



Calvert Cliffs Nuclear  
Power Plant  
Medical Services Drill  
After Action Report/Improvement Plan  
Drill Date – June 13, 2017  
Radiological Emergency Preparedness Program



FEMA

*Published July 20, 2017*

# Calvert Cliffs Nuclear Power Plant

## Medical Services Drill

### After Action Report/Improvement Plan

*Published Date: July 20, 2017*

#### Contents

|  |           |
|--|-----------|
| <b>EXECUTIVE SUMMARY .....</b>                       | <b>3</b>  |
| <b>SECTION 1: EXERCISE OVERVIEW .....</b>            | <b>4</b>  |
| 1.1 Drill Details .....                              | 4         |
| 1.2 Planning Team Leadership .....                   | 4         |
| 1.3 Participating Organizations.....                 | 5         |
| <b>SECTION 2: DESIGN SUMMARY.....</b>                | <b>6</b>  |
| 2.1 Purpose and Design .....                         | 6         |
| 2.2 Objectives, Capabilities and Activities.....     | 7         |
| 2.3 Scenario Summary .....                           | 8         |
| <b>SECTION 3: ANALYSIS OF CAPABILITIES.....</b>      | <b>9</b>  |
| 3.1 Evaluation and Results.....                      | 9         |
| 3.2 Summary Results of Evaluation .....              | 9         |
| 3.3 Criteria Evaluation Summaries.....               | 12        |
| 3.3.1 Risk Jurisdictions.....                        | 12        |
| <b>SECTION 4: CONCLUSION.....</b>                    | <b>13</b> |
| <b>APPENDIX A: EVALUATORS AND TEAM LEADERS .....</b> | <b>14</b> |
| <b>APPENDIX B: ACRONYMS AND ABBREVIATIONS.....</b>   | <b>15</b> |
| <b>APPENDIX C: EXTENT-OF-PLAY AGREEMENT .....</b>    | <b>16</b> |

This page is intentionally blank.

## EXECUTIVE SUMMARY

On June 13, 2017 a Medical Services Drill was conducted for the 10-mile Plume Exposure Pathway, Emergency Planning Zone (EPZ) around the Calvert Cliffs Nuclear Power Plant (CCNPP) by the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region III. The most recent prior Medical Services for this site was conducted on June 19, 2015.

The purpose of the CCNPP Medical Services Drill was to assess the State and local offsite response organizations preparedness in responding to a radiological medical emergency. The Drill was held in accordance with FEMA's policies and guidance concerning the evaluation of State and local Radiological Emergency Response Plans (RERP) and procedures.

FEMA wishes to acknowledge the efforts of the many individuals in the State of Maryland, St. Mary's County Emergency Management Agency, MedStar St. Mary's Hospital and the Hollywood Volunteer Rescue Squad, who were evaluated during this Drill.

Protecting the public health and safety is the full-time job of some of the Drill participants and an additional assigned responsibility for others. Still others have willingly sought this responsibility as volunteers providing vital emergency services twenty-four (24) hours a day to the communities in which they live. Cooperation and teamwork of all the participants was observed during this Drill.

This report contains the final evaluation of the Drill. The State of Maryland and local organizations demonstrated knowledge of their emergency response plans and procedures and adequately implemented them. There were no Level 1 or Level 2 Findings or Plan Issues as a result of this Drill.

## SECTION 1: EXERCISE OVERVIEW

### 1.1 Drill Details

Drill Name

MedStar St. Mary's Hospital 2017 Medical Services Drill

Type of Drill

Medical Services

Drill Date

June 13, 2017

Program

Department of Homeland Security/FEMA Radiological Emergency Preparedness Program

Scenario Type

Radioactive Contaminated/Injured Person

### 1.2 Planning Team Leadership

Patricia Gardner  
Technological Hazards Program Specialist  
Federal Emergency Management Agency  
One Independence Mall  
615 Chestnut Street  
Philadelphia, PA 19106  
(202) 329-7573  
Patricia.Gardner2@fema.dhs.gov

Nicole Markuski  
Training & Exercise Administrator  
Maryland Emergency Management Agency  
5401 Rue Saint Lo Drive  
Reisterstown, MD 21136  
nicole.markuski@maryland.gov  
410-517-3600 (office)  
443-204-1948 (cell)

