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LOCKHEED MARTIN

PLANNING GUIDANCE FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

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ACRONYMS

ACP	access control point
ANAD	Anniston Army Depot
APG	Aberdeen Proving Ground
ARC	American Red Cross
BGAD	Blue Grass Army Depot
CBDCOM	U.S. Army Chemical and Biological Defense Command
CAIRA	Chemical Accident/Incident Response and Assistance
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CSDP	Chemical Stockpile Disposal Program
CSEPP	Chemical Stockpile Emergency Preparedness Program
DA	Department of the Army
DHHS	Department of Health and Human Services
DOD	Department of Defense
EBS	Emergency Broadcast System
EMS	emergency medical services
EOC	emergency operating center
EOP	emergency operations plan
EPA	Environmental Protection Agency
EPG	Emergency Planning Guide
EPZ	emergency planning zone
ERCP	Emergency Response Concept Plan
ETE	evacuation time estimate
FEMA	Federal Emergency Management Agency
FPEIS	Final Programmatic Environmental Impact Statement for the CSDP
ICCB	Intergovernmental Consultation and Coordination Board
ICS	Incident Command System
IPR	in-progress review
IRF	Initial Response Force
IRZ	immediate response zone
JIC	Joint Information Center
LEPC	Local Emergency Planning Committee
MOU	Memorandum of Understanding
NAAP	Newport Army Ammunition Plant
NCP	National Contingency Plan
NDA	National Defense Area
NDMS	National Defense Medical System
NRC	National Response Center
NRT	National Response Team
ORNL	Oak Ridge National Laboratory
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PAZ	protective action zone
PBA	Pine Bluff Arsenal
PL	Public Law
PUDA	Pueblo Depot Activity
PZ	precautionary zone
RRT	Regional Response Team
SARA	Superfund Amendments and Reauthorization Act 1986
SCBA	self-contained breathing apparatus

SERC	State Emergency Response Commission
SOP	standard operating procedure
SRF	Service Response Force
TCP	traffic control point
TDD	teletype device for the deaf
TEAD	Tooele Army Depot
UMDA	Umatilla Depot Activity
USANCA	U.S. Army Nuclear and Chemical Agency

1.0 INTRODUCTION

This planning guide was developed under the direction of the U.S. Army and the Federal Emergency Management Agency (FEMA) which jointly coordinate and direct the development of the Chemical Stockpile Emergency Preparedness Program (CSEPP). It was produced to assist state, local, and Army installation planners in formulating and coordinating plans for chemical events that may occur at the chemical agent stockpile storage locations in the continental United States.

This document provides broad planning guidance for use by both on-post and off-post agencies and organizations in the development of a coordinated plan for responding to chemical events. It contains checklists to assist in assuring that all important aspects are included in the plans and procedures developed at each Chemical Stockpile Disposal Program (CSDP) location. The checklists are supplemented by planning guidelines in the appendices which provide more detailed guidance regarding some issues.

The planning guidance contained in this document will help ensure that adequate coordination between on-post and off-post planners occurs during the planning process. This planning guide broadly describes an adequate emergency planning base that assures that critical planning decisions will be made consistently at every chemical agent stockpile location.

This planning guide includes material drawn from other documents developed by the FEMA, the Army, and other federal agencies with emergency preparedness program responsibilities. Some of this material has been developed specifically to meet the unique requirements of the CSEPP.

In addition to this guidance, other location-specific documents, technical studies, and support studies should be used as needed to assist in the planning at each of the chemical agent stockpile locations to address the specific hazards and conditions at each location. These and other related documents are listed in Sect. 9, Related Documents.

1.1 PURPOSE AND SCOPE

This document serves three principal purposes in the CSEPP:

- To promote the development of an effective, complete, and comprehensive emergency response capability at each chemical agent stockpile location by providing guidance and direction to assist state, local, and Army installation planners in formulating, coordinating, and maintaining effective emergency response plans;
- To ensure that critical planning decisions are made consistently at all eight chemical agent

stockpile locations by establishing a single adequate and systematic framework for emergency response planning related to the CSEPP; and

- To provide a basis for assessing the adequacy of emergency preparedness planning as a part of the evaluation of proposals for federal assistance.

This document provides guidance and direction to Army installation officials and local and state government officials in the development and maintenance of emergency plans for accidents or incidents involving the transportation, storage, or disposal of lethal military chemical agents. These plans will contribute to the development of an effective emergency response capability around each of the eight continental United States installations and ensure coordination of on-post and off-post response plans. The guidance contained in this document is consistent with DA Pamphlet 50-6, *Chemical Accident and Incident Response and Assistance (CAIRA) Operations*, a publication developed by the U.S. Army Nuclear and Chemical Agency (USANCA) for use by Army planners.

A major objective of this planning guide is to provide a consistent framework for emergency planning at all eight CSEPP locations. That does not mean that identical planning decisions should be made at all eight locations, but that decisions at all locations should be based on the same programmatic criteria and technical information. Each of the communities potentially affected by the CSEPP is responsible for deciding how to prepare for the possibility of a release of chemical agent. This guidance document simply defines a comprehensive scope for the decisions and identifies the elements that decision makers should address.

This document does not contain all of the information and detailed technical criteria that will eventually be required for comprehensive emergency plans and resource programs at the eight stockpile locations. Additional location-specific and programmatic technical guidance is available in a number of technical studies, either completed or ongoing. This document provides planning guidance to be used in preparing emergency plans that cover the most important aspects of the program. Subsequent plan refinements can follow the establishment of programs and systems that are based on the technical, location-specific guidance to be provided through Army and FEMA support studies and mechanisms.

This document, in conjunction with other specifications and standards, also provides a basis for assessing the adequacy of emergency preparedness planning. Inability to comply with this guidance should be appropriately justified since proposals for federal assistance in conjunction with the CSEPP will be evaluated in terms of compliance with this guidance. The Memorandum of Understanding (MOU) between FEMA and the Department of the Army (DA) specifically calls for FEMA to develop standards and evaluation criteria against which emergency preparedness programs can be assessed for adequacy and assurance that they can be implemented. The Army in turn agrees to review FEMA assessments as to whether off-site plans are adequate and can be implemented.

