Radiation Protection personnel and a determination made that the issuance of dosimetry and protective clothing for air ambulance personnel is not necessary. The dosimetry will be available for issue and for Evaluator inspection.

   b) Ground medical/transport will be used to transport the offsite contaminated injury victim to the medical center.

      i) Ground medical/transport resources normally responding to the 10-mile EPZ will be utilized.
      ii) Should a real world incident occur necessitating the diversion of available ground transport; a substitute vehicle may be used once initial communication occurs between the ground medical/transport and the medical center.
      iii) It is anticipated that space will be available for the Evaluator to accompany the victim by ground medical/transport to the medical center.
      iv) Ground medical/transport and local law enforcement will be pre-positioned near, but not at, the offsite accident location to minimize travel time and safety concerns.
      v) Local law enforcement will secure the offsite incident scene until such time as monitoring and contamination control/decontamination efforts, if necessary, are completed. Portions of this activity may be demonstrated by interview.

2) Normal communications between the air and ground medical/transport and dispatchers, as appropriate, and the medical center will be demonstrated unless this interferes with real world incident communications. These calls may be simulated as necessary.

3) Air and ground medical/transport crews will demonstrate, by interview, knowledge of where the ambulance and crew would be monitored and decontaminated, if required, or whom to contact for such information.

4) Monitoring of the victims may be performed before transport, done in route, or deferred to the medical facility.

   a) Before using a monitoring instrument(s), the instrument will be checked for current calibration and will be source checked.
   b) All monitoring activities will be completed as they would be in an actual emergency.
   c) Appropriate contamination control measures should be demonstrated before, during and after transport and at medical center.

5) The medical center will demonstrate the capability to activate and set up a radiological emergency area (REA) for treatment per current medical center procedures.

a) Equipment and supplies will be available for the treatment of contaminated injured individuals.
b) The receipt, processing, contamination control, decontamination and handling of the contaminated injury arriving by air medical/transport to the point of transfer to a ward will be demonstrated.
c) The receipt, processing and contamination control of the contaminated injury arriving by ground medical/transport to the point of transfer to the individual to the REA will be demonstrated.
d) The medical center will demonstrate the capability to make decisions on the need for decontamination of the individual, to follow their decontamination procedures, and to maintain records of survey measurements and samples taken.
e) Decontamination and medical response will be demonstrated to the extent practical. Clothing will not fully be removed from the injured individuals and no actual medical procedures will be conducted.
f) Procedures for the collection and analysis of samples (nasal smears, etc.) and the decontamination of the individual will be demonstrated or described to the Evaluator.
g) For safety reasons the transfer of the victims from one gurney to another may be simulated. This transfer process can be demonstrated by interview.
h) Post incident disposition of contaminated materials/fluids and clean-up of the medical center REA will be demonstrated by interview.
i) To ensure that this exercise does not disrupt or interfere with normal medical center operations, the survey process for the route between the helipad and the Trauma Center will be demonstrated by interview. The handoff from the air ambulance to medical center personnel will be demonstrated at the helipad. The victim will then be pre-positioned just outside the Trauma Center and exercise play will continue.
j) Should a real-world incident require the exercise to vacate the medical center Trauma Center, exercise activities will be relocated, pending available hospital staff, to an adjacent treatment room for continued demonstration.

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