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

FEMA

JUL 16 2004

Mr. Bruce S. Mallett
Regional Administrator
U.S. Nuclear Regulatory Commission Region IV
611 Ryan Plaza, Suite 400
Arlington, Texas 76011-8064

Dear Mr. Mallett:

On November 21, 2003, the Federal Emergency Management Agency's (FEMA) Region IX evaluated an off-site Medical Drill for the Emergency Planning Zone (EPZ) around the Palo Verde Nuclear Generating Station (PVNGS). The purpose of the drill was to assess the level of State and local preparedness in responding to a radiological emergency.

I have enclosed a copy of the final report for your records. There were no issues identified. We have determined that based on the overall results of the drill, there is reasonable assurance 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. The level of preparedness and adequacy in the off-site radiological emergency response plans for the State of Arizona and the jurisdictions site-specific to PVNGS, together with the ability to implement these plans, were well demonstrated. Therefore, the Code of Federal Regulations, Title 44 Part 350 approval of the off-site radiological emergency response plans and preparedness for the State of Arizona, site-specific to PVNGS, will remain in effect.

If you have any questions or need additional information, please contact me at (510) 627-7100, or your staff may contact Mr. Kenneth Chin, Regional Assistance Committee Chair, at (510) 627-7122.

Sincerely,

Karen E. Armes
Acting Regional Director

Enclosure

cc: Ms. Vanessa Quinn, FEMA HQ
Mr. Eric Weiss, NRC HQ

FEMA

Final Medical Drill Report

PALO VERDE
NUCLEAR GENERATING STATION

Licensee: **Arizona Public Service Company**

Drill Date: **November 21, 2003**

Report Date: **June 28, 2004**

FEDERAL EMERGENCY MANAGEMENT AGENCY
REGION IX
1111 Broadway, Suite 1200
Oakland, California 94607-4052

I. EXECUTIVE SUMMARY

The Federal Emergency Management Agency (FEMA), Region IX evaluated an Off-site Medical Drill on November 21, 2003, for the emergency planning zone (EPZ) around the Palo Verde Nuclear Generating Station (PVNGS). The purpose of the exercise and drill was to assess the level of State and local preparedness in responding to a radiological emergency. This exercise and drill was held in accordance with FEMA's policies and guidance concerning the exercising of State and local radiological emergency response plans (RERP) and procedures.

The most recent biennial exercise at this site was conducted on March 14, 2003. The most recent medical drill for the Banner Good Medical Center was conducted on March 29, 2002. The qualifying emergency preparedness exercise was conducted on April 1, 1981.

FEMA wishes to acknowledge the efforts of the many individuals who participated in this exercise.

Protecting the public health and safety is the full-time job of some of the exercise participants and an additionally 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 drill.

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 Action (ARCA) identified as a result of this drill.

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II. INTRODUCTION

On December 7, 1979, the President directed FEMA to assume the lead responsibility for all off-site nuclear planning and response. FEMA's activities are conducted pursuant to 44 Code of Federal Regulations (CFR) Parts 350, 351 and 352. These regulations are a key element in the Radiological Emergency Preparedness (REP) Program that was established following the Three Mile Island Nuclear Station accident in March 1979.

FEMA Rule 44 CFR 350 establishes the policies and procedures for FEMA's initial and continued approval of Tribal, State and local governments' radiological emergency planning and preparedness for commercial nuclear power plants. This approval is contingent, in part, on State and local government participation in joint exercises with licensees.

- FEMA's responsibilities in radiological emergency planning for fixed nuclear facilities include the following:

- Taking the lead in off-site emergency planning and in the review and evaluation of RERPs and procedures developed by State and local governments;

- Determining whether such plans and procedures can be implemented on the basis of observation and evaluation of exercises of the plans and procedures conducted by State and local governments;

- Responding to requests by the U.S. Nuclear Regulatory Commission (NRC) pursuant to the Memorandum of Understanding between the NRC and FEMA dated June 17, 1993 (Federal Register, Vol. 58, No. 176, September 14, 1993); and

- Coordinating the activities of Federal agencies with responsibilities in the radiological emergency planning process:

  - U.S. Department of Commerce,
  - U.S. Nuclear Regulatory Commission,
  - U.S. Environmental Protection Agency,
  - U.S. Department of Energy,
  - U.S. Department of Health and Human Services,
  - U.S. Department of Transportation,
  - U.S. Department of Agriculture,
  - U.S. Department of the Interior, and
  - U.S. Food and Drug Administration.

Representatives of these agencies serve on the FEMA Region IX Regional Assistance Committee (RAC) that is chaired by FEMA.

Formal submission of the RERPs for the Palo Verde Nuclear Generating Station to FEMA Region IX by the State of Arizona and the involved local jurisdictions occurred on May 31, 1988.

State and local Radiological Emergency Preparedness plans are required, in NUREG-0654/FEMA REP 1, Rev. 1 (November 1980), to designate primary and back-up medical facilities capable of providing appropriate care to injured/contaminated individuals originating from the off-site effects of an incident at a nuclear power plant. One or more of these facilities are usually exercised as part of the biennial State/Local REP exercise. Others may be exercised during the off-year period. At least one evaluated medical drill must be held each year at each nuclear facility, according to NUREG-0654 Planning Standard N.2.c.