Each Army installation and state and local jurisdiction should follow the guidance contained in this document (including the appended planning standards) as well as approved location-specific CSEPP technical studies and support studies on warning, protective measures, and communications equipment. This should be accomplished through the cooperation of local, state, and Army personnel with technical assistance and oversight provided by the Army and FEMA.

The major technical studies that should be utilized in chemical emergency planning at each location are cited in Sect. 9, Related Documents.

1.2 PROGRAM OVERVIEW

The CSEPP is a joint FEMA/Army program to develop effective emergency response capabilities at each of the eight chemical agent stockpile locations. As depicted in Fig. 1, the CSEPP planning process ultimately translates the programmatic Emergency Response Concept Plan (ERCP) into site-specific emergency response plans for each location.

The emergency planning process progresses along complementary paths. One path defines the scope of necessary planning and specifies the emergency preparedness guidelines to be met. The path leads from the programmatic ERCP to this planning guidance document including the appended guidelines. The guidelines will be applied in producing the site-specific emergency response plans. Overall, this path provides federal direction in attaining maximum protection.

A second path develops the site-specific analyses that shape application of the guidelines at each stockpile location to meet local conditions and requirements. In this path, technical analyses have been used to translate the programmatic ERCP into site-specific emergency response concept plans. Each site-specific ERCP will be replaced by an Emergency Planning Guide (EPG). This path will be augmented by local officials to produce community-based emergency planning proposals which, upon approval and subsequent funding, will be made operational through the site-specific emergency preparedness programs. This path provides maximum protection of the public by applying the concepts of the ERCP to each stockpile location.

There is continual interaction among elements of the planning process (e.g., the scope of planning identified in the planning guidance document influences the technical and demographic data collected for the site-specific EPG, and vice versa). As new information is developed in either of

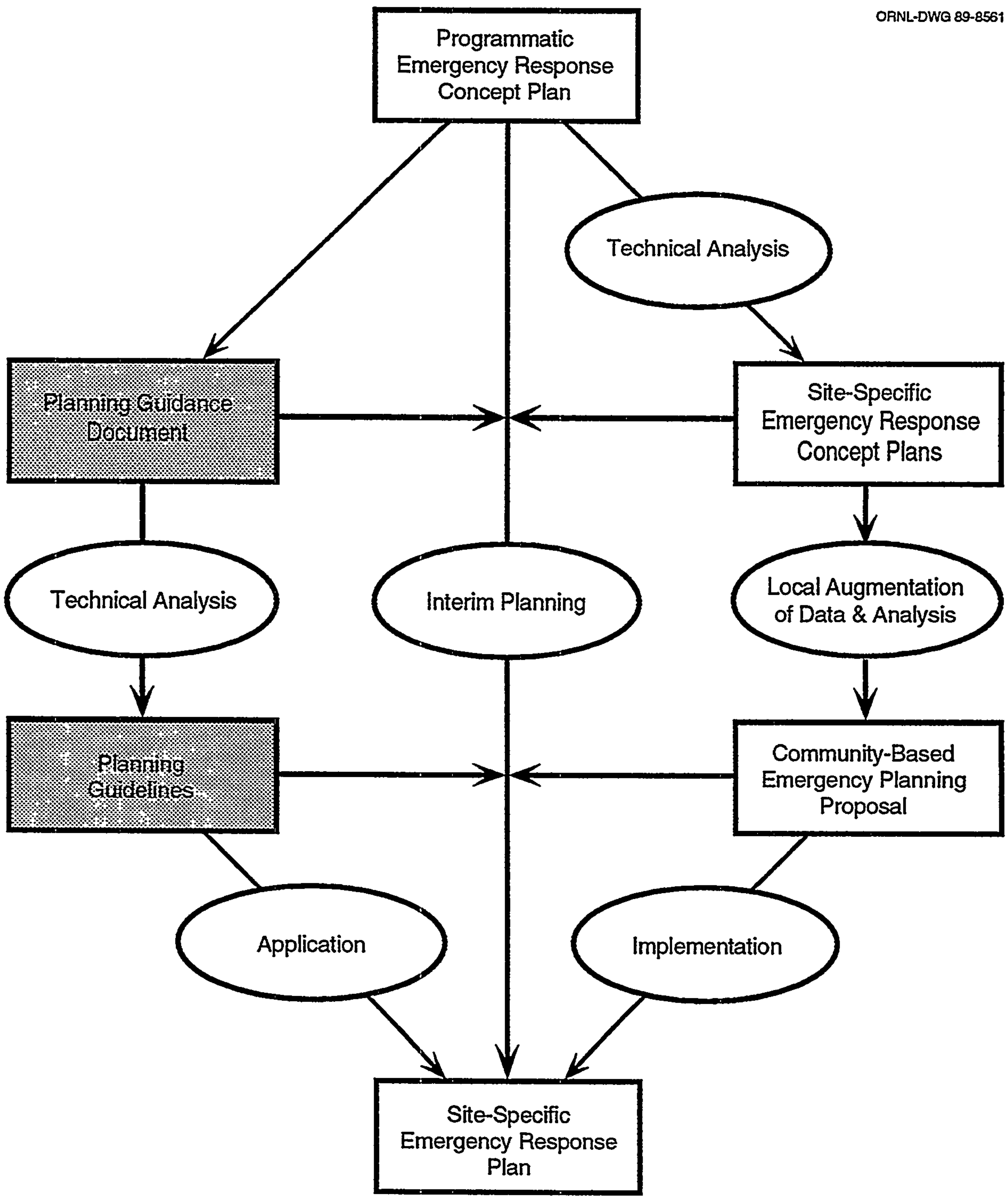

Fig. 1 The Chemical Stockpile Emergency Preparedness Program Process

the paths described above, it is integrated into a third path that upgrades the interim emergency response plans at each stockpile location. This integration is an iterative process that will be complete when planning guidelines have been fully specified and all relevant site-specific data have been collected and analyzed. At that point the paths converge in an emergency response plan for each location which prescribes effective responses for all foreseeable chemical agent emergencies.

