



# Federal Emergency Management Agency

Region VII

2323 Grand Blvd., Suite 900  
Kansas City, MO 64108-2670

JAN 26 2001

Mr. James E. Dyer  
Regional Administrator  
U.S. Nuclear Regulatory Commission, Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

Dear Mr. Dyer:


Enclosed is a copy of the final report for the October 18, 2000, full-scale emergency planning zone exercise of the offsite radiological emergency response plans site-specific to the Duane Arnold Energy Center. The state of Iowa and the risk counties of Benton and Linn participated in this exercise. In addition, the host counties of Buchanan and Johnson also participated. The Federal Emergency Management Agency (FEMA) Region VII prepared the report. The report is being issued beyond the 90 day timeframe in order to include the evaluation of the Buchanan County congregate care sites that was conducted on January 19, 2001. A copy of the final report will be provided to the state of Iowa by the FEMA Region VII staff.

There were no deficiencies identified during the exercise. There were three areas requiring corrective action (ARCAs) identified during this exercise. All three ARCAs were subsequently corrected during the exercise in accordance with the Extent of Play agreement and FEMA policy effective March 31, 2000, and are now closed. One ARCA from the 2000 Quad Cities Nuclear Power Station July 2000 exercise and one ARCA from the October 1999 medical drill were also corrected and are now closed.

Based on the results of the full-scale exercise, the offsite radiological emergency response plans and preparedness for the State of Iowa, and affected local jurisdictions, site-specific to the Duane Arnold Energy Center, are determined to be 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, based on the above, the Title 44 CFR, Part 350 approval, granted on July 2, 1991, will remain in effect.

Should you have any questions, please contact Mr. Eric A. Jenkins, RAC Chair and Chief, Preparedness and Readiness Branch, at (816) 283-7021.

Sincerely,



Arthur L. Freeman  
Acting Regional Director

Enclosure

cc: Vanessa Quinn, PT-CR-RP (w/o enclosure)  
Deborah Mauldin, PT-CR-RP (w/o enclosure)  
Roland Lickus, NRC-III (w/o enclosure)  
Paul Sullivan, Nuclear Management Co. (w/o enclosure)  
Kathy Halvey Gibson, NRC-HQ (w/enclosure)



## FINAL EXERCISE REPORT

### DUANE ARNOLD ENERGY CENTER

Licensee: **Nuclear Management Company, LLC**

Exercise Date: **October 18, 2000**

Report Date: **January 25, 2001**

**Federal Emergency Management Agency  
Region VII  
2323 Grand Boulevard, Suite 900  
Kansas City, Missouri 64108-2670**

**Arthur Freeman, Acting Regional Director**

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## **I. EXECUTIVE SUMMARY**

On October 18, 2000, an exercise was conducted in the plume exposure pathway emergency planning zone (EPZ) around the Duane Arnold Energy Center by the Federal Emergency Management Agency (FEMA), Region VII. The purpose of the exercise was to assess the level of State and local preparedness in responding to a radiological emergency. This exercise was held in accordance with FEMA's policies and guidance concerning the exercise of State and local radiological emergency response plans and procedures. This exercise was one of four exercises for piloting the proposed Evaluation Areas that had been developed by a special Tiger Team based on recommendations from the REP Strategic Review Committee. The previous exercise at this site was conducted on October 21, 1998. The qualifying emergency preparedness exercise was conducted on October 31 - November 1, 1990.

FEMA wishes to acknowledge the efforts of the many individuals who participated in this exercise. In the State of Iowa the risk counties of Benton and Linn and the host counties of Johnson and Buchanan participated along with the State government. The staff of Nuclear Management Company, LLC, who manages Duane Arnold Energy Center for Alliant, is commended for their assistance and cooperation throughout the planning and execution of this pilot process.

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. Cooperation and teamwork of all the participants were evident during this exercise.

This report contains the final evaluation of the biennial exercise.

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 three Areas Requiring Corrective Action (ARCAs) identified as a result of this exercise. The three ARCAs, in accordance with the extent of play agreement, were corrected and closed during the exercise.

There were no ARCAs identified during the October 21, 1998, exercise. One ARCA from the July 12, 2000, Quad Cities Nuclear Power Station exercise was corrected during this exercise. One ARCA from the October 7, 1999, Medical Drill was also corrected during this exercise.

The final protective action decision (PAD) during the emergency phase was an evacuation of subarea 1 (approximately 2 mile radius), and subareas 7 and 8, (2-5 miles downwind in a northwest direction from the plant) including the town of Shellsburg. Schools were moved to their Temporary Relocation Centers and one Special Facility was evacuated. Approximately

1,952 residents and 75 transients in Iowa were affected by the evacuation protective action decisions.

## II. 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. Department of Transportation
  - U.S. Department of Agriculture
  - U.S. Department of the Interior



Representatives of these agencies serve as members of the FEMA Region VII Regional Assistance Committee (RAC), which is chaired by FEMA.

Formal submission of the RERPs for the Duane Arnold Energy Center to FEMA Region VII, by the State of Iowa and involved local jurisdictions occurred on June 20, 1983. Formal approval of these RERPs was granted by FEMA on July 2, 1991, under 44 CFR 350. The prompt alert and notification system was approved by FEMA on January 16, 1990.

A REP exercise was evaluated on October 18, 2000, by FEMA Region VII to assess the capabilities of State and local offsite emergency preparedness organizations in implementing their RERPs and procedures to protect the public during a radiological emergency involving the Duane Arnold Energy Center. The purpose of this exercise 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 Director.

For this PILOT exercise 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, DRAFT criteria, September 19, 2000.
- FEMA-REP-14, "Radiological Emergency Preparedness Exercise Manual," September 1991.

These evaluation areas are being piloted at Duane Arnold and three other facilities. They were developed by a Tiger Team appointed for the specific responsibility of implementing this strategy based on the recommendations of the REP Strategic Review Steering Committee (SRSC); The SRSC developed their recommendations based on input from REP stakeholders.

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 EPZ, a listing of all participating jurisdictions and functional entities which were evaluated, and a tabular presentation of the time of actual occurrence of key exercise events and activities.

Section IV of this report, "Exercise Evaluation and Results," presents basic information on the demonstration of applicable exercise Evaluation 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 ORO's efforts to resolve them.

### **III. EXERCISE OVERVIEW**

Contained in this section are data and basic information relevant to the October 18, 2000, exercise to test the offsite emergency response capabilities in the area surrounding the Duane Arnold Energy Center. This section of the exercise report includes a description of the plume EPZ, a listing of all participating jurisdictions and functional entities that were evaluated, and a tabular presentation of the time of the actual occurrence of key exercise events and activities.

#### **A. Plume Emergency Planning Zone (EPZ) Information**

The Duane Arnold Energy Center is located in Linn County, Iowa, eight miles northwest of Cedar Rapids, near the town of Palo, Iowa. The Cedar River bisects the EPZ from northwest to southeast, passing within a quarter mile of the plant. The river is used for recreational boating.

The plume EPZ for the Duane Arnold Energy Center consists of an irregular shaped circle with the power station as the center point. It extends 10 to 15 miles outward, including all of Cedar Rapids and Marion.

The plume EPZ contains a total population of 153,287 within two counties, Benton and Linn, in Iowa. Linn County contains approximately two-thirds of the plume EPZ area and Benton County approximately one-third. Linn County, with the exception of the Cedar Rapids metropolitan area, is predominately rural. Benton County is mainly a typical agricultural area. Industrial and professional activities are principally located in the Cedar Rapids - Marion metropolitan area. There are 54 major employers within the EPZ. The EPZ is divided into 24 subareas that are defined for the public in terms of familiar landmark descriptions.

Major parks and recreational areas located within the EPZ include Hawkeye Downs, Seminole Valley Park, Squaw Creek Park, Morgan Creek Park, Pleasant Creek State Recreational Area, Cedar Valley Nature Trail, Wickiup Hill Natural Area, Palo Marsh Natural Area, North Cedar Natural Area, Goose Pond Natural Area, Chain Lakes Natural Area, Rock Island Preserve, Atkins Roundhouse Area, Sac & Fox Trail, Benton City Park, and Wildcat Park.

Area transportation includes the Cedar Rapids Airport, Cedar River, railroads, and several major highways.

#### **B. Exercise Participants**

The following agencies, organizations, and units of government participated in the Duane Arnold Energy Center exercise on October 18, 2000.