Rick Woods  
Sr Emergency Preparedness Specialist  
Exelon Generation  
1650 Calvert Cliffs Parkway Lusby, MD, 20657  
Wk 410-495-3866  
Cell 443-532-0571  
rick.woods@exeloncorp.com

### 1.3 Participating Organizations

Agencies and organizations of the following jurisdictions participated in the TMI 2016 Medical Services Drill:

#### State Jurisdictions

- Maryland Emergency Management Agency

#### Risk Jurisdictions

- St. Mary's County Emergency Management Agency
- St Mary's County Emergency Services & Technology
- St. Mary's County Health Department

#### Private Sector Organizations

- MedStar St. Mary's Hospital
- Hollywood Volunteer Rescue Squad (HVRs)

## SECTION 2: DESIGN SUMMARY

### 2.1 Purpose and Design

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

44 CFR 350 establishes the policies and procedures for FEMA's initial and continued approval of 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:

- A. Taking the lead in offsite emergency planning and in the review and evaluation of radiological emergency response plans and procedures developed by State and local governments;
- B. 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;
- C. Responding to requests by the U.S. Nuclear Regulatory Commission (NRC) pursuant to the Memorandum of Understanding between the NRC and FEMA dated December 7, 2015 (Federal Register, Vol. 81, No. 57, March 24, 2016) and;
- D. Coordinating the activities of the following 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
  - U.S. Food and Drug Administration

Representatives of these agencies serve on the Region III Regional Assistance Committee (RAC), which is chaired by FEMA. A REP Medical Services Drill was conducted on June 13, 2017, to assess the capabilities of State and local emergency preparedness organizations in implementing their radiological emergency response plans and procedures to protect the public health and safety during a radiological emergency involving CCNPP.

The purpose of this After Action Report is to present the Drill results, and findings on the performance of the Off-site Response Organizations (OROs) during a simulated radiological emergency involving a contaminated injured individual.

The Drill was designed to demonstrate and evaluate the responder's knowledge of patient and responder personal protective measures, equipment preparation and employment, and decontamination procedures. All activities were demonstrated in accordance with the participants' plans and procedures as they would be performed in an actual emergency, except as agreed to in the Exercise Plan and Extent-of-Play Agreement.

The findings presented in this report are based on the evaluations of the Federal evaluator team, with final determinations made by the FEMA Region III RAC Chairperson and approved by FEMA Headquarters. These reports are provided to the NRC and participating States. State and local governments utilize the findings contained in these reports for the purposes of planning, training, and improving emergency response capabilities.

- Section 1 of this report, entitled Overview, presents the Exercise Planning Team and the Participating Organizations.
- Section 2 of this report, entitled Design Summary, and includes the Purpose and Design, Objectives, Capabilities, and Activities, and the Scenario Summary.
- Section 3 of this report entitled Analysis of Capabilities contains detailed Evaluation and Results; a Summary Results of Evaluation; and Criteria Evaluation Summary. Information on the demonstration for each jurisdiction or functional entity evaluated is presented in a jurisdiction-based, issue-only format.
- Section 4 of this report entitled Conclusion, is a description of FEMA's overall assessment of the capabilities of the participating organizations.

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

- 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;
- Radiological Emergency Preparedness Program Manual, January 2016

## **2.2 Objectives, Capabilities and Activities**

The CCNPP Medical Services Drill evaluated by FEMA, was designed to demonstrate that the ORO can transport, transfer, monitor, decontaminate and treat a contaminated/injured person while minimizing any cross contamination during a radiological emergency.



The demonstration included the ability to:

- A. Respond to a radiation medical emergency following St. Mary's County Emergency Management Agency, MedStar St. Mary's Hospital (MSSMH) and the Maryland Institute for Emergency Medical Systems Services (MIEMSS) procedures.
- B. Monitor for radiation contamination and uptake, and to validate persons providing these services are adequately prepared to handle contaminated individuals.
- C. Conduct timely and accurate communications between the hospital and offsite response agencies.
- D. Exhibit correct priorities and appropriate techniques in Emergency Medical Services (EMS); transportation of patients; and pre-hospital and hospital emergency care of radioactively contaminated patients.
- E. Demonstrate inter-agency cooperation between the Ambulance Service/EMS and the hospital.

### 2.3 Scenario Summary

The exercise scenario for this Medical Services Drill consisted of simulated notifications of escalating emergency classification levels at CCNPP from Site Area Emergency to General Emergency. State and local governments concurred on a protective action to evacuate affected areas the Emergency Planning Zone. The participants simulated the evacuation of Planning Action Zones 6 and 7.