This planning guidance document draws on the programmatic ERCP in defining the scope of issues that must be considered in developing an emergency response plan.

For some topics, detailed planning guidelines and evaluation criteria have been developed and incorporated into this document as appendices. Additional guidelines and criteria will be included as they are completed.

1.3 DOCUMENT OVERVIEW

This document presents information that Army installation, state, and local emergency planners and officials need in preparing effective and comprehensive emergency response plans under the CSEPP. Discussions of specific aspects of emergency planning related to a chemical event in Sects. 2 through 7 culminate in a comprehensive checklist of planning issues in Sect. 8 and planning guidelines for selected issues in the appendices.

Section 2 describes the administrative framework of the CSEPP to provide planners and officials with an understanding of how the program has developed and how their planning efforts relate to the overall preparedness program.

Section 3 provides technical information regarding the chemical agents and the way they are stockpiled. This information is intended to help emergency planners and officials better understand the nature of the hazard posed by CSDP activities.

Section 4 describes the CAIRA program which governs the federal response provided by the Army to a chemical event. This section is intended to acquaint state and local planners with the way an Army installation will respond in a chemical event emergency and to promote understanding and coordination between the on-post and off-post emergency planning efforts.

Section 5 describes the concept of emergency planning zones (EPZs) and the implications of the concept for emergency response planning. EPZs are a mechanism to assist in determining what emergency preparedness measures are appropriate for specific portions of the area potentially affected by a chemical event.

Section 6 discusses the process of assessing the potential impacts of a chemical event and notifying appropriate officials of the results. The section includes a recommended chemical event emergency notification system that classifies events according to the expected extent of their impact. Use of this system will enable personnel on the Army installation to provide information to off-post officials quickly and in sufficient detail to enable them to initiate an appropriate response.

Section 7 discusses the process of making protective action decisions during an emergency situation and describes ways in which the emergency response plan can simplify and speed up the decision making process. The section emphasizes the need for planners to carefully analyze the variables involved in the decision and to pre-establish criteria to be used in selecting appropriate protective actions.

Section 8 deals specifically with the issue of how to develop an emergency response plan that prescribes adequate responses to the full range of situations that could occur due to a chemical event at a stockpile location. This section includes lists of planning issues that collectively define the scope of an effective emergency response plan under the CSEPP.

Section 9 contains a list of documents related to emergency planning for the CSEPP, including both programmatic and technical guidance. Section 10 consists of a glossary of terms used in this planning guidance document.

The appendices consist of planning guidelines that more completely describe the planning needed for some issues identified in Sect. 8. The findings of ongoing technical studies have been applied to general planning principles listed in Sect. 8 to produce these guidelines. Guidelines for additional issues will be added as technical information becomes available.

2.0 PROGRAM ORGANIZATION

The purpose of this section is to describe the administrative framework within which CSEPP is being implemented so that state, local, and Army installation planners will be acquainted with the history of the program and with the organizational authorities and responsibilities relating to it. The section begins by recounting the history of the CSDP, including Congressional mandates and the major steps that have been taken in the program. Next, the section lists the authorities of the DA and FEMA as they relate to the program and describes the responsibilities assigned to each of the two agencies by their MOU regarding the CSEPP. The section concludes with a brief discussion of the composition and basic responsibilities of local area planning groups.

2.1 AUTHORIZATION

The United States currently has a chemical warfare capability with chemical agents and weapons stored at eight Army installations within the continental United States. Public Law (PL) 99-145, Title 14, Part B, Sect. 1412, directs the Department of Defense (DOD) to dispose of the lethal unitary chemical agents and munitions. A July 1986 Draft Programmatic Environmental Impact Statement considered four disposal alternatives for the chemical agent stockpile: (1) disposal at each storage location, (2) disposal at two regional centers, (3) disposal at one national center, and (4) continued storage at each location. In January 1988, the Army issued a *Final Programmatic Environmental Impact Statement (FPEIS) for the Chemical Stockpile Disposal Program*. The FPEIS examined critical site-specific issues in sufficient detail to compare the alternatives and to recommend one alternative. In a February 1988, the Army issued a Record of Decision that state-of-the-art, on-post incineration is the preferred alternative at each of the eight storage locations. Final implementation of the program depends on annual funding by Congress.

In July 1987, the Army released a "Draft Emergency Response Concept Plan" (ERCP) for the CSDP. The ERCP presents a conceptual basis for developing local emergency response programs for the CSDP and examines various emergency planning alternatives. This guidance document is based on the ERCP and other federal guidelines and criteria identified in Sect. 9, Related Documents.

In response to PL 100-180, the Army prepared and submitted to Congress a Chemical Stockpile Disposal Implementation Plan containing program schedules and budgetary requirements. The Army has requested the funds, based on current estimates, to implement enhanced emergency preparedness both on-post and off-post at all eight installations. The Army is responsible for ensuring that viable on-post chemical emergency plans and off-post emergency response plans exist for each storage location.

The August 1988 FEMA/Army MOU delineated their respective roles. FEMA operates under the following authorities:

- Executive Order 12148 delegates authority to FEMA to develop policies which provide that all civil defense and civil emergency functions, resources, and systems of Executive agencies are developed, tested, and utilized to prepare for, mitigate, respond to, and recover from emergencies. The Director of FEMA is also authorized to represent the President in working with State and local governments and the private sector to stimulate participation in civil emergency preparedness, mitigation, response and recovery programs;
- PL 96-342 provides for the development of emergency evacuation plans for areas in which nuclear power plants are located. The law also provides for improvements in emergency public information and training programs and capabilities;
- The Emergency Planning and Community Right-to-Know Act of 1986 (Title III of PL 99-499) authorizes FEMA to provide training and education programs for federal, state and local personnel in hazard mitigation, emergency preparedness, technological hazards, and emergency processes with respect to hazardous chemicals.

