



Calvert Cliffs Nuclear Power Plant

MedStar St. Mary's Hospital

After Action Report

July 3, 2024



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Executive Summary

On June 13, 2024, 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 3. The most recent prior Medical Services Drill for this site was conducted on June 16, 2022.

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. The core capability demonstrated during this drill was: Public Health, Healthcare, and Emergency Medical Services: Provide lifesaving medical treatment via Emergency Medical Services and related operations and avoid additional disease and injury by providing targeted public health, medical, and behavioral health support, and products to all affected populations.

FEMA wishes to acknowledge the efforts of the many individuals in the Maryland Department of Emergency Management, MedStar St. Mary's Hospital, and St. Mary's County Emergency Services Ambulance 189 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 CCNPP Medical Services Drill. The Maryland Department of Emergency Management, MedStar St. Mary's Hospital, and St. Mary's County Emergency Services Ambulance 189 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 of this report, entitled Exercise 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 Exercise Evaluation and Results; a Summary Results of Evaluation; and Capability Target Demonstration and Evaluation Guidance 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.

Section 1: Exercise Overview

1.1. Drill Details

Drill Name

MedStar St. Mary's Hospital

Type of Drill

Medical Services

Drill Date

June 13, 2024

Program

Department of Homeland Security/FEMA Radiological Emergency Preparedness Program

Scenario Type

Radioactive Contaminated/Injured Person

1.2. Planning Team Leadership

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1.3. Participating Organizations

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

State Jurisdiction

- Maryland Department of Emergency Management

County Jurisdiction & Private Organizations

- MedStar St. Mary's Hospital
- St. Mary's County Emergency Services Ambulance 189

Section 2: Design Summary

2.1. 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 Three Mile Island 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 based on 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 3 Regional Assistance Committee (RAC), which is chaired by FEMA. A Radiological Emergency Preparedness Medical Services Drill was conducted on June 13, 2024, to assess the capabilities of State and local emergency preparedness organizations in implementing their Radiological Emergency Response Plans (RERP) and procedures to protect the public health and safety during a radiological emergency involving the CCNPP.

The purpose of this exercise 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 (EOP) 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 3 Regional Assistance Committee (RAC) Chairperson and approved by FEMA Headquarters. These reports are provided to the Nuclear Regulatory Commission (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.

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

- NUREG-0654/FEMA-REP-1, Rev. 2, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," December 2019; and
- Radiological Emergency Preparedness Program Manual, December 2023

2.2. Core Capabilities and Objectives

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. Core capabilities-based planning allowed the exercise planning team to develop the objective and observe associated outcomes through a framework of specific action items. Additionally, the objective and capability target assessed met Radiological Emergency Preparedness Program Manual guidance.

The core capability demonstrated during this drill was:

- Public Health, Healthcare, and Emergency Medical Services: Provide lifesaving medical treatment via Emergency Medical Services and related operations and avoid additional disease and injury by providing targeted public health, medical, and behavioral health support, and products to all affected populations.

This core capability, when successfully demonstrated, met the drill objective. The objectives for this drill were:

- Objective 2: Exposure Control
- Objective 5: Operate

The capability targets for this drill were:

- Capability Target 2.2: Emergency Worker Exposure Control Management
- Capability Target 5.3: Transportation and Treatment of Contaminated, Injured Individuals

2.3. Scenario Summary

The scenario began at 0900 with a notification to the St. Mary's County Emergency Services Ambulance 189 and MedStar St. Mary's Hospital via an exercise controller, that a General Emergency was declared at the Calvert Cliffs Nuclear Power Plant. At 0910 the St. Mary's County Emergency Services Ambulance 189 was requested to report to the St. Mary's County Department of Emergency Services HazMat Building to pick up an injured and potentially

contaminated evacuee in the Emergency Planning Zone (EPZ). Upon arriving at the accident scene, the ambulance crew provided treatment of the patient's injuries as a priority over contamination concerns in addition to initial and ongoing communications with the hospital concerning the patient's condition.

At 0923 the ambulance crew departed for the MedStar St. Mary's Hospital and notified the hospital they were bringing in an injured, potentially contaminated, individual for treatment who was injured while evacuating their home in the EPZ. At 0931 the ambulance arrived at the hospital and conducted a clean transfer of the patient to the medical staff at 0945. In preparation for receiving the patient, the hospital Radiation Safety Officer mobilized the Radiation Emergency Area (REA) staff and conducted a radiological safety briefing to the hospital staff along with a set-up of the REA prior to the patient arrival.