An emergency worker assigned to monitor the plume was injured in a fall and suffered a broken lower leg and radioactive contamination. Other emergency workers on the scene assessed the situation and notify Saint Mary's County 911. The County 911 center notified Hollywood Rescue Squad, St Mary's County Emergency Services and Technology, and MedStar St Mary's Hospital. The hospital initiated its "Code Orange Plan".

The patient was transported by a coworker to a reception center where emergency medical assistance was available. Emergency Medical Technicians (EMTs) at the reception center assessed the patient, implemented gross decontamination, immobilized the injury, and transported him to the hospital.

At the hospital the patient was monitored for radiological contamination and decontaminated. Subsequently the patient was transitioned to a clean gurney and taken for examination and treatment of the injury.

## SECTION 3: ANALYSIS OF CAPABILITIES

### 3.1 Evaluation and Results

Contained in this section are the results and findings of the evaluations of all jurisdictions and locations that participated in the June 13, 2017 CCNPP Medical Services Drill. The Drill was conducted to demonstrate the ability of the OROs to respond to a potentially contaminated injured person associated with CCNPP.

Each jurisdiction and functional entity was evaluated on the basis of its demonstration of the appropriate Demonstration Criteria contained in the REP Program Manual. Detailed information on the Demonstration Criteria and the Extent-of-Play Agreement are found in Appendix C.

The Drill was conducted and evaluated in accordance with the Radiological Emergency Preparedness Program Manual (January 2016) and NUREG-0654/FEMA-REP-1, Rev. 1. The Demonstration Criteria included:

- 1.e.1 Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI) and other supplies are sufficient to support emergency operations.
- 3.a.1 The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans/procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. OROs maintain appropriate record-keeping of the administration of KI to emergency workers.
- 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.

### 3.2 Summary Results of Evaluation

The matrix presented in Table 3.1, on the following pages, presents the status of the Demonstration Criteria from the REP Program Manual that were scheduled for demonstration during this Drill by all participating jurisdictions and functional entities. Drill Demonstration Criteria are listed by number and the demonstration status of the criteria is indicated by the use of the following letters:

(L1) Level 1 Finding: An observed or identified inadequacy of organizational performance in an exercise that could cause a determination that offsite emergency preparedness is not adequate to provide reasonable assurance that appropriate protective measures can be taken in event of a radiological emergency to protect the health and safety of the public living in the vicinity of a Nuclear Power Plant (NPP).

(L2) Level 2 Finding: An observed or identified inadequacy of organizational performance in an exercise that is not considered, by itself, to adversely impact public health and safety.

(P) Plan Issue: An observed or identified inadequacy in the off-site response organizations' emergency plan/implementing procedures, rather than that of the ORO's performance.

(N) Not Demonstrated: The term applied to the status of a REP Evaluation Area Criterion indicating that the ORO, for a justifiable reason, did not demonstrate the Evaluation Area Criterion, as required in the Extent-of-Play Agreement or at the two-year or eight-year interval required in the FEMA REP Program Manual.

(M) Met: The status of a REP Evaluation Area Criterion indicating that the participating ORO demonstrated all demonstration criteria for the Evaluation Area Criterion to the level required in the Extent-of-Play Agreement with no findings assessed in the current exercise and no unresolved prior findings.