FEMA Region IX evaluated an Off-site Medical Drill on November 21, 2003, to assess the capabilities of local emergency preparedness organizations in implementing their RERPs and procedures to protect the public health and safety during a radiological emergency involving the PVNGS. The purpose of this report is to present the results and findings on the performance of the off-site response organizations (ORO) during a simulated radiological emergency.

The findings presented in this report are based on the evaluations of the Federal evaluator team, with final determinations made by the FEMA Region IX RAC Chairperson, and approved by the Regional Director.

The criteria utilized in the FEMA evaluation process are contained in:

- NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980;

- FEMA Radiological Emergency Preparedness Exercise Evaluation Methodology, September, 2001; and

- FEMA Guidance Memoranda MS-1, "Medical Services," November 1986.

Section III of this report, entitled "Exercise Overview," presents basic information and data relevant to the exercise. This section of the report contains a description of the plume pathway EPZ, a listing of all participating jurisdictions and functional entities that were evaluated, and a tabular presentation of the time of actual occurrence of key exercise events and activities.

Section IV of this report, entitled "Exercise Evaluation and Results," presents detailed information on the demonstration of applicable exercise evaluation areas at each

jurisdiction or functional entity evaluated in a jurisdiction-based, issues-only format. This section also contains: (1) descriptions of all Deficiencies and ARCAs assessed during this exercise, recommended corrective actions, and the Tribal, State and local governments' schedule of corrective actions for each identified issue and (2) descriptions of unresolved ARCAs assessed during previous drills and the status of the OROs' efforts to resolve them.

III. OVERVIEW

Contained in this section are data and basic information relevant to the November 21, 2003, medical drill to test a portion of the off-site emergency response capabilities for the area surrounding the Palo Verde Nuclear Generating Station. This section of the report includes a description of the plume pathway EPZ, and a listing of all participating jurisdictions and functional entities that were evaluated.

A. Plume Emergency Planning Zone Description

The State of Arizona has designated an Emergency Planning Zone (EPZ) that extends out from a 10-mile circle around the plant. The EPZ includes the unincorporated areas of Maricopa County.

B. Exercise Participants

The following agencies, organizations, and units of government participated in the Palo Verde Nuclear Generating Station off-site medical drill on November 21, 2003.

RISK JURISDICTIONS

Maricopa County

PRIVATE/VOLUNTEER ORGANIZATIONS

Native American Air Ambulance
Banner Good Samaritan Medical Center
Palo Verde Nuclear Generating Station

IV. EVALUATION AND RESULTS

Contained in this section are the results and findings of the evaluation of all jurisdictions and functional entities which participated in the November 21, 2003, medical drill to test the off-site emergency response capabilities of Tribal Nations, State and local governments in the 10-mile EPZ surrounding the Palo Verde Nuclear Generating Station

Each jurisdiction and functional entity was evaluated on the basis of its demonstration of criteria delineated in exercise evaluation area criteria contained in the FEMA REP Program Manual. Detailed information on the exercise evaluation area criteria and the extent-of-play agreement used in this exercise are found in Appendix 3 of this report.

A. Summary Results of Exercise Evaluation - Table 1

The matrix presented in Table 1, on the following page, presents the status of all exercise evaluation area criteria from the FEMA REP Program Manual. that 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 Deficiency 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)
N	-	Not Demonstrated (Reason explained in Subsection B)

TABLE 1. SUMMARY RESULTS OF EXERCISE EVALUATION

DATE
November 21, 2003

SITE
Palo Verde Nuclear Generating Station

	Mobilization	Facilities	Direction & Control	Communications Equipment	Equipment & Supplies to Support Operations	Emergency Worker Exposure Control	Rad Assmt PARs Based on Avail Information	Rad Assmt PADs for General Public	Prot Action Decisions for Special Population's	Rad Assmt & Decision Making for Ingest Exposure	Rad Assmt & Dec Making for Relo/Re-entry/& Return	Implementation of Emergency Wrkr Exposure Control	Implementation of KI Decision	Implementation of PADs for Special Population's	Implementation of PADs for Schools	Implementation of Traffic Access & Control	Impediments to Evac & Traf are Identified & Resolved	Implementation of Ingestion Pathway Decisions	Impl of IP Decisions Show Strat & Instr Material	Impl of Relocation/Re-entry/Return Decisions	Plume Phase Measurement & Analysis Equip	Plume Phase Field Measurement & Analysis Mgmt	Plume Phase Fld Measurements & Analysis Proced	Post Plume Phase Field Measurements & Sampling	Laboratory Operations	Activation of Prompt Alert & Notification	Activation Prompt Alert & Notif in Exception Areas	Emerg Info & Instructions for the Public & Media	Monitoring/Decon/Registration of Evacuees & EWs	Monitoring & Decon of Emerg Worker Equipment	Temporary Care of Evacuees	Trans & Treatment of Contam Injured Individuals
	EMERGENCY OPNS & MANAGEMENT					PROTECTIVE ACTION DECISION-MAKING						PROTECTIVE ACTION IMPLEMENTATION									FIELD MEASUREMENT & ANALYSIS					NOTIF & PUBLIC INFO			SUPPOR OPN/FACILITIES			
	1a1	1b1	1c1	1d1	1e1	2a1	2b1	2b2	2c1	2d1	2e1	3a1	3b1	3c1	3c2	3d1	3d2	3e1	3e2	3f1	4a1	4a2	4a3	4b1	4c1	5a1	5a3	5b1	6a1	6b1	6c1	6d1
Native American Air Ambulance					M							M																				M
Good Samaritan Medical Center					M							M																				M

M - Met (No Deficiency or ARCA(s) Assessed and no Unresolved ARCAs from Prior Exercises
N - Not Demonstrated as Scheduled (Reason Explained in Section IV.B)
D - Deficiency

A - ARCA(s) Assessed or Unresolved ARCA(s) from Prior Exercises
Blank - Not Scheduled for Demonstration

The following are definitions of the two types of exercise issues that are discussed in this report.