The patient was appropriately treated for injuries and decontaminated prior to release from the hospital. The exercise was terminated at 1017.

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 Calvert Cliffs Nuclear Power Plant Medical Services Drill on June 13, 2024. The Drill was conducted to demonstrate the ability of the OROs to respond to a potentially contaminated injured person.

Each jurisdiction and functional entity were evaluated based on their demonstration of the appropriate “Demonstration and Evaluation Guidance” contained in the REP Program Manual. Detailed information on the Demonstration and Evaluation Guidance, and the Extent-of-Play Agreement is found in Appendix C.

The Drill was conducted and evaluated in accordance with the Radiological Emergency Preparedness Program Manual (December 2019) and NUREG-0654/FEMA-REP-1, Rev. 2. These Capability Targets included:

- Capability Target 2.2 - Emergency Worker Exposure Control Management
- Capability Target 5.3 - Transportation and Treatment of 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 Capability Targets from the REP Program Manual that were scheduled for demonstration during this Drill by all participating jurisdictions and functional entities. Drill Demonstration and Evaluation Guidance are listed by number and the demonstration status of the criteria is indicated using the following letters:

- (L1) Level 1 Finding: An observed or identified inadequacy of organizational performance during an assessment activity 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.
- (L2) Level 2 Finding: An observed or identified inadequacy of organizational performance during an assessment activity 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: June 13, 2024 Site: Calvert Cliffs Nuclear Power Plant (M) Met, (1) Level 1 Finding, (2) Level 2 Finding, (P) Planning Issue	Capability Targets	MedStar St. Mary's Hospital	St. Mary's County Emergency Services Ambulance 189
Objective 2: Exposure Control Emergency Worker Exposure Control Management	2.2	M	M
Objective 5: Operate Transportation/Treatment of Contaminated, Injured Individuals	5.3	M	M

3.3. Criteria Evaluation Summaries

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

3.3.1 County and Private Organizations

3.3.2.1 MedStar St. Mary's Hospital

- a. Met: 2.2, 5.3
- b. Level 1 Findings: NONE
- c. Level 2 Findings: NONE
- d. Plan Issues: NONE
- e. Prior Issues – Resolved: NONE
- f. Prior Issues – Unresolved: NONE

3.3.2.2 St. Mary's County Emergency Services Ambulance 189

- a. Met: 2.2, 5.3
- 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 demonstrated knowledge of their radiological emergency response plans and procedures and they were successfully implemented during the Calvert Cliffs Nuclear Power Plant Medical Services Drill evaluated on June 13, 2024.

Two FEMA evaluators provided analyses of the core capability: Public Health, Healthcare, and Emergency Medical Services, as well as two capability targets: Emergency Worker Exposure Control Management; and Transportation/Treatment of Contaminated, Injured Individuals. These analyses resulted in a determination of no Findings, no new Plan issues, and no unresolved Plan Issues.

St. Mary's County Emergency Services Ambulance 189 successfully demonstrated that necessary equipment and supplies were available to support the treatment of an injured/contaminated patient, and prioritized life-saving medical practices over contamination concerns, implemented protective measures using 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.

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 St. Mary's County Emergency Services Ambulance 189, initiated the set-up and management of a Radiation Emergency Area, 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 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 3 has determined they are adequate (meet the planning and preparedness standards of NUREG-0654/FEMA-REP-1, Revision 2, as referenced in 44 CFR 350.5, and the FEMA Radiological Emergency Preparedness Program Manual, December 2023, 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: Exercise Evaluators

The following is the list of Evaluators for the Calvert Cliffs Nuclear Power Plant Medical Services Drill evaluated on June 13, 2024. The following constitutes the managing staff for the evaluation:

- Narvaez Stinson, DHS/FEMA, Emergency Management Specialist
- Alexander Hazard, DHS/FEMA, Emergency Management Specialist

Location/Venue	Evaluator	Agency
MedStar St. Mary's Hospital	Narvaez Stinson	FEMA HQs
St. Mary's County Emergency Services Ambulance 189	Alexander Hazard	FEMA Region 3

Appendix B: Extent-of-Play Agreement

The Extent-of-Play Agreement was extracted from the Exercise Plan, which was drafted by the Maryland Department of Emergency Management, and is included in this report as an Appendix. The Extent-of-Play was negotiated and agreed upon by FEMA Region 3, and the Maryland Department of Emergency Management.

The Exercise Plan was created as an overall tool for facilitation and implementation of the Calvert Cliffs Nuclear Power Plant 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.

