



FEMA

NOV 07 2016

Cynthia Pederson  
Regional Administrator  
U.S. NRC Region III  
2443 Warrenville Road, Suite 210  
Lisle, IL 60532-4351

Dear Ms. Pederson:

Enclosed is a copy of the Final After Action Report for the August 24, 2016, Medical Services (MS-1) and Out-of-Sequence (OOS) Drills for the offsite radiological emergency response plans site-specific to the Duane Arnold Energy Center. This report was prepared by the Federal Emergency Management Agency (FEMA) Region VII staff. Copies of the final report will be provided to the State of Iowa.

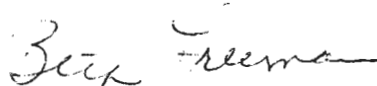
There were no Level - 1 or Level -2 findings, or Planning Issues, identified during the drills. Nor were there previous findings to be corrected during these drills.

Based on the results of this medical and out-of-sequence drill, the offsite radiological emergency response plans and preparedness for the State of Iowa and the affected local jurisdictions, site-specific to the Duane Arnold Energy Center, can be implemented and are adequate to provide reasonable assurance that appropriate measures can be taken offsite to protect the health and safety of the public in the event of a radiological emergency at the site. Therefore, the Title 44 CFR, Part 350 approval of the offsite radiological emergency response plans and preparedness for the State of Iowa, site-specific to the Duane Arnold Energy Center, granted on November 1, 1990, will remain in effect.

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If you have any questions or concerns regarding the report, please contact Mr. Charles (Chuck) Gregg, Regional Assistance Committee Chair, at 816-283-7926 or by email [chuck.gregg@fema.dhs.gov](mailto:chuck.gregg@fema.dhs.gov).

Sincerely,

A handwritten signature in cursive script that reads "Beth Freeman".

Beth Freeman  
Regional Administrator

Enclosure:

cc: Ms. Vanessa Quinn, HQ REP  
Ms. Lisa Hamilton, HQ REP  
Mr. Allan Barker, NRC  
Mr. Steve Warren, HSEMD  
Mr. Mark Fritz, DAEC



Duane Arnold Energy Center  
Out of Sequence Drills

# After Action Report/ Improvement Plan

Date of Drills – August 24, 2016

Radiological Emergency Preparedness (REP) Program



**FEMA**

*Published November 8, 2016*

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# Duane Arnold Energy Center After Action Report/Improvement Plan

*Published November 8, 2016*

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## EXECUTIVE SUMMARY

On August 24, 2016, the Federal Emergency Management Agency (FEMA), Region VII, conducted an out-of-sequence Medical Service (MS-1) drill involving Mercy Medical Center (MMC), Hiawatha Fire & Rescue (HF&R), and a separate drill involving the Iowa State Hygienic Laboratory (ISHL). The purpose of the drills was to assess the level of state and local preparedness in responding to a radiological emergency involving an accident with a contaminated, and injured individual. The drill was held in accordance with FEMA's policies and guidance, and state and local emergency response plans and procedures.

The previous drills at these sites were conducted on:

Mercy Medical Center - April 16, 2014

Hiawatha Fire & Rescue - April 16, 2014

Iowa State Hygienic Laboratory - October 22, 2008

FEMA wishes to acknowledge the efforts of the individuals who participated in this drill. 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 drill 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 these drills.

The evaluated organizations demonstrated knowledge of their emergency response plans and procedures and adequately implemented them. There were no Level 1 or Level 2 findings identified as a result of these out-of-sequence drills.

## **SECTION 1: EXERCISE OVERVIEW**

### **1.1 Exercise Details**

**Exercise Name**

Duane Arnold Energy Center

**Type of Exercise**

Medical Services (MS-1)

Radiological Laboratory

**Exercise Date**

August 24, 2016

**Program**

Department of Homeland Security/FEMA Radiological Emergency Preparedness Program

**Scenario Type**

Radiological Emergency

### **1.2 Exercise Planning Team Leadership**

Sharron Y. McDuffie

Federal Planning Team Lead

FEMA Region VII

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## **1.2 Exercise Planning Team Leadership (continued)**

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## **1.3 Participating Organizations**

**Agencies and organizations of the following jurisdictions participated in these Duane Arnold Energy Center drills:**

### **Iowa Jurisdictions**

Iowa Department of Homeland Security and Emergency Management  
University of Iowa - State Hygienic Laboratory

### **Risk Jurisdictions**

Linn County Emergency Management Agency

### **Support/Volunteer Jurisdictions**

Hiawatha Fire & Rescue  
Mercy Medical Center

## **SECTION 2: EXERCISE DESIGN SUMMARY**

### **2.1 Exercise Purpose and Design**

The medical drill provided an opportunity to assess the ability of Hiawatha Fire & Rescue personnel to respond and care for a patient who needed medical assistance and was contaminated with radioactive material. In addition, the drill allowed the demonstration of procedures for transporting a contaminated individual to the appropriate medical facility. Upon arrival of the patient, the Mercy Medical Center (MMC) staff demonstrated the proper care of the contaminated patient, to include contamination control and decontamination.