## **STATE OF IOWA**

Governor's Office  
State Emergency Management Division  
Adjutant General  
National Guard  
National Weather Service  
U.S. Department of Agriculture – State Emergency Board  
U. S. Department of Transportation/Federal Highway Administration  
Iowa State Patrol  
Iowa State University – Extension Service  
Iowa Department of Environmental Health and Safety  
University of Iowa  
Department of Public Health  
Department of Public Safety  
Department of Human Services  
Department of Natural Resources  
Department of Transportation  
Department of Agriculture and Land Stewardship  
Department of Corrections  
Department of Elder Affairs  
Iowa Communications Network  
Civil Air Patrol  
Anamosa Reformatory  
Iowa Medical Classification Center

## **RISK JURISDICTIONS**

### **BENTON COUNTY**

Emergency Management Coordinator  
Board of County Supervisors  
County Conservation Office  
Vinton Police  
Sheriff's Department  
Public Health  
Human Services  
Visiting Nurses- Home Health  
Benton County Amateur Radio  
Benton Community School District  
Linn-Benton Ambulance

## **LINN COUNTY**

Board of County Supervisors  
Marion City Manager/Mayor Representative  
County Emergency Management  
County Sheriff  
Sheriff's Department  
Cedar Rapids Police Department  
Marion Police Department  
Hiawatha Police Department  
Civil Air Patrol  
Linn County Jail  
School Representative  
County Engineer  
Human Services Department  
County Health Department  
County Conservation Department  
Transportation Coordinator  
Cedar Rapids Public Works  
Cedar Rapids Fire Department  
Marion Fire Department  
Cedar Rapids Safety Commissioner  
Cedar Rapids Streets Commissioner  
Mercy Medical Center  
Linn-Mar School District  
Marion School District  
Kirkwood Community College

## **HOST JURISDICTION**

## **JOHNSON COUNTY**

County Emergency Management Agency  
County Sheriff's Office  
Johnson Police Department  
Iowa City Fire Department  
North Liberty Volunteer Fire Department  
Lone Tree Volunteer Fire Department  
Hills Volunteer Fire Department  
Coralville Fire Department  
Johnson County Haz-Mat Team  
Visiting Nurses Association  
Iowa City Community School District

## **PRIVATE/VOLUNTEER ORGANIZATIONS**

American Red Cross  
Salvation Army  
HAM-RAD (amateur radio)  
Boy Scouts of America  
Alliant Utilities  
WMT EAS Radio Station

## **FEDERAL PLAYERS**

FEMA Region VII Regional Operations Center – Regional Office  
FEMA Region VII State Liaison to Iowa  
FEMA Region VII Public Information Officer

### **C. Exercise Timeline**

Table 1, on the following pages, presents the time at which key exercise events and activities occurred during the Duane Arnold Energy Center exercise held on October 18, 2000. Also included are times that notifications were made to the participating jurisdictions/ functional entities.

# TABLE 1. EXERCISE TIMELINE

DATE AND SITE: October 18, 2000 Duane Arnold Energy Center

Emergency Classification Level or Event	Time Utility Declared	Time That Notification Was Received or Action Was Taken										
		Iowa EOC	Dose Assessment	Field Team Coord.	Forward Command Post	JPIC	EOF		Linn County EOC	Benton County EOC	WMT EAS	
Unusual Event	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
Alert	0826	0839	0847	0850	0851	N/A	N/A		0839	0839	0845	
Site Area Emergency	1106	1115	1115	1113	1120	1118	1113		1115	1115	1125	
General Emergency	1218	1229	1229	1222	1228	1229	1229		1229	1229	1239	
Rad. Release Started	1218	1229	1229	1229	1230	1229	1229		1229	1229	N/A	
Rad. Release Terminated												
Facility Declared Operational		1025	0945	0959	0953	0950	0951		0927	0944	N/A	
Governor Declared State of Emergency		0845	0845		0947	0942	0934		0908	0916		
Exercise Terminated <sup>1</sup>		1320	1320	1257	1321	1320	1320		1316	1315	1320	
KI Recommended		1245	1245	1246	1246	1246	1245		1247	1247	N/A	
KI to Emergency Workers		1246	1246	1249 <sup>A</sup>	1247 <sup>A</sup>	N/A	N/A		1247 <sup>A</sup>	1247 <sup>A</sup>	N/A	
1 <sup>st</sup> Protective Action Decision: Initial <b>SAE</b> Notification and Milk animals stored feed - 10 mile EPZ radius		1116	N/A	1116	N/A	N/A	N/A		1116 <sup>D</sup>	1116 <sup>D</sup>	N/A	
1st Siren Activation		N/A	N/A	N/A	N/A	N/A	N/A		1118 <sup>A</sup>	1118 <sup>A</sup>	N/A	
1st EAS Message		N/A	N/A	N/A	N/A	N/A	N/A		1120 <sup>A</sup>	1120 <sup>A</sup>	1125	
1 <sup>ST</sup> Special Information Message Broadcast: Schools in subareas 7&22 to TRCs		N/A	N/A	N/A	N/A	N/A	N/A		1133 <sup>A</sup>	1120 <sup>D</sup>	1138	
2 <sup>st</sup> Special Information Message Broadcast: Relocation of special facility		N/A	N/A	N/A	N/A	N/A	N/A		1134 <sup>A</sup>	1124 <sup>A</sup>	1138	

LEGEND: D - Decision Making Jurisdiction A - Activating Jurisdiction N/A - Not Applicable <sup>1</sup> Various times are indicated due to the completion of exercise objectives

**TABLE 1. EXERCISE TIMELINE**

**DATE AND SITE: October 18, 2000 Duane Arnold Energy Center**

EMERGENCY ACTIONS AND EVENTS	TIME THAT NOTIFICATION WAS RECEIVED OR ACTION WAS TAKEN											
	Iowa EOC	Dose Assessment	Field Team Coordination	Forward Command Post	JPIC	EOF		Linn County EOC	Benton County EOC	WMT EAS		
3 <sup>rd</sup> Special Information Message Broadcast: Evacuate subarea 1 & recreational areas	N/A	N/A	N/A	N/A	N/A	N/A		1138	1125 <sup>D</sup>	1145		
4 <sup>th</sup> Special Information Message Broadcast: Schools in subarea 9 to TRC	N/A	N/A	N/A	N/A	N/A	N/A		1138 <sup>D</sup>	1142 <sup>A</sup>	1145		
2 <sup>nd</sup> Protective Action Decision: General Emergency	N/A	N/A	N/A	N/A	N/A	N/A		1232 <sup>D</sup>	1232 <sup>D</sup>	N/A		
2 <sup>nd</sup> Siren Activation	N/A	N/A	N/A	N/A	N/A	N/A		1234 <sup>A</sup>	1234 <sup>A</sup>			
2 <sup>nd</sup> EAS Message	N/A	N/A	N/A	N/A	N/A	N/A		1238 <sup>A</sup>	1238 <sup>A</sup>	1239		
5 <sup>th</sup> Special Information Message Broadcast: Evacuate subareas 1, 7, 8	N/A	N/A	N/A	N/A	N/A	N/A		1239 <sup>A</sup>	1239 <sup>D</sup>	1245		
6 <sup>th</sup> Special Information Message Broadcast: Schools in subareas 7 and 22 to PRCs	N/A	N/A	N/A	N/A	N/A	N/A		1248 <sup>A</sup>	1248 <sup>A</sup>	1254		

LEGEND: D - Decision Making Jurisdiction A - Activating Jurisdiction N/A - Not Applicable <sup>1</sup> Various times are indicated due to the completion of exercise objectives

## **IV. EXERCISE EVALUATION AND RESULTS**

Contained in this section are the results and findings of evaluation of all jurisdictions and functional entities that participated in the October 18, 2000, exercise to test the offsite emergency response capabilities of State and local governments in the 10-mile EPZ surrounding the Duane Arnold Energy Center.

Each jurisdiction and functional entity was evaluated on the basis of its demonstration of criteria contained in exercise Evaluation Areas September 2000. Detailed information on the exercise Evaluation Areas and the extent-of-play agreement for this exercise is found in Appendix 3 of this report.