- A **Deficiency** is defined in the FEMA REP Program Manual as "...an observed or identified inadequacy of organizational performance in an exercise that could cause a finding that off-site 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."

- An **ARCA** is defined in the FEMA REP Program Manual. 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."

FEMA has developed a standardized system for numbering exercise issues (Deficiencies and ARCAs). This system is used to achieve consistency in numbering exercise issues among FEMA Regions and site-specific exercise reports within each Region. It is also used to expedite tracking of exercise issues on a nationwide basis.

The identifying number for Deficiencies and ARCAs includes the following elements, with each element separated by a hyphen (-).

- **Plant Site Identifier** - A two-digit number corresponding to the Utility Billable Plant Site Codes.

- **Exercise Year** - The last two digits of the year the exercise was conducted.

- **Evaluation Area Criterion** - A letter and number corresponding to the criteria in the FEMA REP Program Manual.

- **Issue Classification Identifier** - (D = Deficiency, A = ARCA). Only Deficiencies and ARCAs are included in exercise reports.

- **Exercise Issue Identification Number** - A separate two (or three) digit indexing number assigned to each issue identified in the exercise.

B. Status of Jurisdictions Evaluated

This subsection provides information on the evaluation of each participating jurisdiction and functional entity, in a jurisdiction based, issues only format. Presented below is a definition of the terms used in this subsection relative to objective demonstration status.

- **Met** - Listing of the demonstrated exercise evaluation area criteria under which no Deficiencies or ARCAs were assessed during this exercise and under which no ARCAs assessed during prior exercises remain unresolved.

- **Deficiency** - Listing of the demonstrated exercise evaluation area criteria under which one or more Deficiencies was assessed during this exercise. Included is a description of each Deficiency and recommended corrective actions.

- **Area Requiring Corrective Actions** - Listing of the demonstrated exercise evaluation area criteria under which one or more ARCAs were assessed during the current exercise or ARCAs assessed during prior exercises remain unresolved. Included is a description of the ARCAs assessed during this exercise and the recommended corrective action to be demonstrated before or during the next biennial exercise.

- **Not Demonstrated** - Listing of the exercise evaluation area criteria which were not demonstrated as scheduled during this exercise and the reason they were not demonstrated.

- **Prior ARCAs - Resolved** - Descriptions of ARCAs assessed during previous exercises that were resolved in this exercise and the corrective actions demonstrated.

- **Prior ARCAs - Unresolved** - Descriptions of ARCAs assessed during prior exercises that were not resolved in this exercise. Included is the reason the ARCA remains unresolved and recommended corrective actions to be demonstrated before or during the next biennial exercise.

TABLE 2
MEDICAL DRILL ISSUES

LOCATION	NEW ISSUE(S)	PREVIOUS ISSUE(S) RESOLVED	PREVIOUS ISSUE(S) UNRESOLVED
Native American Air Ambulance	NONE	NONE	NONE
Banner Good Samaritan Medical Center	NONE	NONE	NONE

Drill Detail

There were three criteria identified for demonstration, observation, and evaluation. All criteria were met. There are no uncorrected ARCAs from previous drills.

Patient Transfer Operations at PVNGS Site

Palo Verde Nuclear Generating Station (PVNGS) demonstrated that dosimetry and protective clothing supplies were sufficient to support emergency operations related to transfer of a contaminated/injured PVNGS employee to an air ambulance crew for transport to Banner Good Samaritan Medical Center (BGSMC).

Through interview with the PVNGS Fire Department Emergency Medical Technician (EMT), responsible for transfer of the contaminated/injured PVNGS employee to the air ambulance, it was determined that if dosimetry and protective clothing were required for the air ambulance crew, it was his responsibility to issue these items to the air ambulance crew and provide appropriate instructions for their use.

For this drill, radiological contamination was not at a level requiring dosimetry or protective clothing. The PVNGS Fire Department EMT provided for inspection an emergency kit that contained four sets of dosimetry and protective clothing that would be issued to ambulance crews if the situation so required. In each set was a thermoluminescent dosimeter (TLD) with a changeover date of February 2004, a MGP-DMC 2000S Electronic Personal Dosimeter (EPD) with a calibration due date of March 2, 2004, and a Perry Hospital Protective Clothing package containing the following items: 1 pair of shoe covers, 2 pair of latex surgical gloves, 2 plastic aprons; 2 long sleeve surgical gowns, 1 head cover, and 1 face mask. Additionally, the package contained instructions on the sequence for donning these items

PVNGS demonstrated its capability to issue appropriate dosimetry and implement emergency worker exposure control for the Native American Air Ambulance (NAAA) crew that was tasked to transport a contaminated and injured PVNGS employee to BGSMC.

