

After Action Report/Improvement Plan
Radiological Emergency Preparedness (REP) Program
Three Mile Island

Wellspan Ephrata Hospital Medical Services (MS-1)

Exercise Date – October 18, 2017



FEMA

Published December 3, 2017

Radiological Emergency Preparedness Program (REP)

After Action Report/Improvement Plan

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EXECUTIVE SUMMARY

On October 18, 2017, a Three Mile Island (TMI) Medical Services (MS-1) Drill was conducted for the 10-mile Plume Exposure Pathway, Emergency Planning Zone (EPZ) by the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region III. The most recent MS-1 Drill for this site was conducted on October 12, 2016.

The purpose of the TMI, MS-1 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 Commonwealth of Pennsylvania, Lancaster County Emergency Management Agency, WellSpan Ephrata Community Hospital and Manheim Township Ambulance Association, 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 Three Mile Island MS-1 Drill. The Commonwealth of Pennsylvania, 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 Exercise Details

Exercise Name

WellSpan Ephrata Community Hospital

Type of Exercise

Medical Services Drill (MS-1)

Exercise Date

October 18, 2017

Program

Department of Homeland Security/FEMA Radiological Emergency Preparedness Program

Scenario Type

Potentially Contaminated Injured Emergency Worker

1.2 Exercise Planning Team Leadership

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1.3 Participating Organizations

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

State Jurisdictions

Pennsylvania Emergency Management Agency PEMA (PEMA)

Risk Jurisdictions

Lancaster County, Emergency Management Agency (LCEMA)

Support Jurisdictions

None

Private Organizations

WellSpan Ephrata Community Hospital
Manheim Township Ambulance Association
Exelon Corporation

Federal Organizations

Federal Emergency Management Agency (FEMA)

SECTION 2: EXERCISE DESIGN SUMMARY

2.1 Exercise Purpose and Design

On December 7, 1979, the President directed the Federal Emergency Management Agency (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 Radiological Emergency Preparedness (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 Radiological Emergency Preparedness MS-1 Drill

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was conducted on October 18, 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 Three Mile Island.

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 Regional Assistance Committee (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.

2.2 Emergency Planning Zone Description:

The TMI Nuclear Generating Station (40° 9' 12" N/76° 43' 25" W) is a nuclear power plant operated by Exelon Nuclear. The site consists of two pressurized water-type units. Unit One is an 819-megawatt (MW) reactor, and Unit Two is a 906-MW reactor. Unit 1 received its license in June 1974 and began commercial operation in September 1974. Unit 2 began commercial operation in February 1978; it was damaged in March 1979 and has been shut down and placed in a monitored storage mode.

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The minimum exclusion distance specified for the TMI plant is 2,000 feet. Included within the 2,000-foot radius are a portion of Three Mile Island, a portion of Shelly Island, and a portion of the Susquehanna River. Exelon Nuclear owns all the land within the exclusion area. The TMI plant is located in south-central Pennsylvania in Londonderry Township, Dauphin County. The site is part of an 814-acre tract consisting of several adjacent islands in the Susquehanna River. The power plant is located on Three Mile Island, which is one of the largest islands of the group. The site is at an elevation of 300 feet above mean sea level (msl), relatively flat, and wooded on the periphery and the southern portion. Of the 470 acres that make up the island, the plant occupies approximately 200 acres in the northern portion.

Soils on the island are of the Duncannon-Chavies-Tioga Association, which is comprised of deposits of alluvial sand, silt, and clay. Underlying bedrock is red sandstone and shale. The normal pool elevation of the Susquehanna River in this area is 277 feet above msl. Hills on both sides of the river in this vicinity rise to elevations of over 500 feet. The plant grade is 300 feet above msl. An access bridge for plant personnel connects State Route 441 with the north end of the island. A wooden bridge connects the southern portion of the island with State Route 441. Norfolk Southern rail lines are located on both sides of the river; the closest is a one-track line adjacent and parallel to Route 441 on the east shore.

The area within 10 miles of the TMI Nuclear Generating Station is located in south-central Pennsylvania, and includes portions of Cumberland, Dauphin, Lancaster, Lebanon, and York counties. The site is surrounded mostly by farmland within a 10-mile radius. The nearest community is Goldsboro Borough, on the west shore of the Susquehanna River, 1 mile from the plant. The nearest major population center with more than 25,000 people is Harrisburg (population 53,624), which lies just over 10 miles to the north.