### **A. Summary Results of Exercise Evaluation**

The matrix presented in Table 2, on the following page, presents the status of all exercise Evaluation Areas which were scheduled for demonstration during this exercise, at all participating jurisdictions and functional entities. Exercise Evaluation Areas are listed by number and the demonstration status of those Evaluation Areas 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(s) Requiring Corrective Action (ARCA) assessed or unresolved ARCA(s) from prior exercise(s)
- N - Not Demonstrated (Reason explained in subsection B)



**TABLE 2. SUMMARY RESULTS OF EXERCISE EVALUATION**

**DATE AND SITE:** October 18, 2000

**Duane Arnold Energy Center**

JURISDICTION/LOCATION	1	1. a.	1. b.	1. c.	1. d.	1. e.	2	2. a.	2. b.	2. c.	2. d.	3	3. a.	3. b.	3. c.	3. d.	3. e.	4	4. a.	4. b.	4. c.	4. d.	5	5. a.	5. b.	5. c.	6	6. a.	6. b.	6. c.	6. d.
STATE OF IOWA																															
State Emergency Operations Center		M	M	M	M	M				M						M									M						
Dose Assessment		M	M		M	M		M	A <sup>1</sup>	M																					
Field Team Coordination		M	M	M	M	M		M	M				M	M						M											
Plume Field Monitoring Teams		M			M	M							M	M					M		M										
Forward Command Post		M	M	M	M	M		M					M	M		M															
Joint Public Information Center		M	M		M	M							M	M											M						
Emergency Operations Facility		M	M		M	M							M	M																	
RISK JURISDICTIONS																															
LINN COUNTY																															
Emergency Operations Center		M	M	M	M	M		M		M	M		M	M	M	M	M							M	M	M					
WMT Radio						M							M	M										M		M					
Marion School District						M							M	M		M															
Linn-Mar School District						M							M	M		M															
Anamosa Reformatory			M	M	M	M							M	M	M													M			
Iowa Medical Classification Center			M	M	M	M							M	M	M													M			
Kirkwood Emergency Worker M and D Station		M	M	M	M	M							M	M													M	M			
BENTON COUNTY																															
Emergency Operations Center		M	M	M	M	M		M		M	M		M	M	M	M	M							M	M	M					
Benton Community School District						M							M	M		M															
HOST JURISDICTIONS																															
Johnson County Reception and Congregate Care Centers		M	M	M	M	M							M														A <sup>1</sup>		M		
Buchanan County – Congregate Care Centers																													M		
MEDICAL																															
Linn-Benton Ambulance						M							M	M																	M
Mercy Medical Center						M							A <sup>1</sup>	M																	M
University of Iowa Hospital						M <sup>1</sup>																									

LEGEND: M = Met (No Deficiency or ARCAs assessed)    A = ARCA(s) assessed (Not affecting health and safety of public) or prior ARCA not resolved  
D = Deficiency(ies) assessed    N = Not Demonstrated as scheduled    Blank = Not Scheduled For Demonstration  
A<sup>1</sup> = Exercise Issue Closed During Exercise    M<sup>1</sup> = ARCA Correction Only

## B. Status of Jurisdictions Evaluated

This subsection provides information on the evaluation of each participating jurisdiction and functional entity in a jurisdiction based, issues only format. Presented below is a definition of the terms used in this subsection relative to Evaluation Area demonstration status.

**Met** - Listing of the demonstrated exercise Evaluation Areas, under which no Deficiencies or ARCAs were assessed during this exercise and under which no ARCAs assessed during a prior exercise remain unresolved.

**Deficiency** - Listing of the demonstrated exercise Evaluation Areas under which one or more Deficiencies were assessed during this exercise. Included is a description of each Deficiency and recommended remedial actions.

**Area Requiring Corrective Actions (ARCA)** - Listing of the exercise Evaluation Areas under which one or more ARCAs were assessed during the current exercise. Included is a description of ARCA(s) assessed during this exercise and the recommended corrective action(s) to be demonstrated before or during the next biennial exercise.

**Not Demonstrated** - Listing of exercise Evaluation Areas which were not demonstrated as scheduled during this exercise and the reason they were not demonstrated.

**Prior ARCAs - Resolved** - Description of ARCAs assessed during previous exercises that were resolved in this exercise and the corrective actions demonstrated.

**Prior ARCAs - Unresolved** - Description of ARCAs assessed during prior exercises which were not resolved in this exercise. Included is the reason 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, which 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 **Area Requiring Corrective Action (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."

FEMA has developed a standardized system for numbering exercise issues (Deficiencies and ARCAs). This system is used to achieve consistency in numbering exercise issues between 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.
- **Objective Number** - A number corresponding to the exercise evaluation criteria.
- **Issue Classification Identifier** - (D = Deficiency, A = ARCA). Only Deficiencies and ARCAs are included in exercise reports.
- **Exercise Issue Identification Number** - A separate two (or three) digit indexing number assigned to each issue identified in the exercise.

## 1. STATE OF IOWA

**1.1 State Emergency Operations Center.** The State Emergency Operations Center (EOC) is located in the STARC Armory, Level B in Johnston, Iowa. This is an excellent facility to support emergency response. The participants were aware of their emergency response roles and were very dedicated to performance of their duties. The Iowa Emergency Management Division Administrator personally ensured that all actions associated with the emergency response checklist were completed. The Iowa EOC staff kept the Executive Staff informed of all actions and coordinated communications with all OROs. This allowed the Executive Staff to have current information for decision-making and implementation of protective actions. There was excellent coordination between the Iowa State Patrol, Department of Transportation, Department of Natural Resources, and Linn and Benton Counties on establishing and maintaining traffic and access control on the roadways and river.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.c.1; 1.d.1; 1.e.1; 2.b.2; 3.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**

**1.2 Dose Assessment.** This function is located in the STARC Armory, State Emergency Operations Center, Level B, in Johnston, Iowa. The staff was professional and knowledgeable of their emergency responsibilities.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.d.1; 1.e.1; 2.a.1; 2.b.2
- b. **DEFICIENCY: NONE**
- c. **AREA REQUIRING CORRECTIVE ACTION: 2.b.1**

**Issue No.:** 21-00-2.b.1-A-01

**Description:** The computer operator inappropriately reported that the modeled release would not have any adverse dose consequences to people. The dose projection for the unfiltered puff release conservatively assumed a release rate of 100 curies/second with a 15-minute integration period. The computer printout for this dose projection showed zero doses at all distances. The computer operator apparently did not understand the significance of a report consisting of all zeros. The appropriate staff member did not review the dose projection results before the group took action based on the projected doses. (NUREG-0654,, 1.8; 10., 11)

**Recommendation:** Not applicable. See Corrective Action Demonstrated below.

**Corrective Action Demonstrated:** On the scene training was performed and the dose assessment staff member correctly noted that given the source term input into the program, any conclusions based on all zeros was questionable. The dose assessment staff member requested a printout of the plume footprint. Considering the conservative source term used to model the release, the dose assessment staff member correctly determined that the puff release would not result in doses exceeding the protective action guides. Based on the training, successful re-demonstration, and the Extent of Play agreement, this Area Requiring Corrective Action is closed.

- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED:** Objective 09 (identified at the July 12, 2000, Quad Cities Nuclear Power Station exercise)

**Issue No.:** 51-00-09-A-03

**Description:** Dose Assessment staff at the State EOC did not communicate the change in the protective action decision (PAD) to the Field Team Coordinator. At 1224 the evacuation PAD was posted in the Forward Command Post but it was not communicated to the Radiological Emergency Response Team Coordinator (RERT) via the Health Physics communication link and therefore not passed on to the field teams. The result was that the RERT Coordinator and field teams were not aware of what areas were evacuated or sheltered. (NUREG-0654, I.10, N.1.a)

**Recommendation:** Provide training to personnel to assure that all information, including the most current PAD, is transmitted to the RERT Coordinator and subsequently to the field teams in a timely manner. This must be demonstrated during the next biennial exercise.

**Corrective Action Demonstrated:** The dose assessment staff did communicate each protective action decision to the Field Team Coordinator who in turn relayed it to the field monitoring teams. Based on this successful demonstration, this Area Requiring Correction Action is now closed.

f. **PRIOR ARCAS - UNRESOLVED:** NONE

**1.3 Field Team Coordination.** This function is performed at the Emergency Operations Facility (EOF) in Cedar Rapids, Iowa. Staff from the University Hygienic Laboratory located in Oakdale, Iowa, deployed in real time after receiving the ALERT notification. The Response Team Coordinator, Field Team Coordinator, and Dose Assessment did an excellent job in discussing issues and events in order to make informed decisions. They all worked well with the utility staff and coordinated their work. Discussions included how to make the best use of the field teams. There was good discussion and consideration by both organizations of dose rates in the field and field team exposures.

a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.c.1; 1.d.1; 1.e.1; 2.a.1; 2.b.1; 3.a.1; 3.b.1; 4.a.2

b. **DEFICIENCY:** NONE

c. **AREA REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAS - RESOLVED:** NONE

f. **PRIOR ARCAS - UNRESOLVED:** NONE

#### **1.4 Radiological Field Monitoring Teams (Plume Emergency Planning Zone).**

One field monitoring team was from the University of Iowa Hygienic Laboratory (UHL) located in Oakdale, Iowa, and the second field team was from Iowa State University (ISU) located in Ames, Iowa. The teams deployed real time when notified of the Alert status. The Blue Team (UHL) showed initiative in locating the edge of the plume. They did not delay in reporting their readings and they had several good internal discussions. The Green Team (ISU) immediately addressed an equipment problem. Their quick response prevented any delay in reporting of results. Both teams are to be commended for their enthusiasm and professionalism. Each team member demonstrated exceptional teamwork throughout the exercise.

