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Enclosed is the final report for the Calvert Cliffs Nuclear Power Plant plume and ingestion exercise. This report contains results from the full-scale plume phase and ingestion exercise on October 20-22, 2009 as well as a series of ingestion out-of-sequence (OOS) demonstrations conducted September 22-25, 2009 and October 19, 2009.

No deficiencies were identified during the exercise. Six (6) Areas Requiring Corrective Action (ARCAs) were identified; four (4) of which were successfully re-demonstrated during the exercise. One new planning issue was identified.

Additionally, nine (9) ARCAs and one (1) planning issue from previous exercises were successfully resolved during this exercise.

Based on the results of the exercise, the offsite radiological emergency response plans and preparedness for the State of Maryland and the affected local jurisdictions, site-specific to Calvert Cliffs are adequate to protect the public health and safety and provide reasonable assurance that appropriate measures can be taken in the event of a radiological emergency at the site.

If you have any questions, please contact Andrew Hower, Calvert Cliffs Project Officer at (215) 931-5563.

Sincerely,


Darrell Hammons

Regional Assistance Committee
Chairperson, Region III

Enclosure

A X45
NRR

Calvert Cliffs Nuclear Power Plant Exercise October 20-22, 2009

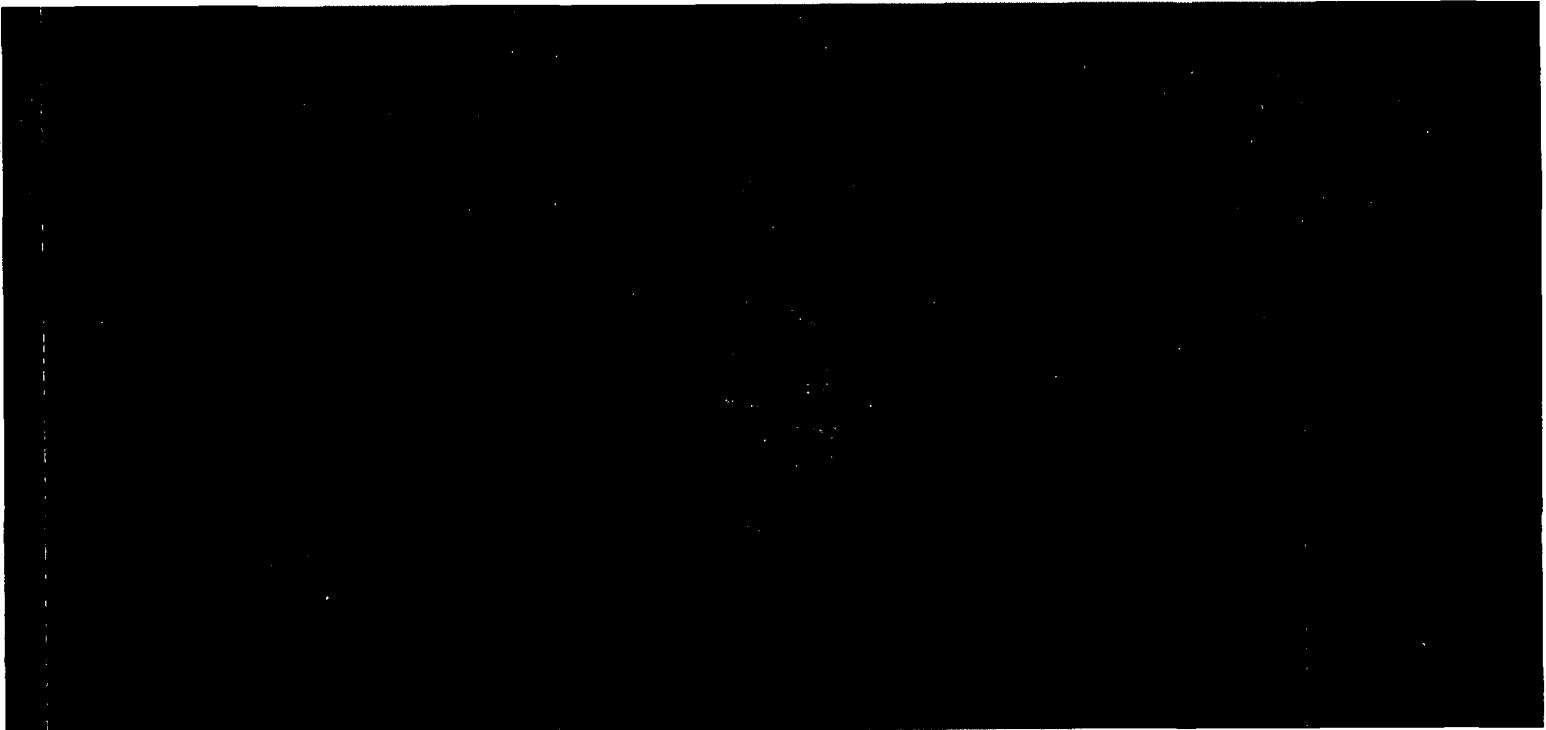
Final Report – Radiological Emergency Preparedness
Program

December 23, 2009



FEMA

FEMA Region III



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FEMA

Final Exercise Report

Calvert Cliffs Nuclear Power Plant

Licensee: **Constellation Energy Group**

Exercise Date: **October 20-22, 2009**

Report Date: **December 23, 2009**

**U.S. DEPARTMENT OF HOMELAND SECURITY
NATIONAL PREPAREDNESS DIVISION
RADIOLOGICAL EMERGENCY PREPAREDNESS
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I. Executive Summary

On October 20, 21, and 22, 2009, a full-scale plume and ingestion exercise was conducted in the 10-mile plume exposure pathway and 50-mile ingestion exposure pathway emergency planning zones (EPZs) around the Calvert Cliffs Nuclear Power Plant (CCNPP) and evaluated by the Federal Emergency Management Agency (FEMA), Region III. A series of ingestion out-of-sequence (OOS) demonstrations were conducted September 22-25, 2009 and October 19, 2009. The purpose of the exercise and the out-of-sequence demonstrations was to assess the level of State and local preparedness in responding to a radiological emergency. The exercise and out-of-sequence demonstrations were held in accordance with FEMA's policies and guidance concerning the exercise of State and local radiological emergency response plans (RERP) and procedures.

The most recent prior full-scale exercise at this site was conducted on October 30, 2007. The qualifying emergency preparedness exercise was conducted on October 30, 1981.

FEMA wishes to acknowledge the efforts of the many individuals in the State of Maryland; the risk jurisdictions of Calvert, St. Mary's, and Dorchester Counties who were evaluated at this exercise. In addition, acknowledgement is extended to the ingestion jurisdictions of Anne Arundel, Caroline, Charles, Kent, Prince Georges, Queen Anne's, Somerset, Talbot, Wicomico, and Worcester Counties in the State of Maryland; Arlington and Lancaster Counties, and the Cities of Falls Church and Alexandria in the Commonwealth of Virginia; and the District of Columbia for participation in this exercise.

Protecting the public health and safety is the full-time job of some of the exercise participants and an additional assigned responsibility for others. Others have willingly sought this responsibility by volunteering to provide vital emergency services to their communities. Cooperation and teamwork of all the participants were evident during this exercise.

This report contains the final evaluation of the biennial exercise and the evaluation of the following out-of-sequence activities:

State of Maryland

- *Ingestion Activities:* Conducted on September 22, 2009 in Caroline and Somerset Counties, Maryland; September 23, 2009 in Queen Anne's County; September 24, 2009 in Charles, Kent, Talbot, Wicomico, and Worcester Counties; and September 25, 2009 in Anne Arundel and Prince George's Counties.
- *Schools:* Conducted on October 21, 2009 in Calvert and St. Mary's Counties.

Commonwealth of Virginia

- *Ingestion Activities:* Conducted on September 22, 2009 in Arlington County and the City of Arlington; and September 23, 2009 in Lancaster County and the City of Falls Church.

District of Columbia

- *Ingestion Activities:* Conducted on October 19, 2009 in the District of Columbia.

The State and local organizations, except where noted in this report, demonstrated knowledge of their emergency response plans and procedures and adequately implemented them. There were no Deficiencies and six (6) Areas Requiring Corrective Action (ARCAs) identified as a result of this exercise; four (4) of the ARCAs were successfully re-demonstrated during the exercise. Nine ARCAs from a previous exercise were successfully demonstrated at this exercise. One new planning issue was identified and one planning issue from a previous exercise was resolved (see Appendix 5 for all planning issues).

II. Introduction

On December 7, 1979, the President directed the Federal Emergency Management Agency (FEMA) to assume the lead responsibility for all off-site nuclear 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 Nuclear Station accident in March 1979.

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

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

- Taking the lead in offsite emergency planning and in the review and evaluation of Radiological Emergency Response Plans (RERPs) and procedures developed by State and local governments;
- Determining whether such plans and procedures can be implemented on the basis of observation and evaluation of exercises of the plans and procedures conducted by State and local governments;
- Responding to requests by the U.S. Nuclear Regulatory Commission (NRC) pursuant to the Memorandum of Understanding between the NRC and FEMA dated June 17, 1993 (Federal Register, Vol. 58, No. 176, September 14, 1993; and
- Coordinating the activities of 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, and
 - U.S. Food and Drug Administration.

Representatives of these agencies serve on the Region III Radiological Assistance Committee (RAC), which is chaired by FEMA.

A REP exercise was conducted on October 20-22, 2009 to assess the capabilities of State and local emergency preparedness organizations in implementing their RERPs and procedures to protect the public health and safety during a radiological emergency involving Calvert Cliffs Nuclear Power Plant (CCNPP). The purpose of this exercise report is to present the exercise results and findings on the performance of the off-site response organizations (OROs) during a simulated radiological emergency.

The findings presented in this report are based on the evaluations of the Federal evaluator team, with final determinations made by the FEMA Region 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.

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;
- FEMA Guidance Memorandum MS-1, "Medical Services," November 1986;
- FEMA-REP-14, "Radiological Emergency Preparedness Exercise Manual," September 1991;
- 66 FR 47546, "FEMA Radiological Emergency Preparedness: Alert and Notification," September 12, 2001; and
- 67 FR 20580, "FEMA Radiological Emergency Preparedness: Exercise Evaluation Methodology," April 25, 2002.

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

Section IV of this report, entitled "Exercise Evaluation and Results," presents detailed information on the demonstration of applicable exercise evaluation areas at each jurisdiction or functional entity evaluated in a jurisdiction-based, issues-only format. This section also contains: (1) descriptions of all Deficiencies and Areas Requiring Corrective Action (ARCAs) assessed during this exercise, recommended corrective actions, and the Tribal, State, and local governments' schedule of corrective actions for each identified exercise issue and (2) descriptions of ARCAs assessed during previous exercises and resolved at this exercise,

including the corrective action demonstrated, as well as ARCAs assessed during previous exercises and scheduled for demonstration at this exercise which remain unresolved.

The final section of the report is comprised of the appendices, which present the following supplementary information: acronyms and abbreviations, exercise evaluators and team leaders, exercise evaluation area criteria and extent of play agreement, and the exercise scenario. It also presents information on planning issues (both new planning issues identified during this exercise and resolved planning issues identified during previous exercises).

III. Exercise Overview

Contained in this section are data and basic information relevant to the October 20-22, 2009 exercise to test the off-site emergency response capabilities in the area surrounding Calvert Cliffs Nuclear Power Plant (CCNPP). This section of the exercise report includes a description of the plume pathway emergency planning zone (EPZ), a listing of all participating jurisdictions and functional entities that were evaluated, and a tabular presentation of the time of actual occurrence of key exercise events and activities.

A. Plume Emergency Planning Zone Description

CCNPP is located near Maryland Highway 2-4 in Calvert County, Maryland, on the west bank of the Chesapeake Bay near Lusby, Maryland. The coordinates of the site are 38°25'39.7" North and 76°26'45" West. The site is owned and operated by Constellation Energy Group and covers an area of approximately 2,108 acres. Seventy percent of the area remains forested and relatively undisturbed by CCNPP activities. There are several endangered plant and insect species within the boundaries of the site. Two pressurized water reactors each generate an electrical output of 825 MW units that provide power to around 400,000 residential customers. Unit 1 began commercial operation during May 1975 and Unit 2 in April 1977. On March 23, 2002, the license was renewed, thereby extending the life of the plant by 20 years.

Nearby communities include: Calvert Beach and Long Beach, approximately 3 miles to the northwest; Cove Point, approximately 4 1/2 miles to the southeast; Chesapeake Ranch Estates, approximately 6 miles to the south-southwest; and the Patuxent Naval Air Test Center, approximately 10 miles to the south. Camp Bay Breeze, a summer camp, is located 2 miles southeast of the site.

The topography of the vicinity around the plant defines several small watersheds. The watershed containing the plant and auxiliary structures drains into the Chesapeake Bay. Chesapeake Bay has an average depth of 30 feet and receives the majority of its fresh water, sediment, and nutrients from the Susquehanna River.

A majority fraction of the land in the area surrounding the site is devoted to agricultural and forest use, such as farming of tobacco, corn, soybeans, and hay. Dairy farming is of minor importance. The waters adjacent to the site are used for commercial fishing, primarily for shellfish such as clams, oysters, and crabs.

There are approximately 50,058 people in the 10-mile EPZ, 13,307 in the 5-mile EPZ, and 2,329 in the 2-mile EPZ. There are approximately 9,563 transients within the EPZ during peak seasonal activities, e.g., daytime, during the summer. No major populated cities (greater than 25,000) exist within the 10-mile EPZ.

B. Exercise Participants

The following agencies, organizations, and units of government participated in the CCNPP out-of-sequence activities on September 22-25, and October 19, 2009 or during the exercise on October 20-22, 2009.

STATE OF MARYLAND

Centers for Disease Control
Federal Radiological Management and Assessment Center
Maryland Department of Agriculture
Maryland Department of Business and Economic Development
Maryland Department of Health and Mental Hygiene
Maryland Department of Housing and Urban Development
Maryland Department of Human Resources
Maryland Department of Natural Resources
Maryland Department of Natural Resources Police
Maryland Department of the Environment
Maryland Department of Transportation
Maryland Emergency Management Agency
Maryland Fire and Rescue Institute
Maryland Fire Marshal
Maryland Institute for Emergency Medical Services Systems
Maryland Insurance Administration
Maryland Military Department
Maryland National Guard
Maryland State Department of Education
Maryland State Highway Administration
Maryland State Police
Maryland Transportation Authority
Nuclear Regulatory Commission
United States Coast Guard
United States Department of Agriculture
United States Department of Energy
United States Environmental Protection Agency
United States Food and Drug Administration

CALVERT COUNTY

Calvert County Communications
Calvert County Department of Agriculture
Calvert County Department of Corrections
Calvert County Department of Environment
Calvert County Department of General Services

Calvert County Department of Health
Calvert County Department of Transportation
Calvert County Emergency Management
Calvert County Emergency Medical Services
Calvert County Engineer
Calvert County Facilities
Calvert County Fire Rescue
Calvert County Highway
Calvert County Public Information Office
Calvert County Public Schools
Calvert County Radiological Office
Calvert County Roads Department
Calvert County Sheriff's Office
Calvert County Social Services
Maryland Department of Agriculture
Maryland Department of Health
Maryland Department of Natural Resources
Maryland Emergency Management Agency
Maryland State Highway Administration
Maryland State Police
Southern Maryland Regional Administration

ST. MARY'S COUNTY

Leonardstown Commission
Maryland Department of Agriculture
Maryland Emergency Management Agency
Maryland State Highway Administration
Maryland State Police
Metropolitan Commission
Naval Air Station Disaster Preparedness Agency
St. Mary's County Board of County Commissioners
St. Mary's County Board of Education
St. Mary's County Administrator
St. Mary's County Attorney
St. Mary's County Department of Environmental Health
St. Mary's County Department of Health
St. Mary's County Department of Public Safety
St. Mary's County Department of Public Works and Transportation
St. Mary's County Emergency Communications Center
St. Mary's County Emergency Management Agency
St. Mary's County Fire Department
St. Mary's County Hazardous Materials
St. Mary's County Rescue Squad
St. Mary's County Sheriff's Office

DORCHESTER COUNTY

Cambridge Police Department
Dorchester County Board of Education
Dorchester County Department of Public Works
Dorchester County Emergency Management Agency
Dorchester County Emergency Medical Services
Dorchester County Fire and Rescue
Dorchester County Health Department
Dorchester County Sheriff's Department
Dorchester County Social Services
Maryland Emergency Management Agency
Maryland Natural Resources Police
Maryland State Farm Service Agency
Maryland State Highway Administration
Maryland State Police

SCHOOLS

Calvert County

Bishop Bus Service
Calvert County Contract Bus Service
Calvert County Public Schools Transportation Department
Patuxent Elementary School
Southern Middle School
St. Leonard Elementary School

St. Mary's County

Green Holly Elementary School
Constellation Energy

MARYLAND INGESTION JURISDICTIONS

Anne Arundel County

American Red Cross
Anne Arundel County Animal Control
Anne Arundel County Central Services
Anne Arundel County Department of Public Works
Anne Arundel County Department of Social Services
Anne Arundel County Fire Department
Anne Arundel County Geographic Information Systems
Anne Arundel County Office of Emergency Management
Anne Arundel County Office of Information Technology
Anne Arundel County Public Schools
Anne Arundel County RACES

Anne Arundel County Soil Conservation District
Anne Arundel County Volunteer Center

Caroline County

Caroline County Department of Emergency Services
Caroline County Department of Health
Caroline County Sheriff's Department
Maryland Emergency Management Agency
University of Maryland County Agricultural Extension

Charles County

Charles County Department of Emergency Services
Charles County Department of Health
Charles County Department of Public Information
Maryland Department of Agriculture
Maryland Emergency Management Agency
United States Department of Agriculture

Kent County

Kent County Health Department / Environmental Services
Kent County Office of Emergency Services
Kent County Sheriff's Office
Kent Soil and Water Conservation District / Natural Resources Conservation Service
Maryland Emergency Management Agency
University of Maryland County Agricultural Extension

Prince Georges County

Prince Georges County Department of Agriculture
Prince Georges County Department of Emergency Services
Prince Georges County Department of Health
Prince Georges County Department of Public Information

Queen Anne's County

Queen Anne's County Department of Emergency Services
Queen Anne's County Health Department
Queen Anne's Farm Service Agency
United States Department of Agriculture
University of Maryland Cooperative Extension Service

Somerset County

Maryland Department of Agriculture
Somerset County Emergency Management
Somerset County Health Department

Talbot County

Maryland Emergency Management Agency
Talbot County Emergency Services

Talbot County Health Department
Talbot County Soil Conservation District
University of Maryland Extension

Wicomico County

Maryland Department of Agriculture
Maryland Department of Environment
Wicomico County Emergency Services
Wicomico County Extension
Wicomico County Health Department
Wicomico County Soil Conservation

Worcester County

Maryland Department of Agriculture
Maryland Department of Environment
Worcester County Emergency Services

COMMONWEALTH OF VIRGINIA INGESTION JURISDICTIONS

Arlington County

Virginia Department of Agriculture
Virginia Department of Emergency Management
Virginia Department of Health
Virginia Department of Public Information
Virginia Fire Department

City of Alexandria

City of Alexandria Department of Communications
City of Alexandria Department of Health
City of Alexandria Fire Department
City of Alexandria Geographic Information System
City of Alexandria Office of Emergency Management
City of Alexandria Police Department
City of Alexandria Sheriff's Department
Virginia Department of Emergency Management

City of Falls Church

Falls Church Department of Agriculture
Falls Church Department of Communications
Falls Church Department of Emergency Management
Falls Church Department of Public Information

Lancaster County

Lancaster County Emergency Management Services
Three River Health District
Virginia Cooperative Extension

Virginia Department of Emergency Management

DISTRICT OF COLUMBIA INGESTION JURISDICTIONS

District of Columbia

PRIVATE/VOLUNTEER ORGANIZATIONS

The following private and volunteer organizations participated in the CCNPP exercise at many different locations throughout the area. We thank them and all those who volunteer their services to State, county, and municipal governments during emergencies.

