

CONF-911126--2

CONF-911126--2

DE92 003511

FROM NUCLIDES TO NERVE GAS: THE DEVELOPMENT  
OF THE CHEMICAL STOCKPILE EMERGENCY  
PREPAREDNESS EXERCISE PROGRAM

**DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Kathy S. Gant  
Martha V. Adler  
Oak Ridge National Laboratory\*  
Oak Ridge, Tennessee 37831

The submitted manuscript has been  
authored by a contractor of the U.S.  
Government under contract No.  
DE-AC05-84OR21400. Accordingly, the U.S.  
Government retains nonexclusive,  
royalty-free license to publish or reproduce  
the published form of this contribution, or  
allow others to do so, for U.S. Government  
purposes.

CONF-911126-2

\*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under contract DE-AC05-84OR21400. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED



## **DISCLAIMER**

**This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.**

---

## **DISCLAIMER**

**Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.**

## **FROM NUCLIDES TO NERVE GAS: THE DEVELOPMENT OF THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS EXERCISE PROGRAM**

### **ABSTRACT**

The Army and the Federal Emergency Management Agency established the Chemical Stockpile Emergency Preparedness Program (CSEPP), to improve emergency preparedness around each location storing the nation's aging stockpile of unitary chemical weapons. The CSEPP requires that a series of exercises be conducted at each location on a regular schedule. The CSEPP exercise program drew upon the existing Army and civilian exercises. Merging the exercise traditions of both the communities and installations into a joint exercise program acceptable to both sides and the particular nature of the hazard required a number of adjustments in the usual approaches.

### **INTRODUCTION**

Facilities that, in the event of an accident, pose a threat to people or the environment in surrounding areas, have a responsibility for emergency preparedness and a need for emergency exercises. The communities surrounding these facilities have responsibilities for protecting their population from the effects of such an accident and also have a need for emergency response exercises. Satisfying these complementary responsibilities is easier to accomplish if the facilities and surrounding areas work together.

This paper deals with one example—the development of a consistent, coordinated emergency response exercise program for eight Army installations and the surrounding jurisdictions. In this case, the Army chose to increase the protection of the public against a possible accident on the installation by assisting the local jurisdictions in upgrading their own preparedness. While DOE facilities may not now have to undertake such a program, it provides an illustration of the challenges a coordinated exercise program can present.

### **BACKGROUND**

The U.S. Army has a stockpile of unitary chemical weapons, most of which are stored at eight locations throughout the country: Aberdeen Proving Ground (Maryland), Anniston Army Depot (Alabama), Lexington-Bluegrass Army Depot (Kentucky), Newport Army Ammunition Plant (Indiana), Pine Bluff Arsenal (Arkansas), Pueblo Depot Activity (Colorado), Tooele Army Depot (Utah), and Umatilla Depot Activity (Oregon). These weapons, both munitions and bulk chemical agents, are 20–40 years old. Congress has mandated that these weapons are to be destroyed (demilitarized); the current plan is to dismantle and incinerate the weapons in special incinerators to be built at each of the storage locations.

The chemical warfare agents pose a distinctive threat if accidentally released because each agent was designed to cause major injury or death at sufficient concentrations. The stockpile of primary concern consists of nerve agents GB (tabun) and VX and mustard agents H, HD, and HT.<sup>1</sup> The time in which protective measures can be taken effectively can be very short and the consequences of not taking some action quickly can be fatal.

The National Defense Authorization Act of 1986<sup>2</sup> directs the chemical demilitarization program to provide maximum protection for the public, post personnel, and the environment. As a result of this directive, funds have been allocated to improve on-post emergency preparedness and to assist state and local governments in developing their emergency response capabilities<sup>3</sup>. To achieve maximum protection during the demilitarization process and to provide additional protection against an accident while the weapons are stored, the Chemical Stockpile Emergency Preparedness Program (CSEPP) was begun.

CSEPP is jointly administered by the Army and the Federal Emergency Management Agency (FEMA) under the terms of a 1988 memorandum of understanding.<sup>4</sup> In the memorandum, the Army and FEMA agree to develop and conduct exercises at each storage location to evaluate formally the effectiveness of the emergency preparedness programs. FEMA traditionally works with the civilian responders in developing their exercise programs, and in certain cases, in the formal evaluation of exercises.

## DIFFERENCES IN EXISTING EXERCISE PROGRAMS

Both FEMA and the Army agreed that the new CSEPP exercise program should draw upon existing exercise programs when possible. Merging the different exercise traditions of the Army installations, FEMA, and the local communities into a joint exercise program acceptable to all sides required adjustments to their usual approaches. The adaptability of existing civilian programs was also somewhat limited by the nature of the threat posed by chemical warfare agents.