For this drill, per the extent-of play, radiological contamination was not at a level that required dosimetry to be issued to the NAAA air ambulance crew and the air ambulance crew was so advised upon their arrival at the pickup point. Through interview with the PVNGS Fire Department EMT, responsible for transfer of the contaminated/injured PVNGS employee to the air ambulance crew, it was determined that if dosimetry and protective clothing were required, it was his responsibility to issue these items to the air ambulance crew and provide appropriate instructions for their use. He further advised that if dosimetry was provided to the ambulance crew, they would be directed to turn in their dosimetry upon mission completion to a PVNGS Radiological Protection Technician (RPT) that would be stationed at BGSMC.

The PVNGS Fire Department EMT provided for inspection an emergency kit containing four sets of dosimetry and protective clothing that would be issued to any ambulance crew picking up a contaminated/injured patient at PVNGS, if contamination levels were high. In each set was a

TLD with a changeover date of February 2004, a MGP-DMC 2000S EPD with a calibration due date of March 2, 2004 and a protective clothing package.

The capability to provide adequate resources and trained personnel for transport and medical care of contaminated/ injured individuals was successfully demonstrated by personnel of the PVNGS and NAAA.

Transportation of the contaminated/injured PVNGS employee to the BGSMC was via helicopter by NAAA. NAAA was notified at 0732 by PVNGS (controller call simulating Palo Verde Medical/Fire Department) of the need for a helicopter to transport a radiological contaminated/injured employee to BGSMC. Upon receiving this call, NAAA, consistent with their procedures, asked for information on type of hazardous material (Hazmat), Hazmat ID number, presence of Hazmat team, and number of patients, and this information was provided. Subsequent to this call, at 0735, the PVNGS controller alerted BGSMC that NAAA would be transporting a contaminated/injured PVNGS employee to their location for treatment.

At 0735 a Palo Verde Fire Department ambulance transporting the contaminated/injured patient and a fire truck arrived at the PVNGS helipad. The fire truck was positioned on the far side of the helipad in event of a helicopter landing/takeoff incident. The patient was properly wrapped in plastic sheeting ("cocooned") to prevent cross contamination and was strapped on a backboard that rested on a gurney. The PVNGS Fire Department EMT, accompanying the patient and responsible for transferring the victim to the NAAA air crew, advised that because there was facial contamination on the patient they would normally use a face mask but were simulating it for the comfort of the actor playing the role of the patient.

At 0741, the pilot of the NAAA helicopter reported that he would be on site in several minutes and he subsequently landed at the PVNGS helipad at 0744. The NAAA crew consisted of pilot, a flight nurse, and a flight paramedic. Upon touch down, the flight nurse and flight paramedic went to the ambulance to assess the situation. They were both wearing double sets of latex protective gloves. They were thoroughly briefed by the PVNGS Fire Department EMT on the patient's medical status and contamination locations/levels and were provided a body map showing contamination locations/levels and vital signs of the patient. The PVNGS Fire Department EMT advised the flight nurse and flight paramedic that because radiation from the patient was at a very low level, there was no need for him to provide them with dosimetry and protective clothing.

In an interview with the flight nurse and flight paramedic, before transferring the patient to the helicopter, they indicated that they had been informed they were responding to an accident scene involving a radiological contaminated victim; and they then reviewed procedures specified in their Hazmat handbook, prepared accordingly, and briefed the pilot. They further indicated awareness that upon completion of their mission, they and their helicopter would be monitored for radiological contamination and decontaminated, if necessary, prior to being allowed to depart from BGSMC.

At 0752, the patient was carefully transported from the ambulance to the NAAA helicopter and at 0755 the helicopter departed for BGSMC.

Evaluation Area Criteria Met

1.e.1; 3.a.1; 6.d.1

Deficiencies

None

Area Requiring Corrective Action

None

Prior Areas Requiring Corrective Action – Corrected

None

Prior Areas Requiring Corrective Action – Uncorrected

None

Patient Transfer Operations Between BGSMC Helipad and Treatment Area

Equipment and other supplies were sufficient and available at BGSMC to support an efficient patient transfer from the NAAA. The equipment utilized were a Ludlum Model 14C meter (calibration due 11/2004) equipped with a Ludlum model 44-3 sodium iodide end-widow probe, an SE International Instrument Division Monitor 4 meter (calibration date 5/03/2003, due annually), and a mop affixed with Masslin cloth to monitor by sweeping the path of the gurney carrying the victim accompanied by the aircraft medical crew to the radiological trauma center. In addition, Masslin cloths were available to wipe down any contamination from the interior of the NAAA Astar AS350-B2 aircraft.

For this exercise, per the extent-of-play, radiation from the victim was of very low level; therefore, dosimetry was not required for use by the NAAA crew.

The elevator from the helipad to the radiological trauma center was secured and operated by security personnel. The security personnel also maintained physical barriers from the elevator exit on the floor where the trauma center was located and only allowed access to authorized personnel.

