

Quad Cities Nuclear Power Station

Drill Report - 2009-10-06

Final Report - Radiological Emergency

Preparedness (REP) Program

2009-12-10



FEMA





FEMA

Drill Report

Quad Cities Nuclear Power Station

Drill Date: 2009-10-06

Report Date: 2009-12-10

U.S. DEPARTMENT OF HOMELAND SECURITY

Federal Emergency Management Agency

REP Program

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Table of Contents

Chapter 1 Executive Summary

Chapter 2 Introduction

Chapter 3 Drill Overview

Section 3.1 EPZ Description

Section 3.2 Drill Participants

Chapter 4 Drill Evaluation and Results

Section 4.1 Summary Results of Drill Evaluation

Section 4.2 Status of Jurisdictions Evaluated

4.2.1 Support Jurisdictions

4.2.1.1 Genesis Medical Center - DeWitt

4.2.1.2 DeWitt Ambulance Service

Appendices

Appendix 1 - Acronyms and Abbreviations

Appendix 2 - Drill Evaluators and Team Leaders

1. Executive Summary

On October 6, 2009, the Federal Emergency Management Agency (FEMA), Region VII, conducted a medical services drill in the plume emergency-planning zone (EPZ) around the Quad Cities Nuclear Power Station. The purpose of the drill was to assess the level of State and local preparedness in responding to a radiological emergency. This drill was held in accordance with FEMA's policies and guidance concerning the exercise of State and local radiological emergency response plans and procedures. The previous medical service drill at this site was conducted on September 28, 2007.

FEMA wishes to acknowledge the efforts of the many individuals who participated in this drill. In the State of Iowa, the Risk County of Clinton participated, along with the Genesis Medical Center - DeWitt and the DeWitt Ambulance Services. The efforts of the utility should also be commended for their work on training and drill preparation.

Protecting the public health and safety is the full-time job of some of the exercise participants and an additional assigned responsibility for others. Still others have willingly sought this responsibility by volunteering to provide vital emergency services to their communities. A special thank you is once again extended to those wonderful volunteers. Cooperation and teamwork of all the participants were evident during this drill.

The State and local organizations demonstrated knowledge of their emergency response plans and procedures and adequately implemented them. No deficiencies were identified. One Area Requiring Corrective Action (ARCA) was identified as a result of this drill. There were no Previous ARCAs to be corrected during this drill.

2. Introduction

On December 7, 1979, the President directed FEMA to assume lead responsibility for all offsite nuclear planning and response. FEMA's activities are conducted pursuant to 44 Code of Federal Regulations (CFR) Parts 350, 351, and 352. These regulations are a key element in the Radiological Emergency Preparedness (REP) Program that was established following the Three Mile Island Nuclear Station accident in March 1979. FEMA Rule 44 CFR 350 establishes the policies and procedures for FEMA's initial and continued approval of State and local governments' radiological emergency planning and preparedness for commercial nuclear power plants. This approval is contingent, in part, on State and local governments' 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 (RERP) and procedures developed by State and local governments.
- * Determining whether such plans and procedures can be implemented on the basis of 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 (Federal Register, Vol. 58, No. 176, September 14, 1993).
- * 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. Food and Drug Administration
- U.S. Public Health Service
- U.S. Department of Transportation
- U.S. Department of Agriculture
- U.S. Department of the Interior

Representatives of these agencies serve on the FEMA Region VII Regional Assistance

Committee (RAC), which is chaired by FEMA.

A REP medical service drill was conducted on October 6, 2009, by FEMA Region VII to assess the capabilities of the States and local offsite emergency preparedness organizations in implementing their RERPs and procedures to protect the public during a radiological emergency involving the Quad Cities Nuclear Power Station. The purpose of this drill report is to present the exercise results and findings on the performance of the offsite 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 VII RAC Chairperson and approved by the Regional Administrator.

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

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

- * Radiological Emergency Preparedness: Exercise Evaluation Methodology as published in the Federal Register September 12, 2001 and April 25, 2002.

Chapter 3 of this report, entitled "Drill Overview," presents basic information and data relevant to the exercise.