The Army installations have periodic installation exercises, exercises as part of Army Materiel Command Surety Field Activity (AMCSFA) inspections, and may participate occasionally in large Service Response Force exercises with scenarios involving chemical agent releases. Civilian communities may exercise in response to scenarios dealing with natural hazards, release of hazardous materials, transportation accidents, releases from commercial nuclear power plants, etc.

Differences in terminology and exercise experience made it difficult to reach a consensus on a joint, evaluated exercise program.

- The Army installations normally have full-scale exercises. However, under FEMA's Comprehensive Coordinated Agreement (CCA) Program, state and local jurisdictions can use a combination of full-scale exercises and functional exercises (with activation of the Emergency Operations Center [EOC]) to meet CCA program requirements.<sup>5</sup> Tabletop exercises are more common than in the Army.
- Little simulation is allowed in the military exercises. Local communities are accustomed to more simulation and negotiated "extent of play" agreements. Some simulation off-post (such as evacuations) is necessary to avoid disruption of normal community activities.
- The Army uses "functional areas", generally those specified in *Chemical Accident or Incident Response and Assistance (CAIRA) Operations*,<sup>6</sup> as objectives for all chemical agent exercises. All the functional areas are to be touched upon during the exercises. FEMA has proposed objectives for hazardous materials accidents<sup>7</sup> based on planning guidance developed by that agency<sup>8</sup> and the National Response Team.<sup>9</sup> The Radiological Emergency Preparedness (REP) Program, dealing with preparedness around commercial nuclear power reactors, has a large well-developed set of objectives. Some of these objectives must be demonstrated in every exercise; others are exercised intermittently, but at least once during a set time interval.<sup>10</sup>
- Evaluation of Army exercises is based on the functional areas. While many off-post exercises are informally evaluated, FEMA has developed objective-based evaluation methodologies (forms and procedures) for hazardous materials exercises<sup>11</sup> and for REP exercises.<sup>12</sup>
- The exercise controllers generally critique the Army installation exercises, although observations are sought from all participants. REP exercises are formally evaluated under FEMA auspices by independent evaluators who have little to do with the conduct of the exercise.

## DEVELOPMENT OF EXERCISE PROGRAM

The Department of the Army and headquarters FEMA personnel have led the overall planning for the exercise program. FEMA, however, wished to have strong regional office involvement in the operation of the exercises. To allow for regional administration and still ensure consistency in the implementation of the exercise program at different installation locations, standard exercise cycles, standard planning guidelines, standard exercise objectives and a standard evaluation methodology were established.

An exercise schedule consisting of tabletop, functional, and full-scale exercises was first proposed. This schedule was later modified as it became obvious that FEMA and the Army had different understandings of the exercise descriptions. The revised schedule called for only one required tabletop exercise at each location—an exercise to get the major participants together during the year before the first full-scale exercise. Other tabletops are encouraged as part of training programs, but they will not be required for the exercise program. In a "direction and

control" exercise, following the tabletop exercise, all EOCs will be activated, all communication nodes will be tested, and key players will participate. The first full-scale exercise will follow during the next year. Full-scale exercises will generally last about 48 hours with around-the-clock play proposed. Full-scale exercises will focus on the early response to the simulated accident, especially during the first few years of the program. After the first full-scale exercise at each location, there will be an annual exercise, alternating between direction and control exercises and full-scale exercises. When this stage has been reached at all sites, there will be eight CSEPP exercises each year, one per location; four of these will be full-scale exercises. Limited "functional exercises" may be required, as necessary, to test new procedures or equipment or as remedials.

Each CSEPP exercise will be planned by a committee jointly chaired by Army and FEMA representatives, with members representing other exercise participants. The Army representative will come from the Army Defense Ammunition Center and School (USADACS), while the FEMA representative will be drawn from the regional FEMA CSEPP staff. The chairpersons of the planning committees will make decisions on how the standard objectives will be tested and the extent of play of the various participants. The functions of the controllers and evaluators will be separated. Controllers and independent evaluators provided by both the Army and FEMA will train together. The exercises will be formally evaluated using an objective-based standard exercise evaluation methodology.

The development of the exercise objectives drew upon the existing exercise materials previously mentioned. No existing set of objectives satisfied the need for testing both the on-post and the off-post responses to the release of chemical agents and the interfaces between the response groups. Existing lists of response functions and generic exercise objectives have many similarities because the same functions appear in many types of response. Some of these functions and objectives are listed for comparison in Fig. 1.