**Table 3.1 – Summary of Drill Evaluation**

| Date: 2017 June 13<br>Site: Calvert Cliffs Nuclear Power Plant           |     |   | MSSMH | HVRS |
|--|-----|---|-------|------|
| (M) Met, (1) Level 1 Finding, (2) Level 2 Finding, (P) Planning Issue    |     |   |       |      |
| Emergency Operations Management  |     |   |       |      |
| Mobilization   | 1a1 |   |       |      |
| Facilities   | 1b1 |   |       |      |
| Direction and Control  | 1c1 |   |       |      |
| Communications   | 1d1 |   |       |      |
| Equipment and Supplies to Support Operations                             | 1e1 | M |       | M    |
| Protective Action Decision Making  |     |   |       |      |
| Emergency Worker Exposure Control  | 2a1 |   |       |      |
| Accident Assessment and Plans for the Emergency Event                    | 2b1 |   |       |      |
| PAD decision-making process and coordination for the General Public      | 2b2 |   |       |      |
| PADs for disabilities & access/functional needs people                   | 2c1 |   |       |      |
| Radiological Assessment & Decision making for the Ingestion Pathway      | 2e1 |   |       |      |
| Radiological Assessment & Decision making for Relocation/Reentry/Return  | 2d1 |   |       |      |
| Protective Action Implementation   |     |   |       |      |
| Implementation of Emergency Worker Exposure Control                      | 3a1 | M |       | M    |
| Implementation of KI PAD for Institutionalized Individuals/Public        | 3b2 |   |       |      |
| Implementation of PADs for disabilities & access/functional needs people | 3c1 |   |       |      |
| Implementation of PADS for Schools                                       | 3c2 |   |       |      |
| Implementation of Traffic and Access Control                             | 3d1 |   |       |      |
| Impediments to Evacuation  | 3d2 |   |       |      |
| Implementation of Relocation/Reentry/Return Decisions                    | 3f1 |   |       |      |
| Field Measurements and Analysis  |     |   |       |      |
| RESERVED   | 4a1 |   |       |      |
| Field Team Management  | 4a2 |   |       |      |
| Plume Phase Field Measurement, Handling, & Analyses                      | 4a3 |   |       |      |
| Post Plume Phase Field Measurements & Sampling                           | 4b1 |   |       |      |
| Emergency Notification and Public Information                            |     |   |       |      |
| Activation of the Prompt Alert & Notification System (ANS)               | 5a1 |   |       |      |
| RESERVED   | 5a2 |   |       |      |
| Activation of the Back-up ANS  | 5a3 |   |       |      |
| Activation of the Exception Area ANS                                     | 5a4 |   |       |      |
| Emergency Information & Instructions to the Public/Media                 | 5b1 |   |       |      |
| Support Operations/Facilities  |     |   |       |      |
| Monitoring, Decontamination, & Registration of Evacuees                  | 6a1 |   |       |      |
| Monitoring/Decontamination of Emergency Workers and Equipment            | 6b1 |   |       |      |
| Temporary Care of Evacuees   | 6c1 |   |       |      |
| Transportation/Treatment of Contaminated Injured Individuals             | 6d1 | M |       | M    |

### **3.3 Criteria Evaluation Summaries**

#### **3.3.1 Risk Jurisdictions**

In summary, the status of DHS/FEMA criteria for this location are as follows:

##### **3.3.1.1 St. Mary's County, MedStar St. Mary's Hospital**

- a. MET: 1.e.1; 3.a.1; 6.d.1
- b. LEVEL 1 FINDINGS: NONE
- c. LEVEL 2 FINDINGS: NONE
- d. PLAN ISSUES: NONE
- e. PRIOR ISSUES – RESOLVED: NONE
- f. PRIOR ISSUES – UNRESOLVED: NONE

##### **3.3.1.2 St. Mary's County, Hollywood Volunteer Rescue Squad**

- a. MET: 1.e.1; 3.a.1; 6.d.1
- b. LEVEL 1 FINDINGS: NONE
- c. LEVEL 2 FINDINGS: NONE
- d. PLAN ISSUES: NONE
- e. PRIOR ISSUES – RESOLVED: NONE
- f. PRIOR ISSUES – UNRESOLVED: NONE

## SECTION 4: CONCLUSION

The State of Maryland and private sector organizations, except where noted in this report, demonstrated knowledge of their radiological emergency response plans and procedures and they were successfully implemented during the CCNPP Medical Services Drill evaluated on June 13, 2017.

Two FEMA evaluators provided analyses of six evaluation criteria. These analyses resulted in a determination of no Findings, no new Plan Issues, and no unresolved Plan Issues.

The Hollywood Volunteer Rescue Squad successfully demonstrated appropriate space, adequate resources, and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals. EMS personnel prioritized life-saving medical practices over contamination concerns, implemented protective measures through the use of Personal Protective Equipment, regular glove changes, and control of cross contamination. Appropriate patient assessments were demonstrated as well as regular and ongoing communications with MedStar St. Mary's Hospital.

The MedStar St. Mary's Hospital successfully demonstrated the mobilization of staff, staffing assignments, issue of dosimetry and monitoring equipment, and effective use of Personal Protective Equipment during the exercise. The hospital staff effectively responded to communications from the AREMS, initiated the set-up and management of a Radiation Emergency Area, and accepted and successfully treated an injured/contaminated patient while administering life-saving medical attention over contamination concerns. In addition, the medical facility provided security control of the facility including the drop off bay for the patient and overall protective measures for contamination control and prevention of cross contamination.