Chapter 4 of this report, entitled "Drill Evaluation and Results," presents basic information on the demonstration of applicable exercise criteria at each jurisdiction or functional entity evaluated in a jurisdiction-based, issues only format. This section also contains: (1) descriptions of all Deficiencies and ARCAs assessed during this exercise, recommended corrective actions, and the State and local governments' Schedule of Corrective Actions for each identified exercise issue and (2) descriptions of ARCAs assessed during previous exercises and the status of the OROs' efforts to resolve them.

3. Drill Overview

Contained in this chapter are data and basic information relevant to the October 6, 2009, medical services drill to test the offsite emergency response capabilities in the area surrounding the Quad Cities Nuclear Power Station.

3.1. EPZ Description

The Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, is located in Cordova Township, Rock Island County, Illinois, ten miles northeast of the city of LeClaire, Iowa, and ten miles southwest of the city of Clinton, Iowa. The plant is on the eastern bank of the Mississippi River opposite the mouth of the Wapsipinicon River. The site is at Mississippi River Mile Marker Number 507 above the mouth of the Ohio River. The topography of the site and its immediate environs is low and relatively flat, with a mean elevation of approximately 605 feet. The ground surface drops off abruptly, approximately 30 feet down to the bank of the river.

The Mississippi River bisects the Emergency Planning Zone (EPZ) from north to south, passing adjacent to the plant. The river is used for commercial waterborne traffic and is a prime area for recreational boating and fishing. In addition to the river, U.S. Highway 30 passes through the northern portion of the EPZ passing within 6 miles of the plant. U.S. Highway 67, which parallels the Mississippi River, bisects the entire EPZ in a north-south direction passing within 2 ½ miles of the plant and State Highway 136 passes through the northern portion of the EPZ.

The EPZ for the Quad Cities Nuclear Power Station consists of an irregular shaped circle with the power station as the center point. It extends 10 to 13 miles outward, including all of Clinton and LeClaire. The EPZ encompasses the Mississippi River floodplain, including the cities and villages built on the floodplain river bluffs, and gently rolling hills further away from the river. The floodplain on the Iowa side of the Mississippi River is relatively narrow and, thus has constrained urban and industrial development in this area.

The 10-mile EPZ total summer population (permanent residents and transients) based on the 2000 census, is 61,327 of which 53,965 reside within Clinton and Scott Counties in Iowa. The remainder of the EPZ is in Rock Island and Whiteside Counties in Illinois with a population in the summer of 7,362.

Both Clinton and Scott Counties are typical agricultural areas with the majority of land used for cash grain production and livestock. Communities within Scott County that are located in the 10-mile EPZ are McCausland, Princeton, and Le Claire. Communities within Clinton County that are located in the 10-mile EPZ are Low Moor, Folletts, Camanche, Malone, Elvira, and Clinton. Industrial and professional activities are principally located in the Clinton and Camanche metropolitan areas. There are 24 major employers in the Iowa EPZ. The Iowa 10-mile EPZ is divided into 12 pre-identified subareas, which are defined for the public in terms of clearly recognizable landmark descriptions.

Major parks and recreational areas located in the EPZ include the Upper Mississippi River National Wildlife/Fish Refuge, Princeton State Wildlife Management Area, Fairbanks Fishing Hole, Rock Creek Park, Riverview Park, Riverview Stadium, and passenger riverboats.

Area transportation includes the Mississippi River, Clinton County airport, railroads, and major highways.

3.2. Drill Participants

Agencies and organizations of the following jurisdictions participated in the Quad Cities Nuclear Power Station drill:

Support Jurisdictions

DeWitt Ambulance Services

Genesis Medical Center - DeWitt

4. Drill Evaluation and Results

Contained in this chapter are the results and findings of the evaluation of participants in the October 6, 2009, medical service drill to test the offsite emergency response capabilities of State and local governments in the 10-mile EPZ surrounding the Quad Cities Nuclear Power Station.

Each functional entity was evaluated on the basis of its demonstration of criteria contained in exercise evaluation areas delineated in Emergency Preparedness: Exercise Evaluation Methodology as printed in the Federal Register September 12, 2001 and April 25, 2002.