DOE's interim exercise evaluation criteria<sup>13</sup> are also included for comparison. The response criteria demonstrated during DOE facility exercises may be closer to the Army functional areas because both apply to the facility response, instead of the community response. The emphasis is on detection, classification, notification, and mitigation.

Exercise objectives consistent with the Army functional areas were initially chosen. Each objective then had one or more evaluation elements (more specific response aspects, similar to the typical off-post objectives). This awkward structure is being discarded in favor of a revised list of objectives. Developing a list of objectives applicable to both the Army and civilian response is

difficult. Some community objectives from other exercise programs dealing with the initial emergency assessment and monitoring may not be appropriate for releases of chemical agent. Off-post response groups may rely on the installation and other military resources for hazard assessment and monitoring for chemical agent releases.

The original exercise objectives and their related exercise evaluation methodology<sup>14</sup> were piloted at the Service Response Force exercise held at Tooele Army Depot in June 1991. Teams of trained evaluators tried using the methodology to do an unofficial evaluation of the exercise response of both the civilian and military response. The exercise evaluation teams felt that the methodology was generally successful and made many useful suggestions for improving the evaluation materials. The materials may be extensively revised, however, by FEMA and the Army.

FEMA will coordinate the evaluation of the off-post activities, while the Army coordinates the evaluation of the installation response. The two agencies will work together to evaluate the interface areas.

## CONCLUSIONS

All emergency response exercises, despite the differences in purpose, form, and scenario, have some common elements. Many of the response functions are the same. In developing an exercise program, it is logical to draw upon the existing materials for exercise programs when possible. The differences in the goals of the exercise programs, the particular hazards, and the response roles of the participants may require some customized materials. The formality of the evaluation will vary—an exercise required by law for operation of a nuclear power plant may be more formally evaluated than a local response drill.

To respond effectively to a release of a chemical warfare agent, both the installation and off-post responders must perform well and the response must be coordinated between the two groups. The necessary communication and coordination can only be practiced in joint exercises. A joint exercise also provides the best assessment of the level of preparedness at any installation location.

The CSEPP exercise program is developing as a joint exercise program containing elements from both the Army and the FEMA exercise traditions. This means that, for the program to succeed, both the civilian and military participants are having to make some changes to the way they do exercises. As DOE expands its exercise program and DOE facilities do more

exercises with the off-site community, DOE and its contractors may be able to apply some of the lessons learned from the CSEPP exercise program.

## REFERENCES

1. Watson, A. P. and N. B. Munro. *The Technical Basis for Offsite Recovery Following Warfare Agent Contamination*, ORNL-6628. Oak Ridge, TN: Oak Ridge National Laboratory, April 1990.
2. Pub. L. 99-145, 1986.
3. Argonne National Laboratory. *The Chemical Stockpile Emergency Preparedness Program Management Plan*. Argonne, IL: Argonne National Laboratory, March 1990.
4. Department of the Army and Federal Emergency Management Agency. Memorandum of Understanding (MOU) Between the Department of the Army and the Federal Emergency Management Agency, in which the agencies agree to collaborate on the emergency preparedness aspects of the Chemical Stockpile Emergency Preparedness Program, August 3, 1988.
5. Federal Emergency Management Agency. *CCA General Program Guidelines*, CPG 1-3. Washington: Federal Emergency Management Agency, June 1987.
6. Department of the Army. *Chemical Accident or Incident Response and Assistance (CAIRA) Operations*, Pamphlet 50-6. Washington: Department of the Army, May 1991.
7. Federal Emergency Management Agency. *Hazardous Materials Exercise Evaluation Methodology (HM-EEM) and Manual* (Interim Guidance Document). Washington: Federal Emergency Management Agency, October 1989.
8. Federal Emergency Management Agency. *Guide for Development of State and Local Emergency Operations Plans*, CPG 1-8. Washington: Federal Emergency Management Agency, September 1990.
9. National Response Team. *Hazardous Materials Emergency Planning Guide*, NRT-1. Washington: National Response Team, March 1987.
10. Federal Emergency Management Agency. *Radiological Emergency Preparedness (REP) Exercise Manual*, FEMA-REP-14 (Draft). Washington: Federal Emergency Management Agency, January 1990.
11. Federal Emergency Management Agency. *Hazardous Materials*.
12. Federal Emergency Management Agency. *Radiological Emergency Preparedness Exercise Evaluation Methodology*, FEMA-REP-15 (Draft). Washington: Federal Emergency Management Agency, August 1990.