The fire department personnel provided additional training for emergency response personnel from the Hiawatha Fire & Rescue to further enhance the local emergency response capability of the community by monitoring contamination and decontaminating emergency workers in the surrounding area of the Duane Arnold Energy Center (DAEC).

The State Laboratory personnel demonstrated the capability to receive and analyze a minimum of two samples, to include one liquid (simulated milk/surface water) sample and one solid (vegetation/simulated wildlife/soil) samples collected and stored from the previous April 17 & 18, 2016, Ingestion Exercise.

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

Duane Arnold Energy Center Emergency Preparedness Exercises and Drills are conducted to test and provide the opportunity to evaluate Emergency Plans, associated Implementing Procedures, facilities, and equipment. This Drill tested the DAEC emergency response organization's ability to assess and respond to emergency conditions and coordinate efforts with other agencies for protection of the health and safety of the public.

The scenario depicted a simulated event that resulted in conditions of sufficient magnitude to warrant mobilization of local agencies to respond to the simulated emergency. Whenever practical, the Drill incorporated provisions for "Free Play" on the part of the participants.

The Duane Arnold Energy Center (DAEC), Emergency Preparedness Exercise & Drill Program objectives are based on the Federal requirements delineated in 44 CFR 350, and State of Iowa, Benton County, and Linn County Radiological Emergency Preparedness plans. A summary of the specific areas to be evaluated for all the participating organizations are listed in Table 3.1.

## 2.3 Scenario Summary

The following is the scenario summary provided by the Iowa Department of Homeland Security personnel and approved by FEMA for use during the Offsite MS-1 Evaluation on August 24, 2016.

This simulated radiation medical emergency is being conducted in order to exercise the emergency medical response where radioactive material is responsible for contaminating a person that is injured or requires medical assistance. The basic objective is to assess the ability of Hiawatha Ambulance personnel to respond and care for a patient who requires medical assistance and is contaminated with radioactive material. In addition, the ambulance staff will notify the Mercy Medical Center (MMC) that they will be transporting the patient to their facility for medical treatment and decontamination.

### **Scenario:**

A Linn County Secondary Roads worker had been taking down access control points following a downgrade from a DAEC General Emergency. When the worker reported to the Linn County Emergency Worker Monitoring and Decontamination Station (EWMDS) for monitoring, he alarmed the portal monitor on his neck/chin, forearms and the front of his body (waist to chest). Attempts to decontaminate were unsuccessful and the ambulance service was contacted to transport the individual to MMC. While waiting for the ambulance to arrive, the worker suffers a panic attack due to worries about the contamination on his body.

### **As The Scenario Begins:**

Hiawatha Ambulance has been called to respond to a non-injured EWMDS worker who is contaminated and needs transferred to MMC for decontamination. The location is 101 50<sup>th</sup> Avenue SW at the Kirkwood Continuing Education and Training Center (location of EWMDS). While the ambulance is enroute to EWMDS, they receive a message that the worker has become very panicky and requires a faster response.

The expectation is that the Ambulance Crew assesses and treats the patient, keeping in mind that he has been radioactively contaminated. Once the patient is treated, packaged, placed into the ambulance and the hospital notified of the incoming patient information – this portion of the evaluation will stop and a critique will be held on actions of the ambulance crew up to this point. The Evaluators will then give their critique on this portion of the scenario.

The patient will then be taken to MMC to begin the hospital portion of the evaluation.

The patient, in the ambulance, will be driven into the Ambulance Bay of MMC. The expectation is that the staff will receive patient turnover from the ambulance crew, assess his status and proceed with treatment knowing that he has been radioactively contaminated. Once the medical condition of the patient has been treated and he has been decontaminated, a clean-cart-transfer will be demonstrated and the patient will be taken out of the decontamination room. The MMC staff will then demonstrate the proper monitoring and clean-up practices for a radiological incident. That will end this portion of the evaluation and a critique will be held on the actions of the MMC staff.

#### INITIAL CONDITIONS, SIGNS, SYMPTOMS and VITALS

Same as Event Summary along with the following:

Vital Signs: Pulse = 90  
BP = 136/84  
Respiration = 22 Temp = Normal  
Pupils = Equal and reactive

History: Per patient

Medications: Per patient

Allergies: Per patient

#### SCHEDULE OF EVENTS

0730- The accident victim will be moulaged at Hiawatha Ambulance during this  
0800 period.