4.1. Summary Results of Drill Evaluation

The matrix presented in Table 2, on the following page, presents the status of all exercise criteria, which were scheduled for demonstration during this drill, at all participating jurisdictions and functional entities. Exercise criteria are listed by number and the demonstration status of those criteria is indicated by the use of the following letters:

M - Met (No Deficiency or ARCAs assessed and no unresolved ARCAs from prior exercises)

D - Deficiency assessed

A - Area Requiring Corrective Action (ARCA) assessed or unresolved ARCA(s) from prior exercises)

N - Not Demonstrated (Reason explained in subsection B)

Table 1 - Summary of Drill Evaluation

DATE: 2009-10-06 SITE: Quad Cities Nuclear Power Station, IL A: ARCA, D: Deficiency, M: Met, N: Not Demonstrated			
		Genesis Medical Center - DeWitt	DeWitt Ambulance Service
Emergency Operations Management			
Mobilization	1a1		
Facilities	1b1		
Direction and Control	1c1		
Communications Equipment	1d1		
Equip & Supplies to support operations	1e1	M	M
Protective Action Decision Making			
Emergency Worker Exposure Control	2a1		
Radiological Assessment and PARs	2b1		
Decisions for the Plume Phase -PADs	2b2		
PADs for protection of special populations	2c1		
Rad Assessment and Decision making for the Ingestion Exposure Pathway	2d1		
Rad Assessment and Decision making concerning Relocation, Reentry, and Return	2e1		
Protective Action Implementation			
Implementation of emergency worker exposure control	3a1	M	M
Implementation of KI decision	3b1		M
Implementation of protective actions for special populations - EOCs	3c1		
Implementation of protective actions for Schools	3c2		
Implementation of traffic and access control	3d1		
Impediments to evacuation are identified and resolved	3d2		
Implementation of ingestion pathway decisions - availability/use of info	3e1		
Materials for Ingestion Pathway PADs are available	3e2		
Implementation of relocation, re-entry, and return decisions.	3f1		
Field Measurement and Analysis			
Adequate Equipment for Plume Phase Field Measurements	4a1		
Field Teams obtain sufficient information	4a2		
Field Teams Manage Sample Collection Appropriately	4a3		
Post plume phase field measurements and sampling	4b1		
Laboratory operations	4c1		
Emergency Notification and Public Info			
Activation of the prompt alert and notification system	5a1		
Activation of the prompt alert and notification system - Fast Breaker	5a2		
Activation of the prompt alert and notification system - Exception areas	5a3		
Emergency information and instructions for the public and the media	5b1		
Support Operations/Facilities			
Mon / decon of evacuees and emergency workers, and registration of evacuees	6a1		
Mon / decon of emergency worker equipment	6b1		
Temporary care of evacuees	6c1		
Transportation and treatment of contaminated injured individuals	6d1	A	M

4.2. Status of Jurisdictions Evaluated

4.2.1. Support Jurisdictions

4.2.1.1. Genesis Medical Center - DeWitt

- a. MET: 1.e.1, 3.a.1.
- b. AREAS REQUIRING CORRECTIVE ACTION: 6.d.1.

ISSUE NO.: 51-09-6d1-A-01

CRITERION: Facility/ORO has the appropriate space, adequate resources, and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals. (NUREG-0654, F.2., H.10., K.5.a.b., L.1., 4)

CONDITION: The radiological survey team was not familiar with the survey equipment and failed to adequately perform operations check on the Ludlum survey meters. Radiological Monitoring staff did not adequately determine background radiation levels in the emergency room area. Radiological monitoring staff could not provide correct readings from the radiation survey instrument.

POSSIBLE CAUSE: Monitoring team staff were not adequately trained on how to read and operate the survey instruments as the survey team had not received hands on training on the set up of the Ludlum instruments.

The Genesis Medical Center Radiation Emergency Response Procedures, Revision 5, January 2008, has an Attachment N, Radiological Operation Annex, that provides procedures for battery installation, battery testing, cable connection, operational checks, and source checks. However, there is nowhere in the plan where Attachment N is assigned as a specific responsibility of an individual, nor is there anywhere in the plan that addresses instrumentation in general. Page 9 of the Procedures instructs radiology technologists to review attachment "O" in a parenthetical statement in the introduction of the responsibilities. There is no specific responsibility

enumerated in the body of the procedures. Furthermore, there is no Attachment O.