The Army will implement its part of the MOU according to the following authorities:

- Title 14, Part B, Sect. 1412 of PL 99-145 authorizes the Secretary of the Army to provide maximum protection for the environment, the general public, and workers when carrying out the destruction of the United States chemical stockpile; and
- Executive Order 12580 delegates to the Army the President's broad response authority under Sect. 104 of CERCLA with respect to releases or threatened releases from any facility under the jurisdiction or control of the Secretary of Defense.

2.2 FEMA/ARMY MEMORANDUM OF UNDERSTANDING

The CSDP is a DA program. In August 1988, DA and FEMA signed a MOU whereby FEMA assumed responsibility for off-post emergency planning activities. The DA maintains its original program role. The MOU clearly identifies the specific responsibilities of DA and FEMA, defines areas where each agency can provide expertise, and outlines where cooperation between the two agencies will result in a more efficient use of personnel and material resources.

2.2.1 FEMA Responsibilities

The MOU lists the following as major responsibilities of FEMA:

- Take the lead in working with state and local governments in developing off-post emergency preparedness plans, upgrading community response capabilities, and conducting necessary training.
- Provide liaison, coordination, and oversight between the DA and federal, state, and local offices during the off-post emergency planning process and the Army's CAIRA planning process.
- Develop standards and evaluation criteria against which emergency preparedness programs can be assessed for adequacy and assurance that they can be implemented.
- Develop, schedule, and conduct exercises to evaluate the effectiveness of emergency preparedness programs at each site.
- Serve as a conduit for providing funds, which may become available from the Army or other sources, to state and local governments for supporting emergency response preparedness for the program.
- Take the lead in the preparation, development, and delivery of training on chemical materials emergency management, planning, mitigation and response techniques to state and local governments. FEMA will ensure the involvement of the Department of Health and Human Services (DHHS) during development of emergency medical training requirements and the implementation of these requirements.
- Provide technical assistance to state and local officials in the development of site-specific emergency preparedness procedures.
- Maintain an updated series of interagency agreements which delineate respective federal, state, and local agency capabilities and responsibilities and define procedures for coordination and direction for emergency planning and response.
- Take the lead in developing public information and education programs while the Army provides the technical data and information necessary to construct accurate educational material concerning the chemical agents and their hazards, and information regarding appropriate actions to be taken by the general public in the event of an incident.

2.2.2 Army Responsibilities

The MOU lists the following as major responsibilities of the Army:

- Provide technical assistance and required resources in developing and implementing emergency response plans and related preparedness capabilities, integrating the on-post and off-post planning processes, and ensuring that all emergency plans are adequate and can be readily implemented;
- Review FEMA assessments to assure that off-post emergency plans are adequate and can be implemented;
- Take the lead and provide technical assistance in developing exercise design criteria and participate fully in developing, conducting, and evaluating exercises on a periodic basis;
- Assure that health and safety decisions with regard to overall emergency preparedness are reviewed by DHHS and other government health agencies as appropriate;
- Provide technical assistance and support to FEMA in preparing chemical emergency training materials and procedures and participate in delivering training to state and local emergency responders, where appropriate; and
- Take the lead in conducting site-specific hazard analyses used for the emergency preparedness plans.

2.2.3 Joint Responsibilities

In addition, the MOU identifies some areas of joint effort:

- Determining the funding requirements by fiscal year to develop and implement emergency preparedness programs;
- Cooperating in the development and implementation of program initiatives to integrate the planning and preparedness functions of FEMA and DA related to emergencies involving chemical warfare agents;
- Establishing a FEMA/DA committee to meet on a quarterly basis, or more frequently if necessary, to review the status of joint programs, to discuss and resolve issues, to consult on major policy issues, and to provide the necessary direction to meet DA's overall goals for the program;
- Cooperating in determining exercise requirements for installations and state and local governments as well as jointly develop and evaluate such exercises;

- Developing and implementing a community relations program to include FEMA and DA personnel working with local public officials and interest groups; and
- Encouraging private sector initiatives beneficial to the state and local government agencies responsible for preparedness.

2.2.4 Implementing the MOU

In February 1994, the management structure of CSEPP was fundamentally revised. Previously, the Army and FEMA had cooperatively managed the program through a Joint Steering Committee (JSC). The JSC established six subcommittees to oversee the functional areas of the program. Efforts to enhance the preparedness of Army installations and off-post communities were pursued individually by the subcommittees subject to review and approval by the JSC. Each subcommittee included as members representatives of state and/or local jurisdictions participating in CSEPP.

This organizational structure was changed when the Army and FEMA adopted a Joint Memorandum for the Record in February 1994. This memorandum enhances the cooperative relationship between the Army and FEMA in management of CSEPP. The Army continues to have the lead in all affairs of CSEPP. FEMA supports the Army by working with state and local governments in developing off-post emergency preparedness plans, upgrading response capabilities, and conducting necessary training. The Army institutes on-post preparedness plans, upgrades response capabilities, conducts necessary training, and integrates on-post and off-post emergency preparedness capabilities. FEMA and the Army will jointly develop protocols for assessing readiness of state and local jurisdictions and Army installations. FEMA regional offices will continue to review plans and evaluate exercises and training.

Under the 1994 Joint Memorandum, the JSC and its six subcommittees are replaced by an Executive Council that is co-chaired by the Principal Deputy Assistant Secretary of the Army for Installation, Logistics and Environment and the Deputy Associate Director of FEMA for Preparedness, Training and Exercises. The Executive Council will meet on a quarterly basis, with additional meetings as needed to resolve issues, ensure timely decisions, and provide policy guidance as appropriate. Representatives of state and local jurisdictions may provide input to Executive Council deliberations as appropriate.