Twenty-three industrial firms are located within a 5-mile radius; they employ approximately 2,400 people. The Harrisburg International Airport is located 2 miles northwest of the TMI plant. An NRC estimate of aircraft risk to TMI Units One and Two indicates an acceptably low risk for either unit, provided fewer than 2,400 operations per year are by aircraft in excess of 200,000 pounds. The NRC requires Exelon to continue periodic monitoring and reporting of airport usage and will reevaluate the adequacy of plant protection if aircraft traffic is reliably projected to exceed 2,400 operations per year.

The major railroads operating in the EPZ include Amtrak, Blue Mountain and Ridge, Chessie System, Conrail, and the Maryland and Pennsylvania Railroad. The climate of the five-county risk EPZ is mild and humid. Weather is variable because the prevailing westerly winds bring both high and low-pressure systems through the area every few days. Average annual precipitation for the southern portion of the EPZ is about 38 inches and the average annual temperature is 52° F.

On the basis of the 2010 census, the total population of the 10-mile EPZ is 226,160. There are 97 sirens used to provide coverage of the plume exposure pathway EPZ. Each county operates its respective sirens.

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

2.3 Exercise Objectives, Capabilities and Activities

The TMI 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 Lancaster County Emergency Management Agency, WellSpan Ephrata Community Hospital and Manheim Township Ambulance Association organization 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.

2.4 Scenario Summary

During the emergency at Three Mile Island a farmer was following direction to place his animals under roof and provide with stored feed and water. While herding his sheep into a shed he slipped and fell twisting his right knee. He crawled about 300 yards across the pasture to his vehicle. The sheep were milling about and one caught him on the cheek with her hoof during the sounding of the sirens. Three Mile Island ordered an evacuation due to imminent or actual release of radiation during the time he was crawling across the pasture. When the farmer reached his vehicle, he drove to a friend's house near Ephrata for assistance and when he arrived the friend called for EMS due to possible "radiation disease".

Patient should rub left cheek with hand several times in presence of EMS and be agitated about this "radiation disease". Touch EMS and hospital staff as possible (spread of contamination).

Contamination: Initial readings at the hospital are indicated in counts per minute (cpm) below:

Injuries: Complaint of pain on left cheek and right knee. Patient will indicate pain upon palpation. Upon inspection, medical providers will see a laceration to the left cheek and pain in the right knee. Patient has difficulty walking due to pain. Medical evaluation will show swelling to the knee and a 3" laceration with bleeding from the cheek.

Vitals included

Blood Pressure:	130/88
Pulse:	72
Breathing:	12
Temperature:	Normal
Skin:	Pale
Nausea:	No
Vision:	Clear, eyes equal and reactive
Patient may give own answer on all other queries.	

Contamination:

- A. There are contamination readings of 1,900 cpm on left palm. After first decontamination attempt, the readings fall 4,000 cpm on left palm. After the second attempt, the readings fall to background.
- B. There are contamination readings of 7,600 cpm on right palm. After first decontamination attempt, the readings fall to 5,500 cpm on right palm. After the second attempt, the readings fall to background.

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- C. There are contamination reading of 2,400 cpm on the left cheek. After first decontamination attempt, the readings fall to 800 cpm. After second attempt, the readings fall to background.

NOTE: EMS will cut away outer clothing (explained) as a method of gross decontamination. This will eliminate a substantial amount of any contamination. If survey meters are not available, EMS should assume they are handling a potentially contaminated patient.

SECTION 3: ANALYSIS OF CAPABILITIES

3.1 Exercise Evaluation and Results

Contained in this section are the results and findings of the evaluations of all jurisdictions and locations that participated in the Three Mile Island MS-1 Drill demonstration of October 18, 2017. This Drill was conducted to demonstrate the ability of the OROs to respond to a potentially contaminated injured person associated with Three Mile Island.

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 Exercise 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).

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(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 – Exercise Evaluation – Criteria Met

October 18, 2017 Three Mile Island (M) Met, Level 1 (L1) Finding, Level 2 (L2) Finding, (P) Planning Issue		WECH	MTAA
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		

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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

In summary, the status of DHS/FEMA criteria for the State jurisdiction is as follows:

3.3.1 Private Jurisdictions

3.3.1.1 Manheim Township Ambulance Association

In summary, the status of DHS/FEMA criteria for the Private Sector Organizations are as follows:

- 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 Lancaster County, Wellspan Ephrata Community Hospital

In summary, the status of DHS/FEMA criteria for the Private Sector Organizations are as follows:

- 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 Commonwealth of Pennsylvania 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 Three Mile Island, WellSpan, Ephrata Community Medical Services Drill evaluated on October 18, 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 Findings or Plan Issues.

The Manheim Township Ambulance Association, successfully demonstrated that necessary equipment and supplies were available to support the treatment of an injured/ contaminated patient. 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 WellSpan Community Ephrata Hospital.