Amateur Radio Emergency Services (ARES) and Radio Amateur Civil Emergency Services (RACES), including the following local clubs:

- Calvert Amateur Radio Association
- Radio Emergency Associated Communications Teams

American Red Cross, including the following local chapters:

- Calvert County
- Dorchester County
- St. Mary's County

- Calvert Memorial Hospital
- Constellation Energy
- Eastern Shore Hospital Center
- Southern Maryland Electrical Cooperative
- St. Mary's Hospital
- Volunteer Organizations Active in Disasters

C. Exercise Timeline

Table 1, on the following page, presents the times at which key events and activities occurred during the CCNPP exercise on October 20-22, 2009. Also included are times notifications were made to the participating jurisdictions/functional entities.

TABLE 1. EXERCISE TIMELINE

DATE AND SITE: *October 20, 2009 Calvert Cliffs Nuclear Power Plant*

Emergency Classification Level or Event	Time Utility Declared	Time Notification Was Received or Action Was Taken						
		Maryland State EOC	Maryland State AAC/EOF	Maryland State AA-MDE	Joint Information Center	Calvert County	St. Mary's County	Dorchester County
Unusual Event	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alert	0841	0848	0845	0845	N/A	0848	0848	0848
Site Area Emergency	1014	1022	1019	1019	1051	1023	1023	1023
General Emergency	1148	1155	1152	N/A	1155	1155	1155	1155
Simulated Radiation Release Started	1148	1155	1152	N/A	1155	1155	1155	1156
Simulated Radiation Release Terminated	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Facility Declared Operational		0912	0934	0930	0953	0919	0921	0926
Declaration of State of Emergency		1125	1124	N/A	1150	1142	1216	1141
Exercise Terminated		1437	1430	1143	1436	1436	1440	1432
1st A&N Decision Shelter: PAZ 2, 4; Stored feed and water within 10-mile radius Evacuate: PAZ 1		1123	1127	1127	1132	1127	1127	1127
1st Siren Activation		1137				1137	1137	1137
1st EAS Message		1140				1140	1140	1140
2nd A&N Decision Recommendation: Stored feed within 50-miles of areas N, P, Q, R Shelter: PAZ 3, 6, 7 Evacuate: PAZ 1, 2, 4, 5		1240	1243	N/A	1240	1245	1245	1245
2nd Siren Activation		1255				1255	1255	1255
2nd EAS Message		1258				1258	1258	1258
KI Administration Decision: Emergency Workers in 10-mile EPZ <u>TO</u> take KI		1123	1127	1127	1132	1128	1127	1128
KI Administration Decision: General Public in PAZ 1, 2, 4, 5 advised <u>TO</u> take KI		1240	1243	N/A	1240	1245	1245	1245

Legend: N/A – Not Applicable

IV. Evaluation and Results

Contained in this section are the results and findings of the evaluation of all jurisdictions and locations that participated in the October 20-22, 2009, biennial Radiological Emergency Preparedness (REP) exercise. The exercise was held to test the offsite emergency response capabilities of local governments in the 10-mile Emergency Planning Zone (EPZ) surrounding the Calvert Cliffs Nuclear Power Plant (CCNPP).

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

A. Summary Results of Exercise Evaluation

The matrix presented in Table 2, on the following pages, presents the status of the exercise evaluation area criteria from the REP Exercise Evaluation Methodology that were scheduled for demonstration during this exercise by all participating jurisdictions and functional entities. Exercise evaluation area criteria are listed by number and the demonstration status of the criteria is indicated by the use of the following letters:

- M Met (No Deficiency or Area Requiring Corrective Action (ARCA) assessed and no unresolved ARCA's from prior exercises)
- A ARCA(s) assessed
- A¹ ARCA(s) assessed, but successfully re-demonstrated
- R Resolved ARCA(s) from prior exercises

TABLE 2. SUMMARY RESULTS OF EXERCISE EVALUATION

DATE AND SITE: October 20-22, 2009 Calvert Cliffs Nuclear Power Plant

JURISDICTION/LOCATION	1.a	1.b	1.c	1.d	1.e	2.a	2.b	2.c	2.d	2.e	3.a	3.b	3.c	3.c.2	3.d	3.d.2	3.e	3.e.2	3.f	4.a	4.a.2	4.a.3	4.b	4.c	5.a	5.a.2	5.a.3	5.b	6.a	6.b	6.c	6.d		
STATE OF MARYLAND – PLUME																																		
Maryland State EOC	M		M	M	M			M																		M			M					
Maryland State AAC-MDE	M		M	M	M	M	M	M		M																								
Maryland State AAC-EOF			M	M	M	M/R	M	M		M												M/R												
Joint Information Center	M			M																					M			M						
State Field Team A	M			M	M						M	M									A ¹	M	M											
State Field Team B	M			M	M						M	M									A ¹	M	M											
RISK JURISDICTIONS																																		
CALVERT COUNTY																																		
Calvert County EOC	M		M	M	M	M		M	M		M	M	M	M	M	M	M	M	M	M						M		M	M					
Field Monitoring Team				M	M						M	M										M	M	M										
Route Alerting Team				M	M						M	M																A ¹						
Traffic/Access Control Point					M						M	M			M	M																		
ST. MARY'S COUNTY																																		
St. Mary's County EOC	M		M	M	M	M		M	M		M	M	M	M	M	M	M	M	M	M						M		M	M					
Field Monitoring Team				M	M						M	M										M	M	M										
Route Alerting Team				M	M						A ¹	A ¹																A ¹						
Traffic/Access Control Point					M						M	M			M	M																		
DORCHESTER COUNTY																																		
Dorchester County EOC	M		M	M	M	M		M	M		M	M	M	M	M	M	M	M	M	M						M		M	M					
Field Monitoring Team				M	M						M	M										M	M	M										
Route Alerting Team				M	M						M	M																M						
Traffic/Access Control Point					M						M	M			M	M																		
SCHOOLS																																		
CALVERT COUNTY																																		
Patuxent ES																																		
St. Leonard ES																																		
Southern MS																																		
ST. MARY'S COUNTY																																		
Green Holly ES																																		
STATE OF MARYLAND – INGESTION																																		
Maryland State EOC and JIC					M																													
Maryland State AAC/MDE/IPCC	M		M	M						M	M																							
Maryland Laboratory					M						M	M																						
Ingestion Field Sampling Team 1					M						M	M																						
Ingestion Field Sampling Team 2					M						M	M																						

LEGEND: M = Met (no Deficiency or ARCA(s) assessed)
R = Resolved ARCA(s) from prior exercises

A = ARCA(s) assessed
U = Unresolved ARCA(s) from prior exercise

A¹ = ARCA(s) assessed but successfully re-demonstrated
Blank = Not scheduled for demonstration

TABLE 2. SUMMARY RESULTS OF EXERCISE EVALUATION

DATE AND SITE: October 20-22, 2009 Calvert Cliffs Nuclear Power Plant

JURISDICTION/LOCATION	1 ^a a	1 ^a b	1 ^a c	1 ^a d	1 ^a e	2 ^a a	2 ^a b	2 ^b b	2 ^b c	2 ^b d	2 ^b e	3 ^a a	3 ^a b	3 ^a c	3 ^a d	3 ^a e	3 ^a f	4 ^a a	4 ^a a	4 ^a a	4 ^a b	4 ^a c	5 ^a a	5 ^a a	5 ^a a	5 ^a b	6 ^a a	6 ^a b	6 ^a c	6 ^a d	
INGESTION OUT OF SEQUENCE																															
STATE OF MARYLAND																															
Anne Arundel County EOC		M		M	M											M	M	M												M	
Caroline County EOC		M		M	M											M	M	M												M	
Charles County EOC		M		M	M											M	M	M												M	
Kent County EOC		M		M	M											M	M	M												M	
Prince Georges County EOC		M		M	M											M	M	M												M	
Queen Anne's County EOC		M		M	M											M/R	M/R	M/R												M	
Somerset County EOC		M		M	M											M	M	M												M	
Talbot County EOC		M		M	M											M	M	M												M	
Wicomico County EOC		M		M	M											M	M	M												M	
Worcester County EOC		M		M	M											M	M	M												M	
STATE OF VIRGINIA																															
Arlington County EOC		M		M	M											M	M	M												M	
Lancaster County EOC		M		M	M											M	M	M												M	
Falls Church EOC		M		M	M											M	M	M												M	
City of Alexandria EOC		M		M	M											M	M	M												M	
DISTRICT OF COLUMBIA																															
District of Columbia EOC		M	R	M	M	R										M/R	M	M/R												M	

LEGEND: M = Met (no Deficiency or ARCA(s) assessed)
R = Resolved ARCA(s) from prior exercises

A = ARCA(s) assessed
U = Unresolved ARCA(s) from prior exercise

A¹ = ARCA(s) assessed but successfully re-demonstrated
Blank = Not scheduled for demonstration

B. Status of Jurisdictions Evaluated

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

- **Met** – Listing of the demonstrated exercise evaluation area criteria under which no Deficiencies or ARCAs were assessed during this exercise and under which no ARCAs assessed during prior exercises remain unresolved.
- **Deficiency** – Listing of the demonstrated exercise evaluation area criteria under which one or more Deficiencies were assessed during this exercise. Included is a description of each Deficiency and recommended corrective actions.
- **Area Requiring Corrective Action** – Listing of the demonstrated exercise evaluation area criteria under which one or more ARCAs were assessed during the current exercise. Included is a description of the ARCAs assessed during this exercise and the recommended corrective actions to be demonstrated before or during the next biennial exercise.
- **Not Demonstrated** – Listing of the exercise evaluation area criteria that were scheduled to be demonstrated during this exercise, but were not demonstrated and the reason they were not demonstrated.
- **Prior ARCAs – Resolved** – Descriptions of ARCAs assessed during previous exercises that were resolved in this exercise and the corrective actions demonstrated.
- **Prior ARCAs – Unresolved** – Descriptions of ARCAs assessed during prior exercises that were not resolved in this exercise. Included are the reasons the ARCAs remain unresolved and recommended corrective actions to be demonstrated before or during the next biennial exercise.

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

- A **Deficiency** is defined in FEMA-REP-14 as “...an observed or identified inadequacy of organizational performance in an exercise that could cause a finding that offsite emergency preparedness is not adequate to provide reasonable assurance that appropriate protective measures can be taken in the event of a radiological emergency to protect the health and safety of the public living in the vicinity of a nuclear power plant.”

- An **ARCA** is defined in FEMA-REP-14 as “...an observed or identified inadequacy of organizational performance in an exercise that is not considered, by itself, to adversely impact public health and safety.”

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

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

- **Plant Site Identifier** – A two-digit number corresponding to the Utility Billable Plant Site Codes.
- **Exercise Year** – The last two digits of the year the exercise was conducted.
- **Evaluation Area Criterion** – A letter and number corresponding to the criteria in the FEMA REP Exercise Evaluation Methodology.
- **Issue Classification Identifier** – (D = Deficiency, A = ARCA). Only Deficiencies and ARCAs are included in exercise reports.
- **Exercise Issue Identification Number** – A separate two digit indexing number assigned to each issue identified in the exercise.

1.0 STATE OF MARYLAND – PLUME EXERCISE

1.1 Maryland Emergency Operations Center (Reisterstown)

- a. MET: 1.a.1 2.b.2 5.a.1
1.c.1 5.b.1
1.d.1
1.e.1
- b. DEFICIENCY: None
- c. AREAS REQUIRING CORRECTIVE ACTION: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ARCAs – RESOLVED: None
- f. PRIOR ARCAs – UNRESOLVED: None

1.2 Maryland State Accident Assessment Center - Maryland Department of the Environment (Baltimore)

- a. MET: 1.a.1 2.a.2
1.c.1 2.b.1
1.d.1 2.b.2
1.e.1 2.d.1
- b. DEFICIENCY: None
- c. AREAS REQUIRING CORRECTIVE ACTION: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ARCAs – RESOLVED: None
- f. PRIOR ARCAs – UNRESOLVED: None

1.3 Maryland State Accident Assessment Center – Emergency Operations Facility (Barstow)

- a. MET: 1.c.1 2.a.1 4.a.2
1.d.1 2.b.1
1.e.1 2.b.2
- b. DEFICIENCY: None

- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** Two

Issue Number: 11-07-2.a.1-A-01

Condition: The Secretary of Maryland Department of the Environment (MDE) made a decision for all emergency workers in the Emergency Planning Zone to ingest potassium iodine (KI). This decision was never received in the MDE Dose Assessment room in the Emergency Operations Facility. As a result, the State Field Monitoring Teams did not receive instruction to ingest their KI.

Corrective Action Demonstrated: At 1127 during the exercise on October 20, 2009, the Secretary of the MDE, who was located at the AAC in the EOF, made the decision for emergency workers to take KI. At this time the field monitoring teams were still being managed by the Field Team Leader in the MDE AAC in Baltimore. The Radiation Assessment Director conveyed this KI decision to the Field Team Leader. At 1130 the Field Monitoring Teams were instructed to take KI. They completed this action by 1139. These actions close out Issue Number 11-07-2.a.1-A-01.

Issue Number: 11-07-4.a.2-A-03

Condition: The State Field Monitoring Teams were unaware of the Emergency Classification Level (ECL), release status and Protective Action Decisions (PADs). At the end of the exercise they thought they were still in the ALERT ECL, were not aware that a release of radioactive materials had occurred or was in progress, or that there was an evacuation ordered.

Corrective Action Demonstrated: During the exercise on October 20, 2009 the Field Team Leader kept both field monitoring teams informed on the changes to the emergency classification levels, the start of the radiation release and the evacuation decisions that were made. The Radiological Health Protection Leader who was collocated with the Secretary of the MDE on the ground floor of the EOF made sure that the Field Team Leader who was in a separate area on the second floor of the EOF was kept well informed. These actions close out Issue Number 11-07-4.a.2-A-03.

f. **PRIOR ARCAs – UNRESOLVED:** None

1.4 Joint Public Information Center (Barstow)

a. **MET:** 1.a.1 5.a.1
1.d.1 5.b.1

b. **DEFICIENCY:** None

c. **AREAS REQUIRING CORRECTIVE ACTION:** None

d. **NOT DEMONSTRATED:** None

e. **PRIOR ARCAs – RESOLVED:** None

f. **PRIOR ARCAs – UNRESOLVED:** None

1.5 State Field Air Monitoring Team A

a. **MET:** 1.a.1 3.a.1 4.a.2
1.d.1 3.b.1 4.a.3
1.e.1

b. **DEFICIENCY:** None

c. **AREAS REQUIRING CORRECTIVE ACTION:** One (4.a.1 Re-demonstrated)

Issue Number: 11-09-4.a.1-A-01 (Re-demonstrated)

Condition: The Eberline model MS-2 radiation survey instruments used by State Field Monitoring Teams (FMT) did not successfully pass the required radioactive source check within the “range of readings” specified for the 5 microcurie Barium-133 radioactive source.

Possible Cause: Both FMT instruments failed the source check and responded below the lower limit of the 70,000-100,000 count per minute specified range of readings. The Ba-133 source has a 10.5 year half-life and may have decayed significantly since the range of readings was determined.

References: NUREG-0654, H.7, 10;
Maryland Department of the Environment EP-302,
Revision 11, Ambient Radiation Monitoring and
Sampling

Effect: The Eberline MS-2 instrument is used to analyze field air samples for radioactive iodine. If the instrument does not pass source check it cannot be relied on to analyze samples in the field and would delay analysis of field air samples pending laboratory evaluation. A delay in sample analysis could also delay dose assessment and protective action decisions.

Corrective Action Demonstrated: The Ba-133 sources used for the instrument source checks were correctly decay calculated to the current source strength. This calculation resulted in a decrease from 5 microcuries in August 2005, to 3.78 microcuries as of 10/23/2009. The corresponding source range values were recalculated to be 53,000 counts per minute (cpm) to 76,000 cpm. This is a decrease from the original values of 70,000 cpm to 100,000 cpm. The new ranges were verified to be correct values by calculations performed by Region III FEMA Staff. On October 27, 2009 at the Calvert Cliffs Nuclear Power Plant Joint Information Center, both instruments used by the State Field Teams were source checked by MDE Staff and observed by FEMA Region III staff. Both instruments were within the source range values. This closes out issue 11-09-4.a.1-A-01.

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

1.6 State Field Air Monitoring Team B

- a. **MET:** 1.a.1 3.a.1 4.a.2
1.d.1 3.b.1 4.a.3
1.e.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** One (4.a.1 Re-demonstrated)

Issue Number: 11-09-4.a.1-A-01 (Re-demonstrated)

Condition: The Eberline model MS-2 radiation survey instruments used by State Field Monitoring Teams (FMT) did not successfully pass the required radioactive source check within the

“range of readings” specified for the 5 microcurie Barium-133 radioactive source.