- a. **MET:** Evaluation Criterion 1.a.1; 1.d.1; 1.e.1; 3.a.1; 3.b.1; 4.a.1; 4.a.3.
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

#### **1.5 Forward Command Post.**

The Forward Command Post (FCP) is located at the District 11 Post of the Iowa State Patrol in Cedar Rapids. Representatives from the Iowa State Patrol, Department of Transportation, Department of Natural Resources, Iowa National Guard, and Iowa Emergency Management Division staff this facility. The FCP staff demonstrated effective coordination and communication with all OROs. There were excellent briefings on emergency worker exposure control, use of dosimetry, and the purpose and use of potassium iodide by the FCP Radiological Officer.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.c.1; 1.d.1; 1.e.1; 2.a.1; 3.a.1; 3.b.1; 3.d.1
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

**1.6 Joint Public Information Center.** This function is located at the Alliant Tower in Cedar Rapids, Iowa. This facility was utilized by the utility, State, local, and Federal agencies. Rumor control was conducted at this location as well as at the State EOC. There was an excellent demonstration of teamwork between the state, counties, utility, and FEMA in preparing for and presenting three media briefings. During the first briefing, the State PIO gave a good explanation of what the Governor's Proclamation meant. The utility's use of both a medical advisor and claims advisor on the media panel was an excellent idea. In addition, we commend the utility for providing a media consultant to the entire JPIC staff during the exercise. She and her staff provided an excellent "hot wash"/critique addressing suggestions for improvement and reinforcing positives demonstrated by JPIC staff. The Rumor Control staff demonstrated excellent teamwork in coordinating the tracking of rumors and reporting trends to the rumor control supervisor for appropriate dissemination. There was a very effective internet-based system used for tracking rumors.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.d.1; 1.e.1; 3.a.1; 3.b.1; 5.b.1.
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

**1.7 Emergency Operations Facility.** This function is located at the Alliant Tower in Cedar Rapids, Iowa. Both the Iowa Emergency Management Division and Iowa Public Health liaisons provided current and often "heads up" information to their State EOC counterparts. This provided the State advance notice in order to become better prepared to make decisions.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.d.1; 1.e.1; 3.a.1; 3.b.1.
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

## **2. RISK JURISDICTIONS**

### **2.1 BENTON COUNTY**

**2.1.1 Benton County Emergency Operations Center.** The county Emergency Operations Center is located in the Benton County Courthouse basement in Vinton, Iowa, which is located outside the 10-mile emergency planning zone. The Emergency Management Coordinator is to be commended for the level of direction and control demonstrated throughout the exercise. Internal communication was very good and kept internal task groups well informed. The Public Health Officer/Radiological Officer provided an excellent briefing regarding emergency worker exposure control.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.c.1; 1.d.1; 1.e.1; 2.a.1; 2.b.2, 2.c.1, 3.a.1; 3.b.1; 3.c.1; 3.c.2; 3.d.1; 3.d.2; 5.a.1; 5.a.3; 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

**2.1.2 Benton Community School District.** The school district includes an elementary school located in Atkins, Iowa, which is in subarea 7 of the Emergency Planning Zone. The school has approximately 226 students with a staff of 11. Recommendations to the Atkins Attendance Center, the only school this district has within the Emergency Planning Zone, will also include the Central Lutheran Schools in Atkins, Iowa. Interviews were conducted with the Superintendent, Transportation Supervisor, and a bus driver. Participants were very knowledgeable about their roles and responsibilities during an emergency.

- a. **MET:** Evaluation Criterion 1.e.1; 3.a.1; 3.b.1; 3.c.2
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE



- e. **PRIOR ARCAS - RESOLVED: NONE**
- f. **PRIOR ARCAS - UNRESOLVED: NONE**

## 2.2. LINN COUNTY

**2.2.1 Linn County Emergency Operations Center (EOC).** This facility is located in the basement of the Cedar Rapids City Hall in Cedar Rapids, Iowa. Since the 1996 exercise there have been several refinements to increase efficiency of the organization. The county and WMT radio station are to be commended for their efforts in revising EAS and special information messages to improve the process for providing information to the public in an expediant manner. During the exercise, the County Board of Supervisors and the Emergency Management Coordinator demonstrated excellent direction and control. All EOC representatives were very knowledgable regarding their emergency response roles and responsibilities.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.c.1; 1.d.1; 1.e.1; 2.a.1; 2.b.2; 2.c.1; 3.a.1; 3.b.1; 3.c.1; 3.c.2; 3.d.1; 3.d.2; 5.a.1; 5.a.3; 5.b.1
- b. **DEFICIENCY: NONE**
- c. **AREA REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAS - RESOLVED: NONE**
- f. **PRIOR ARCAS - UNRESOLVED: NONE**

**2.2.2 Marion School District.** This school district is located in Cedar Rapids, Iowa. The district is composed of 5 schools, grades K –12. There are approximately 2,100 students, 140 teaching staff, and 80 support staff in the district. Interviews were conducted with the Superintendent, Transportation Director, and one bus driver. Participants were very knowledgeable about their roles and responsibilities during an emergency.

- a. **MET:** Evaluation Criterion 1.e.1; 3.a.1; 3.b.1; 3.c.2
- b. **DEFICIENCY: NONE**
- c. **AREA REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**

- e. **PRIOR ARCAS - RESOLVED: NONE**
- f. **PRIOR ARCAS - UNRESOLVED: NONE**

**2.2.3 Linn-Mar School District.** The Superintendent, Transportation Supervisor for Linn-Mar School District, and a bus driver for the school were interviewed. The school district is entirely located within the Emergency Planning Zone. The district is composed of 7 schools, grades K –12. There are approximately 4,600 students, 330 teaching staff, and 200 support staff in the district. Participants were very knowledgeable about their roles and responsibilities during an emergency.

- a. **MET: Evaluation Criterion 1.e.1; 3.a.1; 3.b.1; 3.c.2**
- b. **DEFICIENCY: NONE**
- c. **AREA REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAS - RESOLVED: NONE**
- f. **PRIOR ARCAS - UNRESOLVED: NONE**

**2.2.4 WMT Radio Station.** WMT is the Emergency Alerting System station for both Linn and Benton Counties. This facility is located in Cedar Rapids, Iowa, within the 10-mile Emergency Planning Zone. The station staff had appropriate dosimetry and were aware of their maximum exposures, when to read their dosimeters, and whom to contact regarding exposure. This information is also contained in the WMT procedures manual. The station received 2 EAS messages and had them on the air (simulated) within 4 and 2 minutes respectively. The station also broadcast (simulated) 6 special news broadcasts as part of the exercise. The station personnel are to be commended for their professionalism and commitment to the community.

- a. **MET: Evaluation Criterion 1.e.1; 3.a.1; 3.b.1; 5.a.1; 5.b.1**
- b. **DEFICIENCY: NONE**
- c. **AREA REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAS - RESOLVED: NONE**
- f. **PRIOR ARCAS - UNRESOLVED: NONE**

### **2.2.5 Kirkwood Emergency Worker Monitoring & Decontamination Station.**

This facility is located at the Kirkwood Community College in Cedar Rapids, Iowa. The Cedar Rapids Fire Department staff this facility. The Monitoring Supervisor did an excellent job of providing thorough briefings and distributing dosimetry to the staff. In addition, all monitoring teams displayed strong teamwork skills and good procedural knowledge.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.c.1; 1.d.1; 1.e.1; 3.a.1; 3.b.1; 6.a.1; 6.b.1
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

### **2.2.6 Anamosa Reformatory.** The Anamosa Reformatory is located in Anamosa, Iowa, outside the Emergency Planning Zone. This facility will only receive male inmates from the Linn County Correctional center. The Warden and Associate Wardens were interviewed and a tour was provided to the evaluators of the receiving area where the inmates would be monitored and housed. The monitoring demonstration by the Linn County Correctional staff was demonstrated at the Linn County Armory. The Anamosa Reformatory staff was very knowledgeable regarding their emergency response duties. The Linn County Correctional monitors functioned well as a team, assisting the monitor to ensure an appropriate monitoring speed was used in monitoring an inmate.