The 1994 Joint Memorandum also calls for establishment of a central CSEPP office at the U.S. Army Chemical and Biological Defense Command (CBDCOM). This office will provide a central focus for CSEPP within the Army, implement the program on Army installations, and coordinate and integrate on and off-post activities. The office will be staffed by both FEMA and Army personnel. Staff of the office will serve as members of Site Support Teams.

The Joint Memorandum established a CSEPP Program Review Panel which will conduct quarterly in-progress reviews (IPRs) for each functional area of the program and for each site. At each IPR, the CBDCOM Site Support Teams will present status reports along with input obtained from state and local jurisdictions.

2.3 INTERGOVERNMENTAL CONSULTATION AND COORDINATION BOARDS

One national and eight local intergovernmental consultation and coordination boards (ICCBs) composed of federal, state, and local memberships have been created. The purpose of the local ICCBs is to provide local communities with CSEPP information, offer an avenue of open communication between officials and citizens, increase citizen involvement, and raise the level of public confidence in the CSDP. The national ICCB serves as a forum for presenting and discussing management and programmatic issues surrounding the CSDP and aids policy makers in setting program guidelines and direction.

2.4 APPROACH AND PLANNING SEQUENCE

2.4.1 Approach

The Army has initiated a planning effort at each of the chemical stockpile disposal locations that has included state and local agency briefings, Army installation participation, and technical and financial assistance to state and local governments for initial planning activity. The guidance contained in this document is intended to support a continuing effort toward achieving a complete and comprehensive emergency preparedness program for both continued storage operations and the eventual demilitarization activity. This process will require continued close coordination between the Army installation personnel and off-post agencies. All local and state agencies that have a role in emergency response should be incorporated into the planning effort. This includes State Emergency Response Commissions (SERCs) and Local Emergency Planning Committees (LEPCs) established under the Superfund Amendment and Reauthorization Act of 1986 (SARA), Title III.

The planning development team should consist of public officials or agency representatives with authority to make organizational commitments and to be involved in decision making during an emergency. The team should include technical experts in the various fields necessary to support the planning process. The planning development team should include, but not necessarily be limited to, the following people:

- Elected officials of involved off-post local governments;
- Local emergency management, police, fire, emergency medical services, and other key municipal and county agencies;
- State emergency management, environmental, public health, and public safety agency representatives;
- Chemical agent storage/disposal installation command and technical personnel;
- Volunteer agency representatives (e.g., American Red Cross);
- Community organization, school, hospital, and long-term care facility representatives; and
- Media representatives.

The membership is essentially that suggested for the LEPC established under Title III of SARA. This planning body should be included in the CSEPP planning process.

2.4.2 Planning Sequence

The CSEPP planning process involves a number of important tasks similar to the SARA Title III planning requirements:

- Identify the planning team;
- Identify sources of technical and administrative support for the planning team;
- Review existing plans to determine their status, to prevent overlap, and to eliminate inconsistency;
- Analyze local hazards, determine risk, and assess vulnerability;
- Evaluate response capabilities and resources;
- Upgrade existing plans or develop new plans and procedures; and
- Develop an ongoing program for plan implementation, maintenance, training, and exercises.

This document offers guidance to assist the planning group in covering the major planning areas adequately and systematically. As stated earlier, it also strives to offer consistency throughout the entire CSEPP even as local variations and adjustments to the guidance are made. Section 8 presents this guidance in substantial detail.

3.0 TECHNICAL BACKGROUND

Effective emergency response planning under the CSEPP requires an adequate understanding of the chemical agents involved and the way they are stockpiled. This section describes aspects of the agents and stockpiles pertinent to emergency planning. The chemical agents are described in terms of characteristics that affect the form in which they could be released and the ways in which they would present an exposure hazard to humans. In addition, this section discusses the toxicity of the agents and the public health and environmental impacts that might occur if they were released. The stockpile is described in tèrms of the relative amount of agent stored at each location, the various munitions and containers in which the agents are stored, and the general physical characteristics of the storage areas.

3.1 PROPERTIES OF CHEMICAL AGENTS

The agents of primary concern in this guidance are the nerve agents GB, and VX and the blister agents H and HD. (Nerve agent GA and blister agents HT and Lewisite are also stored in very small quantities at one stockpile location. These agents present a minor planning concern.) The chemical and physical properties of these agents have a direct bearing on emergency planning and response. The physical properties determine the agents' volatility, behavior in fires, and persistence in the environment. Agent toxicity determines the impact on human, animal, or plant life. Appendix B of the FPEIS describes these properties in detail. They are discussed here only in relation to emergency response planning.

3.1.1 Physical and Chemical Properties

All of the agents are liquids at normal indoor temperatures, although the mustards (H, HD, and HT) freeze at ambient temperatures below 13 to 15°C (55 to 59°F). The mustard agents have relatively high boiling points 215 to 217°C (419 to 423°F) but have significant vapor pressures at ambient temperatures. Therefore, mustards pose an inhalation hazard at higher ambient temperatures.

The nerve agents (GA, GB, and VX) are usually odorless, colorless, and tasteless. GA and GB are nonpersistent nerve agents which primarily present a vapor hazard. The vapors from these agents would present the primary casualty producer since they can be carried downwind quickly. Under most releases and meteorological conditions GA and GB produce the greatest downwind hazard distance. Thermal decomposition of GA and GB begins at approximately 130°C (266°F), and they completely decompose in 2.5 hours at 150°C (302°F).

Nerve agent VX is a persistent agent which presents both a vapor and a percutaneous threat. VX is not very volatile, so it presents much less vapor hazard than GA and GB; however, it is 100 times more toxic by the percutaneous route. Therefore, if VX is aerosolized due to an explosive release, it presents a percutaneous downwind hazard. Thermal decomposition rates of VX are 1.5 hours at 200°C (392°F), 4 minutes at 250°C (482°F), and 36 seconds at 295°C (563°F). In practical terms, a toxic dose of VX is more likely to result from skin rather than respiratory exposure; however, all nerve agents are sufficiently volatile to pose an inhalation hazard. At agent concentrations of 30 mg/m^3 or greater, median lethal inhalation doses can be attained in a few minutes.