Possible Cause: Both FMT instruments failed the source check and responded below the lower limit of the 70,000-100,000 count per minute specified range of readings. The Ba-133 source has a 10.5 year half-life and may have decayed significantly since the range of readings was determined.

References: NUREG-0654, H.7, 10;
Maryland Department of the Environment EP-302,
Revision 11, Ambient Radiation Monitoring and
Sampling

Effect: The Eberline MS-2 instrument is used to analyze field air samples for radioactive iodine. If the instrument does not pass source check it cannot be relied on to analyze samples in the field and would delay analysis of field air samples pending laboratory evaluation. A delay in sample analysis could also delay dose assessment and protective action decisions.

Corrective Action Demonstrated: The Ba-133 sources used for the instrument source checks were correctly decay calculated to the current source strength. This calculation resulted in a decrease from 5 microcuries in August 2005, to 3.78 microcuries as of 10/23/2009. The corresponding source range values were recalculated to be 53,000 counts per minute (cpm) to 76,000 cpm. This is a decrease from the original values of 70,000 cpm to 100,000 cpm. The new ranges were verified to be correct values by calculations performed by Region III FEMA Staff. On October 27, 2009 at the Calvert Cliffs Nuclear Power Plant Joint Information Center, both instruments used by the State Field Teams were source checked by MDE Staff and observed by FEMA Region III staff. Both instruments were within the source range values. This closes out issue 11-09-4.a.1-A-01.

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.0 RISK JURISDICTIONS

2.1 Calvert County

2.1.1 Calvert County Emergency Operations Center

- a. **MET:** 1.a.1 2.a.1 3.a.1 4.a.2 5.a.1
1.c.1 2.b.2 3.b.1 5.b.1
1.d.1 2.c.1 3.c.1 5.b.1
1.e.1 3.c.2
3.d.1
3.d.2
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.1.2 Field Monitoring Team

- a. **MET:** 1.d.1 3.a.1 4.a.1
1.e.1 3.b.1 4.a.2
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.1.3 Route Alerting Team

- a. **MET:** 1.d.1 3.a.1
1.e.1 3.b.1
- b. **DEFICIENCY:** None

- c. **AREAS REQUIRING CORRECTIVE ACTION:** One (5.a.3 Re-demonstrated)

Issue Number: 11-09-5.a.3-A-02 (Re-demonstrated)

Condition: The Deputy Sheriff performing backup route alerting was unable to complete the route within 45 minutes of notification of a failure of Siren C-19.

Possible Cause: There were two possible causes. First, the controller inject was provided to the Calvert County Emergency Management Director at 1140. The Sheriff's Deputy was dispatched to a "staging area" where he was subsequently directed by the senior Sheriff's representative in the County EOC to begin the route. This resulted in a 20-minute delay before he started the alerting process. Second, the Sheriff's Deputy had not been informed of which specific route he should follow, out of three identified in the county plan. Since he knew the area, he tried to combine portions of all three identified routes, which resulted in him not completing any of the routes prior to the end of the 45-minute period.

References: NUREG-0654, E.6; Appendix 3.B.2.c.

Effect: Some of the residents might not have been alerted and may have missed the EAS message.

Corrective Action Demonstrated: Following discussion with the Calvert County Emergency Manager, the FEMA Evaluation Team Leader, the Sheriff's Commander in the County Emergency Operations Center, the Deputy repeated the backup route alerting process of a single route in 25 minutes.

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.1.4 Traffic Control Point/Access Control Point

- a. MET: 1.e.1 3.a.1
3.b.1
3.d.1
3.d.2
- b. DEFICIENCY: None
- c. AREAS REQUIRING CORRECTIVE ACTION: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ARCAs – RESOLVED: None
- f. PRIOR ARCAs – UNRESOLVED: None

2.2 St. Mary's County

2.2.1 St. Mary's County Emergency Operations Center

- a. MET: 1.a.1 2.a.1 3.a.1 4.a.2 5.a.1
1.c.1 2.b.2 3.b.1 5.b.1
1.d.1 2.c.1 3.c.1 5.b.1
1.e.1 3.c.2
3.d.1
3.d.2
- b. DEFICIENCY: None
- c. AREAS REQUIRING CORRECTIVE ACTION: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ARCAs – RESOLVED: None
- f. PRIOR ARCAs – UNRESOLVED: None

2.2.2 Field Monitoring Team

- a. MET: 1.d.1 3.a.1 4.a.1
1.e.1 3.b.1 4.a.2
- b. DEFICIENCY: None
- c. AREAS REQUIRING CORRECTIVE ACTION: None

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.2.3 Route Alerting Team

- a. **MET:** 1.d.1
1.e.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** Two
(All Re-demonstrated: 3.a.1, 3.b.1, 5.a.3)

Issue Number: 11-09-3.a.1, 3.b.1-A-03 (Re-demonstrated)

Condition: The St. Mary's County Sheriff's Office Deputy assigned to demonstrate route alerting was not provided a radiological exposure briefing, nor was she issued dosimetry or KI prior to the start of the route alerting process.

Possible Cause: The Sheriff's Deputies were dispatched to the staging area at 1134 hours and the siren failure occurred at 1138 hours. There was insufficient time to provide a radiological briefing, issue dosimetry and KI, and complete the route alerting process within the required 45 minute time period.

References: NUREG-0654 K.3; O.1; J.10.e;
*St. Mary's County Radiological Emergency
Plan Sheriff's Office EOC Checklist
(revision 1 – September 2007)*

Effect: Without dosimetry and KI, the emergency worker would be unable to determine her exposure and take precautionary actions, if appropriate.

Recommendation: Ensure the staging area is established at the Site Area Emergency (SAE) Emergency Classification Level (ECL) and that appropriate emergency workers are notified to report to the staging area to receive a radiological briefing, dosimetry and KI.

Corrective Action Demonstrated: The Radiological Officer for St. Mary's County successfully corrected issues for 3.a.1 and 3.b.1 by conducting a radiological briefing and issuing dosimetry and KI to the St. Mary's County Sheriff's Deputy on October 22, 2009 prior to dispatching her to conduct route alerting. All pertinent information related to KI and dosimetry was briefed in accordance with the *St. Mary's County Radiological Emergency Response Plan, Radiological Officer Checklist*. Through interview, it was determined the Deputy was able to demonstrate knowledge on when KI should be ingested, how dosimetry should be worn and how frequently it was to be read, and the process for turning in all equipment at the end of her mission.

Issue Number: 11-09-5.a.3-A-04 (Re-demonstrated)

Condition: The St. Mary's County Sheriff's Office was unable to complete backup route alerting within the required 45 minute time period. Siren #S11 failed at 1138 hours and route alerting was completed at 1234 hours; a total of 56 minutes from time of siren failure to the completion of route alerting.

Possible Cause: The Sheriff's Deputy deviated from the plan and traveled down roads not specifically addressed in the route description for siren #S11.

References: NUREG-0654 E.6;
CCNPP Route Alerting Tab B – Sheriff's Office Checklist (revision date unknown)

Effect: The public residing in the area covered by siren #S11 might not have been notified in the required 45 minutes.

Recommendation: The route alerting team should follow the roads described in *CCNPP Route Alerting Tab B – Sheriff's Office Checklist*.

Corrective Action Demonstrated: The St. Mary's County Sheriff's Deputy successfully re-demonstrated route alerting and corrected the issue for criterion 5.a.3. The Deputy promptly left the EOC (simulated staging area)

upon notification of siren #11 failure. The route alerting was completed well under the 45 minute time requirement.

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.2.4 Traffic Control Point/Access Control Point

- a. **MET:** 1.e.1 3.a.1
3.b.1
3.d.1
3.d.2
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.3 Dorchester County

2.3.1 Dorchester County Emergency Operations Center

- a. **MET:** 1.a.1 2.a.1 3.a.1 4.a.2 5.a.1
1.c.1 2.b.2 3.b.1 5.b.1
1.d.1 2.c.1 3.c.1 5.b.1
1.e.1 3.c.2
3.d.1
3.d.2
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.3.2 Field Monitoring Team

- a. **MET:** 1.d.1 3.a.1 4.a.1
1.e.1 3.b.1 4.a.2
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.3.3 Route Alerting Team

- a. **MET:** 1.d.1 3.a.1 5.a.3
1.e.1 3.b.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

2.3.4 Traffic Control Point/Access Control Point

- a. **MET:** 1.e.1 3.a.1
3.b.1
3.d.1
3.d.2
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None

f. **PRIOR ARCAs – UNRESOLVED: None**

3.0 SCHOOLS

3.1 Calvert County

3.1.1 Patuxent Elementary School

- a. MET: 3.c.2**
- b. DEFICIENCY: None**
- c. AREAS REQUIRING CORRECTIVE ACTION: None**
- d. NOT DEMONSTRATED: None**
- e. PRIOR ARCAs – RESOLVED: None**
- f. PRIOR ARCAs – UNRESOLVED: None**

3.1.2 St. Leonard Elementary School

- a. MET: 3.c.2**
- b. DEFICIENCY: None**
- c. AREAS REQUIRING CORRECTIVE ACTION: None**
- d. NOT DEMONSTRATED: None**
- e. PRIOR ARCAs – RESOLVED: None**
- f. PRIOR ARCAs – UNRESOLVED: None**

3.1.3 Southern Middle School

- a. MET: 3.c.2**
- b. DEFICIENCY: None**
- c. AREAS REQUIRING CORRECTIVE ACTION: None**
- d. NOT DEMONSTRATED: None**
- e. PRIOR ARCAs – RESOLVED: None**
- f. PRIOR ARCAs – UNRESOLVED: None**

3.2 St. Mary's County

3.2.1 Green Holly Elementary School

- a. MET: 3.c.2**
- b. DEFICIENCY: None**
- c. AREAS REQUIRING CORRECTIVE ACTION: None**
- d. NOT DEMONSTRATED: None**
- e. PRIOR ARCAs – RESOLVED: None**
- f. PRIOR ARCAs – UNRESOLVED: None**

4.0 STATE OF MARYLAND – POST-PLUME EXERCISE

4.1 Maryland Emergency Operations Center and Joint Information Center (Reisterstown)

- a. MET: 1.d.1 3.e.1 5.b.1
3.e.2
3.f.1
- b. DEFICIENCY: None
- c. AREAS REQUIRING CORRECTIVE ACTION: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ARCAs – RESOLVED: None
- f. PRIOR ARCAs – UNRESOLVED: None

4.2 Maryland State Accident Assessment Center / Maryland Department of the Environment / Ingestion Pathway Coordinating Committee (Baltimore)

- a. MET: 1.a.1 2.d.1
1.c.1 2.e.1
1.d.1
- b. DEFICIENCY: None
- c. AREAS REQUIRING CORRECTIVE ACTION: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ARCAs – RESOLVED: None
- f. PRIOR ARCAs – UNRESOLVED: None

4.3 Maryland Laboratory

- a. MET: 1.d.1 3.a.1
3.b.1
- b. DEFICIENCY: None

c. **AREAS REQUIRING CORRECTIVE ACTION:** Two (4.c.1)

Issue Number: 11-09-4.c.1-A-05

Condition: The contamination control measures established within the laboratory were not adequate to prevent spread of contamination within the laboratory.

Possible Cause: Laboratory personnel were unaccustomed to working with highly contaminated samples and did not fully understand the importance of contamination monitoring as a method to prevent the spread of contamination within the laboratory. For example: contamination survey instruments were not used in sample preparation areas (to monitor surfaces, gloves, etc. during and after handling contaminated samples), laboratory personnel were not aware of the need to perform contamination surveys of personnel and materials exiting sample preparation areas, and analysis personnel were not aware of the high potential for contaminating gamma spectroscopy detectors by opening contaminated samples to place them on the detector for counting. It was additionally noted that there was only one contamination monitoring instrument (Eberline RM-14 with pancake Geiger-Muller detector) brought to the laboratory by the MDE Radiation Safety Officer.

References: NUREG-0654, C.3, I.8, 9;
Maryland Department of the Environment EP-601,
Revision 3, Laboratory Procedures for
Radiological Emergencies

Effect: If radioactive contamination is spread through the laboratory and into the sample counting/analysis area, counting equipment could become contaminated and/or samples could become cross-contaminated, rendering their analysis unusable for protective action decision making.

Recommendation: Set up contamination monitoring instruments in the sample preparation rooms and train personnel on when they should be used to preclude the spread of contamination to other parts of the laboratory. Additionally, analysis personnel should devise a method to put samples onto the detector without having to open the sample (e.g., sample handling jig).

State Response: Procedures will be revised to include use of contamination monitoring instruments in the sample preparation rooms. Training will be conducted to ensure personnel prevent the

spread of contamination to other parts of the laboratory. Additionally, analysis personnel will devise methods to put samples onto the detector without having to open the sample.

Issue Number: 11-09-4.c.1-A-06

Condition: The Department of Natural Resources (DNR) laboratory located at 201 West Preston Street, Baltimore, MD is part of the State's Radiological Laboratory. The current quality assurance program for gamma spectroscopy systems at the DNR laboratory does not meet nationally accepted laboratory standards.

Possible Cause: Non-compliance with established quality assurance standards. Based on the requirements of the FRMAC Lab Analysis manual, the DNR lab would not meet the standards and would be excluded for sample analysis for DOE samples. For example: daily routine checks are not performed on the gamma spectroscopy HpGe detectors; energy calibrations are done when a lab employee notices some peaks are offset; and efficiency calibrations are done every ten years. Nationally accepted quality assurance standards require daily performance checks and energy and efficiency calibrations every two years or if a daily performance checks indicates a problem.

References: NUREG-0654, C.3; I.8, 9; J.11;
FRMAC Laboratory Analysis Manual, 2005;
National Environmental Laboratory Accreditation Program, Chapter 5, Quality Systems, Revision 15, National Environmental Laboratory Accreditation Council, May 2001;
Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP), Chapter 18, NUREG-1576, EPA 402-B-01-003, NTIS PB2001-106745. DRAFT July 2001.

Effect: Sample analysis results cannot be verified to be correct due to the deviation from established quality control standards.

Recommendation: Modify plans and procedures to come into compliance with nationally accepted standards. Train staff in the revised plans and procedures.

State Response: Procedures will be reviewed and revised to ensure compliance with nationally accepted standards. Staff will be trained on the revised plans and procedures.

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

4.4 Ingestion Field Sampling Team 1

- a. **MET:** 1.d.1 3.a.1 4.a.1
3.b.1 4.b.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

4.5 Ingestion Field Sampling Team 2

- a. **MET:** 1.d.1 3.a.1 4.a.1
3.b.1 4.b.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.0 INGESTION OUT-OF-SEQUENCE EVALUATIONS

5.1 State of Maryland

5.1.1 Anne Arundel County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.2 Caroline County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.3 Charles County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.4 Kent County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.5 Prince George’s County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.6 Queen Anne’s County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None

- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** Three

Issue Number: 11-04-3.e.1-A-01

Description: Queen Anne's County personnel were unable to provide information detailing the locations of food supplies, milk, and agricultural products. (NUREG-0654, H.7, 10; J.10.a, b, e; J.11; K.3.a; Queen Anne's County EOP dated September 2003)

Corrective Action Demonstrated: The Queen Anne County Emergency Operations Center (EOC) discussed the types of information that was available about agribusinesses in the county including maps showing the exact locations of local produce, poultry farms and dairy farms. Each type of agribusiness was presented in hard copy with individual contact information. Beekeepers were displayed on individual maps with overlays of the 50 mile EPZ as well. Discussion further included location and isolation of exposed water supply intakes such as surface water.

Queen Anne County does have Geographical Information Systems (GIS) capabilities. The most current information was also readily available from the support counties, Maryland Emergency Management Agency (MEMA), Department of Health and Mental Hygiene (DHMH), Tidal Fisheries division, Department of Natural Resources, Maryland Dept. of Agriculture, State Highway Administration (SHA), Queen Anne County Health Department, and Maryland Cooperative Extension.

These actions close out Issue Number 11-04-3.e.1-A-01.

Issue Number: 11-04-3.e.2-A-02

Description: The Queen Anne's County Offsite Response Organization (ORO) did not have any pre-printed instructional material on hand, which would provide information to individuals and businesses, and aid in the protective action measures used for dealing with

contamination of food, water supply, and agricultural products.

The County Emergency Operations Plan (EOP) does not include specific guidance for the application of appropriate measures, strategies, and pre-printed material developed for implementing protective action decisions. Officials from Queen Anne's County were did not know if the procedures/ actions taken by Emergency Operations Center (EOC) personnel were in accordance with those mentioned in the County plan. (NUREG-0654, J.9, 11; Queen Anne's County EOP dated September 2003)

Corrective Action Demonstrated: Queen Anne County had pre-printed brochures prepared and issued through Constellation Emergency containing information for farmers and food processors located within the 50 mile Emergency Planning Zone.

The Queen Anne County Emergency Operations Plan, Annex Q, Revision 1, dated September 23, 2009, states that the EOC, in conjunction with the County Health Department, Public Information Officer, USDA Farm Service Agency, and the University of Maryland Cooperative Extension Service will have the responsibility to coordinate local, State and Federal activities and to assist in the implementation of protective actions and public information in the county. A representative from the Maryland Department of Agriculture was on hand to provide guidance for the analysis of food, water milk and livestock, and to ensure all truck and dairy farms, milk processing centers and potable water supplies are controlled to prohibit public consumption. A representative from the Maryland Department of the Environment was available in the EOC to support the county with State recommended Protective Action Decisions (PADs). Other support agencies included the Tidal Fisheries Division of the Department of Natural Resources, State Highway Administration and other Federal agencies.

These actions close out Issue Number 11-04-3.e.2-A-02.

Issue Number: 11-04-3.f.1-A-03

Description: Queen Anne's County officials did not adequately demonstrate the ability to effectively render

protective action decision regarding re-entry of emergency workers, and the return and relocation of the public. (NUREG-0654, M.1, 3; Queen Anne's County EOP dated September 2003)

Corrective Action Demonstrated: The Emergency Director lead the discussion regarding post emergency actions for Emergency Workers and the general public that were relocated out of the affected area. A controlled re-entry process was discussed allowing emergency workers access to farms, conditions permitting with the concurrence of State agencies and county officials including MD Department of the Environment, (MDE), Department of Health and Department of Agriculture. Queen Anne County would advise or notify the general public and Emergency Workers through the Emergency Alert System (EAS), Public Information Officer, radio & newspaper, press, television, Internet, satellite radio or other official channels when a decision to permit reentry is made. The EOC discussed the entry and egress route, Personal Protective Equipment (PPE), radiological concerns and safety concerns for vital functions as milking, watering and feeding farm animals.