- a. **MET:** Evaluation Criterion 1.b.1; 1.c.1; 1.d.1; 1.e.1; 3.a.1; 3.b.1; 3.c.1; 6.a.1.
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

### **2.2.7 Iowa Medical Classification Center.** This facility is located in Oakdale, Iowa, and is outside the Emergency Planning Zone. This facility will accept both male and female inmates. The Warden was interviewed for the procedures that would occur once

notification was received from the Department of Corrections to expect evacuees from the Linn County Correctional Facility. A tour was provided to the evaluators of the inmate processing and decontamination facilities. The Warden was very knowledgeable regarding his emergency responsibilities and duties. The capability to monitor inmates by the Linn County Correctional staff was adequately demonstrated at the Linn County Armory. The Linn County Correctional monitors functioned well as a team, assisting the monitor to ensure an appropriate monitoring speed was used in monitoring an inmate.

- a. **MET:** Evaluation Criterion 1.b.1; 1.c.1; 1.d.1; 1.e.1; 3.a.1; 3.b.1; 3.c.1; 6.a.1.
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

### **3. HOST JURISDICTIONS**

#### **3.1 JOHNSON COUNTY.**

**3.1.1 Johnson County Reception and Congregate Care Centers.** The reception centers for this host community are located at the Northwest Junior High School, West High School, and the University of Iowa Hospital. The University of Iowa Hospital provides monitoring for non-ambulatory evacuees using the same procedures they use for monitoring a contaminated injured person. The monitors for both Northwest Junior High School and West High School are from the same pool of monitors maintained and trained by Johnson County. Therefore, the monitoring demonstration occurred at West High School, with a walk through conducted of the areas used for monitoring at Northwest Junior High School. In addition to the reception center, nine congregate care sites in Johnson County were evaluated as part of this demonstration. The congregate care sites evaluated were the City High School, Southeast Junior High School, West High School, Northwest Junior High School, University of Iowa Hospital, University of Iowa Carver-Hawkeye Arena, Field House, Memorial Union, and the Recreation Building and Indoor Practice Field. The Iowa City Schools Director of Facilities, University of Iowa Associate Director and Assistant Facility Director, Johnson County Emergency Management Agency, the American Red Cross, Salvation Army, Visiting Nurses Association, and HAM-RAD (amateur radio) are commended for their participation during the evaluations of the congregate care sites. The facilities are more than adequate to meet the needs of evacuees. All participants are to be commended for their high level

of interest and continued planning and coordination efforts. Participants in the reception center demonstration were identified in section III of the report. The monitoring personnel, amateur radio representatives, and health and human services representatives were very knowledgeable of their emergency response duties. Their enthusiasm and commitment to duty was evident throughout the reception center exercise.

- a. **MET:** Evaluation Criterion 1.a.1; 1.b.1; 1.c.1; 1.d.1; 1.e.1; 3.a.1; 6.c.1
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** 6.a.1

**Issue No:** 21-00-6.a.1-A-02

**Description:** Contamination survey techniques demonstrated were inadequate in the male and female decontamination areas. Specifically, the male decontamination area technique was demonstrated at an excessive rate with the distance between the probe and the area being surveyed repeatedly exceeding  $\frac{1}{2}$  inch. There was in some instances a perceived sense of urgency to complete the contamination surveys in a hurried manner. In the female decontamination area the plastic bag covering the probe frequently touched the potentially contaminated surfaces. These types of survey techniques could have resulted in failure to detect radioactive contamination of personnel that would have resulted in a potential spread of contamination. (NUREG-0654 K.5.a, K.5.b)

**Recommendation:** Not applicable. See Corrective Action Demonstrated below.

**Corrective Action Demonstrated:** Training on effective contamination survey instrument operation techniques was conducted and a re-demonstration occurred. As part of the evaluation, the retraining was completed on site and a re-demonstration of survey techniques was completed by one of the individuals that was observed demonstrating improper survey techniques during the earlier evaluations. The retraining included information on the following; how to bag the survey probe, proper scan rate, checking for increasing background conditions during decontamination activities, proper survey instrument operation, monitoring the thyroid area, surveying personal articles, use of the audible response feature on the survey instruments, and surveying wheelchair bound individuals. The re-demonstration of survey techniques was successfully completed and no further actions are required. Based on the extent of play, retraining, and re-demonstration, this issue is closed.

- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS - RESOLVED:** NONE
- f. **PRIOR ARCAS - UNRESOLVED:** NONE

## **3.2. BUCHANAN COUNTY**

**3.2.1. Buchanan County Congregate Care Centers.** Three new congregate care centers have been identified for this host county. Therefore, a walk through with appropriate managers was conducted by FEMA on January 19, 2001. The three new locations are St. John's Elementary School, Independence Middle School, and Independence High School. In addition, West Elementary School was also reviewed. This facility is temporarily approved pending submission of the American Red Cross survey and plan change approval. These facilities replace congregate care sites located at the Mental Health Institute. The facilities would be capable of providing adequate space for evacuees. The representative from the Mental Health Institute (MHI) was very knowledgeable regarding emergency response duties. The American Red Cross would be managers of all congregate care (mass care) facilities for MHI. All congregate care facilities will have food prepared and provided through MHI. During the 1998 floods MHI prepared and delivered over 20,000 meals in a week.

- a. **MET:** Evaluation Criterion 6.c.1
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAS – RESOLVED:** NONE
- f. **PRIOR ARCAS – UNRESOLVED:** NONE

## **4. MEDICAL DRILL**

**4.1 Linn-Benton Ambulance.** This ambulance service is located at the Palo, Iowa, fire station within subarea 1 of the Emergency Planning Zone. The ambulance crew demonstrated effective contamination control procedures in the preparation of the ambulance and in wrapping the simulated victim prior to transport to the hospital. The crew was very professional and enthusiastic throughout the demonstration.

- a. **MET:** Evaluation Criterion 1.e.1; 3.a.1; 3.b.1; 6.d.1
- b. **DEFICIENCY:** NONE
- c. **AREA REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE

- e. **PRIOR ARCAS - RESOLVED: NONE**
- f. **PRIOR ARCAS - UNRESOLVED: NONE**

**4.2 Mercy Medical Center.** This facility is the primary medical center for Duane Arnold Energy Center and is located in Cedar Rapids, Iowa, within the Emergency Planning Zone. The staff are to be commended for their excellent monitoring skills, awareness of contamination control, and high level of professionalism and enthusiasm demonstrated during the drill.

- a. **MET:** Evaluation Criterion 1.e.1; 3.b.1; 6.d.1
- b. **DEFICIENCY: NONE**
- c. **AREA REQUIRING CORRECTIVE ACTION: 3.a.1**

**Issue No.:** 21-00-3.a.1-A-03

**Description:** The medical staff was not knowledgeable regarding their exposure limits. Through interviews only one staff member could state what the established exposure limits were. The information had not been retained from earlier training and exposure control instructions were located outside of the treatment area and were not readily accessible. This would result in possible exposure in excess of established limits to the medical staff.

**Recommendation:** Not applicable. See Corrective Action Demonstrated below.

**Corrective Action Demonstrated:** There was informal training and discussion on exposure limits. Each member of the hospital staff that demonstrated was made aware that they had a radiation exposure card that has the applicable exposure limits in their dosimetry kits. A poster of the radiation exposure card will be made and placed inside the radiation treatment area. Based on the extent of play, training, exposure cards, and development of the poster for the emergency room, this issue is closed.

- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAS - RESOLVED: NONE**
- f. **PRIOR ARCAS - UNRESOLVED: NONE**

**4.3 University of Iowa Hospital.** This hospital is located in Iowa City, Iowa, and serves as both a receiving hospital for contaminated, injured individuals and a reception center for non-ambulatory evacuees. Iowa City is located approximately 30 miles outside the

Emergency Planning Zone. The hospital's participation in this exercise was only for the purpose of correcting an Area Requiring Corrective Action identified during the 1999 medical drill.