#### FOR HIAWATHA AMBULANCE SERVICE:

0815- Hiawatha Ambulance will be requested to report to the specified location.  
0845 Once at the scene, the ambulance staff will determine the medical and contamination status of the injured worker. (Scene simulated within the ambulance building)

0845 The MS-1 Hospital is notified that a contaminated worker requiring medical assistance is being transported to their facility.

0845-  
0930 Mercy Medical Center (MMC) begins preparations for a contaminated worker requiring medical assistance.

0845- The contaminated worker requiring medical assistance is prepared for  
0900 transport and loaded into the ambulance.

While in transit, the ambulance staff communicates patient's vitals and ETA information via the Emergency Medical Services (EMS) radio or cellular phone to the emergency room staff.

0930- Upon arrival, the ambulance staff briefs the Emergency Room staff and  
1000 turns the patient over to their care. The hospital staff will monitor the attendants, and then the attendants will monitor their vehicle.

If the Hospital staff begins to ask questions concerning patient background data or request technical assistance with the evaluation, then the controller should provide the information provided in the message.

0945- In the Emergency Room, staff monitors the patient's physical and  
1045 radiological condition, and performs medical and contamination control duties as necessary.

1100 Exercise activities are terminated as directed by the Exercise Manager.

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## SECTION 3: ANALYSIS OF CAPABILITIES

### 3.1 Exercise Evaluation and Results

Contained in this section are the results and findings of the evaluation of all jurisdictions and functional entities, which participated in the August 24, 2016, Medical Service (MS-1), and Radiological Laboratory drill to test the offsite emergency response capabilities of the State of Iowa and local Iowa facilities in support of the Duane Arnold Energy Center.

Each jurisdiction and functional entity was evaluated on the basis of its demonstration of the criteria delineated in FEMA's Radiological Emergency Preparedness Program Manual, dated January 2016.

### 3.2 Summary Results of Exercise Evaluation

The matrix presented in Table 3.1 presents the status of all exercise criteria, which were scheduled for demonstration during these drills, 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:

1. **Met**  
An observed action, behavior, procedure, and/or practice that met the exercise criteria.
2. **Level 1 Finding**  
An observed or identified inadequacy of organizational performance in an exercise that could cause a determination that offsite emergency preparedness is not adequate to provide reasonable assurance that appropriate protective measures can be taken in the event of a radiological emergency to protect the health and safety of the public living in the vicinity of a Nuclear Power Plant (NPP).
3. **Level 2 Finding**  
An observed or identified inadequacy of organizational performance in an exercise that is not considered, by itself, to adversely impact public health and safety.
4. **Plan Issue**  
An observed or identified inadequacy in the offsite response organization's (ORO) emergency plan/implementing procedures, rather than that of the ORO's performance.
5. **N - Not Demonstrated**

Table 3.1 - Summary of Exercise Evaluation

DATE: 2016-08-24 SITE: Duane Arnold Energy Center, IA M: Met, 1: Level 1, 2: Level 2, P: Plan Issue, N: Not Demonstrated		Hiawatha Fire & Rescue	Mercy Medical Center	Iowa State Hygienic Lab
Emergency Operations Management				
Mobilization	1a1			
Facilities	1b1			
Direction & Control	1c1			
Communications Equipment	1d1			
Equipment and Supplies	1e1	M	M	M
Protective Action Decision Making				
EW Exp. Control Decisions	2a1			
PARs	2b1			
PADs	2b2			
PADs for Disabled/Functional Needs	2c1			
Ingestion PADs	2d1			
RRR Decisions	2e1			
Protective Action Implementation				
EW Exp. Control Implementation	3a1	M	M	M
KI Public/Institutionalized	3b1			
PAD Imp. Disabled/Functional Needs	3c1			
PAD Imp. Schools	3c2			
TACP Establishment	3d1			
Impediments to Evacuation	3d2			
Implementation of Ingestion PADs	3e1			
Ingestion Strategies and Information	3e2			
Imp. of RRR Decisions	3f1			
Field Measurement and Analysis				
RESERVED	4a1			
Field Team Management	4a2			
Field Team Operations	4a3			
Field Team Sampling	4b1			
Laboratory Operations	4c1			M
Emergency Notification and Public Info				
Initial Alert & Notification	5a1			
RESERVED	5a2			
Backup Alert & Notification	5a3			
Exception Area Alerting	5a4			
Subsequent Public Information	5b1			
Support Operations/Facilities				
Reception Center Operations	6a1			
EW Monitoring & Decon	6b1			
Congregate Care	6c1			
Contaminated Injured Transport & Care	6d1	M	M	

### 3.3 Criteria Evaluation Summaries

#### 3.3.1 Iowa Jurisdictions

##### 3.3.1.1 Iowa State Hygienic Laboratory

The Iowa State Hygienic Laboratory located at 2490 Crosspark Road, Coralville, Iowa, was evaluated on August 24, 2016. The Laboratory successfully demonstrated the use of various equipment, and supplies sufficient to support emergency operations.