Provisions were discussed around short-term evacuation of the general public within the affected area and long term relocation during the recovery process. There were several options including bus services supporting the relocation of transportation-dependent evacuees from the restricted area. The total population in the affected area was estimated to be about 48,000 people with a large portion being transient (vacation properties) and about 4,000 permanent residents. The State and local officials provide brochures to farmers and general public containing general information and instructions to assist with decontamination of animals, food, and property if warranted including isolation. Even though the affected area of Queen Anne County population is seasonal dependent, there was discussion around measures to restore services and facilities including assisted living communities, water treatment facilities, hospitals social services, roads and schools.

These actions close out Issue Number 11-04-3.f.1-A-03.

f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.7 Somerset County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.8 Talbot County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.9 Wicomico County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None

f. **PRIOR ARCAs – UNRESOLVED:** None

5.1.10 Worcester County Emergency Operations Center

a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1

b. **DEFICIENCY:** None

c. **AREAS REQUIRING CORRECTIVE ACTION:** None

d. **NOT DEMONSTRATED:** None

e. **PRIOR ARCAs – RESOLVED:** None

f. **PRIOR ARCAs – UNRESOLVED:** None

5.2 Commonwealth of Virginia

5.2.1 Arlington County Emergency Operations Center

a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1

b. **DEFICIENCY:** None

c. **AREAS REQUIRING CORRECTIVE ACTION:** None

d. **NOT DEMONSTRATED:** None

e. **PRIOR ARCAs – RESOLVED:** None

f. **PRIOR ARCAs – UNRESOLVED:** None

5.2.2 Lancaster County Emergency Operations Center

a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1

b. **DEFICIENCY:** None

c. **AREAS REQUIRING CORRECTIVE ACTION:** None

- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.2.3 Falls Church County Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.2.4 City of Alexandria Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1
- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** None
- f. **PRIOR ARCAs – UNRESOLVED:** None

5.3 District of Columbia

5.3.1 District of Columbia Emergency Operations Center

- a. **MET:** 1.b.1 3.e.1 5.b.1
1.d.1 3.e.2
1.e.1 3.f.1

- b. **DEFICIENCY:** None
- c. **AREAS REQUIRING CORRECTIVE ACTION:** None
- d. **NOT DEMONSTRATED:** None
- e. **PRIOR ARCAs – RESOLVED:** Four

Issue Number: 11-04-1.c.1-A-04

Description: The Emergency Management Director or his designee was not present to perform leadership responsibilities. For example, no decision was reached regarding the timing for the relocation of residents in contaminated areas or the cancellation of the precautionary shelter-in-place order. (NUREG-0654, A.1.d, A.2.a, b)

Corrective Action Demonstrated: The District of Columbia's Emergency Management leadership successfully demonstrated their capability to make informed decisions regarding the relocation of residents in contaminated areas and the cancellation of the precautionary shelter-in-place order.

In addition, leadership stated that the District would request assistance from Federal and State agencies (e.g., Federal Radiological Monitoring and Assessment Center (FRMAC), Department of Health (DOH), Department of Energy (DOE)) to provide decision-making support as needed.

All activities were based on the plan and procedures and completed as they would have been in an actual emergency except as noted in the extent of play agreement.

These actions close out Issue Number 11-04-1.c.1-A-04.

Issue Number: 11-04-2.a.1-A-05

Description: No decision-making took place regarding the potential for emergency worker radiation exposure. (NUREG-0654, K.4; FRMAC Radiological Emergency Response Health and Safety Manual, Section 2.4)

Corrective Action Demonstrated: The District of Columbia's Emergency Management leadership

successfully demonstrated their ability to make effective decisions regarding the management of emergency worker radiological exposure.

In addition, leadership stated that the District would request assistance from Federal and State agencies (e.g., Federal Radiological Monitoring and Assessment Center (FRMAC), Department of Health (DOH), Department of Energy (DOE)) to provide supplementary dosimetry or exposure controls as needed.

All activities were based on the plan and procedures and completed as they would have been in an actual emergency except as noted in the extent of play agreement.

These actions close out Issue Number 11-04-2.a.1-A-05.

Issue Number: 11-04-3.e.2-A-06

Description: The capability to control, restrict or prevent distribution of contaminated food by commercial sectors and for enforcing food controls within the Ingestion Pathway Zone (IPZ) was not addressed. This includes rapid reproduction and distribution of information and instructions to pre-determined individuals and businesses. Coordination with agencies responsible for enforcing food controls within the IPZ was not demonstrated and communications with food producers and processors was not demonstrated or simulated. (NUREG-0654, E.5, 7; J.9, 11)

Corrective Action Demonstrated: The District of Columbia demonstrated through printed materials and electronic means numerous ways of communicating Protective Action Decisions (PADs) to the public and Emergency. The Metropolitan police discussed how they would support the decisions of the elected authorities to maintain command and control. They also would use the Emergency Alert System, or EAS, to broadcast over local commercial radio stations, land lines, reverse 9-1-1, Printed materials, local radio and television. The District of Columbia provided to the evaluation team examples of the materials made available to all residents in the District such as "Be Ready DC" A guide to Family Preparedness and "It's a Disaster... and what are you gonna do about it?" a preparedness, prevention and first aid manual.

These actions close out Issue Number 11-04-3.e.2-A-06.

Issue Number: 11-04-3.f.1-A-07

Description: Specific response actions associated with the relocation of the public and the re-entry of emergency workers into potentially contaminated areas were not addressed. (NUREG-0654, M.1, 3)

Corrective Action Demonstrated: The Emergency Coordinator lead the discussion regarding post-emergency actions for emergency workers supporting relocation and re-entry of the general public in the affected area. A controlled re-entry process was discussed allowing designated volunteers and professional emergency workers access to re-energize critical infrastructure and emergency services, coordinating with State of Maryland agencies and officials including MD Department of the Environment, (MDE), Department of Health and local authorities. Evacuated residents would not be routinely allowed access back into the affected area without pre-approved authorization on a case by case basis until it has been determine that there is no radioactive release requiring protective actions.

The Radiological Officer introduced discussion on the Protective Action Guides afforded emergency workers such as whole body exposure limits specified by the Environmental Protection Agency and Bureau of Radiation Protection.

Provisions were discussed around short term evacuation of the general public within the affected area and long term relocation during the recovery process. There was also discussion supporting the relocation of transportation dependent evacuees and the monitoring and decontamination of evacuee from within the restricted area.

These actions close out Issue Number 11-04-3.f.1-A-07.

f. PRIOR ARCAs – UNRESOLVED: None

APPENDIX 1:

Acronyms and Abbreviations

A&N	Alert and Notification
AAC	Accident Assessment Center
ACP	Access Control Point
ARC	American Red Cross
ARC 3031	American Red Cross document <i>Mass Care – Preparedness and Operations</i>
ARCA	Area Requiring Corrective Action
ARES	Amateur Radio Emergency Service
ATL	Assistant Team Leader
CCNPP	Calvert Cliffs Nuclear Power Plant
CFR	Code of Federal Regulations
cpm	Counts per minute
DHMH	Department of Health and Mental Hygiene
DHS	Department of Homeland Security
DNR	Department of Natural Resources
DRD	Direct Reading Dosimeter
EAL	Emergency Action Level
EAS	Emergency Alert System
ECL	Emergency Classification Level
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EPZ	Emergency Planning Zone
ES	Elementary School
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FMT	Field Monitoring Team
FR	Federal Register
FRERP	Federal Radiological Emergency Response Plan
FRMAC	Federal Radiological Monitoring and Assessment Center
HS	High School
HpGe	High Purity Germanium
ICF	ICF International
IPCC	Ingestion Pathway Coordinating Committee
IPZ	Ingestion Pathway Emergency Planning Zone
JIC	Joint Information Center

KI	Potassium Iodide
mR/h	Milliroentgen(s) Per Hour
MDE	Maryland Department of the Environment
MEMA	Maryland Emergency Management Agency
MS	Middle School
MS-1	Medical Services Drill
MW	Megawatt
NRC	U.S. Nuclear Regulatory Commission
NUREG-0654	NUREG-0654/FEMA-REP-1, Rev. 1 (Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants), November 1980
ORO	Offsite Response Organization
PAD	Protective Action Decision
PAG	Protective Action Guidance
PAR	Protective Action Recommendation
PRD	Permanent Record Dosimeter
R	Roentgen(s)
RAC	Regional Assistance Committee
RACES	Radio Amateur Civil Emergency Services
Rem	Roentgen Equivalent Man
REP	Radiological Emergency Preparedness
RERP	Radiological Emergency Response Plan
R/hr	Roentgens per hour
SAE	Site Area Emergency
SD	School District
SEOC	State Emergency Operations Center
TCP	Traffic Control Point
TL	Team Leader
TTL	Technical Team Lead

APPENDIX 2:

Exercise Evaluators and Team Leaders

The following is a list of the personnel who evaluated the Calvert Cliffs Plume Exercise on October 20, 2009; the out-of-sequence school demonstrations on October 21, 2009; ingestion pathway out-of sequence demonstration on September 21-25, and October 19, 2009; and post-plume activities on October 21-22, 2009.

FEMA	Federal Emergency Management Agency
DHS	Department of Homeland Security
ICF	ICF Consulting
TL	Team Leader
ATL	Assistant Team Leader
TTL	Technical Team Leader
T	Technical Evaluator

POSITION	NAME	ORGANIZATION
RAC Chairperson	Darrell Hammons	DHS/FEMA
Project Officer	Andrew Hower	DHS/FEMA
ICF Coordinator	Roger B. Kowieski	ICF

I. BIENNIAL PLUME EXERCISE – October 20, 2009

A. State of Maryland		
EVALUATION SITE	EVALUATOR	ORGANIZATION
State Emergency Operations Center (Interview on post-plume activities)	John Price	DHS/FEMA (TL)
	Henry Christiansen	ICF (ATL)
	Richard Wessman	ICF
	Clark Duffy	ICF
Accident Assessment - MDE	William Palmer	ICF (TTL)
Accident Assessment – EOF Barstow	Reggie Rodgers	ICF
Joint Information Center (JIC) Barstow	Jon Christiansen	ICF
State Field Sampling Team A	Nicholas DePierro	ICF (T)
State Field Sampling Team B	Deborah Blunt	ICF (T)

I. BIENNIAL PLUME EXERCISE – October 20, 2009 (cont.)

B. Risk Jurisdictions		
EVALUATION SITE	EVALUATOR	ORGANIZATION
1. Calvert County EOC		
County Emergency Operations Center	Joe Suders	DHS/FEMA (TL)
	Robert Black	ICF (ATL)
	John Flynn	ICF
	Robert Lemeshka	ICF
Field Monitoring Team	Paul Cormier	ICF (T)
Route Alerting	Clayton Spangenberg	ICF
TCP/ACP	Lawrence Visniesky	ICF
2. St. Mary's County EOC		
County Emergency Operations Center	Richard Kinard	DHS/FEMA (TL)
	Michael Shuler	DHS/FEMA (ATL)
	Kim Wood	ICF
	Paul Ringheiser	ICF
Field Monitoring Team	Ronald Bonner	ICF (T)
Route Alerting	Todd Sniffin	ICF
TCP/ACP	Carl Wentzell	ICF
3. Dorchester County EOC		
County Emergency Operations Center	Robert Neff	DHS/FEMA (TL)
	Walter Gawlak	ICF (ATL)
	Robert Gantt	ICF
	Michael Petullo	ICF
Field Monitoring Team	Larry Harrington	ICF (T)
Route Alerting	Harold Spedding	ICF
TCP/ACP	Karl Fippinger	ICF

**II. PLUME EXERCISE ACTIVITIES OCCURRING OUT-OF-SEQUENCE –
October 21, 2009 (1300-1630)**

EVALUATION SITE	EVALUATOR	ORGANIZATION
SCHOOLS	Tina Lai	DHS/FEMA (TL)
Calvert County		
Patuxent Elementary School	Lawrence Visniesky	ICF
St Leonard Elementary School	Clayton Spangenberg	ICF
Southern Middle School	Carl Wentzell	ICF
St. Mary's County		
Green Holly Elementary School	Harold Spedding	ICF
Dorchester County		
There are no Risk Schools located in the Plume EPZ. Procedures will be explained to FEMA Evaluator at the County EOC.		

III. INGESTION PATHWAY EXERCISE

A. Ingestion Out-of Sequence Activities - September 21-25, 2009		
EVALUATION SITE	EVALUATOR	ORGANIZATION
Maryland Ingestion Jurisdictions		
Anne Arundel County	Bart Freeman Andrew Hower	DHS/FEMA
Caroline County	Bart Freeman Andrew Hower	DHS/FEMA
Charles County	Joe Suders Tina Lai	DHS/FEMA
Kent County	Robert Neff Michael Shuler	DHS/FEMA
Prince Georges County	Joe Suders Tina Lai	DHS/FEMA
Queen Anne's County	Robert Neff Michael Shuler	DHS/FEMA
Somerset County	Robert Neff Michael Shuler	DHS/FEMA
Talbot County	Robert Neff Michael Shuler	DHS/FEMA
Wicomico County	Bart Freeman Andrew Hower	DHS/FEMA
Worcester County	Bart Freeman Andrew Hower	DHS/FEMA

III. INGESTION PATHWAY EXERCISE (cont.)

B. Ingestion Out-of Sequence Activities - September 21-25, 2009 (cont.)		
EVALUATION SITE	EVALUATOR	ORGANIZATION
Virginia Ingestion Jurisdictions		
Arlington County	Joe Suders Tina Lai	DHS/FEMA
Lancaster County	Bart Freeman Andrew Hower	DHS/FEMA
City of Alexandria	Joe Suders Tina Lai	DHS/FEMA
Falls Church	Joe Suders Tina Lai	DHS/FEMA

C. Ingestion Out-of Sequence Activities - October 19, 2009		
EVALUATION SITE	EVALUATOR	ORGANIZATION
Washington D.C. – EOC	Robert Neff Michael Shuler	DHS/FEMA

D. Ingestion Exercise Activities - October 21, 2009 – 8:00 AM		
EVALUATION SITE	EVALUATOR	ORGANIZATION
State of Maryland – Assessment		
MDE AAC/IPCC	Reggie Rodgers David Stuenkel	ICF (TL) ICF
Ingestion Field Sampling Team 1	Nicholas DePierro	ICF
Ingestion Field Sampling Team 2	Deborah Blunt	ICF

E. Ingestion Exercise Activities - October 22, 2009 – 8:00 AM		
EVALUATION SITE	EVALUATOR	ORGANIZATION
State of Maryland – Implementation		
MEMA EOC and JIC	Richard Kinard Earl Shollenberger	DHS/FEMA (TL) ICF
Maryland Laboratory	Marcy Campbell	ICF

APPENDIX 3:

Exercise Evaluation Area Criteria and Extent of Play Agreement

This appendix contains the extent of play agreement from the State of Maryland approved by the Federal Emergency Management Agency (FEMA) Region III on October 8, 2009.

The exercise evaluation area criteria, contained in the "FEMA Radiological Emergency Preparedness Exercise Evaluation Methodology", 67 FR 20580, April 25, 2002, represent a functional translation of the planning standards and evaluation criteria of NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for the Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980.

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

Final

CALVEX '09

Plume / Ingestion Pathway Exercise

STATE OF MARYLAND

EXERCISE CRITERIA

AND

EXTENT OF PLAY

**CALVERT CLIFFS NUCLEAR POWER PLANT
Maryland Jurisdictions**

**REVISION 4
October 8, 2009**

Calvert Cliffs Nuclear Power Plant CALVEX 09

Revision 4

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INTRODUCTION

The purpose of this document is to establish those exercise evaluation areas and corresponding extent of play parameters expected to be demonstrated during the Calvert Cliffs Nuclear Power Plant Plume and Ingestion Pathway graded exercise to be conducted on October 20 through 23, 2009.

This exercise is being conducted in close cooperation with the Commonwealth of Virginia and the District of Columbia. References to "Ingestion Jurisdictions" will apply to all ingestion zone counties in the State of Maryland and the Commonwealth of Virginia.

These evaluation areas have been developed through reviews of past exercises, associated plans and procedures, the proposed exercise scenario, applicable FEMA guidance documents, and extensive discussions with FEMA representatives.

All demonstrations will be conducted in accordance with established plans and procedures, except as noted for specific exercise evaluation areas described in this Extent of Play. Evaluations for this exercise will be restricted to areas within the State of Maryland. Actual exercise play will not extend beyond the designated 50-mile Ingestion Planning Zone.

Out-of-sequence evaluations for plume phase activities will be conducted during the week of October 19, 2009 involving the three Calvert Cliffs risk jurisdictions in Maryland. The out-of-sequence activities to be demonstrated are:

- Special Facilities – Schools

Out-of-sequence evaluations for the ingestion phase activities will be conducted during the week of September 21, 2009 involving ten of the thirteen Calvert Cliffs ingestion jurisdictions in Maryland, four ingestion jurisdictions in Virginia. Calvert, St. Mary's and Dorchester counties will demonstrate ingestion objectives via interview immediately after the October plume phase evaluation. The District of Columbia will demonstrate Ingestion Pathway activities on October 19, 2009. Separate documents have been submitted to delineate the extent of play for these Ingestion Jurisdictions and the District of Columbia

The full-scale graded plume phase exercise will be conducted on October 20th, 2009 involving all the Calvert Cliffs risk jurisdictions and selected State agencies in Maryland. Demonstration activities will be initiated following a simulated accident at the plant. The graded ingestion pathway activities for the Maryland State agencies will be conducted on October 21st and 22nd, 2009.

Actions will be taken in accordance with each jurisdiction's county emergency plan and procedures unless specified under the specific extent of play.

State Locations

State EOC
State AAC
State IPCC
Joint Information Center

State Laboratory
State Field Teams (Plume)
State Field Teams (Ingestion)

Plume Zone Local Jurisdictions

Calvert County

Calvert County Government
Patuxent Elementary School (Risk School)
St Leonard Elementary (Risk School)
Southern Middle School (Risk School)

St. Mary's County

St. Mary's County Government
Green Holly Elementary School (Risk School)

Dorchester County

Dorchester County Government

Ingestion Zone Local Jurisdictions

Maryland Ingestion Jurisdictions

Anne Arundel County
Calvert County*
Caroline County
Charles County
Dorchester County*
Kent County
Prince Georges County
Queen Anne's County
Somerset County
St. Mary's County*
Talbot County
Wicomico County
Worcester County

Washington DC**

Virginia Ingestion Jurisdictions

Arlington County
Lancaster County
City of Alexandria
Falls Church

* Evaluated October 20, 2009

** Evaluated October 19, 2009

EVALUATION AREA 1: EMERGENCY OPERATIONS MANAGEMENT

Sub-element 1.a – Mobilization

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

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to alert, notify, and mobilize emergency personnel and to activate and staff emergency facilities.