13. Department of Energy. *DOE Emergency Exercise Evaluation Criteria* (Interim). Washington: Department of Energy, May 1991.

14. Oak Ridge National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercise Objectives and Evaluation Materials* (Draft). Oak Ridge, TN: Oak Ridge National Laboratory, April 1991.

CSEPP Evaluation Element <sup>a</sup> (April 1991)	CAIRA Functions (May 1991)	FEMA CPG 1-8 Functions for Generic Annexes (Sept. 1990)	NRT-1 Response Functions (March 1987)	HAZMAT, HM-EEM (Oct. 1989)	Draft FEMA-REP-14 (Oct. 1990)	Interim DOE Emergency Exercise Evaluation Criteria (May 1991)
Command and Control	Command and Control	Direction and Control	Direction and Control	Direction and Control	Direction and Control	Emergency Response Organization Emergency Response Staff Activities - Emergency Response Staff Functions
Facility Activation					Facilities: Activation, Equipment, and Displays <sup>b</sup>	Emergency Response Staff Activities - Staffing and Activation of Facilities
24-Hour Operations				Staff Mobilization and 24-Hour Operations <sup>b</sup>	Mobilization of Emergency Personnel (Continuous, 24-hour basis)	
Supplementary Assistance				Supplementary Assistance	Supplementary Assistance (Federal/Other)	
Role of On-Scene Coordinator						
Communications		Communications	Communications (among responders)	Communications	Communications	Offsite Response Interfaces Notifications and Communications <sup>b</sup>
Determination of Emergency Classification Levels	Hazard Assessment			Emergency Condition Levels		Determination of Emergency Event Class
Continuing Chemical Event Hazard Assessment		Damage Assessment	Ongoing Incident Assessment <sup>b</sup>		Plume Dose Projection	Consequence Assessment

<sup>a</sup>These evaluation elements were used during the Service Response Force Exercise, June 1991. The CSEPP objectives are currently being revised.

<sup>b</sup>Objectives or criteria that appear in more than one place.

Fig. 1 Comparison of response functions from different sources.

CSEPP Evaluation Element <sup>a</sup> (April 1991)	CAIRA Functions (May 1991)	FEMA CPG 1-8 Functions for Generic Annexes (Sept. 1990)	NRT-1 Response Functions (March 1987)	HAZMAT, HM-EEM (Oct. 1989)	Draft FEMA-REP-14 (Oct. 1990)	Interim DOE Emergency Exercise Evaluation Criteria (May 1991)
Initial Notification						Notifications and Communications <sup>b</sup>
Alert and Mobilization of Emergency Personnel	Alert and Notification		Initial Notification of Response Agencies	Staff Mobilization and 24-Hour Operations <sup>b</sup>	Alert and Mobilization of Emergency Personnel	
Alert and Notification of the Public		Warning	Warning Systems and Emergency Public Notification	Alert and Notification	Alert and Notification	
Protective Action Decision Making	Protective Actions	Evacuation In-place Protective Shelter	Personal Protection of Citizens <ul style="list-style-type: none"> <li>- Indoor Protection</li> <li>- Evacuation Procedures</li> <li>- Other Public Protection Strategies</li> </ul>	Population Protective Actions	Plume Protective Action Decision Making <ul style="list-style-type: none"> <li>Ingestion Exposure Pathway - Protective Exposure Protective Action Decision Making<sup>b</sup></li> </ul>	Protective Actions <sup>b</sup>
Protective Action Implementation - Special Populations					Implementation of Protective Actions - Special Populations <ul style="list-style-type: none"> <li>Implementation of Protective Actions - Use of KI for Emergency Workers, Institutionalized Persons, and the General Public<sup>b</sup></li> </ul>	
Protective Action Implementation - Schools					Implementation of Protective Actions - Schools	
Traffic and Access Control	Security	Law Enforcement	Law Enforcement	Traffic and Access Control	Traffic and Access Control	Protective Actions <sup>b</sup> Security Measures
Rescue	Fire Fighting and Rescue	Fire and Rescue	Fire and Rescue			Emergency Response Staff Activities - Fire and Rescue

Fig. 1 Comparison of response functions from different sources. (continued)