Accidental releases of these agents during fires or explosions could expose on-post personnel and the general public off-post to combustion products as well as uncombusted agents. Fire involving vesicant and nerve agents would produce toxic combustion products. Nerve agents are destroyed at the high temperature of a fuel fire and, in addition, VX is flammable. Data indicate that at flame temperatures above 400°C (752°F), both VX and G agents would be decomposed within two to three minutes.

Persistence of chemical agents in the environment varies with the agent, the environmental medium, and other conditions such as pH and temperature. Blister agents (H, HD, and HT) and the nerve agent VX persist in soils and on vegetation, although the persistence varies. Nerve agents GA and GB degrade within a relatively short period. Mustard agents can permeate ordinary rubber and may permeate other protective materials over time. The solubility of these agents in water and toxic compounds formed during their decomposition pose a potential threat of drinking water contamination following an accident.

3.1.2 Toxicity

The agents GA, GB, and VX are rapidly acting, lethal nerve agents. They directly affect the nervous system and are toxic as liquids and vapors. They are organophosphorus esters that inhibit acetylcholinesterase, an enzyme that prevents the accumulation of the neurotransmitter acetylcholine at the nerve synapses. When too much acetylcholine is present, convulsion and death may result.

The severity of symptoms of acute exposure to the nerve agents depends on the quantity and dose rate of the exposure. Symptoms may include tightness of the chest, pinpointing of the pupils of the eyes (miosis), breathing difficulties, drooling and excessive sweating, nausea, vomiting, cramps, twitching and staggering, headaches and convulsion, followed by cessation of breathing and death.

The vesicant agents (H, HD, and HT) injure the eyes, damage the lungs and severely blister the skin upon exposure. The vesicants can often react with tissue constituents, and there is significant evidence that exposure to sufficiently high doses may increase the risk of developing cancer. The vesicant agents are potent in minute quantities and produce delayed effects as late as 15 hours after contact.

3.1.3 Public Health Impacts

If chemical agents are released, severe human health effects could result. The magnitude of the impact would depend on a number of variables: the amount and type of agent released; the method of release (e.g., spill, explosion, etc.); meteorological conditions; the number of unprotected people potentially exposed to the agent(s); distance from the chemical event to the unprotected individuals; age, gender, and health of exposed populations; route and duration of exposure; and timeliness of decontamination and medical treatment.

The Army's Gaussian-plume dispersion model, D2PC, is used to predict the size and location of areas affected by releases of chemical agents. The model predicts areas affected by time-weighted average concentrations likely to produce fatalities and lesser health effects. The D2PC code incorporates chemical agent source-term information as well as characteristics of the various chemical agents, based on field testing with the actual munitions and simulants of the chemical agents.

The resulting dose-rate values are based on the assumption that the majority of the dose is absorbed by inhalation and that the individuals exposed are wearing clothing. In the case of VX, the lethality estimates for human exposure through the skin change dramatically as a function of the amount of clothing worn and the wind speed. Although the majority of the potentially exposed population would be expected to be clothed, many individuals would be expected to have portions of their bodies exposed. Thus adjustments to the toxicity levels should be made in some modeling applications for civilian populations. Certain members of the population may be more susceptible to agent exposure, e.g., infants, the elderly, and individuals debilitated by chronic disease. The FPEIS discusses this in some detail and provides civilian application criteria. (See FPEIS, Appendix B, "Toxicity of Warfare Agents and Their Breakdown Products," pp. B-112 ff.) As explained in Sect. 5, the emergency planning zones (EPZs) are based partially on these considerations.

3.1.4 Environmental Impacts

In addition to the concern over acute and chronic human health effects, emergency response planning must consider impacts on the environment, drinking water sources, food supplies, and other natural resources. Additionally, environmental contamination will affect the return of evacuated personnel after termination of the immediate airborne health hazard.

Data on persistence of chemical agents indicate that attention should be given to potential effects on water supplies. Because it is unlikely that such contamination would occur, this is a secondary planning concern. In addition to the potential for water contamination from the primary agents, there is also potential for contamination by toxic decomposition products. Contamination of surface water bodies used as public water supplies would be of immediate concern. Groundwater supplies could also be affected if the agents migrate into the substrata.

Chemical agent contamination of land surfaces poses a threat of food chain contamination and bioaccumulation and serves as a direct exposure pathway for humans and animals. VX can also be absorbed in undegraded form by plants. Animal toxicity can be expected from ingestion of food items contaminated by the chemical agents.

Because of the limited data on persistence and environmental distribution, it may be difficult to predict the amount of time required before the public can return to evacuated areas. Monitoring and sampling of the affected areas will be necessary to support decisions on return (see Sect. 8.18).

3.2 CHEMICAL STOCKPILE CHARACTERISTICS AND DISTRIBUTION

3.2.1 Distribution

Although the size of the United States chemical stockpile is generally classified for national security reasons, information on distribution is available. Chemical agents, predominantly GB, VX, H, HD, and HT, are stored at eight installations: Tooele Army Depot, Utah (42.3% of the total stockpile); Pine Bluff Arsenal, Arkansas (12.0%); Umatilla Depot Activity, Oregon (11.6%); Pueblo Depot Activity, Colorado (9.9%); Anniston Army Depot, Alabama (7.1%); Aberdeen Proving Ground, Maryland (5.0%); Newport Army Ammunition Plant, Indiana (3.9%); and Blue Grass Army Depot, Kentucky (1.6%). The remaining 6.6% of the stockpile is located outside of the continental United States at Johnston Island in the Pacific Ocean. All percentage figures are based on weight.

3.2.2 Configurations

The chemical agents are stored in three basic configurations: (1) projectiles, cartridges, mines, and rockets containing propellant and/or explosive components; (2) aircraft-delivered munitions that do not contain explosive components; and (3) steel one-ton containers. Most of the stockpile (61%) is in the latter form. All of the agents are at least 20 years old; some are more than 40 years old.