Radiological exposure to emergency workers was managed in accordance with current plans and procedures. Samples are brought to the Lab by a courier and surveyed with a radiation survey meter before they are handled. Any sample that reads over 2 mR/hour on contact is diverted from the Lab and not handled by the Lab staff. The Lab staff demonstrated a thorough knowledge of the Lab's procedures for handling and storage of potentially contaminated samples and are unlikely to get any significant radiation exposure during emergency operations. The Lab is outside the 10-mile EPZ for Duane Arnold Power Station, so potassium iodide (KI) tablets are not required, but are available.

The Lab participates in the FDA's Food Emergency Radiation Network (FERN) program and has periodic audits and is required to process challenge samples from that program. The Lab has two high-purity germanium gamma detectors interfaced to a computer data acquisition system. The Lab does ten-minute screen counts on typical environmental samples, and about 200 samples per day could be run with the full lab staff participating in the sample receipt and preparation activities.

All criteria at this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

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

- a. MET: 1.e.1, 3.a.1, 4.c.1.
- b. LEVEL ONE: None
- c. LEVEL TWO: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

#### 3.3.2 Support Jurisdictions

##### 3.3.2.1 Hiawatha Fire & Rescue

The Hiawatha Fire and Rescue is located at 60 N. 10<sup>th</sup> Avenue, in Hiawatha, Iowa. They received a phone call of a possibly non-injured County Road worker who was contaminated and needed to be transferred to Mercy Medical Center for decontamination. The patient was placed



on a backboard on the ambulance transport stretcher and cocooned in a double-wrap of sheets. The ambulance crew did an excellent hand-off to Mercy Medical Center's emergency decon staff, with a report of vital signs, the location and amount of contamination. The crew provided great care and maintained communication with the medical center throughout the medical assessment, monitoring, and transportation process.

All criteria at this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

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

- a. MET: 1.e.1, 3.a.1, 6.d.1.
- b. LEVEL ONE: None
- c. LEVEL TWO: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

### **3.3.2.2 Mercy Medical Center**

The demonstration was held at Mercy Medical Center, 701 10th Street, Cedar Rapids, Iowa on August 24, 2016. The Center had appropriate space, adequate equipment and resources, and trained personnel to provide monitoring, decontamination, and medical services to a contaminated individual in a timely manner.

The patient was carefully unwrapped and surveyed again. Decontamination was carried out by irrigation of the contaminated area, followed by gentle wiping with 4x4 gauze pads several times until the patient was successfully decontaminated and released.

Overall, effective communication and contamination control was demonstrated. The staff surveying the patient demonstrated excellent monitoring techniques.

All criteria at this location were adequately demonstrated in accordance with the plans, procedures, and extent of play agreement.

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

- a. MET: 1.e.1, 3.a.1, 6.d.1
- b. LEVEL ONE: None
- c. LEVEL TWO: None
- d. PLAN ISSUES: None
- e. NOT DEMONSTRATED: None
- f. PRIOR ISSUES - RESOLVED: None
- g. PRIOR ISSUES - UNRESOLVED: None

## **SECTION 4: CONCLUSION**

Based on the results of these out-of-sequence drills, the offsite radiological emergency response plans and preparedness for the State of Iowa and the affected local jurisdictions are deemed adequate to provide reasonable assurance that appropriate measures can be taken to protect the health and safety of the public in the event of a radiological emergency. Therefore, 44 CFR Part 350 approval of the offsite radiological emergency response plans and preparedness for the State of Iowa site-specific to the Duane Arnold Energy Center will remain in effect.

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## APPENDIX B: EXERCISE EVALUATORS

The evaluation team for this exercise and out-of-sequence drill consisted of DHS/FEMA Radiological Emergency Preparedness Program (REPP) personnel.

DATE: 08-24-2016 SITE: Duane Arnold Energy Center, IA

LOCATION	EVALUATOR	AGENCY
Iowa State Hygienic Laboratory	Paul Ward	FEMA HQ
Mercy Medical Center	Paul Ward	FEMA HQ
Hiawatha Fire & Rescue	K. Darren Bates	FEMA HQ

## APPENDIX C: ACRONYMS AND ABBREVIATIONS

### ACRONYMS AND ABBREVIATIONS

ARCA	Area Requiring Corrective Action
DAEC	Duane Arnold Energy Center
EPA	Environmental Protection Agency
EPZ	Emergency Planning Zone
EMS	Emergency Medical Services
EWMS	Emergency Worker Monitoring and Decontamination Station
FEMA	Federal Emergency Management Agency
HFR	Hiawatha Fire & Rescue
ISHL	Iowa State Hygienic Laboratory
MS-1	Medical Services Drill
MMC	Mercy Medical Center
ORO	Offsite Response Organization
REP	Radiological Emergency Preparedness