EXTENT OF PLAY

Responsible OROs should demonstrate the capability to receive notification of an emergency situation from the licensee, verify the notification, and contact, alert, and mobilize key emergency personnel in a timely manner. Responsible OROs should demonstrate the activation of facilities for immediate use by mobilized personnel when they arrive to begin emergency operations. Activation of facilities should be completed in accordance with the plan and/or procedures. Pre-positioning of emergency personnel is appropriate, in accordance with the extent of play agreement, at those facilities located beyond a normal commuting distance from the individual's duty location or residence. Further, pre-positioning of staff for out-of-sequence demonstrations is appropriate in accordance with the extent of play agreement.

State of Maryland Extent of Play:

All activities must 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. Emergency Management staff normally reporting to the State or local EOC's will report to normal work locations. Responders requiring commute in excess of 60 minutes (including the Secretary, MDE) may pre-stage at their assigned location but should not initiate response activities until scenario condition warrant.

Locations Evaluated:

State EOC, AAC, and JIC
Calvert County
St. Mary's County
Dorchester County

Outstanding Issues:

None

EVALUATION AREA 1: EMERGENCY OPERATIONS MANAGEMENT

Sub-element 1.b – Facilities

Criterion 1.b.1: Facilities are sufficient to support the emergency response. (NUREG-0654, H)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs have facilities to support the emergency response.

EXTENT OF PLAY

Facilities will only be specifically evaluated for this criterion if they are new or have substantial changes in structure or mission. Responsible OROs should demonstrate the availability of facilities that support the accomplishment of emergency operations. Some of the areas to be considered are: adequate space, furnishings, lighting, restrooms, ventilation, backup power and/or alternate facility (if required to support operations).

State of Maryland Extent of Play:

Facilities will be set up based on the ORO's plans and procedures and demonstrated, as they would be in an actual emergency.

Locations Evaluated:

None - No new facilities have been included in the State or local RERPs.

Outstanding Issues:

None

EVALUATION AREA 1: EMERGENCY OPERATIONS MANAGEMENT

Sub-element 1.c - Direction and Control

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

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs have the capability to control their overall response to an emergency.

EXTENT OF PLAY

Leadership personnel should demonstrate the ability to carry out essential functions of the response effort, for example: keeping the staff informed through periodic briefings and/or other means, coordinating with other appropriate OROs, and ensuring completion of requirements and requests.

State of Maryland Extent of Play:

All activities associated with direction and control will be performed based on the ORO's plans and procedures and completed, as they would be in an actual emergency.

Locations Evaluated:

State EOC, AAC, IPCC

Local Plume Zone Jurisdictions

Outstanding Issues:

None

EVALUATION AREA 1: EMERGENCY OPERATIONS MANAGEMENT

Sub-element 1.d – Communications Equipment

Criterion 1.d.1: At least two communication systems are available, at least one operates properly, and communication links are established and maintained with appropriate locations. Communications capabilities are managed in support of emergency operations. (NUREG-0654, F.1, 2)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should establish reliable primary and backup communication systems to ensure communications with key emergency personnel at locations such as the following: appropriate contiguous governments within the emergency planning zone (EPZ), Federal emergency response organizations, the licensee and its facilities, emergency operations centers (EOC), and field teams.

EXTENT OF PLAY

ORO will demonstrate that a primary and at least one backup system are fully functional at the beginning of an exercise. If a communications system or systems are not functional, but exercise performance is not affected, no exercise issue will be assessed. Communications equipment and procedures for facilities and field units should be used as needed for the transmission and receipt of exercise messages. All facilities and field teams should have the capability to access at least one communication system that is independent of the commercial telephone system. Responsible OROs should demonstrate the capability to manage the communication systems and ensure that all message traffic is handled without delays that might disrupt the conduct of emergency operations. OROs should ensure that a coordinated communication link for fixed and mobile medical support facilities exist.

The specific communications capabilities of OROs should be commensurate with that specified in the response plan and/or procedures. Exercise scenarios could require the failure of a communications system and the use of an alternate system.

State of Maryland Extent of Play:

All activities associated with the management of communications capabilities will be demonstrated based on the ORO's plans and procedures and completed as they would be in an actual emergency. Communications with the Ingestion Jurisdictions will be validated during the October 21st plume phase exercise during notification of the site area and general emergency classifications or any subsequent Ingestion Pathway decisions. Receipt of the call will be verified by Web EOC log entries, facsimile or e-mail.

Locations Evaluated:

State EOC, AAC, Field Teams (Plume), Field Teams (Ingestion), Laboratory
Local Plume Zone Jurisdictions, Maryland Ingestion Jurisdictions

Outstanding Issues

None

EVALUATION AREA 1: EMERGENCY OPERATIONS MANAGEMENT

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

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

INTENT

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

EXTENT OF PLAY

Equipment within the facility(ies) should be sufficient and consistent with the role assigned to that facility in the ORO's plans and/or procedures in support of emergency operations. Use of maps and displays is encouraged.

All instruments, including air sampling flow meters (field teams only), should be inspected, inventoried, and operationally checked before each use. They should be calibrated in accordance with the manufacturer's recommendations (or at least annually for the unmodified CDV-700 series or if there are no manufacturer's recommendations for a specific instrument; modified CDV-700 instruments should be calibrated in accordance with the recommendation of the modification manufacturer.). A label indicating such calibration should be on each instrument or verifiable by other means. Note: Field team equipment is evaluated under 4.a.1; radiological laboratory equipment under 4.c.1; reception center and emergency worker facilities' equipment is evaluated under 6.a.1; and ambulance and medical facilities' equipment is evaluated under 6.d.1.

Sufficient quantities of appropriate direct-reading and permanent record dosimetry and dosimeter chargers should be available for issuance to all categories of emergency workers that could be deployed from that facility. Appropriate direct-reading dosimeters should allow individual(s) to read the administrative reporting limits and maximum exposure limits contained in the ORO's plans and procedures.

Dosimeters should be inspected for electrical leakage at least annually and replaced, if necessary. CDV-138s, due to their documented history of electrical leakage problems, should be inspected for electrical leakage at least quarterly and replaced if necessary. This leakage testing will be verified during the exercise, through documentation submitted in the Annual Letter of Certification, and/or through a staff assistance visit.

Responsible OROs should demonstrate the capability to maintain inventories of KI sufficient for use by emergency workers, as indicated on rosters; institutionalized individuals, as indicated in capacity lists for facilities; and, where stipulated by the plan and/or procedures, members of the general public (including transients) within the plume pathway EPZ.

Quantities of dosimetry and KI available and storage location(s) will be confirmed by physical inspection at storage location(s) or through documentation of current inventory submitted during the exercise, provided in the Annual Letter of Certification submission, and/or verified during a Staff Assistance Visit. Available supplies of KI should be within the expiration date indicated on KI bottles or blister packs. As an alternative, the ORO may produce a letter from FEMA indicating that the KI supply remains potent; in accordance with Food and Drug Administration (FDA) guidance. FEMA issues these letters based upon the findings of the certified independent laboratory that performed the analysis at the ORO's request and expense.

At locations where traffic and access control personnel are deployed, appropriate equipment (e.g., vehicles, barriers, traffic cones and signs, etc.) should be available or their availability described.

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. Electrical leakage information is included with the Annual Letter of certification. Electronic dosimetry does not require electrical leakage testing.

Locations Evaluated:

State EOC, AAC, IPCC

Calvert County

St. Mary's County

Dorchester County

Outstanding Issues:

None

EVALUATION AREA 2: PROTECTIVE ACTION DECISION-MAKING

Sub-element 2.a – Emergency Worker Exposure Control

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

INTENT

This sub-element is derived from NUREG-0654, which provides that an ORO have the capability to assess and control the radiation exposure received by emergency workers and have a decision chain in place as specified in the ORO's plans and procedures to authorize emergency worker exposure limits to be exceeded for specific missions.

Radiation exposure limits for emergency workers are the recommended accumulated dose limits or exposure rates that emergency workers may be permitted to incur during an emergency. These limits include any pre-established administrative reporting limits (that take into consideration Total Effective Dose Equivalent or organ-specific limits) identified in the ORO's plans and procedures.

EXTENT OF PLAY

OROs authorized to send emergency workers into the plume exposure pathway EPZ should demonstrate a capability to meet the criterion based on their emergency plans and procedures.

Responsible OROs should demonstrate the capability to make decisions concerning the authorization of exposure levels in excess of pre-authorized levels and to the number of emergency workers receiving radiation dose above pre-authorized levels.

As appropriate, OROs should demonstrate the capability to make decisions on the distribution and administration of KI, as a protective measure, based on the ORO's plan and/or procedures or projected thyroid dose compared with the established protective action guides (PAGs) for KI administration.

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. KI tablets for emergency workers will be simulated. Actual distribution of KI will not be demonstrated. Simulated TLDs may be used. Actual equipment will be available for inspection.

Locations evaluated:

State ACC

Local Plume Zone Jurisdictions

Outstanding Issues:

Issue Number: 11-07-2.a.1-A-01

Condition: The Secretary of Maryland Department of the Environment (MDE) made a decision for all emergency workers in the Emergency Planning Zone to ingest potassium iodine (KI). This decision was never received in the MDE Dose Assessment room in the Emergency Operations Facility. As a result, the State Field Monitoring Teams did not receive instruction to ingest their KI.

EVALUATION AREA 2: PROTECTIVE ACTION DECISION-MAKING

Sub-element 2.b. Radiological Assessment and Protective Action Recommendations and Decisions for the Plume Phase of the Emergency

Criterion 2.b.1: Appropriate protective action recommendations are based on available information on plant conditions, field monitoring data, and licensee and ORO dose projections, as well as knowledge of on-site and off-site environmental conditions. (NUREG-0654, I.8, 10, 11 and Supplement 3)

INTENT

This sub-element is derived from NUREG-0654, which indicates that OROs have the capability to independently project integrated dose from exposure rates or other information and compare the estimated dose savings with the protective action guides. OROs have the capability to choose, among a range of protective actions, those most appropriate in a given emergency situation. OROs base these choices on protective action guides (PAGs) from the ORO's plans and procedures, or EPA 400-R-92-001 and other criteria, such as, plant conditions, licensee protective action recommendations, coordination of protective action decisions with other political jurisdictions (e.g. other affected OROs), availability of appropriate in-place shelter, weather conditions, evacuation time estimates, and situations that create higher than normal risk from evacuation.

EXTENT OF PLAY

During the initial stage of the emergency response, following notification of plant conditions that may warrant offsite protective actions, the ORO should demonstrate the capability to use appropriate means, described in the plan and/or procedures, to develop protective action recommendations (PARs) for decision-makers based on available information and recommendations from the licensee and field monitoring data, if available.

When release and meteorological data are provided by the licensee, the ORO also considers these data. The ORO should demonstrate a reliable capability to independently validate dose projections. The types of calculations to be demonstrated depend on the data available and the need for assessments to support the PARs appropriate to the scenario. In all cases, calculation of projected dose should be demonstrated. Projected doses should be related to quantities and units of the PAGs to which they will be compared. PARs should be promptly transmitted to decision-makers in a prearranged format.

Differences greater than a factor of 10 between projected doses by the licensee and the ORO should be discussed with the licensee with respect to the input data and assumptions used, the use of different models, or other possible reasons. Resolution of these differences should be incorporated into the PAR if timely and appropriate. The ORO should demonstrate the capability to use any additional data to refine projected doses and exposure rates and revise the associated PARs.

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.

Locations Evaluated:

State AAC, EOF

Outstanding Issues:

None

EVALUATION AREA 2: PROTECTIVE ACTION DECISION-MAKING

Sub-element 2.b. Radiological Assessment and Protective Action Recommendations and Decisions for the Plume Phase of the Emergency

Criterion 2.b.2: A decision-making process involving consideration of appropriate factors and necessary coordination is used to make protective action decisions (PADs) for the general public (including the recommendation for the use of KI, if ORO policy). (NUREG-0654, J.9; J.10.m)

INTENT

This sub-element is derived from NUREG-0654, which indicates that OROs have the capability to independently project integrated dose from exposure rates or other information and compare the estimated dose savings with the protective action guides. OROs have the capability to choose, among a range of protective actions, those most appropriate in a given emergency situation and base these choices on protective action guides (PAGs) from the ORO's plans and procedures, FRC Reports Numbers 5 and 7 or EPA 400-R-92-001 and other criteria, such as, plant conditions, licensee protective action recommendations, coordination of protective action decisions with other political jurisdictions (e.g. other affected OROs), availability of appropriate in-place shelter, weather conditions, evacuation time estimates, and situations that create higher than normal risk from evacuation.

EXTENT OF PLAY

OROs should have the capability to make both initial and subsequent **PADs**. They should demonstrate the capability to make initial PADs in a timely manner appropriate to the situation, based on notification from the licensee, assessment of plant status and releases, and PARs from the utility and ORO staff.

The dose assessment personnel may provide additional PARs based on the subsequent dose projections, field monitoring data, or information on plant conditions. The decision-makers should demonstrate the capability to change protective actions as appropriate based on these projections.

If the ORO has determined that KI will be used as a protective measure for the general public under off-site plans, then the ORO should demonstrate the capability to make decisions on the distribution and administration of KI as a protective measure for the general public to supplement shelter and evacuation protective actions. This decision should be based on the ORO's plan and/or procedures or projected thyroid dose compared with the established PAG for KI administration. The KI decision-making process should involve close coordination with appropriate assessment and decision-making staff.

If more than one ORO is involved in decision-making, OROs should communicate and coordinate PADs with affected OROs. OROs should demonstrate the capability to communicate the contents of decisions to the affected jurisdictions.

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. The process for making KI for the general public available at reception centers will be described to the evaluator at the appropriate centers. Actual KI will not be transported. KI will be available for inspection at the respective storage location.

Locations Evaluated:

State EOC, AAC

Calvert County

St. Mary's County

Dorchester County

Outstanding Issues:

None

EVALUATION AREA 2: PROTECTIVE ACTION DECISION-MAKING

Sub-element 2.c - Protective Action Decisions Consideration for the Protection of Special Populations

Criterion 2.c.1: Protective action decisions are made, as appropriate, for special population groups. (NUREG-0654, J.9; J.10.c, d, e, g)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to determine protective action recommendations, including evacuation, sheltering and use of potassium iodide (KI), if applicable, for special population groups (e.g., hospitals, nursing homes, correctional facilities, schools, licensed day care centers, mobility impaired individuals, and transportation dependent individuals). Focus is on those special population groups that are (or potentially will be) affected by a radiological release from a nuclear power plant.

EXTENT OF PLAY

Usually, it is appropriate to implement evacuation in areas where doses are projected to exceed the lower end of the range of PAGs, except for situations where there is a high-risk environment or where high-risk groups (e.g., the immobile or infirm) are involved: In these cases, examples of factors that should be considered are weather conditions, shelter availability, Evacuation Time Estimates, availability of transportation assets, risk of evacuation vs. risk from the avoided dose, and precautionary school evacuations. In situations where an institutionalized population cannot be evacuated, the administration of KI should be considered by the OROs.

State of Maryland Extent of Play:

All decision-making activities associated with protective actions, including consideration of available resources, for special population groups including schools, will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency.

Locations Evaluated:

Calvert County
St. Mary's County
Dorchester County

Outstanding Issues:

None

EVALUATION AREA 2: PROTECTIVE ACTION DECISION-MAKING

Sub-element 2.d. –Radiological Assessment and Decision-Making for the Ingestion Exposure Pathway

Criterion 2.d.1: Radiological consequences for the ingestion pathway are assessed and appropriate protective action decisions are made based on the ORO planning criteria. (NUREG-0654, I.8, J.11)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs have the means to assess the radiological consequences for the ingestion exposure pathway; relate them to the appropriate protective action guides (PAGs), and make timely, appropriate protective action decisions to mitigate exposure from the ingestion pathway.

During an accident at a nuclear power plant, a release of radioactive material may contaminate water supplies and agricultural products in the surround areas. Any such contamination would likely occur during the plume phase of the accident, and depending on the nature of the release could impact the ingestion pathway for weeks or years.

EXTENT OF PLAY

It is expected that the ORO will take precautionary actions to protect food and water supplies, or to minimize exposure to potentially contaminated water and food, in accordance with their respective plans and procedures. Often such precautionary actions are initiated by the OROs based on criteria related to the facility's emergency classification levels (ECL). Such action may include recommendations to place milk animals on stored feed and to use protected water supplies.

The ORO should use its procedures (for example, development of a sampling plan) to assess the radiological consequences of a release on the food and water supplies. The ORO assessment should include the evaluation of the radiological analyses of representative samples of water, food, and other ingestible substances of local interest from potentially impacted areas, the characterization of the releases from the facility, and the extent of areas potentially impacted by the release. During this assessment, OROs should consider the use of agricultural and watershed data within the 50-mile EPZ. The radiological impacts on the food and water should then be compared to the appropriate ingestion PAGs contained in the ORO's plan and/or procedures. (The plan and/or procedures may contain PAGs based on specific dose commitment criteria or based on criteria as recommended by current Food and Drug Administration guidance.) Timely and appropriate recommendations should be provided to the ORO decision-makers group for implementation decisions. As time permits, the ORO may also include a comparison of taking or not taking a given action on the resultant ingestion pathway dose commitments.

The ORO should demonstrate timely decisions to minimize radiological impacts from the ingestion pathway, based on the given assessments and other information available. Any such

decisions should be communicated and to the extent practical, coordinated with neighboring and local OROs.

ORO's should use Federal resources, as identified in the Federal Radiological Emergency Response Plan (FRERP), and other resources (e.g., compacts, nuclear insurers, etc), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating.

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 including precautionary protective actions based on plant conditions. The IPCC and federal counterparts will establish a sample plan based on scenario information presented during the advanced party meetings and fly-over data presented by the FRMAC. The IPCC in coordination with the federal participants will determine Ingestion Pathway Protective Actions on October 21st based on the sampling plan results. PADs will be developed for post plume day 1, 3 and 8 sample results. Decisions will be communicated to the SEOC for implementation on October 22nd. Providing PADs on a subsequent day does not allow for concurrent discussions with decision makers and those responsible for implementation. The intent of these activities is to demonstrate the process of decision making and may not include all commodities or areas affected by the scenario.