The WellSpan, Ephrata Community 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 Ambulance, initiated the set-up and management of a Radiation Emergency Area (REA), 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.

All activities were 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.

APPENDIX A: EXERCISE EVALUATORS AND TEAM LEADERS

October 18, 2017

Three Mile Island

LOCATION	TEAM LEADER	AGENCY
Lancaster County, WellSpan, Ephrata Community Hospital	Michael Shuler	FEMA RIII
Lancaster County, Manheim Township Ambulance Association	Michael Shuler	FEMA RIII


LOCATION	EVALUATOR	AGENCY
Lancaster County, WellSpan, Ephrata Community Hospital	Michael Shuler	FEMA RIII
Lancaster County, Manheim Township Ambulance Association	Barton Freeman	FEMA RIII

APPENDIX B: EXTENT OF PLAY

The Extent-of-Play Agreement was extracted from the Exercise Plan, which was drafted by the Commonwealth of Pennsylvania, Pennsylvania Emergency Management Agency, and is included in this report as an Appendix. The Extent-of-Play was negotiated and agreed upon by FEMA Region III, and the Pennsylvania Emergency Management Agency.

The Exercises Plan was created as an overall tool for facilitation and implementation of the Three Mile 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.

This Extent of Play is for the 2017 Three Mile Island, WellSpan Ephrata Community Hospital Medical Services Exercise (MS-1) Drill.


All information is ~~deemed confidential~~ and considered "For Official Use Only."

Method of Operation

1. The power station and its personnel will not play as active role in the facilitation of this exercise. The plant's simulated events, radiation releases, and emergency classifications will be injected by off-site Controllers. A pre-approved scenario will be used.
2. The Pennsylvania Emergency Management Agency (PEMA), Area Office (Eastern Area) will not be activated as part of this drill. The Exercise Coordinator will provide pre-exercise coordination and observe exercise activities.
3. PEMA Eastern Area Office and Exelon Corporation will participate as a Controller in this exercise.
4. Lancaster County Emergency Management Agency will participate in this exercise.
5. Controllers will be supplied by PEMA. Controllers are not players and will provide injects and information to initiate and stimulate drill play by providing radiological readings during the monitoring of personnel. Live radioactive sources will only be used to perform operational checks of radiological monitoring instruments.
6. PEMA staff and qualified county emergency management personnel will be assigned to key locations for the purpose of observing, noting response actions and conditions, and

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recording observations for future use. Observers will not take an active part in the proceedings, but will interact with staff members to the extent necessary to fulfill their observer responsibilities. Coaching of players is not permitted, except as appropriate to provide training to participants awaiting a re-demonstration.

7. Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), Radiological Emergency Preparedness Program (REPP) and FEMA Evaluators will be present at designated demonstration locations.
8. Exercise activities are scheduled to commence on or about 8:00 a.m., October 18, 2017 and continue until the participants have completed the exercise objectives and demonstrated the Exercise Evaluation Criteria.
9. Participants and agencies will Stand Down when the Controllers have confirmed with the Evaluators that all evaluation criteria have been demonstrated and when the State and County Observers are satisfied that the Objectives have been met.
10. An emergency plan is drafted to address the generally expected conditions of an emergency. Not everything in the emergency plan may be applicable for a given scenario. The main purpose of an emergency plan is to assemble sufficient expertise and officials so as to properly react to the events as they occur. The responders should not be so tied to a plan that they cannot take actions that are more protective of the public. Therefore, if, by not following the plan, the responders protect the public equally, as well as provided in the plan, it should be noted for possible modification of the plan, but not classified as a negative incident. Furthermore, if, by following the plan there is a failure to protect the public health and safety, it should be noted so that the plan can be modified and the appropriate negative assessment corrected.
11. During the exercise, any activity that is not satisfactorily demonstrated may be re-demonstrated by the participants during the exercise, provided it does not negatively interfere with the exercise. Refresher training may be provided by the players, observers, and/or Controllers. Evaluators are not permitted to provide refresher training. Re-demonstrations will be negotiated between the Players, Observers, Controllers, and Evaluators. PEMA may advise the Regional Assistance Committee Chair prior to initiating any re-demonstrations. It is permissible to extend the demonstration window, within reason, to accommodate the re-demonstration. Activities corrected from a re-demonstration will be so noted.

Objectives

- A. Demonstrate the ability to respond to a radiation medical emergency following the procedures of Lancaster County Emergency Management Agency, Manheim Ambulance Association and WellSpan, Ephrata Community Hospital.
- B. Demonstrate timely and accurate communications between the hospital and offsite response agencies. (Telephones will be used in lieu of radios whenever possible to limit the potential misinterpretation of the exercise as an actual event.)
- C. Demonstrate correct priorities and appropriate techniques in EMS, transportation of patients and pre-hospital and hospital emergency care of radioactively contaminated patients.
- D. Demonstrate inter-agency cooperation between the ambulance company/EMS and the hospital.