MedStar St. Mary's Hospital Medical Service Drill Exercise Plan Draft

Appendix A: Extent of Play

Capability Target 2.2: Emergency Worker Exposure Control Management (VICE Sub-Element 3.a.1)

Core Capabilities: Operational Coordination; Environmental Response/Health and Safety; Planning

Recommended Evaluation Frequencies: Biennially

Recommended Assessment Activities: Exercise; Drill

Planning Reference: NUREG-0654/FEMA-REP-1, Rev. 2 (C.2.c, H.11, H.11.b, K.2.b, K.3, K.3.a, M.1.b, and O.1)

Intent: The capability of emergency workers to manage dose and exposure, use equipment (e.g., dosimetry, radio protective drugs), and identify procedures to monitor their exposure and dose, including following procedures to obtain authorization to receive emergency exposures in excess of the PAGs.

Demonstration and Evaluation Guidance:

- Maintain an appropriate inventory of DRDs that are leak-tested or current in calibration.
- Maintain an appropriate inventory of PRDs.
- Retain an adequate supply of radioprotective drugs.
- Adequately distribute appropriate DRDs and PRDs.
- Adequately distribute radioprotective drugs to emergency workers.
- Record and report exposures in the field.
- Implement decisions to administer radioprotective drugs.
- Report to the individual responsible for managing exposure and dose when limits are reached.
- Implement exposure control decisions to members of the public from radiological exposure and control dose for those who are authorized to temporarily reenter a restricted area.

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Capability Target 2.2: EMS Crew Extent of Play

Table 5 - Capability Target 2.2: EMS Crew Extent of Play

EMS Crew Extent of Play
<ul style="list-style-type: none">• All activities are based on the ORO's plans and procedures and completed as they would be in an actual emergency.• Potassium Iodide (KI) will be simulated tablets.• One EMS provider will demonstrate donning and doffing for the FEMA evaluator.

Capability Target 2.2 MSMH Extent of Play

Table 6 Capability Target 2.2 MSMH Extent of Play

MSMH Extent of Play
<ul style="list-style-type: none">• All activities are based on the ORO's plans and procedures and completed as they would be in an actual emergency.

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Objective 5: Operate

Capability Target 5.3: Transportation and Treatment of Contaminated, Injured Individuals

Transport contaminated, injured individuals to medical facilities with the capability to monitor and decontaminate.

Intent: The capability to provide medical transport and treatment services to contaminated, injured individuals.

Planning reference: NUREG-0654/FEMA-REP-1, Rev. 2 (C.2.d, F.2, H.11, H.12, J.2, K.3, K.4, L.1, L.3, L.4, and O.1)

Core Capabilities: Environmental Response/Health and Safety; Public Health, Healthcare, Emergency Medical Services; Planning

Recommended Evaluation Frequencies: Biennially

Recommended Assessment Activities: Medical Services Drill (N.4.b)

Planning Reference: NUREG-0654/FEMA-REP-1, Rev. 2 (C.2.d, F.2, H.11, H.12, J.2, K.3, K.4, L.1, L.3, L.4, and O.1)

Intent: The capability to provide medical transport and treatment services to contaminated, injured individuals.

Demonstration and Evaluation Guidance:

Transportation

- Transport contaminated, injured individuals to medical facilities.
- Maintain communications between the medical transportation provider and the receiving medical facility.

Medical Facility

- Operationally check instruments and equipment.
- Set-up, activate, and operate a Radiation Emergency Area (REA).

Monitor and decontaminate the individual, equipment, and other items.

MedStar St. Mary's Hospital Medical Service Drill Exercise Plan Draft

Capability Target 5.3: EMS Crew Extent of Play

Table 8 - Capability Target 5.3 EMS Crew Extent of Play

EMS Crew Extent of Play
<ul style="list-style-type: none">• All activities are based on the ORO's plans and procedures and completed, as they would be in an actual emergency.• After viewing the Emergency Worker video, the EMS Unit will pre stage away from the firehouse and will await the St. Mary's County Fire Dispatch notification to appear on scene.• One EMS provider will demonstrate donning and doffing of their PPE.• Transport to the hospital will follow all traffic laws and not be treated as an emergency transport.• Only one EMS crew member will be surveyed by the St. Mary's County Rad Officer.

Target 5.3: MSMH Extent of Play

Table 8 - Capability Target 5.3 MSMH Extent of Play

MedStar St. Mary's Hospital
<ul style="list-style-type: none">• All activities are based on the ORO's plans and procedures and completed as they would be in an actual emergency.