Locations Evaluated:

State AAC, IPCC, SEOC

Outstanding Issues:

None

EVALUATION AREA 2: PROTECTIVE ACTION DECISION-MAKING

Sub-element 2.e. – Radiological Assessment and Decision-Making Concerning Relocation, Re-entry, and Return

Criterion 2.e.1: Timely relocation, re-entry, and return decisions are made and coordinated as appropriate, based on assessments of the radiological conditions and criteria in the ORO's plan and/or procedures. (NUREG-0654, A.1.b; I.10; M)

INTENT

The sub-element is derived from NUREG-0654, which provides that OROs have the capability to make decisions on relocation, re-entry, and return of the general public. These decisions are essential for the protection of the public from the direct long-term exposure to deposited radioactive materials from a severe accident at a commercial nuclear power plant.

EXTENT OF PLAY

Relocation: OROs should demonstrate the capability to estimate integrated dose in contaminated areas and to compare these estimates with PAGs, apply decision criteria for relocation of those individuals in the general public who have not been evacuated but where projected doses are in excess of relocation PAGs and control access to evacuated and restricted areas. Decisions are made for relocating members of the evacuated public who lived in areas that now have residual radiation levels in excess of the PAGs. Determination of areas to be restricted should be based on factors such as the mix of radionuclides in deposited materials, calculated exposure rates vs. the PAGs and field samples of vegetation and soil analyses.

Re-entry: Decisions should be made regarding the location of control points and policies regarding access and exposure control for emergency workers and members of the general public who need to temporarily enter the evacuated area to perform specific tasks or missions.

Examples of control procedures are the assignment of or checking for, direct reading and non direct-reading dosimeters for emergency workers; questions regarding the individual's objectives and locations expected to be visited and associated time frames; availability of maps and plots of radiation exposure rates; advice on areas to avoid; and procedures for exit including: monitoring of individuals, vehicles, and equipment, decision criteria regarding decontamination; and proper disposition of emergency worker dosimeters and maintenance of emergency worker radiation exposure records.

Responsible OROs should demonstrate the capability to develop a strategy for authorized re-entry of individuals into the restricted zone, based on established decision criteria. OROs should demonstrate the capability to modify those policies for security purposes (e.g., police patrols), for maintenance of essential services (e.g., fire protection and utilities), and for other critical functions. They should demonstrate the capability to use decision making criteria in allowing access to the restricted zone by the public for various reasons, such as to maintain property (e.g., to care for the farm animals or secure machinery for storage), or to retrieve important possessions. Coordinated policies for access and exposure control should be

developed among all agencies with roles to perform in the restricted zone. OROs should demonstrate the capability to establish policies for provision of dosimetry to all individuals allowed to re-enter the restricted zone. The extent that OROs need to develop policies on re-entry will be determined by scenario events.

Return: Decisions are to be based on environmental data and political boundaries or physical/geological features, which allow identification of the boundaries of areas to which members of the general public may return. Return is permitted to the boundary of the restricted area that is based on the relocation PAG.

Other factors that the ORO should consider are, for example: conditions that permit the cancellation of the emergency classification level and the relaxation of associated restrictive measures, basing return recommendations (i.e., permitting populations that were previously evacuated to reoccupy their homes and businesses on an unrestricted basis) on measurements of radiation from ground deposition; and the capability to identify services and facilities that require restoration within a few days and to identify the procedures and resources for their restoration. Examples of these services and facilities are: medical and social services, utilities, roads, schools, and intermediate term housing for relocated persons.

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. Decisions on Relocation, Re-entry and Return will be made by the IPCC on October 21st based on scenario data supplied by sample teams or controller information. Decisions will be communicated to the SEOC for implementation on October 22nd. Providing PADs on a subsequent day does not allow for concurrent discussions with decision makers and those responsible for implementation. The intent of these activities is to demonstrate the process of decision making and may not include all commodities or areas affected by the scenario.

Locations Evaluated:

State IPCC

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

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

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

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to provide for the following: distribution, use, collection, and processing of direct-reading dosimeters and permanent record dosimeters; provide for direct-reading dosimeters to be read at appropriate frequencies by emergency workers; maintain a radiation dose record for each emergency worker; and provide for establishing a decision chain or authorization procedure for emergency workers to incur radiation exposures in excess of protective action guides, always applying the ALARA (As Low As is Reasonably Achievable) principle as appropriate.

EXTENT OF PLAY

OROs should demonstrate the capability to provide appropriate direct-reading and permanent record dosimetry, dosimetry chargers, and instructions on the use of dosimetry to emergency workers. For evaluation purposes, appropriate direct-reading dosimetry is defined as dosimetry that allows individual(s) to read the administrative reporting limits (that are pre-established at a level low enough to consider subsequent calculation of Total Effective Dose Equivalent) and maximum exposure limits (for those emergency workers involved in life saving activities) contained in the OROs plans and procedures.

Each emergency worker should have the basic knowledge of radiation exposure limits as specified in the ORO's plan and/or procedures. Procedures to monitor and record dosimeter readings and to manage radiological exposure control should be demonstrated.

During a plume phase exercise, emergency workers should demonstrate the procedures to be followed when administrative exposure limits and turn-back values are reached. The emergency worker should report accumulated exposures during the exercise as indicated in the plans and procedures. OROs should demonstrate the actions described in the plan and/or procedures by determining whether to replace the worker, to authorize the worker to incur additional exposures or to take other actions. If scenario events do not require emergency workers to seek authorizations for additional exposure, evaluators should interview at least two emergency workers, to determine their knowledge of whom to contact in the event authorization is needed and at what exposure levels. Emergency 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 and adequate control of exposure can be effected for all members of the team by one dosimeter worn by the team leader. Emergency workers who are assigned to low exposure rate areas, e.g., at reception centers, counting laboratories, emergency operations centers, and communications centers, may have individual direct-reading dosimeters or they may be monitored by dosimeters strategically placed in the work area. It should be noted that, even in these situations, each team member must still have their own permanent record dosimeter.

Individuals without specific radiological response missions, such as farmers for animal care, essential utility service personnel, or other members of the public who must re-enter an evacuated area following or during the plume passage, should be limited to the lowest radiological exposure commensurate with completing their missions.

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. Dosimetry electrical leakage checks are submitted with the ALC. Electronic dosimetry may be substituted for Direct Reading Electronic Dosimeters at some state or local jurisdictions.

Locations Evaluated:

State Field Teams via AAC (plume), Field Teams (ingestion), State Laboratory
Local Plume Zone Jurisdictions, Field Teams; TCP/ACP

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.b – Implementation of KI Decision

Criterion 3.b.1: KI and appropriate instructions are available should a decision to recommend use of KI be made. Appropriate record keeping of the administration of KI for emergency workers and institutionalized individuals (not the general public) is maintained. (NUREG-0654, E.7; J.10.e, f)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to provide radioprotective drugs for emergency workers, institutionalized individuals, and, if in the plan and/or procedures, to the general public for whom immediate evacuation may not be feasible, very difficult, or significantly delayed. While it is necessary for OROs to have the capability to provide KI to emergency workers and institutionalized individuals, the provision of KI to the general public is an ORO option, reflected in ORO's plans and procedures. Provisions should include the availability of adequate quantities, storage, and means of the distribution of radioprotective drugs.

EXTENT OF PLAY

OROs should demonstrate the capability to make KI available to emergency workers, institutionalized individuals, and, where provided for in the ORO plan and/or procedures, to members of the general public. OROs should demonstrate the capability to accomplish distribution of KI consistent with decisions made. Organizations should have the capability to develop and maintain lists of emergency workers and institutionalized individuals who have ingested KI, including documentation of the date(s) and time(s) they were instructed to ingest KI. The ingestion of KI recommended by the designated ORO health official is voluntary. For evaluation purposes, the actual ingestion of KI is not necessary. OROs should demonstrate the capability to formulate and disseminate appropriate instructions on the use of KI for those advised to take it. If a recommendation is made for the general public to take KI, appropriate information should be provided to the public by the means of notification specified in the ORO's plan and/or procedures.

Emergency workers should demonstrate the basic knowledge of procedures for the use of KI whether or not the scenario drives the use of KI. This can be accomplished by an interview with the evaluator.

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.

Locations Evaluated:

State Field Teams via AAC (plume), Field Teams (ingestion), Laboratory
Local Plume Zone Jurisdictions

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.c – Implementation of Protective Actions for Special Populations

Criterion 3.c.1: Protective action decisions are implemented for special populations other than schools within areas subject to protective actions. (NUREG-0654, E.7; J.9; J.10.c, d, e, g)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to implement protective action decisions, including evacuation and/or sheltering, for all special populations. Focus is on those special populations that are (or potentially will be) affected by a radiological release from a nuclear power plant.

EXTENT OF PLAY

Applicable OROs should demonstrate the capability to alert and notify (e.g., provide protective action recommendations and emergency information and instructions) special populations (hospitals, nursing homes, correctional facilities, mobility impaired individuals, transportation dependent, etc). OROs should demonstrate the capability to provide for the needs of special populations in accordance with the ORO's plans and procedures.

Contact with special populations and reception facilities may be actual or simulated, as agreed to in the Extent of Play. Some contacts with transportation providers should be actual, as negotiated in the extent of play. All actual and simulated contacts should be logged.

State of Maryland Extent of Play:

Lists of any special populations will be verified at the EOC. Contact with any facility will be simulated or discussed at the EOC. Contact with a facility is optional but encouraged. All simulated or actual contacts and associated actions will be logged.

Locations Evaluated:

Local Plume Zone Jurisdictions

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.c – Implementation of Protective Actions for Special Populations

Criterion 3.c.2: OROs/School officials decide upon and implement protective actions for schools. (NUREG-0654, J.10.c, d, g)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to implement protective action decisions, including evacuation and/or sheltering, for all special populations. Focus is on those special population groups that are (or potentially will be) affected by a radiological release from a nuclear power plant.

EXTENT OF PLAY

Applicable OROs should demonstrate the capability to alert and notify all public school systems/districts, licensed day care centers, and participating private schools within the emergency planning zone of emergency conditions that are expected to or may necessitate protective actions for students.

In accordance with plans and/or procedures, OROs and/or officials of participating public and private schools and licensed day care centers should demonstrate the capability to make and implement prompt decisions on protective actions for students. Officials should demonstrate that the decision making process for protective actions considers (e.g., either accepts automatically or gives heavy weight to) protective action recommendations made by ORO personnel, the ECL at which these recommendations are received, preplanned strategies for protective actions for that ECL, and the location of students at the time (e.g., whether the students are still at home, en route to the school, or at the school).

Implementation of protective actions should be completed subject to the following provisions: At least one school in each affected school system or district, as appropriate, needs to demonstrate the implementation of protective actions. The implementation of canceling the school day, dismissing early, or sheltering should be simulated by describing to evaluators the procedures that would be followed. If evacuation is the implemented protective action, all activities to coordinate and complete the evacuation of students to reception centers, congregate care centers, or host schools may actually be demonstrated or accomplished through an interview process. If accomplished through an interview process, appropriate school personnel including decision making officials (e.g., superintendent/principal, transportation director/bus dispatcher), and at least one bus driver (and the bus driver's escort, if applicable) should be available to demonstrate knowledge of their role(s) in the evacuation of school children. Communications capabilities between school officials and the buses, if required by the plan and/or procedures, should be verified.

Officials of the participating school(s) or school system(s) should demonstrate the capability to develop and provide timely information to OROs for use in messages to parents, the general public, and the media on the status of protective actions for schools.

State of Maryland Extent of Play:

Calvert and St. Mary's county will demonstrate protective actions for schools as an out-of-sequence activity on October 21st, 2009. There are no risk schools in Dorchester County.

This element will be evaluated as an out-of-sequence activity

Locations Evaluated:

Calvert County

- Patuxent Elementary School (Risk School)
- St Leonard Elementary (Risk School)
- Southern Middle School (Risk School)

St. Mary's County

- Green Holly Elementary School (Risk School)

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.d. – Implementation of Traffic and Access Control

Criterion 3.d.1: Appropriate traffic and access control is established. Accurate instructions are provided to traffic and access control personnel. (NUREG-0654, J.10.g, j, k)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs have the capability to implement protective action plans, including relocation and restriction of access to evacuated/sheltered areas. This sub-element focuses on selecting, establishing, and staffing of traffic and access control points and removal of impediments to the flow of evacuation traffic.

EXTENT OF PLAY

ORO's should demonstrate the capability to select, establish, and staff appropriate traffic and access control points consistent with protective action decisions (for example, evacuating, sheltering, and relocation), in a timely manner. ORO's should demonstrate the capability to provide instructions to traffic and access control staff on actions to take when modifications in protective action strategies necessitate changes in evacuation patterns or in the area(s) where access is controlled.

Traffic and access control staff should demonstrate accurate knowledge of their roles and responsibilities. This capability may be demonstrated by actual deployment or by interview in accordance with the extent of play agreement.

In instances where ORO's lack authority necessary to control access by certain types of traffic (rail, water, and air traffic), they should demonstrate the capability to contact the State or Federal agencies with authority to control access.

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. The location of the TCP/ACP will be pre-designated by the respective County Directors to include using the parking lot at the EOC.

Locations Evaluated:

State EOC (rail, water, air traffic)

Calvert County

St. Mary's County

Dorchester County

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.d. – Implementation of Traffic and Access Control

Criterion 3.d.2: Impediments to evacuation are identified and resolved. (NUREG-0654, J.10, k)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs have the capability to implement protective action plans, including relocation and restriction of access to evacuated/sheltered areas. This sub-element focuses on selecting, establishing, and staffing of traffic and access control points and removal of impediments to the flow of evacuation traffic.

EXTENT OF PLAY

ORO should demonstrate the capability, as required by the scenario, to identify and take appropriate actions concerning impediments to evacuation. Actual dispatch of resources to deal with impediments, such as wreckers, need not be demonstrated; however, all contacts, actual or simulated should be logged.

State of Maryland Extent of Play:

All activities must be based on the ORO's plans and procedures and completed, as they would be in an actual emergency, unless specified above or indicated in the extent of play agreement. Impediments for evacuation will be discussed at the EOC. No equipment will be dispatched.

Locations Evaluated:

Calvert County
St. Mary's County
Dorchester County

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.e – Implementation of Ingestion Pathway Decisions

Criterion 3.e.1: The ORO demonstrates the availability and appropriate use of adequate information regarding water, food supplies, milk, and agricultural production within the ingestion exposure pathway emergency planning zone for implementation of protective actions. NUREG-0654, J.9, 11)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to implement protective actions, based on criteria recommended by current Food and Drug Administration guidance, for the ingestion pathway emergency planning zone (IPZ), the area within an approximate 50-mile radius of the nuclear power plant. This sub-element focuses on those actions required for implementation of protective actions.

EXTENT OF PLAY

Applicable OROs should demonstrate the capability to secure and utilize current information on the locations of dairy farms, meat and poultry producers, fisheries, fruit growers, vegetable growers, grain producers, food processing plants, and water supply intake points to implement protective actions within the ingestion pathway EPZ.

ORO should use Federal resources as identified in the FRERP, and other resources (e.g. compacts, nuclear insurers; etc), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating in the exercise.

State of Maryland Extent of Play:

This activity will be demonstrated at the State EOC on October 22nd. Ingestion Pathway Protective Action Decisions developed by the State IPCC and FRMAC will be presented to the EOC representatives. The EOC will discuss and simulate initiation of the respective decisions developed by the IPCC for day 1, 3, and 8 post-plume. Contact with affected local jurisdictions will be demonstrated.

Locations Evaluated:

State EOC

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.e – Implementation of Ingestion Pathway Decisions

Criterion 3.e.2: Appropriate measures, strategies, and pre-printed instructional material are developed for implementing protective action decisions for contaminated water, food products, milk, and agricultural production. (NUREG-0654, E.5, 7; J.9, 11)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to implement protective actions, based on criteria recommended by current Food and Drug Administration guidance, for the ingestion pathway emergency planning zone (IPZ), the area within an approximate 50-mile radius of the nuclear power plant. This sub-element focuses on those actions required for implementation of protective actions.

EXTENT OF PLAY

Development of measures and strategies for implementation of ingestion pathway zone (IPZ) protective actions should be demonstrated by formulation of protective action information for the general public and food producers and processors. This includes the capability for the rapid reproduction and distribution of appropriate reproduction-ready information and instructions to pre-determined individuals and businesses. OROs should demonstrate the capability to control, restrict or prevent distribution of contaminated food by commercial sectors. Exercise play should include demonstration of communications and coordination between organizations to implement protective actions. However, actual field play of implementation activities may be simulated. For example, communications and coordination with agencies responsible for enforcing food controls within the IPZ should be demonstrated, but actual communications with food producers and processors may be simulated.

State of Maryland Extent of Play:

This activity will be demonstrated at the State EOC on October 22nd. Ingestion Pathway Decisions developed by the State IPCC and FRMAC will be presented to the EOC representatives. The EOC will discuss and simulate initiation of the respective decisions. Contact with affected local jurisdictions will be demonstrated. News release pertinent to the decisions will be developed at the EOC.

Locations Evaluated:

State EOC
Calvert County
St. Mary's County
Dorchester County

Outstanding Issues:

None

EVALUATION AREA 3: PROTECTIVE ACTION IMPLEMENTATION

Sub-element 3.f. – Implementation of Relocation, Re-entry, and Return Decisions

Criterion 3.f.1: Decisions regarding controlled re-entry of emergency workers and relocation and return of the public are coordinated with appropriate organizations and implemented. (NUREG-0654, M.1, 3)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should demonstrate the capability to implement plans, procedures, and decisions for relocation, re-entry, and return. Implementation of these decisions is essential for the protection of the public from the direct long-term exposure to deposited radioactive materials from a severe accident at a commercial nuclear power plant.

EXTENT OF PLAY

Relocation: OROs should demonstrate the capability to coordinate and implement decisions concerning relocation of individuals, not previously evacuated, to an area where radiological contamination will not expose the general public to doses that exceed the relocation PAGs. OROs should also demonstrate the capability to provide for short-term or long-term relocation of evacuees who lived in areas that have residual radiation levels above the PAGs.

Areas of consideration should include the capability to communicate with OROs regarding timing of actions, notification of the population of the procedures for relocation, and the notification of, and advice for, evacuated individuals who will be converted to relocation status in situations where they will not be able to return to their homes due to high levels of contamination. OROs should also demonstrate the capability to communicate instructions to the public regarding relocation decisions.