CSEPP Evaluation Element <sup>a</sup> (April 1991)	CAIRA Functions (May 1991)	FEMA CPG 1-8 Functions for Generic Annexes (Sept. 1990)	NRT-1 Response Functions (March 1987)	HAZMAT, HM-EEM (Oct. 1989)	Draft FEMA-REP-14 (Oct. 1990)	Interim DOE Emergency Exercise Evaluation Criteria (May 1991)
Public Instructions and Emergency Information	Public Affairs	Emergency Public Information	Public Information/Community Relations	Emergency Public Information	Public Instructions and Emergency Information	
Media					Emergency Information - Media	Public Information
Rumor Control					Emergency Information - Rumor Control	
Immediate First Aid - Buddy Aid	Medical	Health and Medical (includes public health)	Health and Medical <sup>b</sup>	Medical Services - Transportation and Facilities		Emergency Response Staff Activities - Medical
Medical Services - Transportation					Medical Services - Transportation	
Medical Services - Treatment and Facilities					Medical Services - Facilities	
Emergency Worker Exposure Control	Safety	Radiological Protection	Response Personnel Safety <sup>b</sup>	Emergency Worker Decontamination <sup>b</sup>	Emergency Worker Exposure Control  Decontamination - Emergency Workers, Equipment, Vehicles, Material, and Waste Disposal <sup>b</sup>  Implementation of Protective Actions - Use of KI for Emergency Workers, Institutionalized Persons, and the General Public <sup>b</sup>	Emergency Response Staff Activities - Coordination of Operations, Monitoring, and Repair Teams
Agent Detection and Monitoring	Contamination Control  Agent and Munitions Operations <sup>b</sup>  Environmental Monitoring				Post-Emergency Ingestion Sampling  Post-Emergency Laboratory Operations  Field Radiological Monitoring - Ambient Radiation Monitoring  Field Radiological Monitoring - Airborne Radioiodine and Particulate Activity Monitoring	

Fig. 1 Comparison of response functions from different sources. (continued)

CSEPP Evaluation Element <sup>a</sup> (April 1991)	CAIRA Functions (May 1991)	FEMA CPG 1-8 Functions for Generic Annexes (Sept. 1990)	NRT-1 Response Functions (March 1987)	HAZMAT, HM-EEM (Oct. 1989)	Draft FEMA-REP-14 (Oct. 1990)	Interim DOE Emergency Exercise Evaluation Criteria (May 1991)
Emergency Worker Decontamination	Agent and Weapons Operations <sup>b</sup>	Radiological Protection (continued)	Response Personnel Safety <sup>b</sup>	Emergency Worker Decontamination <sup>b</sup>	Decontamination - Emergency Workers, Equipment, Vehicles, Material, and Waste Disposal <sup>b</sup>	
Screening Public for Agent Contamination				Population Contamination Control	Reception Center - Monitoring, Decontamination, and Registration <sup>b</sup>	
Agent Containment	Agent and Weapons Operations <sup>b</sup>		Containment and Cleanup <sup>b</sup>		Decontamination - Emergency Workers, Equipment, Vehicles, Material, and Waste Disposal <sup>b</sup>	
Adequacy of Facilities - Equipment, Displays				Facilities, Equipment, and Displays	Facilities: Activation, Equipment, and Displays <sup>b</sup>	Emergency Facilities and Equipment
Evacuee Registration	Administration	Reception and Care	Human Services	Relocation Centers	Reception Center - Monitoring, Decontamination, and Registration <sup>b</sup>	
Congregate Care		Human Services			Offsite Support for the Evacuation of Onsite Personnel <sup>b</sup>	
Legal	Legal				Congregate Care	
Resupply and Sustainability of Chemical-Unique Materials	Logistics <sup>b</sup>	Resource Management	Resource Management			Emergency Response Staff Activities - Repair and Maintenance

Fig. 1 Comparison of response functions from different sources. (continued)

CSEPP Evaluation Element <sup>a</sup> (April 1991)	CAIRA Functions (May 1991)	FEMA CPG 1-8 Functions for Generic Annexes (Sept. 1990)	NRT-1 Response Functions (March 1987)	HAZMAT, HM-EEM (Oct. 1989)	Draft FEMA-REP-14 (Oct. 1990)	Interim DOE Emergency Exercise Evaluation Criteria (May 1991)
Reentry		Public Works Health and Medical <sup>b</sup>	Public Works	Reentry and Recovery	Recovery and Reentry - Determination of Appropriate Measures  Recovery and Reentry - Implementation  Ingestion Exposure Pathway - Protective Exposure Protective Action Decision Making	Recovery and Reentry
Restoration	Site Restoration	Containment and Cleanup <sup>b</sup>				
	Chaplain	Continuity of Government	Other		Unannounced Exercise or Drill	Conduct of Exercise

Fig. 1 Comparison of response functions from different sources. (continued)