Based on the results of the Drill and a review of the offsite radiological emergency response plans and procedures submitted, FEMA Region III has determined they are adequate (meet the planning and preparedness standards of NUREG-0654/FEMA-REP-1, Revision 1, November 1980, as referenced in 44 CFR 350.5) and there is reasonable assurance they can be implemented, as demonstrated during this Drill.

An Improvement Plan (IP) will not be developed as part of this report.

## APPENDIX A: EVALUATORS AND TEAM LEADERS

The following is the list of Evaluators and Team Leaders for the CCNPP 2017 Medical Services Drill evaluated on June 13, 2017. The following constitutes the managing staff for the Evaluation:

- Thomas Scardino, DHS/FEMA, Regional Assistance Committee Chairman
- Patricia Gardner, DHS/FEMA, Technological Hazards Program Specialist, Lead Evaluator

DATE: June 13, 2017

SITE: Calvert Cliffs Nuclear Power Plant

| LOCATION                                  | EVALUATOR        | AGENCY    |
|---|------------------|-----------|
| MedStar St. Mary's Hospital               | Patricia Gardner | FEMA RIII |
| St. Mary's County, Hollywood Rescue Squad | Nicholas Buls    | FEMA RIII |

## APPENDIX B: ACRONYMS AND ABBREVIATIONS

| Acronym | Meaning   |
|---------|---|
| ANS     | Alert and Notification System                             |
| CCNPP   | Calvert Cliffs Nuclear Power Plant                        |
| CFR     | Code of Federal Regulations                               |
| cpm     | Counts Per Minute   |
| DHS     | Department of Homeland Security                           |
| EMS     | Emergency Medical Services                                |
| EMT     | Emergency Medical Technician                              |
| EPZ     | Emergency Planning Zone                                   |
| FEMA    | Federal Emergency Management Agency                       |
| HVRS    | Hollywood Volunteer Rescue Squad                          |
| IP      | Improvement Plan  |
| MIEMSS  | Maryland Institute for Emergency Medical Systems Services |
| MSSMH   | MedStar St. Mary's Hospital                               |
| NPP     | Nuclear Power Plant                                       |
| NRC     | Nuclear Regulatory Commission                             |
| ORO     | Offsite Response Organization                             |
| PAD     | Protective Action Decision                                |
| RAC     | Regional Assistance Committee                             |
| REP     | Radiological Emergency Preparedness                       |



## APPENDIX C: EXTENT-OF-PLAY AGREEMENT

The enclosed Extent of Play was created as an overall tool for facilitation and implementation of the 2017 CCNPP MedStar St. Mary's Hospital Medical Services Drill and to integrate the concepts and policies of the Homeland Security Exercise Evaluation Program with the Radiological Emergency Preparedness Program Exercise Methodology.

The "MedStar St. Mary's Hospital 2017 Medical Services Drill Extent of Play" was agreed upon by FEMA Region III, MEMA, and the emergency management agencies of the participants.

For the purposes of this report, the terms exercise and drill are synonymous.

MedStar St. Mary's Hospital 2017 Medical Services Drill Extent of Play

### **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. (NUREG0654/FEMA-REP-1, H.7, 10; I.7, 8, 9; J.10.a.b.e; J.11, 12; K.3.a; K.5.b)

#### **INTENT**

This sub-element is derived from NUREG-0654 REP-1, which requires that OROs have emergency equipment and supplies adequate to support the emergency response.

#### **EXTENT OF PLAY**

Assessment of this Demonstration Criterion is accomplished primarily through a baseline evaluation and subsequent periodic inspections. A particular facility's equipment and supplies must be sufficient and consistent with that facility's assigned role in the ORO's emergency operations plans. Use of maps and other displays is encouraged. For non-facility-based operations, the equipment and supplies must be sufficient and consistent with the assigned operational role. At locations where traffic and access control personnel are deployed, appropriate equipment (e.g., vehicles, barriers, traffic cones, and signs) must be available, or their availability described.