Re-entry: OROs should demonstrate the capability to control re-entry and exit of individuals who need to temporarily re-enter the restricted area, to protect them from unnecessary radiation exposure and for exit of vehicles and other equipment to control the spread of contamination outside the restricted area. Monitoring and decontamination facilities will be established as appropriate.

Examples of control procedure subjects are: (1) the assignment of, or checking for, direct-reading and non-direct-reading dosimeters for emergency workers; (2) questions regarding the individuals' objectives and locations expected to be visited and associated timeframes; (3) maps and plots of radiation exposure rates; (4) advice on areas to avoid; and procedures for exit, including monitoring of individuals, vehicles, and equipment, decision criteria regarding contamination, proper disposition of emergency worker dosimeters, and maintenance of emergency worker radiation exposure records.

Return: OROs should demonstrate the capability to implement policies concerning return of members of the public to areas that were evacuated during the plume phase. OROs should demonstrate the capability to identify and prioritize services and facilities that require restoration

within a few days, and to identify the procedures and resources for their restoration. Examples of these services and facilities are medical and social services, utilities, roads, schools, and intermediate term housing for relocated persons.

Communications among OROs for relocation, re-entry, and return may be simulated; however all simulated or actual contacts should be documented. These discussions may be accomplished in a group setting.

ORO should use Federal resources as identified in the FRERP, and other resources (e.g. compacts, nuclear insurers, etc), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating in the exercise.

State of Maryland Extent of Play:

This activity will be demonstrated at the State EOC on Oct. 22nd. Relocation, Re-entry and Return Decisions developed by the State IPCC and FRMAC for days 1, 3, and 8 post-plume will be presented to the EOC representatives. The EOC will discuss and simulate initiation of the respective decisions. Contact with affected local jurisdictions will be demonstrated.

Locations Evaluated:

- State EOC
- Calvert County
- St. Mary's County
- Dorchester County

Outstanding Issues:

None

EVALUATION AREA 4: FIELD MEASUREMENT AND ANALYSIS

Sub-element 4.a – Plume Phase Field Measurements and Analyses

Criterion 4.a.1: The field teams are equipped to perform field measurements of direct radiation exposure (cloud and ground shine) and to sample airborne radioiodine and particulates. (NUREG-0654, H.10; I.8, 9, 11)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to deploy field teams with the equipment, methods, and expertise necessary to determine the location of airborne radiation and particulate deposition on the ground from an airborne plume. In addition, NUREG-0654 indicates that OROs should have the capability to use field teams within the plume emergency planning zone to measure airborne radioiodine in the presence of noble gases and to measure radioactive particulate material in the airborne plume.

In the event of an accident at a nuclear power plant, the possible release of radioactive material may pose a risk to the nearby population and environment. Although accident assessment methods are available to project the extent and magnitude of a release, these methods are subject to large uncertainties. During an accident, it is important to collect field radiological data in order to help characterize any radiological release. This does not imply that plume exposure projections should be made from the field data. Adequate equipment and procedures are essential to such field measurement efforts.

EXTENT OF PLAY

Field teams should be **equipped** with all instruments and supplies necessary to accomplish their mission. This should include instruments capable of measuring gamma exposure rates and detecting the presence of beta radiation. These instruments should be capable of measuring a range of activity and exposure, including radiological protection/exposure control of team members and detection of activity on the air sample collection media, consistent with the intended use of the instrument and the ORO's plans and procedures. An appropriate radioactive check source should be used to verify proper operational response for each low range radiation measurement instrument (less than 1 R/hr) and for high range instruments when available. If a source is not available for a high range instrument, a procedure should exist to operationally test the instrument before entering an area where only a high range instrument can make useful readings.

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. Plume zone field teams use equipment to measure ambient radiation levels only. Air sampling activities will not be conducted by the local plume field teams.

Locations Evaluated:

State Field Teams (Plume and Ingestion)
Local Plume Zone Field Teams

Outstanding Issues:
None

EVALUATION AREA 4: FIELD MEASUREMENT AND ANALYSIS

Sub-element 4.a – Plume Phase Field Measurements and Analyses

Criterion 4.a.2: Field teams are managed to obtain sufficient information to help characterize the release and to control radiation exposure. (NUREG-0654, I.8, 11; J.10.a)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to deploy field teams with the equipment, methods, and expertise necessary to determine the location of airborne radiation and particulate deposition on the ground from an airborne plume. In addition, NUREG-0654 indicates that OROs should have the capability to use field teams within the plume emergency planning zone to measure airborne radioiodine in the presence of noble gases and to measure radioactive particulate material in the airborne plume.

In the event of an accident at a nuclear power plant, the possible release of radioactive material may pose a risk to the nearby population and environment. Although accident assessment methods are available to project the extent and magnitude of a release, these methods are subject to large uncertainties. During an accident, it is important to collect field radiological data in order to help characterize any radiological release. This does not imply that plume exposure projections should be made from the field data. Adequate equipment and procedures are essential to such field measurement efforts.

EXTENT OF PLAY

Responsible OROs should demonstrate the capability to brief teams on predicted plume location and direction, travel speed, and exposure control procedures before deployment.

Field measurements are needed to help characterize the release and to support the adequacy of implemented protective actions or to be a factor in modifying protective actions. Teams should be directed to take measurements in such locations, at such times to provide information sufficient to characterize the plume and impacts.

If the responsibility to obtain peak measurements in the plume has been accepted by license field monitoring teams, with concurrence from OROs, there is no requirement for these measurements to be repeated by State and local monitoring teams. If the license teams do not obtain peak measurements in the plume, it is the ORO's decision as to whether peak measurements are necessary to sufficiently characterize the plume. The sharing and coordination of plume measurement information among all field teams (licensee, federal, and ORO) is essential. Coordination concerning transfer of samples, including a chain-of-custody form, to a radiological laboratory should be demonstrated.

ORO should use Federal resources as identified in the Federal Radiological Emergency Response Plan (FRERP), and other resources (e.g., compacts, etc), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating in the exercise.

State of Maryland Extent of Play:

These activities will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency. The Utility Field Teams will measure plume centerline data. State and local teams will not measure plume centerline. Information will be shared between the Utility, State and local teams.

Locations Evaluated:

AAC, State Field Teams (2) (Plume)

Local Plume Zone Jurisdictions (Calvert, St. Mary's, Dorchester)

Outstanding Issues:

Issue Number: 11-07-4.a.2-A-03

Condition: The State Field Monitoring Teams were unaware of the Emergency Classification Level (ECL), release status and Protective Action Decisions (PADs). At the end of the exercise they thought they were still in the ALERT ECL, were not aware that a release of radioactive materials had occurred or was in progress, or that there was an evacuation ordered.

EVALUATION AREA 4: FIELD MEASUREMENT AND ANALYSIS

Sub-element 4.a – Plume Phase Field Measurements and Analyses

Criterion 4.a.3: Ambient radiation measurements are made and recorded at appropriate locations, and radioiodine and particulate samples are collected. Teams will move to an appropriate low background location to determine whether any significant (as specified in the plan and/or procedures) amount of radioactivity has been collected on the sampling media. (NUREG-0654, I.8, 9, 11)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to deploy field teams with the equipment, methods, and expertise necessary to determine the location of airborne radiation and particulate deposition on the ground from an airborne plume. In addition, NUREG-0654 indicates that OROs should have the capability to use field teams within the plume emergency planning zone to measure airborne radioiodine in the presence of noble gases and to measure radioactive particulate material in the airborne plume.

In the event of an accident at a nuclear power plant, the possible release of radioactive material may pose a risk to the nearby population and environment. Although accident assessment methods are available to project the extent and magnitude of a release, these methods are subject to large uncertainties. During an accident, it is important to collect field radiological data in order to help characterize any radiological release. This does not imply that plume exposure projections should be made from the field data. Adequate equipment and procedures are essential to such field measurement efforts.

EXTENT OF PLAY

Field teams should demonstrate the capability to report measurements and field data pertaining to the **measurement of airborne radioiodine and particulates** to the field team coordinator, dose assessment, or other appropriate authority. If samples have radioactivity significantly above background, the appropriate authority should consider the need for expedited laboratory analyses of these samples. OROs should share data in a timely manner with all appropriate OROs. The methodology, including contamination control, instrumentation, preparation of samples, and a chain-of-custody form for transfer to a laboratory, will be in accordance with the ORO plan and/or procedures.

ORO's should use Federal resources as identified in the FRERP, and other resources (e.g., compacts, etc), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating in the exercise.

State of Maryland Extent of Play:

These activities will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency. Only the State teams will demonstrate air sampling procedures. One sample will be obtained in an area that exhibits above background ambient. Delivery of samples for additional analysis will not be demonstrated. Airborne radioactivity

samples will be counted in the field. Chain of custody procedures to deliver samples for additional analysis will be described to the evaluator. The State (2) and County (1 each) field teams will demonstrate ambient readings. At least six readings will be obtained at a minimum of one survey point location.

Locations Evaluated:

State Field Teams

Local Plume Zone Jurisdictions (Calvert, St. Mary's, Dorchester)

Outstanding Issues:

None

EVALUATION AREA 4: FIELD MEASUREMENT AND ANALYSIS

Sub-element 4.b – Post Plume Phase Field Measurements and Sampling

Criterion 4.b.1: The field teams demonstrate the capability to make appropriate measurements and to collect appropriate samples (e.g., food crops, milk, water, vegetation, and soil) to support adequate assessments and protective action decision-making. (NUREG-0654, I.8; J.11)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to assess the actual or potential magnitude and locations of radiological hazards in the ingestion emergency planning zone (IPZ) and for relocation, re-entry and return measures.

This sub-element focuses on the collection of environmental samples for laboratory analyses that are essential for decisions on protection of the public from contaminated food and water and direct radiation from deposited materials.

EXTENT OF PLAY

The ORO field teams should demonstrate the capability to take measurements and samples, at such times and locations as directed, to enable an adequate assessment of the ingestion pathway and to support re-entry, relocation, and return decisions. When resources are available, the use of aerial surveys and in-situ gamma measurement is appropriate. All methodology, including contamination control, instrumentation, preparation of samples, and a chain-of-custody form for transfer to a laboratory, will be in accordance with the ORO's plan and/or procedures.

Ingestion pathway samples should be secured from agricultural products and water. Samples in support of relocation and return should be secured from soil, vegetation, and other surfaces in areas that received radioactive ground deposition.

ORO's should use Federal resources as identified in the FRERP, and other resources (e.g. compacts, nuclear insurers, etc), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating in the exercise.

State of Maryland Extent of Play:

These activities will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency. Sample teams will obtain samples from pre-designated areas that may not be actually impacted by scenario events or outside the actual Ingestion Pathway Planning zone. Chain of custody procedures will be described to the evaluator.

Locations Evaluated:

State Field Teams (Ingestion)

Outstanding Issues:
None

EVALUATION AREA 4: FIELD MEASUREMENT AND ANALYSIS

Sub-element 4.c - Laboratory Operations

Criterion 4.c.1: The laboratory is capable of performing required radiological analyses to support protective action decisions. (NUREG-0654, C.3; I.8, 9; J.11)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to perform laboratory analyses of radioactivity in air, liquid, and environmental samples to support protective action decision-making.

EXTENT OF PLAY

The laboratory staff should demonstrate the capability to follow appropriate procedures for receiving samples, including logging of information, preventing contamination of the laboratory, preventing buildup of background radiation due to stored samples, preventing cross contamination of samples, preserving samples that may spoil (e.g., milk), and keeping track of sample identity. In addition, the laboratory staff should demonstrate the capability to prepare samples for conducting measurements.

The laboratory should be appropriately equipped to provide analyses of media, as requested, on a timely basis, of sufficient quality and sensitivity to support assessments and decisions as anticipated by the ORO's plans and procedures. The laboratory instrument calibrations should be traceable to standards provided by the National Institute of Standards and Technology. Laboratory methods used to analyze typical radionuclides released in a reactor incident should be as described in the plans and procedures. New or revised methods may be used to analyze atypical radionuclide releases (e.g. transuranics or as a result of a terrorist event) or if warranted by circumstances of the event. Analysis may require resources beyond those of the ORO.

The laboratory staff is qualified in radioanalytical techniques and contamination control procedures.

OROs should use Federal resources as identified in the FRERP, and other resources (e.g. compacts, nuclear insurers, etc), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating in the exercise.

State of Maryland Extent of Play:

These activities will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency. Analysis of atypical radionuclides will not be demonstrated. Samples containing transuranics or that exceed the measuring capability of the State Laboratory will be analyzed at a federal facility via the FRMAC.

Locations Evaluated:

State Laboratory

Outstanding Issues:
None

EVALUATION AREA 5: EMERGENCY NOTIFICATION & PUBLIC INFORMATION

Sub-element 5.a – Activation of the Prompt Alert and Notification System

Criterion 5.a.1: Activities associated with primary alerting and notification of the public are completed in a timely manner following the initial decision by authorized offsite emergency officials to notify the public of an emergency situation. The initial instructional message to the public must include as a minimum the elements required by current FEMA REP guidance. (10 CFR Part 50, Appendix E & NUREG-0654, E. 1, 4, 5, 6, 7)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to provide prompt instructions to the public within the plume pathway EPZ. Specific provisions addressed in this sub-element are derived from the Nuclear Regulatory Commission (NRC) regulations (10 CFR Part 50, Appendix E.IV.D.), and FEMA-REP-10, "Guide for the Evaluation of Alert and Notification systems for Nuclear Power Plants."

EXTENT OF PLAY

Responsible OROs should demonstrate the capability to sequentially provide an alert signal followed by an initial instructional message to populated areas (permanent resident and transient) throughout the 10-mile plume pathway EPZ. Following the decision to activate the alert and notification system, in accordance with the ORO's plan and/or procedures, completion of system activation should be accomplished in a timely manner **(will not be subject to specific time requirements)** for primary alerting/notification. The initial message should include the elements required by current FEMA REP guidance.

For exercise purposes, timely is defined as "the responsible ORO personnel/ representatives demonstrate actions to disseminate the appropriate information/ instructions with a sense of urgency and without undue delay." If message dissemination is to be identified as not having been accomplished in a timely manner, the evaluator(s) will document a specific delay or cause as to why a message was not considered timely.

Procedures to broadcast the message should be fully demonstrated as they would in an actual emergency up to the point of transmission. Broadcast of the message(s) or test messages is not required. The alert signal activation may be simulated. However, the procedures should be demonstrated up to the point of actual activation.

The capability of the primary notification system to broadcast an instructional message on a 24-hour basis should be verified during an interview with appropriate personnel from the primary notification system.

State of Maryland Extent of Play:

These activities will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency. Actual siren sounding and EAS demonstration will be simulated.

Locations Evaluated:

Local Plume Zone Jurisdictions
State EOC (coordination)

Outstanding Issues:

None

EVALUATION AREA 5: EMERGENCY NOTIFICATION & PUBLIC INFORMATION

Sub-element 5.a – Activation of the Prompt Alert and Notification System

Criterion 5.a.3: Activities associated with FEMA approved exception areas (where applicable) are completed within 45 minutes following the initial decision by authorized offsite emergency officials to notify the public of an emergency situation. Backup alert and notification of the public is completed within 45 minutes following the detection by the ORO of a failure of the primary alert and notification system. (NUREG-0654, E. 6, Appendix 3.B.2.c)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to provide prompt instructions to the public within the plume pathway EPZ. Specific provisions addressed in this sub-element are derived from the Nuclear Regulatory Commission (NRC) regulations (10 CFR Part 50, Appendix E.IV.D.) and FEMA-REP-10, "Guide for the Evaluation of Alert and Notification systems for Nuclear Power Plants."

EXTENT OF PLAY

OROs with FEMA-approved exception areas (identified in the approved Alert and Notification System Design Report) 5-10 miles from the nuclear power plant should demonstrate the capability to accomplish primary alerting and notification of the exception area(s) within 45 minutes following the initial decision by authorized offsite emergency officials to notify the public of an emergency situation. The 45-minute clock will begin when the OROs make the decision to activate the alert and notification system for the first time for a specific emergency situation. The initial message should, at a minimum, include: a statement that an emergency exists at the plant and where to obtain additional information.

For exception area alerting, at least one route needs to be demonstrated and evaluated. The selected routes should vary from exercise to exercise. However, the most difficult route should be demonstrated at least once every six years. All alert and notification activities along the route should be simulated (e.g., the message that would actually be used is read for the evaluator, but not actually broadcast) as agreed upon in the extent of play. Actual testing of the mobile public address system will be conducted at some agreed upon location.

Backup alert and notification of the public should be completed within 45 minutes following the detection by the ORO of a failure of the primary alert and notification system. Backup route alerting needs only be demonstrated and evaluated, in accordance with the ORO's plan and/or procedures and the extent of play agreement, if the exercise scenario calls for failure of any portion of the primary system(s), or if any portion of the primary system(s) actually fails to function. If demonstrated, only one route needs to be selected and demonstrated. All alert and notification activities along the route should be simulated (e.g., the message that would actually be used is read for the evaluator, but not actually broadcast) as agreed upon in

the extent of play. Actual testing of the Public Address system will be conducted at some agreed upon location.

State of Maryland Extent of Play:

These activities will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency. One back-up route alerting route will be demonstrated in each risk county. A map of the route will be available for the evaluation

Locations Evaluated:

Local Plume Zone Jurisdictions

Outstanding Issues:

None

EVALUATION AREA 5: EMERGENCY NOTIFICATION & PUBLIC INFORMATION

Sub-element 5.b – Emergency Information and Instructions for the Public and the Media

Criterion 5.b.1: OROs provide accurate emergency information and instructions to the public and the news media in a timely manner. (NUREG-0654, E.5, 7; G.3.a; G.4.a, b, c)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs should have the capability to disseminate to the public appropriate emergency information and instructions including any recommended protective actions. In addition, NUREG-0654 provides that OROs should ensure the capability exists for providing information to the media. This includes the availability of a physical location for use by the media during an emergency. NUREG-0654 also provides that a system be available for dealing with rumors. This system will hereafter be known as the public inquiry hotline.

EXTENT OF PLAY

Subsequent emergency information and instructions should be provided to the public and the media in a timely manner (**will not be subject to specific time requirements**). For exercise purposes, timely is defined as “the responsible ORO personnel/representatives demonstrate actions to disseminate the appropriate information/instructions with a sense of urgency and without undue delay.” If message dissemination is to be identified as not having been accomplished in a timely manner, the evaluator(s) will document a specific delay or cause as to why a message was not considered timely.