3.2.3 Storage and Security

Each stockpile is stored in a chemical exclusion area at each installation. Most of the stockpile is kept on pallets, in boxes, in cans, or is stored individually in igloos specifically designed for ammunition and explosives. The igloos have lightning protection systems and steel doors, and they are covered with earth. They are equipped with multiple locking systems.

Some one-ton containers of mustard and VX agents are stored in warehouses or outside; when outside they are secured with chains. In either case, they are stored within an exclusion area.

Extensive security precautions protect exclusion areas. Access is strictly controlled by security forces, intrusion detection devices, barricades, and perimeter lighting.

4.0 CHEMICAL ACCIDENT OR INCIDENT RESPONSE AND ASSISTANCE (CAIRA)

To be effective, an off-post emergency response program must complement the associated on-post program. State and local emergency management officials and emergency service providers must be aware of the actions that will be taken by the Army installation and understand how those actions relate to the responsibilities of their own organizations. The on-post response is guided by the DA Pamphlet 50-6, *Chemical Accident or Incident Response and Assistance (CAIRA) Operations*, which describes the Army's functions, responsibilities, organization, and procedures for responding to chemical events. This section presents an overview of the CAIRA concept.

The DA's CAIRA effort includes all those actions taken to save life, preserve health and safety, prevent further environmental damage, protect property, secure the chemical agents, and maintain public confidence in the Army's ability to coordinate off-post and on-post emergency preparedness and response. CAIRA policy and guidance address the federal emergency response to a chemical surety emergency. This response effort includes some key off-post concerns such as public information, event assessment, emergency notification, and coordination of response activities.

The term "chemical event" includes two major elements: (1) chemical accidents resulting from nondeliberate events where safety is a primary concern and (2) chemical incidents resulting from deliberate events such as terrorism or from criminal acts where security is a concern. Whether the chemical event is called an accident or an incident is of little concern regarding the public safety. Therefore, the term "chemical event" is used in this document. The initial assessment and immediate notification process, however, is a major concern. This notification process, called the Chemical Event Emergency Notification System, is more fully explained in Sect. 6.

Under CAIRA, the Army establishes, trains, and maintains an initial response force (IRF) at each chemical agent stockpile location to respond to chemical events. In addition, an Army-wide service response force (SRF) is established, trained, and maintained for deployment in the continental United States as needed. The IRF, under the command of the Army installation commander, is prepared to implement CAIRA procedures for immediate response to a release of chemical agent. If a follow-on response effort is required, the SRF is activated. The SRF, under the direction of a general officer, includes the IRF and additional staff and teams from various agencies and is capable of sustained operations. The commander of the IRF or SRF (whichever is activated) is the federal On-scene Coordinator (OSC) and is responsible for coordinating and directing all federal emergency response efforts.

As a result of its 1987 Service Response Force (SRF) Exercise, the Army concluded that current CAIRA policy must be expanded to include more emphasis on coordination with off-post authorities. Subsequently the Army began developing more detailed guidance aimed at standardizing CAIRA plans at the chemical agent storage locations. From the perspective of off-post planners, key features to be included are emergency assessment and notification, protective action recommendations, and coordination of off-post actions.

The local planning group must be familiar with the overall CAIRA plan at its location and especially familiar with those parts of the plan that relate to off-post activities. The local planning group must coordinate the development of its off-post plans and procedures closely with the CAIRA plan. Both parties—the Army installation and the local planning body—need to keep each other well informed of planning developments, especially when notable changes are made in the respective plans. As will be discussed later, a regular exercise program that involves on-post and off-post emergency responders will promote this cooperative effort.

All of the planning checklist items contained in Sect. 8 require off-post and on-post coordination.

5.0 EMERGENCY PLANNING ZONES (EPZs)

Emergency response plans must reflect the fact that a release of chemical agent will affect different areas in different ways and at different times. Areas near the point of release are likely to experience relatively high concentrations of agent very quickly, while areas farther away are likely to experience lower agent concentrations after a longer period of time. Consequently, there are differences in the response actions that are appropriate for the different areas and in the time available to implement those actions. This section describes a method of dealing with these area-based differences in the emergency planning phase. The section describes the concept of EPZs and provides guidance on how the zones should be defined and what types of emergency response actions are appropriate for each zone.

In general, the likelihood of being exposed to a chemical agent from a release decreases as the distance from the point of release increases. In addition, the extent of exposure also decreases with distance as the concentration of the agent becomes lower.

As the risks and hazards decrease with distance, the extent and type of planning required also change. Lower risks mean less likelihood that a response will be needed. Lower hazards mean that exposure to an agent is less likely to occur. Greater distance means that more time is available to implement protective actions. Since it is not practical to develop emergency response plans that vary continuously with distance, it is necessary to establish zones to differentiate appropriate levels of response. The concept of zone-based emergency planning is common, perhaps best illustrated by the federal Radiological Emergency Preparedness program for fixed nuclear facilities, which uses two zones of 10 miles and 50 miles in radius.

For CSEPP, the EPZ concept involves three concentric zones. This concept reflects the differing response requirements associated with a fast-breaking chemical event with limited time for warning and response. The innermost planning zone is the immediate response zone (IRZ), the middle zone is the protective action zone (PAZ), and the outermost zone is the precautionary zone (PZ). Fig. 2 shows these zones as they exist conceptually before being used in planning. Due to the nature of the surrounding terrain or the composition of their chemical stockpile, some locations will have substantially different EPZs.