BGSMC had a three spot helicopter pad on the top of the emergency parking building that provided sufficient space, adequate resources, and trained personnel to provide the transfer of the patient/victim to the radiological trauma center, including medical services, monitoring, and decontamination of the contaminated injured individual.

NAAA provided the transport of the contaminated injured patient from the PVNGS to BGSMC. Upon landing at 0821 the NAAA Astar AS350-B2 helicopter was met by a BGSMC medical technician from the nuclear medicine department and security personnel. The victim had been cocooned at PVNGS, monitored for contamination, and a body map prepared with contamination levels and vital signs noted. The body map was passed to the medical technician who remained at the helipad and the patient was immediately transferred from the helicopter to a hospital gurney and escorted by security and the NAAA medical staff to the trauma center for medical attention.

While the patient was taken to the radiological trauma center, the medical technician remained behind and initiated a monitoring of the path of the gurney and air medical staff to the trauma center. The sweep of the path was accomplished by use of a mop affixed with Masslin cloth. At the completion of the sweep of the path from the helicopter to the elevator and into the trauma center up to the trauma room/contaminated area, the bottom of mop was monitored with a Ludlum Model 14C meter (calibration due 11/2004) equipped with a Ludlum model 44-3 sodium iodide probe, covered with plastic, for any contamination picked up by the mop; none was detected. Additionally, the medical technician passed the victim's body map to the medical staff at this time. It is suggested that the body map remain with the patient so that it is available to the medical staff in the BGSMC trauma center.

The Masslin cloth did not move freely on the concrete of the helipad and the ramp to the elevator. It is suggested that other methods of monitoring the concrete area be investigated.

Upon the completion of the sweep of the path up to the barrier in the trauma center, the medical technician monitored the aircrew for external contamination with the instrument listed above. The crew was found to be clean. The hospital gurney, utilized to transfer the patient to the trauma center, was monitored for contamination with an SE International Instrument Division Monitor 4 meter (calibration date 5/03/2003, due annually). The gurney was found to be clean.

The aircrew, medical technician, and security personnel then reported to the helipad. Upon arrival the medical technician initiated monitoring the helicopter for contamination with the use of the SE Monitor 4 meter. The entire interior of the aircraft was monitored in addition to the exterior of the doors and handles. The helicopter was found to the clean. Following the contamination checks, the helicopter was released, and departed the helipad at 0900.

Evaluation Area Criteria Met

1.e.1; 3.a.1; 6.d.1

Deficiencies

None

Area Requiring Corrective Action

None

Prior Areas Requiring Corrective Action – Corrected

None

Prior Areas Requiring Corrective Action – Uncorrected

None

Treatment of Patient at the GSRMC Emergency Department

The capability to provide equipment and supplies sufficiently to support emergency operations was demonstrated by staff of the BGSMC in Phoenix, Arizona.

Dosimetry was issued to those persons who entered the Trauma Room/Contaminated Area (TR/CA), if they did not have it with them for their daily activities. Only three such persons were issued dosimetry during the exercise. Each person who entered the vicinity of the TR/CA was issued a TLD (issue date November 1, 2003), and an EPD Model MGP-DCM 2000S with a calibration-due date of March 2, 2004. The EPD is convertible from a dose-rate instrument to an integrating dosimeter by the push of a button. It has a range of 0-9999 mR as an integrating dosimeter.

Supplies and equipment for setting up the TR/CA and delineating the route from the elevator (from the Helipad) are kept in a sealed cabinet, stocked and maintained by PVNGS personnel. The contents of this cabinet were checked by PVNGS radiation protection personnel on November 17, 2003, and all items were found to be present. Significant items include 20 EPDs, extra batteries, protective clothing, two survey meters, masslin cloth, radiation signs, stanchions, radiation-hazard tape, two friskers, step-off pad, and 20 TLDs.

Survey meters used during this exercise in the TR/CA and adjacent areas were as follows: a Ludlum Model 14C survey instrument with attached Ludlum Model 44-3 end-window probe (calibration-due date of August 1, 2004) (range 0 – 2R/hr); and two Eberline Model RM-20 survey instruments (friskers) with attached Geiger-Muller pancake probe (calibration-due date of Mar 2, 2004) (range 0 – 500,000 counts per minute). Instruments were checked for operability by use of a one-microcurie cesium-137 source.

The capability to issue appropriate dosimetry and procedures, and to manage radiological exposure to emergency workers in accordance with plans and procedures was demonstrated by the staff of the BGSMC in Phoenix, Arizona, with the assistance of radiation protection personnel from the PVNGS.

Personnel who did not have regularly assigned TLDs and who would be required to enter the TR/CA were issued a TLD (issue date of November 1, 2003) together with an EPD Model MGP-DCM 2000S (calibration-due date of March 2, 2004). This EPD may be converted from a dose-

rate instrument to an integrating dosimeter by the push of a button. Pre-determined alarm points may be set for both the dose-rate and integrating dosimeter functions. A record of dosimetry issued was made on the specified "Dosimeter Log for Radiological Emergency" form. Initial and final readings were noted.

Staff personnel who entered the TR/CA donned protective clothing and equipment which included head covers, disposable coveralls, shoe covers, face masks, surgical gloves, plastic face-shields, disposable surgical gowns, and lead aprons. Dosimetry packets (containing the TLD and EPD) were worn outside the lead aprons, under the disposable surgical gowns, in accordance with specified procedures. Contamination control and survey techniques were excellent and would contribute to maintaining minimum exposure of the staff and patient. Staff members were aware of the decontamination action level of 100 counts per minute (cpm) above background, but their goal as stated was to remove all contamination to background levels.