The OROs should ensure that emergency information and instructions are consistent with protective action decisions made by appropriate officials. The emergency information should contain all necessary and applicable instructions (e.g., evacuation instructions, evacuation routes, reception center locations, what to take when evacuating, information concerning pets, shelter-in-place instructions, information concerning protective actions for schools and special populations, public inquiry telephone number, etc.) to assist the public in carrying out protective action decisions provided to them. OROs should demonstrate the capability to use language that is clear and understandable to the public within both the plume and ingestion pathway EPZs. This includes demonstration of the capability to use familiar landmarks and boundaries to describe protective action areas.

The emergency information should be all-inclusive by including previously identified protective action areas that are still valid as well as new areas. The OROs should demonstrate the capability to ensure that emergency information that is no longer valid is rescinded and not repeated by broadcast media. In addition, the OROs should demonstrate the capability to ensure that current emergency information is repeated at pre-established intervals in accordance with the plan and/or procedures.

OROs should demonstrate the capability to develop emergency information in a non-English language when required by the plan and/or procedures.

If ingestion pathway measures are exercised, OROs should demonstrate that a system exists for rapid dissemination of ingestion pathway information to pre-determined individuals and businesses in accordance with the ORO's plan and/or procedures.

OROs should demonstrate the capability to provide timely, accurate, concise, and coordinated information to the news media for subsequent dissemination to the public. This would include demonstration of the capability to conduct timely and pertinent media briefings and distribute media releases as the situation warrants. The OROs should demonstrate the capability to respond appropriately to inquiries from the news media. All information presented in media briefings and media releases should be consistent with protective action decisions and other emergency information provided to the public. Copies of pertinent emergency information (e.g., EAS messages and media releases) and media information kits should be available for dissemination to the media.

OROs should demonstrate that an effective system is in place for dealing with calls to the public inquiry hotline. Hotline staff should demonstrate the capability to provide or obtain accurate information for callers or refer them to an appropriate information source. Information from the hotline staff, including information that corrects false or inaccurate information when trends are noted, should be included, as appropriate, in emergency information provided to the public, media briefings, and/or media releases.

State of Maryland Extent of Play:

These activities will be based on the ORO's plans and procedures and completed, as they would be in an actual emergency. At least one media briefing will be conducted. Public inquiry calls will be initiated at a site emergency classification. Each location will receive at least six calls. Special News Broadcasts will be developed at appropriate centers but actual broadcast of these messages will not take place.

Locations Evaluated:

JIC (State and Calvert County)
SEOC / JIC – Ingestion Pathway Activities
Local Plume Zone Jurisdictions (St. Mary's and Dorchester County)

Outstanding Issues:

None

EVALUATION AREA 6: SUPPORT OPERATION/FACILITIES

Sub-element 6.a – Monitoring and Decontamination of Evacuees and Emergency Workers, and Registration of Evacuees

Criterion 6.a.1: The reception center/emergency worker facility has appropriate space, adequate resources, and trained personnel to provide monitoring, decontamination, and registration of evacuees and/or emergency workers. (NUREG-0654, J.10.h; K.5.b)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs have the capability to implement radiological monitoring and decontamination of evacuees and emergency workers, while minimizing contamination of the facility, and registration of evacuees at reception centers.

EXTENT OF PLAY

Radiological monitoring, decontamination, and registration facilities for evacuees/ emergency workers should be set up and demonstrated as they would be in an actual emergency or as indicated in the extent of play agreement. This would include adequate space for evacuees' vehicles. Expected demonstration should include 1/3 of the monitoring teams/portal monitors required to monitor 20% of the population allocated to the facility within 12 hours. Prior to using a monitoring instrument(s), the monitor(s) should demonstrate the process of checking the instrument(s) for proper operation.

Staff responsible for the radiological monitoring of evacuees should demonstrate the capability to attain and sustain a monitoring productivity rate per hour needed to monitor the 20% emergency planning zone (EPZ) population planning base within about 12 hours. This monitoring productivity rate per hour is the number of evacuees that can be monitored per hour by the total complement of monitors using an appropriate monitoring procedure. A minimum of six individuals per monitoring station should be monitored, using equipment and procedures specified in the plan and/or procedures, to allow demonstration of monitoring, decontamination, and registration capabilities. The monitoring sequences for the first six simulated evacuees per monitoring team will be timed by the evaluators in order to determine whether the twelve-hour requirement can be met. Monitoring of emergency workers does not have to meet the twelve-hour requirement. However, appropriate monitoring procedures should be demonstrated for a minimum of two emergency workers.

Decontamination of evacuees/emergency workers may be simulated and conducted by interview. The availability of provisions for separately showering should be demonstrated or explained. The staff should demonstrate provisions for limiting the spread of contamination. Provisions could include floor coverings, signs and appropriate means (e.g. partitions, roped-off areas) to separate clean from potentially contaminated areas. Provisions should also exist to separate contaminated and uncontaminated individuals, provide changes of clothing for individuals whose clothing is contaminated, and store contaminated clothing and personal belongings to prevent further contamination of evacuees or facilities. In addition, for any

individual found to be contaminated, procedures should be discussed concerning the handling of potential contamination of vehicles and personal belongings.

Monitoring personnel should explain the use of action levels for determining the need for decontamination. They should also explain the procedures for referring evacuees who cannot be adequately decontaminated for assessment and follow up in accordance with the ORO's plans and procedures. Contamination of the individual will be determined by controller inject and not simulated with any low-level radiation source.

The capability to register individuals upon completion of the monitoring and decontamination activities should be demonstrated. The registration activities demonstrated should include the establishment of a registration record for each individual, consisting of the individual's name, address, results of monitoring, and time of decontamination, if any, or as otherwise designated in the plan. Audio recorders, camcorders, or written records are all acceptable means for registration.

State of Maryland Extent of Play: N/A.

This element has been demonstrated at all locations for the six-year cycle the week of July 16 – 20, 2007

Locations Evaluated:

None

Outstanding Issues:

None

EVALUATION AREA 6: SUPPORT OPERATION/FACILITIES

Sub-element 6.b – Monitoring and Decontamination of Emergency Worker Equipment

Criterion 6.b.1: The facility/ORO has adequate procedures and resources for the accomplishment of monitoring and decontamination of emergency worker equipment including vehicles. (NUREG-0654, K.5.b)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs have the capability to implement radiological monitoring and decontamination of emergency worker equipment, including vehicles.

EXTENT OF PLAY

The monitoring staff should demonstrate the capability to monitor equipment, including vehicles, for contamination in accordance with the ORO's plans and procedures. Specific attention should be given to equipment, including vehicles, that was in contact with individuals found to be contaminated. The monitoring staff should demonstrate the capability to make decisions on the need for decontamination of equipment including vehicles based on guidance levels and procedures stated in the plan and/or procedures.

The area to be used for monitoring and decontamination should be set up as it would be in an actual emergency, with all route markings instrumentation, record keeping and contamination control measures in place. Monitoring procedures should be demonstrated for a minimum of one vehicle. It is generally not necessary to monitor the entire surface of vehicles. However, the capability to monitor areas such as air intake systems, radiator grills, bumpers, wheel wells, tires, and door handles should be demonstrated. Interior surfaces of vehicles that were in contact with individuals found to be contaminated should also be checked.

Decontamination capabilities, and provisions for vehicles and equipment that cannot be decontaminated, may be simulated and conducted by interview.

State of Maryland Extent of Play: N/A

This element has been demonstrated at all locations for the six-year cycle the week of July 16 – 20, 2007

Locations Evaluated:

None

Outstanding Issues:

None

EVALUATION AREA 6: SUPPORT OPERATION/FACILITIES

Sub-element 6.c - Temporary Care of Evacuees

Criterion 6.c.1: Managers of congregate care facilities demonstrate that the centers have resources to provide services and accommodations consistent with American Red Cross planning guidelines (found in MASS CARE-Preparedness Operations, ARC 3031). Managers demonstrate the procedures to assure that evacuees have been monitored for contamination and have been decontaminated as appropriate prior to entering congregate care facilities. (NUREG-0654, J.10.h; J.12)

INTENT

This sub-element is derived from NUREG-0654, which provides that OROs demonstrate the capability to establish relocation centers in host areas. Congregate care is normally provided in support of OROs by the American Red Cross under existing letters of agreement.

EXTENT OF PLAY

Under this criterion, demonstration of congregate care centers may be conducted out of sequence with the exercise scenario. The evaluator should conduct a walk-through of the center to determine, through observation and inquiries, that the services and accommodations are consistent with ARC 3031 **In this simulation, it is not necessary to set up operations, as they would be in an actual emergency.** Alternatively, capabilities may be demonstrated by setting up stations for various services and providing those services to simulated evacuees. Given the substantial differences between demonstration and simulation of this criterion, exercise demonstration expectations should be clearly specified in extent-of-play agreements.

Congregate care staff should also demonstrate the capability to ensure that evacuees have been monitored for contamination, have been decontaminated as appropriate, and have been registered before entering the facility. This capability may be determined through an interview process.

If operations at the center are demonstrated, material that would be difficult or expensive to transport (e.g., cots, blankets, sundries, and large-scale food supplies) need not be physically available at the facility(ies). However, availability of such items should be verified by providing the evaluator a list of sources with locations and estimates of quantities.

State of Maryland Extent of Play: N/A.

This element has been demonstrated at all locations for the six-year cycle the week of July 16 – 20, 2007

Locations Evaluated:

None

Outstanding Issues: None

Maryland State Agency Evaluation Locations

Maryland Emergency Management Agency - State Emergency Operations Center
Camp Fretterd Military Reservation, 5401 Rue Saint Lo Drive Reisterstown, MD 21136

Maryland Department of the Environment
1800 Washington Blvd. Suite 105, Baltimore, MD 21230-1721

DNR / DHMH Radiological Laboratory - Environmental Chemistry Division
O'Coner Bldg. 201 W. Preston Street, Baltimore, MD 21201

Maryland State Field Team - Sampling Location
4240 Folly Quarter Road, Ellicott City, MD 21042

Joint Information Center / Emergency Operations Facility
100 Skipjack Road, Prince Frederick, MD 20678

Calvert County Evaluation Locations

Calvert County EOC
175 Main Street Prince Frederick, MD 20678

Patuxent Elementary School
35 Appeal Lane, Lusby, MD

St Leonard Elementary
5370 Saint Leonard Rd, St Leonard, MD

Southern Middle School
9615 Hg Trueman Rd, Lusby, MD

St. Mary's County Evaluation Locations

St Mary's County EOC
23090 Leonard Hall Drive, Rt. 245 Leonardtown Hollywood Road Leonardtown, MD 20650

Green Holly Elementary School
46060 Millstone Landing Rd, Lexington Park, MD

Dorchester County Evaluation Location

Dorchester County EOC
829 Fieldcrest Road Cambridge, MD 21613

APPENDIX 4:

Exercise Scenario

This appendix contains a summary of the simulated sequence of events used as the basis for invoking emergency response actions by Offsite Response Organizations (OROs) during the Calvert Cliffs Nuclear Power Plant (CCNPP) exercise on October 20-22, 2009.

The exercise scenario was submitted by the State of Maryland. The scenario was approved by the Federal Emergency Management Agency (FEMA) Region III on October 6, 2009.

The summary presented in this appendix is a compilation of exercise scenario materials submitted by the State of Maryland and Constellation Energy Group. Events at the plant site that are not pertinent to the ORO response have been omitted.

CALVERT CLIFFS NUCLEAR POWER PLANT

PLUME EXERCISE SCENARIO NARRATIVE

The Exercise commences at 0800. Units 1 and 2 at the Calvert Cliffs Nuclear Power Plant (CCNPP) are at 100 percent power. One of the three off site electric power sources is not available owing to maintenance and will not be available till 1600 today. In addition maintenance work is underway in Unit 1 on a valve that will cause one (train 1) of the two trains of safety equipment to be out of service till 1500 today. These two safety equipment trains provide a redundant emergency supply of water to the reactor coolant system if there is a loss of coolant accident and to the reactor containment spray system.

At 0815 scaffolding falls and causes a break in a pipe that supplies hydrogen gas to the Unit 1 Auxiliary Building. By 0830 the Unit 1 Control Room will determine that there is flammable gas in an area that can effect safety equipment. They will declare an Alert under EAL A.A.6.3.4. Operators will isolate the flow of gas to the line and keep personnel out of the area.

At 1000 a lightning strike on an electric sub-station results in the loss of the two remaining sources of offsite electric power. Both Units 1 and 2 shut down automatically. The emergency diesel generators for Unit 2 start and provide electric power to Unit 2. However both the emergency diesel generators for Unit 1 fail to start or starts but cannot be loaded onto the electric bus. The backup emergency diesel generator starts but cannot be connected to provide power to the available safety equipment train 2.

At 1030 the Emergency Director (ED) in the Emergency Operations Facility (EOF) declares a Site Area Emergency at Unit 1 under EAL H.S.2.1.3.owing to the loss of both onsite and offsite power to both of the vital 4 Kilo volt (KV) electric buses for more than 15 minutes. After this

declaration operators are able to get the backup emergency diesel to supply power to one the 14 KV vital electric buses that provide power to the safety equipment trains.

At 1045 a 10,000 gallons per minute loss of coolant accident occurs on Unit 1 owing to a break in the coolant system piping. This is indicated by a rapid lowering of the reactor coolant system pressure and the rapid increase in the pressure, temperature and humidity in the Reactor Containment Building. Safety equipment train 2 high pressure safety injection pump fails to start and hence no emergency cooling water can be supplied to the reactor coolant system. Also there is no cooling system to the Reactor Containment Building (containment sprays) that would help to lower the increasing pressure in the building.

At 1200 as a result of the loss of coolant accident and with no ability to add cooling water, the water level in the reactor vessel falls to below the top of the fuel rods. This will cause the temperature of the fuel cladding to rise rapidly. When this temperature reaches 1200 degrees F fuel clad damage begins and radioactive material from the damaged fuel rods will escape into the reactor coolant system and then into the Reactor Containment Building through the break in the coolant system piping. However at this time it remains contained in the Reactor Containment Building.

At 1220 operators receive a call that there is steam visibly escaping through the equipment hatch in the Reactor Containment Building. The seals on the hatch have failed. This is a direct release path of radioactive materials from the Reactor Containment to the environment.

At 1230 the ED in the CCNPP EOF declares a General Emergency under EAL H.G.5.1.4 due to the loss of two fission product barriers and a potential loss of the third barrier. The ED will recommend evacuation of protective action zones (PAZ) 1 and 2.

At 1300 one of the sources of offsite power is made available. By 1400 repairs have been made to other damaged equipment and by 1430 operators are able to supply water to the containment sprays. This results in the cooling of the steam atmosphere and a decrease in the pressure in the Reactor Containment Building. The driving force for the radioactive release out of the Reactor Containment Building through the leaking equipment hatch is slowly reduced. Radioactive releases will begin to decrease.

When all of the objectives are met the exercise will be terminated.

APPENDIX 5: Planning Issues

This appendix contains the Planning Issues assessed during the October 20-22, 2009 exercise at Calvert Cliffs Nuclear Power Plant (CCNPP) and those outstanding from earlier exercises. Planning Issues are issues identified in an exercise or drill that do not involve participant performance, but rather involve inadequacies in the plan or procedures. Planning Issues are required to be corrected through the revision and update of the appropriate State and local radiological emergency response plans (RERPs) and/or procedures in accordance with the following schedule:

- Within 120 days of the date of the exercise/drill when the Planning Issue is directly related to protection of the public health and safety.
- During the annual plan review and update (reported in the Annual Letter of Certification) when the Planning Issue does not directly affect the public health and safety. However, when the date for the annual plan review and update is imminent and the responsible organization does not have sufficient time to make the necessary revisions in the plans and/or procedures, the revised portion of the plans and/or procedures should be submitted in the subsequent annual plan review and update and reported in the Annual Letter of Certification.

Any requirement for additional training of responders to radiological emergencies necessitated by the revision and update of the plans and/or procedures must be completed within the timeframes described above in order for the Planning Issue to be considered resolved.

NEW PLANNING ISSUE

Maryland State Accident Assessment Center / Maryland Department of the Environment / Ingestion Pathway Coordinating Committee

Issue Number: 11-09-2.e.1-P-01

Condition: There are several instances in MDE procedures where the use of occupational dose limits (5 rem/year TEDE) in accordance with *Manual of Protective Actions of Protective Action Guides and Protective Actions for Nuclear Incidents*, EPA-400-R-92-00 during the intermediate phase of the response is not clearly described. For example, in MDE EP-306, *Protective Action Recommendation for Ingestion Pathway/Recovery/Reentry Phase*, Rev. 4, Attachment 4 includes discussion of doses up to and exceeding 25 rem for life-saving missions. It is unclear why authorization of doses exceeding 5 rem TEDE would be required during the intermediate phase. Additionally, the note on page 4 of MDE EP-307, *Protective Action Recommendation for Ingestion Pathway/Recovery/Reentry Phase*, indicates that "individuals permitted to reenter a

restricted zone should not exceed 5 rem/year CDE”, when the occupational dose limits are given as TEDE.

Possible Cause: Plans may not have been written with an appropriate emphasis on the difference between the use of emergency dose limits during the early (emergency) phase and occupational dose limits during the intermediate and late phases.

Reference: NUREG-0654/FEMA REP-1, Rev. 1, Criterion M.1

Effect: Personnel may not understand that different dose limits apply during the early emergency phase and during the intermediate/late phases, and need to be managed and tracked independently.

Recommendation: The Maryland plans MDE procedures should be revised to clarify that different dose limits apply during the early emergency phase and the intermediate/late phases.

State Response: The Maryland procedures will be reviewed and revised as appropriate to clarify dose limits that apply during the early emergency phase and the intermediate/late phases (i.e. emergency exposure limits vs. occupational exposure limits)

PRIOR PLANNING ISSUE RESOLVED

Maryland State Field Teams

Issue Number: 11-07-1.e.1-P-01

Condition: The current “range of readings” criteria used to operationally check the Maryland Department of the Environment (MDE) Field Team’s radiological survey instruments response to radioactive sources were established using too broad a range and does not assure proper operation of the instrument.

Corrective Action Demonstrated: The range of readings listed on Field Team radiological survey instruments operational check tags was updated to fall within +/- 20% of the mean value. In addition, the operational check tags were updated to include the appropriate orientation of the instrument to sources for consistency.