Evaluation Area 1—Emergency Operations Management
Sub-Element 1.e—Equipment and Supplies to Support Operations

Intent

This sub-element is derived from NUREG-0654/FEMA-REP-1, which requires that Offsite Response Organizations (ORO) have emergency equipment and supplies adequate to support the emergency response.

Criterion 1.e.1: Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654/FEMA-REP-1, H.7, 10; I.7, 8, 9; J.10.a, b, e, J.11, 12; K.3.a; K.5.b).

Assessment/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 location(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 a 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 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 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.

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In areas where portal monitors are used, the OROs must set up and operationally check the monitor(s). The monitor(s) must conform 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 arrive 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 as they would be in an actual emergency, unless noted above or otherwise specified in the Extent-of- Play Agreement.

State Negotiated Extent of Play:

Ambulance crews are not trained or equipped to operate or carry radiological monitoring equipment. In accordance with the PEMA SOP Annex E, Appendix 5 "Radiological Exposure Control" (March 2002), ambulance crews operating outside the 10-mile Emergency Planning Zone are considered "Category C" emergency workers; therefore, they are only required to implement protective measures consistent with protection against blood-borne pathogens; i.e., long sleeved garments, trousers, impermeable gloves, and surgical masks. "Category C" emergency worker dosimetry issue consists of one permanent reading dosimeter per worker. Ambulance crews are provided additional dosimetry if they are tasked with entering the 10-mile EPZ.

Hospital personnel are also considered "Category C" emergency workers and will conform to PEMA SOP protective measures at minimum. Direct Reading Dosimeters may be issued individually; however, an Area Kit will be established in the Radiation Emergency Area (REA). Individual PRDs will be issued by the hospital. Radiological Survey Instruments are calibrated per manufactures recommendations.

Outstanding Issues:

None

Evaluation Area 3—Protective Action Implementation

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

Intent

This Sub-element is derived from NUREG0654/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 PAGs, and the capability to provide Potassium Iodide (KI) for emergency workers, always applying the “as low as is reasonably achievable” principle as appropriate.

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)

Assessment/Extent of Play

Assessment of this Demonstration Criterion may be accomplished during a biennial 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

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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 co-workers) 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 re-enter 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.

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State Negotiated Extent of Play:

- Demonstrate appropriate procedures and equipment to manage radiological exposure to staff.
- Demonstrate the ability to transport contaminated/injured individuals while using ALARA principles.
- Demonstrate the ability to utilize dosimetry, equipment and procedures to manage radiological exposure to emergency workers as required by plans.

Radiological briefings will be provided to address exposure limits and procedures to replace personnel approaching limits and how permission to exceed limits is obtained. At any time, players may ask other players or supervisors to clarify radiological information. In Pennsylvania, emergency workers outside the EPZ do not have turn-back values. Standard issue of dosimetry and potassium iodide for each category of emergency worker is as follows:

Category A: 1 PRD, 1 DRD, and 1 unit of KI

Category B: 1 PRD and 1 unit of KI

Category C: 1 PRD

NOTE: As per Annex E Appendix 5, page E-5-35, "Emergency responders located outside the EPZ who, due to assigned tasks during a nuclear emergency, have limited potential for radiation exposure (e.g., monitoring/decontamination teams, MS-1 hospital staffs). Transporters of contamination or potentially contaminated individuals outside of EPZ are not provided dosimetry.

All locations that have dosimetry equipment indicated within their Radiological Emergency Response Plan (RERP) will make the dosimetry equipment (and KI, as appropriate) available for inspection by the Federal Evaluator. Simulation PRDs with mock serial numbers may be used.

Outstanding Issues:

None

Evaluation Area 6—Support Operation/Facilities

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

Intent

This Sub-element is derived from NUREG0654/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.

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. (NUREG0654/FEMA-REP-1, F.2; H.10; K.5.a, b; L.1, 4)

Assessment/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 the 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. OROs 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 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 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 drill. 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.

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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 an actual emergency, unless noted above or otherwise specified in the Extent-of- Play Agreement.

State Negotiated Extent of Play:

Demonstrate that the facility has the appropriate space, adequate resources and trained personnel to provide monitoring, decontamination and medical services to contaminated/injured individuals.

Demonstrate the ability to transport contaminated/injured individuals while using ALARA principles.

Manheim Ambulance will pick-up a pre-staged simulated contaminated/injured victim.

Outstanding Issues:

None

Radiological Emergency Preparedness Program (REP)

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