The capability to provide appropriate space, adequate resources, and trained personnel to decontaminate, and provide medical services for contaminated injured individuals was demonstrated at the BGSMC in Phoenix, Arizona by medical staff of the Center assisted by a RPT from the PVNGS

The initial notification to the BGSMC staff that a contaminated injured patient would be arriving was received from PGNGS at 0735. PVNGS stated that they had a patient with an injured left leg which had been sustained in a fall, that the patient was contaminated, and that they had notified NAAA. The call was received by the Charge Nurse and the information was immediately transferred to the Trauma Nurse who verified the information by calling PVNGS at 0736. The Trauma Nurse began notification of BGSMC staff immediately following that call. Among those notified were the following: Emergency Center Environmental Services, Radiation Safety Officer, Nuclear Medicine Technicians, Safety Director, Disaster Manager, Radiation Oncology, and Security. Notification of the staff was complete by 0742.

Preparation of the TR/CA, an area designed for treatment of contaminated injured patients, began at approximately 0755. All emergency room equipment and supplies not actually needed for treatment of the patient were removed and the area was cordoned off using "Radiation Area" yellow-and-magenta tape and stanchions. Radiation Area tape was placed on the floor outlining the TR/CA. Security personnel also cordoned off the pathway over which the patient would travel from the elevator (from the Helipad area) to the TR/CA. Hospital safety rules do not permit the use of plastic on the floor area of the TR/CA because of the potential slipping hazard that it might create. The plastic floor tiles could be readily decontaminable or could be replaced, if necessary. Equipment and supplies for setup of the TR/CA were obtained from a sealed cabinet stocked and maintained by PVNGS radiation safety personnel. Lead aprons were obtained from the "lead containment case," and the specially designed decontamination trough was positioned within the TR/CA. The decontamination trough is fabricated of readily decontaminable materials, and is equipped with a tube which drains decontamination fluids into a plastic tank for subsequent disposal by PVNGS personnel.

Staff personnel who would actually be attending the patient in the TR/CA (a physician, a trauma nurse, and an RPT from PVNGS) received a TLD (issue date of November 1, 2003), ring/finger

dosimeters (issue date of November 1, 2003), and an EPD Model MGP-DCM 2000S with a calibration due date of March 2, 2004. This dosimeter may be used as a dose-rate (mR/hr) instrument or, by press of a button, as an integrating dosimeter (displaying accumulated dose in mR). It's range is 0 - 9999 mR. The pre-determined alarm set points used for this application were "5 rem per hour" and "1 rem accumulated or total dose." (It was suggested by the evaluator that the alarm set point of 5 rem per hour realistically could be lowered considerably for this application; however, the high alarm set point would not have had any substantial safety effect, because the patient had been previously monitored outside the TR/CA and was being closely monitored by hand-held survey meter while in the TR/CA for dose rate information.) TLDs, if issued from the PVNGS supply at the BGSMC, are processed by PVNGS, and the EPDs are calibrated by PVNGS at six-month intervals. Many of the hospital staff had their own (occupational) TLDs which they wear on a daily basis. A record, "Dosimeter Log for Radiological Emergency," was made for all TLDs and EPDs issued to staff. Staff personnel who would be inside the TR/CA donned the following protective clothing: headcover, disposable coveralls, shoe covers, face mask, surgical gloves, plastic face-shield, disposable surgical gown, and a lead apron. In accordance with specified procedures, the TLD/EPD packet was worn outside the lead apron but under the surgical gown.

At 0812, the RPT briefed all emergency room personnel regarding the nature of the patient's injury, her contamination condition, and how the patient would be received and transferred to the TR/CA. The TR/CA and attending staff were ready to receive the patient at 0815.

The Trauma Nurse was notified at 0801 by the Charge Nurse that a call had been received from the crew of the NAAA at 0800 that they had picked up the patient and were en route to the BGSMC emergency area. Their estimated time of arrival (ETA) was "16 minutes." Information concerning the patient's contamination and physical condition was given at that time.

The patient arrived at the emergency room at 0825 and was transferred from a hospital-supplied gurney (to which the patient had been transferred from the air ambulance) to the decontamination trough in the TR/CA at 0826. Information regarding the patient's contamination and physical condition were given by the NAAA to staff personnel within the TR/CA. The body map prepared by PVNGS personnel accompanying the patient was not immediately available to the attending staff, but the information was imparted verbally and was accurate. The body map was retrieved from the medical technician attending the Helipad area and subsequently used by TR/CA staff.

Vital signs were checked by the attending physician who checked the patient's coherence and determined her physical stability. The patient then received a complete radiation survey conducted by the PVNGS RPT. Monitoring was accomplished by use of a Eberline Model RM-20 radiation survey instrument equipped with a Geiger-Muller pancake probe protected from contamination transfer by a thin plastic cover. The Eberline Model RM-20 [range 0 – 500,000 cpm] and had a calibration-due date label attached showing a date of Mar 2, 2004. A Ludlum Model 14C radiation survey meter equipped with a Ludlum Model 44-3 end-window probe was used to monitor personnel and equipment outside the TR/CA. This instrument has a range of 0 – 2R/hr and exhibited a calibration-due date of August 1, 2004. Both instruments were checked for operability by use of one microcurie cesium-137 sources attached to the instruments.