Specific equipment and supplies that must be demonstrated under this criterion include KI inventories, dosimetry, and monitoring equipment, as follows:

KI: Responsible OROs must demonstrate the capability to maintain inventories of KI sufficient for use by: (1) emergency workers; (2) institutionalized individuals, as indicated in capacity lists for facilities; and (3) where stipulated by the plans/procedures, members of the general public (including transients) within the plume pathway EPZ. In addition, OROs must demonstrate provisions to make KI available to specialized response teams (e.g., civil support team, Special Weapons and Tactics Teams, urban search and rescue, bomb squads, HAZMAT, or other ancillary groups) as identified in plans/procedures. The plans/procedures must include the forms to be used for documenting emergency worker ingestion of KI, as well as a mechanism for identifying emergency workers that have declined KI in advance. Consider carefully the placement of

emergency workers that have declined KI in advance.

ORO quantities of dosimetry and KI available and storage locations(s) will be confirmed by physical inspection at the storage locations(s) or through documentation of current inventory submitted during the exercise, provided in the ALC submission, and/or verified during an SAV. Available supplies of KI must be within the expiration date indicated on KI bottles or blister packs. As an alternative, the ORO may produce a letter from certified private or State laboratory indicating that the KI supply remains potent in accordance with U.S. Pharmacopoeia standards.

Dosimetry: Sufficient quantities of appropriate direct-reading and permanent record dosimetry and dosimeter chargers must be available for issuance to all emergency workers who will be dispatched to perform an ORO mission. In addition, OROs must demonstrate provisions to make dosimetry available to specialized response teams (e.g. civil support team, Special Weapons and Tactics Teams, urban search and rescue, bomb squads, HazMat, or other ancillary groups) as identified in plans/procedures.

Appropriate direct-reading dosimetry must allow an individual(s) to read the administrative reporting limits and maximum exposure limits contained in the ORO's plans/procedures.

Direct-reading dosimeters must be zeroed or operationally checked prior to issuance. The dosimeters must be inspected for electrical leakage at least annually and replaced when necessary. Civil Defense Victoreen Model 138s (CD V-138s) (0-200 mR), due to their documented history of electrical leakage problems, must be inspected for electrical leakage at least quarterly and replaced when necessary. This leakage testing will be verified during the exercise through documentation submitted in the ALC and/or through an SAV.

Operational checks and testing of electronic dosimeters must be in accordance with the manufacturer's instructions and be verified during the exercise, through documentation submitted in the ALC and/or through an SAV.

Monitoring Instruments: All instruments must be inspected, inventoried, and operationally checked before each use. Instruments must be calibrated in accordance with the manufacturer's recommendations. Unmodified CDV-700 series instruments and other instruments without a manufacturer's recommendation must be calibrated annually. Modified CDV-700 instruments must be calibrated in accordance with the recommendation of the modification manufacturer. A label indicating such calibration must be on each instrument or calibrated frequency can be verified by other means. In addition, instruments being used to measure activity must have a sticker-affixed to their sides indicating the effective range of the readings. The range of readings documentation specifies the acceptable range of readings that the meter should indicate when it is response-checked using a standard test source.

For Field Monitoring Teams (FMTs), the instruments must be capable of measuring gamma exposure rates and detecting beta radiation. These instruments must be capable of measuring a range of activity and exposure, including radiological protection/ exposure control of team members and detection of activity on air sample collection media, consistent with the intended use of the instrument and the ORO's plans/procedures. An appropriate radioactive check source must be used to verify proper operational response for each low-range radiation measurement

instrument (less than 1R/hr.) and for a high-range instruments when available. If a source is not available for a high-range instrument, a procedure must exist to operationally test the instrument before entering an area where only a high-range instrument can make useful readings.

In areas where portal monitors are used, the OROs must set up and operationally check the monitor(s). The monitor(s) must confirm to the standards set forth in the Contamination Monitoring Standard for a Portal Monitor Used for Emergency Response, FEMA-REP-21 (March 1995) or in accordance with the manufacturer's recommendations.

Mutual Aid Resources: If the incoming resources arriving with their own equipment (i.e., monitors and/or dosimetry), they will be evaluated by REP Program standards. FEMA will not inventory equipment that is not part of the REP Program. If an agency has a defined role in the REP Plan, they are subject to the planning process and standards, as well as the guidance of this Manual.

All activities must be based on the ORO's plans/procedures and completed at they would be in an actual emergency, unless noted above or otherwise specified in the Extent-of-Play Agreement.