Monitoring staff were not adequately trained on the need to determine background levels using a standard technique.

The Genesis Medical Center Radiation Emergency Response Procedures do not address the determination of background. It is not included in the Radiological Technologists responsibilities, or in Appendix N, Radiological Operations Annex.

The Genesis Medical Center Radiation Emergency Response Procedures directs the charge nurse to distribute Attachment E, Radiology Technologist Responsibilities to the Radiology Technologists. However, Attachment E provides procedures for performing X-Ray diagnostics on a potentially contaminated individual, not on the duties of a Radiology Technologist performing contamination surveys.

REFERENCE: NUREG-0654/FEMA REP 1, Rev. 1, Planning Standard L.

Genesis Medical Center, Radiation Emergency Response Plan, Revision 5, January 2008, Procedures, Section B., Radiology Technologists (RTs) Responsibilities

Genesis Medical Center, DeWitt, Iowa, Radiation Emergency Response Procedures, Revision 5, January 2008, Radiology Technologist Responsibilities, page 9.

Genesis Medical Center, DeWitt, Iowa, Radiation Emergency Response Procedures, Revision 5, January 2008, Attachment N, page 48.

Clinton County Plan, Attachment A.

EFFECT: The radiological survey team began to use instruments that were inoperable. This would have resulted in not locating actual contamination. Once the instruments were operating, the team did not perform a source check on the device so there would have been no confidence in the survey numbers. Contamination would not have been found or would have been

indicated where there was none.

The monitoring team staff could not provide accurate radiation survey data to the decontamination staff resulting in missing contamination on the patient that would not be removed.

No defensible background level was determined in order to adequately assess the effectiveness of decontamination efforts.

RECOMMENDATION: Additional hands-on training should be performed on a continuous basis for medical staff assigned to radiological survey duty.

Assign an individual the responsibility of assembling the instruments and performing operability checks on the instruments.

Update Emergency Response procedures to provide more details concerning instrumentation.

Provide survey personnel with a set of responsibilities that details assembling the instrument and performing operability checks.

Develop a well-trained monitoring team of several people available to every shift that is capable of performing adequate patient contamination surveys.

Train monitoring staff on the process for determining background radiation levels.

Provide a monitoring responsibility checklist for the monitoring team to use to determine background radiation levels.

Include the determination of background radiation as a specific responsibility of a radiology technician.

SCHEDULE OF CORRECTIVE ACTIONS:

State of Iowa indicated that additional training sessions will be scheduled for staff assigned to radiological monitoring duties. This criterion will be demonstrated at the Genesis Hospital during its next medical drill.

Excelon Corporation agreed to modify Genesis Hospital procedures and

submit to FEMA Region VII for review and approval by January 15, 2010.

- c. DEFICIENCY: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ISSUES - RESOLVED: None
- f. PRIOR ISSUES - UNRESOLVED: None

4.2.1.2. DeWitt Ambulance Service

- a. MET: 1.e.1, 3.a.1, 3.b.1, 6.d.1.
- b. AREAS REQUIRING CORRECTIVE ACTION: None
- c. DEFICIENCY: None
- d. NOT DEMONSTRATED: None
- e. PRIOR ISSUES - RESOLVED: None
- f. PRIOR ISSUES - UNRESOLVED: None

APPENDIX 1

ACRONYMS AND ABBREVIATIONS

ARCA	Area Requiring Corrective Action
EPZ	Emergency Planning Zone
FEMA	Federal Emergency Management Agency
NRC	Nuclear Regulatory Commission
QCNP	Quad Cities Nuclear Power Station
RAC	Regional Assistance Committee
REP	Radiological Emergency Preparedness

APPENDIX 2

DRILL EVALUATORS AND TEAM LEADERS

DATE: 2009-10-06, SITE: Quad Cities Nuclear Power Station, IL

LOCATION	EVALUATOR	AGENCY
Genesis Medical Center - DeWitt	Garianne Howard	ICF
DeWitt Ambulance Service	Al Lookabaugh	ICF
* Team Leader		