- a. **MET: NONE**
- b. **DEFICIENCY: NONE**
- c. **AREA REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAS - RESOLVED:** Objective 5 (new evaluation area 1.e.1)

**Issue No:** 21-99-05-A-01

**Description:** The 200mR dosimeters had not been quarterly checked for electrical leakage as required. The dosimetry had been provided by the utility that performs the checks on a semi-annual basis according to their procedures. However, pursuant to FEMA-REP-14, electrical leakage checks must be performed on all instruments measuring in mR on a quarterly basis. This could result in an emergency worker having a non-functioning dosimeter and could increase the risk of exposure. The Johnson County Plan, page 19, paragraph 4.a. states that dosimetry is inspected quarterly for electrical leakage by the Iowa Emergency Management Division. The State Plan, page II-H-4, paragraph VI.A indicates that the county is responsible for dosimetry in the mR range. (NUREG-0654, K.3.a.)

**Corrective Action Demonstrated:** The University of Iowa Hospital provided written evidence that the 10 dosimeters are checked for leaks on a quarterly basis. The last two leak tests were conducted on 7/28/00 and 9/26/00. Based on the above this ARCA is now closed.

- f. **PRIOR ARCAS - UNRESOLVED: NONE**



## **Appendix 1 - Acronyms and Abbreviations**

ARCA	Area Requiring Corrective Action
CFR	Code of Federal Regulations
CPM	Counts Per Minute
DOT	Department of Transportation
EAS	Emergency Alert System
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EPA	U.S. Environmental Protection Agency
EPZ	Emergency Planning Zone
EWMDS	Emergency Worker Monitoring and Decontamination Station
FCP	Forward Command Post
FEMA	Federal Emergency Management Agency
FEMA-REP-14	FEMA Radiological Emergency Preparedness Exercise Manual
HHS/PHS	Health and Human Services/Public Health Service
INEEL	Idaho National Engineering and Environmental Laboratory
ISU	Iowa State University
JPIC	Joint Public Information Center
KI	Potassium Iodide
mR	Milliroentgen
NRC	U.S. Nuclear Regulatory Commission

NUREG-0654	Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (NUREG-0654/FEMA-REP-1, Rev. 1).
ORO	Offsite Response Organization(s)
PAD	Protective Action Decision
PAR	Protective Action Recommendation
PIO	Public Information Officer
PRC	Permanent Reception Center
R	Roentgen
RAC	Regional Assistance Committee
REP	Radiological Emergency Preparedness
RERP	Radiological Emergency Response Plan
RERT	Radiological Emergency Response Team
SAE	Site Area Emergency
SRSC	Strategic Review Steering Committee
TL	Team Leader
TRC	Temporary Reception Center
UHL	University Hygienic Laboratory
USDA	U.S. Department of Agriculture

## Appendix 2 - Exercise Evaluators and Team Leaders

The following is a list of the personnel who evaluated the Duane Arnold Energy Center exercise on October 18, 2000. The letters "TL" after their names indicates evaluator Team Leaders. The organization that each evaluator represents is indicated by the following abbreviations:

DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HHS/PHS	Health and Human Services/Public Health Service
INEEL	Idaho National Engineering & Environmental Laboratory
USDA	U.S. Department of Agriculture

<u>EVALUATION SITE</u>	<u>EVALUATOR</u>	<u>ORGANIZATION</u>
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### STATE OF IOWA

Emergency Operations Center	Joe Schulte – TL	FEMA
	Kathleen Barrett	USDA
	Angela Watson-Spinner	FEMA
Dose Assessment	Gerald Gibeault	INEEL
Field Team Coordination	Bob Dye	INEEL
Plume Field Monitoring Teams	Jim Coulson	INEEL
	Doris Thompson	INEEL
Emergency Operations Facility	Deborah Mauldin	FEMA
Joint Public Information Center/ Rumor Control	Norman Valentine – TL	FEMA
	Sharron McDuffie	FEMA
Forward Command Post	Forrest Holmes	INEEL

### Benton County

Emergency Operations Center	Rex Jennings – TL	FEMA
	Eleanor Castle	FEMA
	Joan Harding	HHS/PHS

### Linn County

Emergency Operations Center	Deborah Bell – TL	FEMA
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	Bob Waters Debbie Waggoner	FEMA DOT
<u>EAS Station (WMT)</u>	Joe Chandler	FEMA
<u>FEMA</u>		
Regional Office Coordination	Dianne Harrell	FEMA
<b><u>OUT OF SEQUENCE EVENTS</u></b>		
Johnson County Congregate Care	Joe Chandler	FEMA
City High School	Bob Waters	FEMA
West High School	Deborah Mauldin	FEMA
Northwest Junior High School	Angela Watson-Spinner	FEMA
Southeast Junior High School		
University of Iowa Hospital		
Carver-Hawkeye Arena (U. of Iowa)		
Field House (U. of Iowa)		
Memorial Union (U. of Iowa)		
Recreation Building & Indoor		
Practice Field (U. of Iowa)		
Johnson County Reception Center	Jim Coulson – TL Forrest Holmes Deborah Bell Bob Dye Jane Young	INEEL INEEL FEMA EPA FEMA
Marion School District	Joe Schulte	FEMA
Linn-Mar School District	Joe Schulte	FEMA
Benton Community School District	Rex Jennings Sharron McDuffie	FEMA FEMA
Linn-Benton Ambulance	Forrest Holmes Norman Valentine	FEMA FEMA
Mercy Medical Center	Jim Coulson Joan Harding	INEEL HHS/PHS
University of Iowa Hospital	Joe Chandler	FEMA

Kirkwood Emergency Worker Monitoring and Decontamination Station	Doris Thompson Eleanor Castle Jane Young	INEEL FEMA FEMA
Anamosa Reformatory	Gerald Gibeault Rex Jennings	INEEL FEMA
Iowa Medical Classification Center	Gerald Gibeault Rex Jennings	INEEL FEMA
Buchanan County Congregate Care Independence High School Independence Middle School St. John's Elementary School West Elementary School	Jane Young	FEMA

## **Appendix 3 - Exercise Evaluation Areas and Extent of Play Agreement**

This appendix lists the exercise evaluation areas criteria that were scheduled for demonstration during the Duane Arnold Energy Center exercise on October 18, 2000. The Iowa Emergency Management Division submitted their proposed offsite exercise evaluation areas on August 15, 2000, which were approved by FEMA Region VII on September 20, 2000.

The exercise evaluation areas were developed from recommendations received from stakeholders in the REP program. They were created by a Tiger Team to replace the evaluation methodology contained in FEMA-REP-14 and 15. These evaluation areas are being piloted during this exercise. There will be a total of four pilots of these exercise evaluation areas. The Regional Assistance Committee Chairpersons from each FEMA Region will then meet to review and make final recommendations concerning the evaluation areas. These evaluation areas and associated criteria 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 areas are intended for use at all nuclear power plant sites and because of variations among offsite plans and procedures, an extent-of-play agreement dated September 20, 2000, was prepared by FEMA Region VII and provided to the state of Iowa for further clarification of expected demonstration of the evaluation areas.

Listed below are the specific REP exercise evaluation areas criteria scheduled for demonstration during this exercise and the extent of play agreement (Expected Demonstration), if applicable. For all evaluation areas the generic extent of play for each criterion is valid.

### **Evaluation Area 1: Emergency Operations Management**

Sub-element 1.a.; Criterion 1.a.1: All telephone calls to mobilize personnel or place them on standby must actually be made. Linn and Benton Counties use an automatic paging system. Therefore, after it is activated a copy of who was notified will be provided to the evaluator. Pre-positioning of staff is not authorized except by written approval from this office prior to the exercise. Your request must include which staff positions will be pre-positioned and the facility (ies) that will be affected.

For the day of the exercise, the following staffs are approved for pre-positioning:

STARC Armory – State Emergency Operations Center (EOC) – Emergency Management Staff  
Forward Command Post – Emergency Management Staff  
Benton County EOC – Emergency Management Staff  
Linn County EOC – Emergency Management Staff

Joint Public Information Center – Emergency Management Staff  
Emergency Operations Facility (EOF) – Emergency Management Staff and the  
Department of Public Health Representative  
Field Monitoring Teams at the EOF – Iowa State University Department of  
Environmental Health and Safety Staff

We recognize that the staff at the State EOC could be there during the working day. However, at all other locations State staff may not arrive until one hour after the Offsite Response Organizations have received notification of the ALERT.

As discussed at the extent of play meeting, the Civil Air Patrol will be notified by the State EOC in accordance with the plans, but will not report to the State EOC for this exercise. The Civil Air Patrol will be active at the Linn County EOC and an interview will be conducted with their representative regarding delivery and briefing of dosimetry and potassium iodide to Radio Station WMT.