#### **State of Maryland Extent of Play**

All activities will be based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in this extent of play agreement. St Mary's County emergency workers may substitute electronic personnel dosimetry for the self-reading dosimeters. KI will not be issued to emergency workers for a contaminated injured response. Calibration and electrical leakage testing of dosimetry will be evaluated with the State of Maryland Annual Letter of Certification.

#### **Locations evaluated**

MedStar St Mary's Hospital  
Hollywood Volunteer Rescue Squad  
St Mary's County Health Department

#### **Outstanding Issues**

None

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

Criterion 3.a.1: The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans/procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. OROs maintain appropriate record-keeping of the administration of KI to emergency workers. (NUREG-0654/FEMA-REP-1, K.3.a, b; K.4)

#### **INTENT**

This Sub-element is derived from NUREG-0654/FEMA-REP-1, which requires that OROs have the capability to provide for the following: distribution, use, collection, and processing of direct-reading dosimetry and permanent record dosimetry; reading of direct-reading dosimetry by emergency workers at appropriate frequencies; maintaining a radiation dose record for each emergency worker; establishing a decision chain or authorization procedure for emergency workers to incur radiation exposures in excess of the Protective Action Guides (PAGs), and the capability to provide KI for emergency workers, always applying the “as low as is reasonably achievable” principle as appropriate.

#### **EXTENT OF PLAY**

Assessment of this Demonstration Criterion may be accomplished during a full-scale, functional or tabletop exercise. Other means may include drills, seminars or training activities that would fully demonstrate technical proficiency. OROs must demonstrate the capability to provide emergency workers (including supplemental resources) with the appropriate direct-reading and permanent record dosimetry, dosimeter chargers, KI, and instructions on the use of these items. For evaluation purposes, appropriate direct-reading dosimetry is defined as dosimetry that allows an individual(s) to read the administrative reporting limits that are pre-established at a level low enough to consider subsequent calculation of TEDE and maximum exposure limits, for those emergency workers involved in lifesaving activities, contained in the ORO's plans/procedures. Each emergency worker must have basic knowledge of radiation exposure limits as specified in the ORO's plans/procedures. If supplemental resources are used, they must be provided with just-in-time training to ensure basic knowledge of radiation exposure control. Emergency workers must demonstrate procedures to monitor and record dosimeter readings and manage radiological exposure control.

During a plume phase exercise, emergency workers must demonstrate the procedures to be followed when administrative exposure limits and turn-back values are reached. The emergency worker must report accumulated exposures during the exercise as indicated in the plans/procedures. OROs must demonstrate the actions described in the plans/procedures by determining whether to replace the worker, authorize the worker to incur additional exposures, or take other actions. If exercise play does not require emergency workers to seek authorizations for additional exposure, evaluators must interview at least two workers to determine their knowledge of whom to contact in case authorization is needed, and at what exposure levels. Workers may use any available resources (e.g., written procedures and/or coworkers) in providing responses.

Although it is desirable for all emergency workers to each have a direct-reading dosimeter, there may be situations where team members will be in close proximity to each other during the entire

mission. In such cases, adequate control of exposure can be achieved for all team members using one direct-reading dosimeter worn by the team leader. Emergency workers assigned to low-exposure rate fixed facilities (e.g., EOCs and communications center within the EPZ, reception centers, and counting laboratories) may have individual direct-reading dosimeters or they may be monitored using group dosimetry (i.e., direct-reading dosimeters strategically placed in the work area). Each team member must still have his or her own permanent record dosimetry. Individuals authorized by the ORO to reenter an evacuated area during the plume (emergency) phase, must be limited to the lowest radiological exposure commensurate with completing their missions.

OROs may have administrative limits lower than EPA-400-R-92-001 dose limits for emergency workers performing various services (e.g., lifesaving, protection of valuable property, all activities). OROs must ensure that the process used to seek authorization for exceeding dose limits does not negatively impact the capability to respond to an incident where lifesaving and/or protection of valuable property may require an urgent response.

OROs must demonstrate the capability to accomplish distribution of KI to emergency workers consistent with decisions made. OROs must have the capability to develop and maintain lists of emergency workers who have ingested KI, including documentation of the date(s) and time(s) they did so. Ingestion of KI recommended by the designated ORO health official is voluntary. For evaluation purposes, the actual ingestion of KI shall not be performed. OROs must demonstrate the capability to formulate and disseminate instructions on using KI for those advised to take it. Emergency workers must demonstrate basic knowledge of procedures for using KI whether or not the scenario drives the implementation of KI use. This can be accomplished by an interview with the evaluator.