The patient was simulated to be contaminated on the trousers (80000 cpm), face (50000 cpm), and left leg (100,000 cpm). After two decontamination procedures, using sterile saline solution, the contamination levels were reduced to background. Good decontamination practices were used, and contamination control procedures as directed by the attending RPT were excellent. Contamination monitoring techniques were very good. Nasal and mouth swabs were ordered by the physician to determine if internal contamination might be indicated, because the contamination had been on the face. These were checked by the radiation protection technician using the Eberline Model RM-20 survey instrument equipped with a Geiger-Muller pancake probe. There were no open wounds; therefore, no wound swabs were necessary. Records of measurements and samples (swabs) and patient physical condition were maintained by a recorder outside the TR/CA as work progressed inside the TR/CA. The patient's vital signs during operations within the TR/CA were checked repeatedly to assure the patient's continued stability. Staff members were aware of the procedure-specified decontamination action level of 100 cpm above background, but the RPT stated that their goal would be to reduce any contamination to background levels. Following simulated successful decontamination efforts and a post-decontamination radiation survey by the RPT, the attending physician ordered an X-ray of the injured leg. Contamination control during the X-ray procedure was also excellent. The simulated X-ray was taken at 0845.

The patient was declared ready to be transferred to other areas of the hospital, and, at 0850, the simulated transfer of the patient from the gurney containing the decontamination trough was made, using a pillow as a substitute for the patient. (Hospital safety policy is to limit any non-essential patient lifts, because of the potential for injuring lifting personnel.) A clean transfer of the simulated patient to the clean gurney was accomplished, and a final complete body survey of the patient for any residual contamination was explained fully, but simulated. (Monitoring techniques had already been fully demonstrated).

The floor area in the emergency room leading from the elevator to the TR/CA was surveyed by an RPT by use of a masslin mop swipe, which was checked for contamination by use of the same Ludlum Model 14C survey meter and Ludlum Model 44-3 end-window probe described earlier in this report.

Staff personnel who had worked inside the TR/CA removed their protective clothing in accordance with BGSMC Procedure EP 2-004A as each step was read to them, and according to verbal instruction provided by the TR/CA RPT. They exited the TR/CA by use of a step-off pad, and were given a final radiation survey at that point by a hospital RPT who had supported the TR/CA staff (from outside the TR/CA) during the patient treatment and decontamination operations.

The exercise was terminated at 0902

Evaluation Area Criteria Met

1.e.1; 3.a.1; 6.d.1

Deficiencies

None

Area Requiring Corrective Action

None

Prior Areas Requiring Corrective Action – Corrected

None

Prior Areas Requiring Corrective Action – Uncorrected

None

APPENDIX 1

ACRONYMS AND ABBREVIATIONS

The following is a list of the acronyms and abbreviations that were used in this report.

ARCA	Area Requiring Corrective Action
BGSMC	Banner Good Samaritan Medical Center
CFR	Code of Federal Regulations
cpm	counts per minute
EMT	Emergency Medical Technician
EPD	Electronic Personal Dosimeter
EPZ	Emergency Planning Zone
ETA	Estimated Time of Arrival
FEMA	Federal Emergency Management Agency
FR	Federal Register
HAZMAT	hazardous materials
mR	milliroentgen
mR/h	milliroentgen per hour
NAAAA	Native American Air Ambulance
NMT	Nuclear Medicine Technician
NRC	U.S. Nuclear Regulatory Commission
NUREG-0654	NUREG-0654/FEMA-REP-1, Rev. 1, *"Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980*
ORO	Off-site Response Organization
PVNGS	Palo Verde Nuclear Generating Station

R	Roentgen
REA	Radioactive Emergency Area
REM	Roentgen Equivalent Man
REP	Radiological Emergency Preparedness
RERP	Radiological Emergency Response Plan
R/h	Roentgen(s) per hour
RO	Radiological Officer
RPT	Radiological Protection Technician
TL	Team Leader
TLD	Thermoluminescent Dosimeter
TR/CA	Trauma Room/Containment Area

APPENDIX 2

EVALUATORS AND TEAM LEADERS

The following is a list of the personnel who evaluated the Good Samaritan Regional Medical Center medical drill on November 21, 2003. The organization which each evaluator represents is indicated by the following abbreviations:

ICF - ICF Consulting

EVALUATION SITE	EVALUATOR	ORGANIZATION
Air Evac Services	Paul Carlson	ICF
Good Samaritan Regional Medical Center	Hollis Berry	ICF
	Lyle Slagle	ICF

APPENDIX 3

EVALUATION AREA CRITERIA AND EXTENT-OF-PLAY AGREEMENT

This appendix lists the exercise evaluation area criteria that were scheduled for demonstration in the Off-site Palo Verde Nuclear Generating Station Medical Drill on November 21, 2003, and the extent-of-play agreement approved by FEMA Region IX.

The exercise evaluation area criteria, contained in the "Radiological Emergency Preparedness Exercise New Methodology" represent a functional translation of the planning standards and evaluation criteria of NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for the Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980.