The staff at the out-of-sequence demonstrations at the Kirkwood Emergency Worker Monitoring and Decontamination Station (EWMDS) and the Johnson County Reception Center may be pre-positioned. The issuance of radiological instrumentation and operability checks at the Johnson County Reception Center, Kirkwood EWMDS, and the monitoring of jail evacuees must not be accomplished prior to the evaluators' arrival.

Sub-element 1.b.; Criterion 1.b.1: No modifications.

Sub-element 1.c.; Criterion 1.c.1: No modifications.

Sub-element 1.d.; Criterion 1.d.1: The evaluators will request copies of all messages and logs of message traffic at each site.

Sub-element 1.e.; Criterion 1.e.1: Verification of dosimetry and KI supplies will occur at the Linn County EOC, Benton County EOC, Kirkwood EWMDS, Benton Community, Linn-Mar, and Marion School Districts, Johnson County Reception Center, Mercy Medical Center and Linn-Benton Ambulance, and all other facilities that maintain dosimetry and KI in accordance with the plan.

At the University of Iowa Hospital (congregate care), the Area Requiring Corrective Action, Issue No. 21-99-A-05-01 can be corrected and closed.

## **Evaluation Area 2: Emergency Worker Exposure Control**

Sub-element 2.a.; Criterion 2.a.1: No modifications.

Sub-element 2.b.; Criterion 2.b.1: According to the plan, dose assessment will be demonstrated at the State EOC and by the Field Team Coordinator at the Forward Command Post. Successful demonstration of this criterion will close the Area Requiring Corrective

Action, Issue No: 51-00-09-A-03, identified during the July 2000 Quad Cities Nuclear Power Station exercise.

Sub-element 2.b.; Criterion 2.b.2: No modifications.

Sub-element 2.c.; Criterion 2.c.1: No modifications.

### **Evaluation Area 3: Protective Action Implementation**

Sub-element 3.a.; Criterion 3.a.1: Emergency workers must wear appropriate direct-reading and permanent record dosimetry and have access to a dosimetry charger in accordance with state and local plans and procedures. In addition, they must be able to demonstrate basic knowledge of dosimetry, radiation exposure limits, and turn-back exposure limits through an interview process. Procedures to monitor and record dosimeter readings and to manage radiological exposure control must be demonstrated.

During the medical drill, the responding ambulance crew and the appropriate hospital staff must have dosimetry available and be knowledgeable of procedures for its use and of their exposure limits.

During the school interviews bus drivers must demonstrate their knowledge of emergency worker exposure control. The bus drivers must have dosimetry and a dosimetry charger available for this demonstration. The interviews described above will be conducted out of sequence from the exercise.

Sub-element 3.b.; Criterion 3.b.1: Although the decision to recommend the use of KI is not due for demonstration during this exercise, it is possible that the scenario could require it. If the decision to use KI is made, the instructions must be appropriately disseminated to all personnel including those deployed (simulated) for traffic and access control and other missions. However, if the decision to use KI is not required by the scenario, all emergency workers, at all facilities, will be expected to demonstrate this objective through an interview of their knowledge of the procedures for the authorization and the use of KI. Actual administration of KI will be simulated.

During the medical drill, the responding ambulance crew must have KI available and be knowledgeable of procedures for the authorization and use of KI. During the school evaluations, the bus drivers must have KI available and be knowledgeable of procedures for the authorization and use of KI.



Sub-element 3.c.; Criterion 3.c.1: Telephone calls to special facilities, individuals with special needs, and transportation providers may be simulated. However, all facilities, individuals with special needs, and transportation providers that are required to be notified must be clearly identified and the simulated contacts appropriately documented. Telecommunications Device for the Deaf (TDD) calls to the hearing impaired population will be simulated and appropriately documented.

Sub-element 3.c.; Criterion 3.c.2: We will expect the capability to take appropriate protective actions for schools to be demonstrated by Benton Community, Linn-Mar, and Marion School Districts. An exercise evaluator will be assigned for each school to interview the district superintendent (or other designated school official) and principal.

In addition, at least one school bus driver must be available at each school for an interview to determine their awareness of and preparedness for the evacuation of school children.

During the emergency phase of the actual exercise on October 18, 2000, all appropriate actions (e.g. notifications, EAS messages, etc.) must be demonstrated or simulated by the EOC staff for any public or private schools affected by protective action recommendations. Actual telephone calls do not need to be made; however, all contacts that would be required should be appropriately documented.

Sub-element 3.d.; Criterion 3.d.1: Deployment of traffic and access control personnel to assigned locations will be simulated. However, the locations where traffic and access control would be established must be appropriately documented. Staffing of traffic and access control points must be appropriately coordinated with all involved jurisdictions.

At least two individuals who would perform traffic and access control must be available at each county EOC for an interview. The Iowa State patrol liaisons that will deploy to the counties from the Forward Command Post will be interviewed prior to their departure from the Forward Command Post. During the interviews, all personnel will be expected to demonstrate knowledge of their roles and responsibilities concerning traffic and access control, as well as appropriate knowledge concerning dosimetry and potassium iodide procedures.

Sub-element 3.d.; Criterion 3.d.2: No modifications.

## **Evaluation Area 4: Field Measurement and Analysis**

Sub-element 4.a.; Criterion 4.a.1.: Each of the deployed field monitoring teams must take radiation measurements at a sufficient number of locations to identify the plume. A demonstration of an operational check of the instruments utilizing a check source is required. Information on the proper reading or range of readings should be attached to or accompany the instrument. Radiological detection instruments, equipment, and

protective clothing as annotated in Section II, Part I of the Iowa State Plan should be available for the demonstrations. The Field Teams will be deployed from the EOF in Cedar Rapids, Iowa.

Sub-element 4.a.; Criterion 4.a.2.: The field teams from the State of Iowa must demonstrate the criteria listed under this objective as they would in an actual emergency. Activities related to the use of equipment and procedures for the collection and transport of samples from areas that received deposition from the airborne plume must be demonstrated. The evaluator will interview the field teams as to the procedures for the physical turn over of the samples (to include transfer of custody forms) to the Civil Air Patrol.

Sub-element 4.a.; Criterion 4.a.3.: No modifications.

## **Evaluation Area 5: Emergency Notification and Public Information**

Sub-element 5.a.; Criterion 5.a.1: An evaluator will be assigned at WMT EAS radio station to observe the station's procedures for broadcasting all exercise related messages. We expect to see the actual receipt of the messages from the county EOC(s). Following receipt at the station, procedures to broadcast the message must be fully demonstrated up to the point of transmission. Actual broadcasts of the messages or EAS test messages are not required. The FEMA evaluator will remain at the EAS station until the termination of the exercise to observe receipt and broadcast procedures for all EAS messages and Public Information messages. Copies of all EAS messages and Public Information messages will be requested from the facility.

The initial EAS message needs simply to identify the emergency classification level and include instruction to stay tuned to the radio station. The procedures for siren activation must be demonstrated up to the point of actual activation. Actual siren activation may be simulated. In addition, the indoor warning system (tone alert radios) and weather radio activation may be simulated.

Sub-element 5.a.; Criterion 5.a.3.: To be demonstrated only if there is a failure in the primary alert and notification sequence.

Sub-element 5.b.; Criterion 5.b.1: All subsequent protective action instructions provided to the public after the initial notification should be disseminated in a timely manner. Messages should be all inclusive by including previously identified protective action areas as well as new areas. Procedures must be demonstrated, if appropriate, to ensure that EAS messages and Public Information messages containing Protective Action Recommendation(s) (PARs) that have been changed are rescinded and not repeated by the EAS station. In addition, procedures must be demonstrated to ensure that EAS messages and Public Information messages containing current PARs are repeated at pre-established intervals.

Media briefings will be conducted at the Joint Public Information Center (JPIC) located at the Alliant Tower on the 6<sup>th</sup> floor in Cedar Rapids, Iowa. The JPIC will simulate a move to its alternate facility should exercise play require it. Press Releases will be prepared at the State EOC and be printed at the JPIC via the Internet.

The Emergency Information hotline (rumor control) staff at the State EOC and the Information Hotline (rumor control located at the Alliant Tower) staff must demonstrate this criterion. Each rumor control staff member must demonstrate the capability to respond to an average of at least six calls per hour throughout the emergency phase. Calls will be made on the phone; however, use of the Internet is allowed and a printout of the call and response must be provided to the evaluator.