All activities must be based on the ORO's plans/procedures and completed as they would be in an actual emergency, unless noted above or otherwise specified in the Extent-of-Play Agreement.

#### **State of Maryland Extent of Play**

All activities will be based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in the extent of play agreement. Certain portions of the FEMA extent of play will not be evaluated in the medical drill scenario.

#### **Locations evaluated**

St Mary's County Environmental Health  
MedStar St Mary's Hospital  
Hollywood Volunteer Rescue Squad

#### **Outstanding Issues**

None

## **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/FEMA-REP-1, F.2; H.10; K.5.a, b; L.1, 4)

### INTENT

This Sub-element is derived from NUREG-065/FEMA-REP-1, which requires that OROs have the capability to transport contaminated injured individuals to medical facilities with the capability to provide medical services.

### EXTENT OF PLAY

Assessment of this Demonstration Criterion may be accomplished during a biennial exercise, an actual event, or drills. FEMA has determined that these capabilities have been enhanced and consistently demonstrated as adequate; therefore, offsite medical services drills need only be evaluated biennially. FEMA will, at the request of the ORO, continue to evaluate the drills on an annual basis. All hospitals listed in the plan as medical services hospitals must be evaluated, with a transportation provider, every 2 years. Additional transportation providers will be rotated through the drills in the 8-year exercise cycle. For ambulance providers who do not participate in an evaluated drill during the two year cycle, training will be provided. This training will be documented in the ALC.

Monitoring, decontamination, and contamination control efforts must not delay urgent medical care for the victim.

ORO must demonstrate the capability to monitor/ decontaminate and transport contaminated, injured individuals to medical facilities.

An ambulance must be used for response to the victim. However, to avoid taking an ambulance out of service for an extended time, OROs may use any vehicle (e.g., car, truck, or van) to transport the victim to the medical facility. It is allowable for an ambulance to demonstrate up to the point of the departure for the medical facility and then have a non-specialized vehicle transport the "victim(s)" to the medical facility. This option is used in areas where removing an ambulance from service to drive a great distance (over an hour) for a drill would not be in the best of interests of the community.

Normal communications between the ambulance/ dispatcher and the receiving medical facility must be demonstrated. If a substitute vehicle is used for transport to the medical facility, this communication must occur before releasing the ambulance from the drills. This communication would include reporting radiation monitoring results, if available. In addition, the ambulance crew must demonstrate, by interview, knowledge of where the ambulance and crew would be monitored and decontaminated, if required, or whom to contact for such information.

Monitoring of the victim may be performed before transport or en route, or may be deferred to the medical facility. Contaminated injured individuals transported to medical facilities are monitored as soon as possible to assure that everyone (ambulance and medical facility) is aware of the medical and radiological status of the individual(s). However, if an ambulance defers monitoring

to the medical facility, then the ambulance crew presumes that the patient(s) is contaminated and demonstrate appropriate contamination controls until the patient(s) is monitored. Before using monitoring instruments, the monitor(s) must demonstrate the process of checking the instrument(s) for proper operation. All monitoring activities must be completed as they would be in an actual emergency. Appropriate contamination control measures must be demonstrated before and during transport and at the receiving medical facility.

The medical facility must demonstrate the capability to activate and set up a radiological emergency area for treatment. Medical facilities are expected to have at least one trained physician and one trained nurse to perform and supervise treatment of contaminated injured individuals. Equipment and supplies must be available for treatment of contaminated injured individuals.

The medical facility must demonstrate the capability to make decisions on the need for decontamination of the individual, follow appropriate decontamination procedures, and maintain records of all survey measurements and samples taken. All procedures for collection and analysis of samples and decontamination of the individual must be demonstrated or described to the evaluator. Waste water from decontamination operations must be handled according to facility plans/procedures.

All activities must be based on the ORO's plans/procedures and completed as they would be in actual emergency, unless noted above or otherwise specified in the Extent-of-Play Agreement.

#### **State of Maryland Extent of Play**

All activities associated with this criterion will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency, unless noted above or otherwise indicated in the extent of play agreement. Radiological monitoring of the victim will not be the responsibility of the responding rescue squad.

#### **Locations evaluated**

Hollywood Volunteer Rescue Squad  
MedStar St Mary's Hospital

#### **Outstanding Issues**

None