Because the evaluation area criteria are intended for use at all nuclear power plant sites, and because of variations among off-site plans and procedures, an extent-of-play agreement is prepared by the State and approved by FEMA to provide evaluators with guidance on expected actual demonstration of the Evaluation area criteria.

A. Evaluation Area Criteria

Listed below is the specific radiological emergency preparedness evaluation area criteria scheduled for demonstration during this drill.

EVALUATION AREA 1: EMERGENCY OPERATIONS MANAGEMENT

Sub-element 1.e - Equipment and Supplies to Support Operations

Criterion 1.e.1: Equipment, maps, displays, dosimetry, potassium iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654, H., J.10.a.b.e.f.j.k., 11, K.3.a.)

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.a - Implementation of Emergency Worker Exposure Control

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.)

EVALUATION AREA 6: SUPPORT OPERATION/FACILITIES

Sub-element 6.d - Transportation and Treatment of Contaminated Injured Individuals

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.)

B. Extent-of-Play Agreement

The extent-of-play agreement on the following pages was submitted by the Palo Verde Nuclear Generating Station, and was approved by FEMA Region IX, in preparation for the Off-site Palo Verde Nuclear Generating Station Medical Drill on November 21, 2003. The extent-of-play agreement includes any significant modification or change in the level of demonstration of each exercise evaluation area criterion listed in Subsection A of this appendix.

2003 Off-Site Contaminated Injury Drill
Banner Good Samaritan Regional Medical Center

OBJECTIVES

In accordance with FEMA Guidance, the following objectives will be demonstrated in this exercise and evaluated by the Federal Emergency Management Agency (FEMA). Additionally, Areas Requiring Corrective Actions (ARCAs) that have been noted in the FEMA drill report for the November 6th, 2002 evaluated drill at Maryvale Medical Center may be re-evaluated for closure.

ARCA 45-02-6.d.1-A1	**Victim transfer to Emergency Room**
Recommendation	Provide additional training to ARRA personnel

EVALUATION AREA 1: EMERGENCY OPERATIONS MANAGEMENT

Sub-element 1e – Equipment and Supplies to Support Operations

Criterion 1.e.1: Equipment, maps, displays, dosimetry, potassium iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654, H.7, 10; J.10.a, b, e, J.11; K.3.a)

EVALUATION AREA 2: PROTECTIVE ACTION DECISION-MAKING

Sub-element 2a – Emergency Worker Exposure Control

Criterion 2.a.1: OROs use a decision-making process, considering relevant factors and appropriate coordination, to insure that an exposure control system, including the use of KI, is in place for emergency workers including provisions to authorize radiation exposure in excess of administrative limits or protective action guides. (NUREG-0654K.4, J.10.e, f)

EVALUATION AREA 6: SUPPORT OPERATIONS/FACILITIES

Sub-element 6.d – Transportation and treatment of Contaminated Injured Individuals

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)

2003 Off-Site Contaminated Injury Drill
Banner Good Samaritan Regional Medical Center

CONTROLLER DESIGNATIONS

No.	Location / Function	Name	Telephone	Pager
C-1	Lead Controller	T. Schoech	623-393-2165	2747
C-2	Hospital Medical Controller	L. Cano		N/A
C-3	Hospital RP Controller	S. Bell	623-393-3723	N/A

EXTENT OF PLAY

All activities described in this exercise scenario will be demonstrated unless agreed upon by the Lead Controller and the Lead Evaluator or described in the Extent Of Play section of the scenario. Re-demonstrated of activities in which a player has failed to properly execute a portion of a responsibility will be allowed when this action does not impede flow of the exercise. The victim and Palo Verde Fire will be pre-staged at an agreed upon location for an air ambulance pick-up. The survey techniques and procedures used to move the patient from the REA onto a gurney from transport to the ward will be done by interview. Additionally the survey and decontamination procedure for the REA, pathway to the heliport, and the helicopter and aircrew will also be conducted by interview.

The exercise will be terminated when the patient is cleared for removal to a hospital ward.

NOTE:

- Times associated with messages are approximate.
- Significant deviations in time frames or anticipated response activities Shall be communicated to and resolved in coordination with the Lead Controller and Lead Evaluator.

APPENDIX 4

SCENARIO

This appendix contains a summary of the simulated sequence of events -- Scenario -- that was used as the basis for invoking emergency response actions by OROs in the Off-site Palo Verde Nuclear Generating Station Medical Drill on November 21, 2003.

This exercise scenario was submitted by the Palo Verde Nuclear Generating Station, and approved by FEMA Region IX.

2003 Off-Site Contaminated Injury Drill
Banner Good Samaritan Regional Medical Center

Medical Scenario

General Situation

A plant worker was performing a routine maintenance activity when she sustained a laceration to her right leg. This laceration was sustained after a fall from a latter. The laceration was contaminated by material on the floor of the area in which the maintenance was being preformed.

The exercise scenario will begin at the point where the victim is handed off to an air ambulance service for transport to Banner Good Samaritan Regional Medical Center (BGSRMC).

The victim as well as the PV Fire Department personnel will be pre-staged to facility this hand off.

As the drill begins the victim will be located in a PV Fire Department vehicle at the designated transfer location.