The staff should demonstrate the capability to monitor the contents of broadcast media coverage of the emergency situation. Any trends in rumors identified by either rumor control staff must be addressed by the State EOC in news releases or by the Joint Public Information Center (JPIC) in media briefings. Therefore, appropriate demonstration will require close coordination between utility staff and state public information staff at the Joint Public Information Center. At least one message should address a false or misleading rumor for which measures should be taken. Evaluators will be assigned to the State EOC rumor control, Alliant Tower rumor control, and the JPIC. A temporary pass will be provided to the evaluator to allow entry and exit to the Rumor Control area.

## **Evaluation Area 6: Support Operation/Facilities**

Sub-element 6.a.; Criterion 6.a.1: At the Johnson County reception center the number of evacuees required to be monitored within twelve hours is 13,272 evacuees assigned to the center. According to the plan, this reception center has three separate monitoring locations: West High School, Northwest Junior High, and University of Iowa Hospital. The University of Iowa Hospital would use its procedures that it would normally use as an MS-1 hospital. The same pool of monitors would be available for both West High School and Northwest Junior High. Therefore, for purposes of this exercise, West High School will fully demonstrate monitoring and decontamination procedures with at least one team using handheld survey instruments for monitoring non-ambulatory individuals (wheelchairs, stretcher, etc).

According to the plan, five portal monitors will be available at the facility that will require 5 monitoring teams. The monitoring sequence for at least 6 simulated evacuees per monitoring station will be timed by the evaluators to determine whether the reception center can adequately meet the twelve-hour requirement referenced above. The monitoring of non-ambulatory evacuees will not be timed as they would be fewer in number at the Northwest Junior High location.

According to the Johnson County plan, personnel from the Iowa City Fire Department, North Liberty Volunteer Fire Department, Lone Tree Fire Department, Coralville Fire

Department, and Hills Volunteer Fire Department will serve as radiological monitors. Therefore monitors for this demonstration must represent these resources.

The facilities at West High School used for monitoring/decontamination of evacuees must be fully activated and set up to receive evacuees for evaluation. This would include full staffing of personnel required to accomplish monitoring and decontamination of evacuees. Decontamination may be accomplished by interview including demonstration of appropriate knowledge of decontamination action levels.

Decontamination and re-monitoring procedures should be initiated for at least one female and one male evacuee. Decontamination procedures may be simulated.

The individuals who perform monitoring must demonstrate an operational check of the instruments, utilizing a check source, prior to monitoring. Information on the proper reading or range of readings should be attached to or accompany the instrument. The evaluators must observe instrument operability checks and issuance of dosimetry at this facility. All organizations that, per the plans, provide resources in support of reception center activities must be present for evaluation at the Johnson County Reception Center.

In addition, the Linn County Sheriff's Office will demonstrate monitoring and decontamination. The time, date, and location is to be determined.

Emergency worker monitoring and decontamination will occur at the Kirkwood Emergency Worker Monitoring and Decontamination Station.

Sub-element 6.b.; Criterion 6.b.1: This will be demonstrated at the Kirkwood Emergency Worker Monitoring and Decontamination Station, located at Kirkwood Community College in Cedar Rapids, Iowa. Appropriate procedures for monitoring and decontamination of emergency worker equipment, including vehicles, must be demonstrated. According to the plan Cedar Rapids Fire Department will be responsible for establishing the Kirkwood EWMDS. Cedar Rapids Fire Department maintains 25 trained staff members to function as monitors and decontaminate personnel, vehicles, and equipment at the Kirkwood EWMDS. Therefore, monitors from this organization must be present to demonstrate monitoring and decontamination procedures.

The individuals who perform monitoring must demonstrate an operational check of the instruments, utilizing a check source, prior to monitoring. Information on the proper reading or range of readings should be attached to or accompany the instrument.

Sub-element 6.c.; Criterion 6.c.1: According to the Extent of Play meeting all congregate care facilities will be evaluated for Johnson County. In order to demonstrate this objective, the West High School in Iowa City, Northwest Junior High School in Coralville, City High School and Southeast Junior High School in Iowa City, and the University of Iowa's Carver-Hawkeye Arena, Field House, Iowa Memorial Union, and Recreation Center/Indoor Practice Field will be evaluated on the adequacy of facilities for providing

congregate care. These facilities will be required to be open to allow a cursory review by the FEMA evaluator. According to the plans, the American Red Cross, Salvation Army, the Johnson County Department of Public Health, and the Johnson County Visiting Nurses Association provide resources and support for the congregate care centers and must provide at least one representative each during the evaluation

An evaluator will conduct a walk through of the Anamosa Men's Reformatory and the Iowa Medical Classification Center. A complete walk through is not required. Interviews will be conducted with the respective wardens and the individuals responsible for setting up the monitoring area. Observation and inventory of supplies is also required.

The new congregate care facilities for Buchanan County will be evaluated during a Staff Assistance Visit prior to the end of the calendar year. All requirements regarding their evaluation are as stated above.

Sub-element 6.d.; Criterion 6.d.1: The Linn-Benton Ambulance will demonstrate the transportation of a contaminated injured person. The use of flashing lights and sirens are not necessary during this exercise. A non-specialized vehicle may be used to transport the simulated victim to the medical facility. However, prior to transport, communications between the ambulance and the receiving medical facility must be demonstrated as per the discussion in the extent of play meeting.

The ambulance or non-specialized vehicle and crew must be monitored before release back into service. It is not necessary to demonstrate actual decontamination of the ambulance or non-specialized vehicle and crew; however, the crew must be knowledgeable of where this would be accomplished.

The hospital portion will be demonstrated by Mercy Medical Center. In addition, the Area Requiring Corrective Action (ARCA), Issue No: 21-99-05-A-01, identified at the University of Iowa hospital during the 1999 MS-1 drill regarding leakage testing can be corrected.

In the event that, during an out-of-sequence demonstration an evaluator identifies an exercise issue, the evaluator will discuss it with the Team Leader, Controller, and Trainer (State representative). If possible, the trainer will provide immediate instruction and a re-demonstration will occur to correct the issue. The exercise report will reflect the exercise issue and that it has been corrected.

## Appendix 4 - Exercise Scenario

This appendix contains a summary of the simulated sequence of events, which was used as the basis for invoking emergency response actions by OROs during the Duane Arnold Energy Center full-scale exercise conducted on October 18, 2000.

Alliant Utilities submitted the exercise scenario on August 22, 2000, and it was approved by FEMA on September 13, 2000.

During the exercise, controllers from Alliant Utilities provided "inject messages" that contained scenario events and/or relevant data, to those persons or locations that would normally receive notification of such events. Inject messages was the method used for invoking response actions by OROs.

The times indicated are from the scenario. Actual times of the exercise events can be found in Table 1 of this report.

### **SCENARIO SUMMARY:**

- 730 Initial Conditions are established. Commence the 2000 DAEC Evaluated Exercise.
- 745 CRD High Temps – Temp Mod-Mod package generated. Work Control to call Sim/CR to notify crew of package.
- 815 Fuel Handling crew drops fuel bundle and bubbles rise from assembly to surface. Area Radiation Monitors show increase and some alarm.
- 835 OSM declares an ALERT classification based on valid ARM alarms on refuel floor.
- 850 Technical Support Center activated and staffed.
- 1000 Failure of dump valve air line causes a loss of Feedwater Heating.
- 1040 Nine Control Rods are in. All other Control Rods indicated full or an intermediate position. Power oscillations continue in the core.
- 1055 EC declares a SITE AREA EMERGENCY – failure of auto & manual scram.
- 1100 Evacuees to Off-site Reactor Assembly Area.
- 1130 Operations with assistance from the OSC attempt to vent the overhead piston area.
- 1140 Crack in tailpipe of PSV-4401 results in Torus rad levels increase and slowly propagate the leak.

- 1155 "A" Squib valve returned to service to shutdown reactor within 30-40 minutes.
- 1200 Drywell Spray Valve MO-2000 closed due to a bad thermal relay in its breaker. Use of torus sprays is ineffective in reducing the containment pressure/temp increase.
- 1205 Ops Emergency Depressurizes in accordance with the EOP when containment temp reaches 280<sup>0</sup> F. or EOP Graph 5 (Pressure Suppression Pressure) is exceeded.
- 1210 PSV-4401 tailpipe breaks completely off and containment pressure goes to 53 psig.
- 1220 GENERAL EMERGENCY declared on SBTG Kaman or a loss of all three Fission Product Barriers.
- 1245 SBLC system shuts down reactor.
- 1300 Exercise is terminated.