The EPZ concept is intended to guide the development of emergency response concepts, and should not be applied inflexibly to a particular location or to a specific event scenario. The development of actual installation-specific EPZs should occur in recognition of the unique geographic

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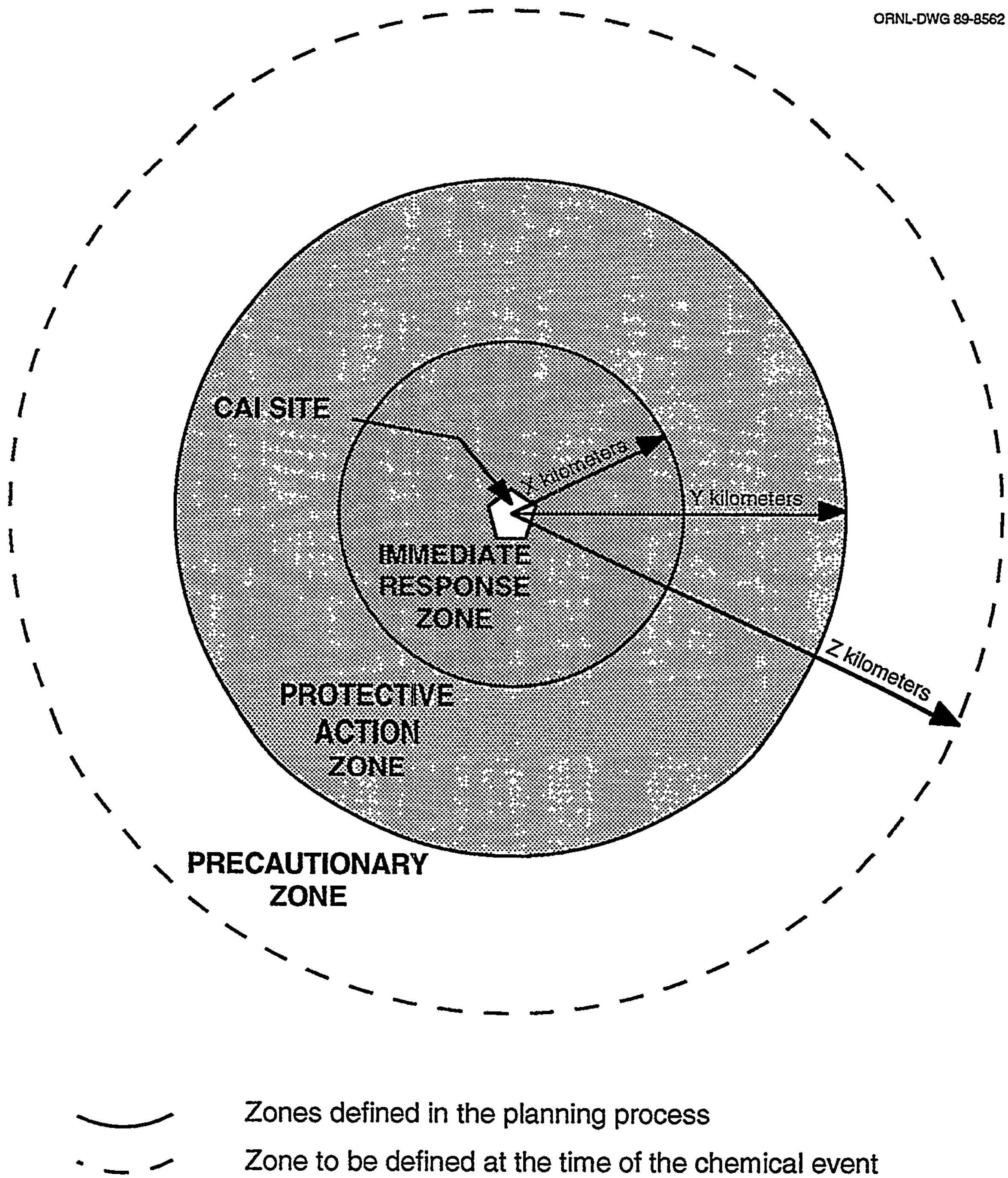


Fig. 2 Emergency Planning Zone Concept

and political characteristics at each location. Although the general EPZ concept should be applied consistently throughout the program, specific configurations will vary from location to location. The goal is to most appropriately define the planning boundaries for each installation.

Each installation and its associated off-post areas have a specific concept plan for the application of generic EPZ concepts. The final determination of EPZs will take into account the chemical agents stored and their packaging, risk analyses, local meteorological, geographic, and political conditions, and other factors. The concurrence of local and state officials will be required to make final EPZ determinations.

Clear definition of EPZs is critical for decision making and response. They should be as precise as possible in distinguishing areas of potential impact. The use of familiar or easily recognized geographic and political boundaries or topographic features such as rivers, mountains, parks, or other landmarks in defining EPZs will result in clearer plans and more useful emergency public information.

5.1 IMMEDIATE RESPONSE ZONE (IRZ)

Prompt and effective response is most critical in the IRZ because of the potentially limited warning and response time available. This area would be the first affected by an accidental release of chemical agent and would likely receive the heaviest agent concentrations. This zone encompasses an area requiring less than one-hour response time when affected by an agent release under "typical" weather conditions. The IRZ extends to approximately 10 to 15 km (6 to 9 miles) from the potential chemical event source, depending on the stockpile location. For these reasons, emergency response plans developed for the IRZ must provide for the most rapid and effective protective actions possible. The typical weather conditions used to delimit the IRZ are defined as a wind blowing at about 6 miles per hour with air rising or plume dispersion rated as neutral (D stability). Table 1 shows the various levels of stability. Time of day and temperature affect the levels. Generally, stability levels A, B, and C relate to daytime conditions and levels E, F, and G relate to nighttime conditions.

Table 1. Stability levels

Stability level	Air mixing/plume dispersion
A - Very unstable	Very good
B - Unstable	
C - Slightly unstable	
D - Neutral	Neutral
E - Slightly stable	
F - Stable	
G - Very stable	Very poor

The full range of appropriate and available protective action options and response mechanisms should be considered for the IRZ. Public protective actions must be selected primarily on the basis of the affected individuals' safety and ability to implement various alternative actions. The range of these alternatives is discussed in Sect. 8.6. Evacuation is the preferred action if time permits. Sheltering with some form of enhancement may be appropriate if little time is available to implement protection. In this instance, time may not be available to evacuate even a part of the IRZ. The suitability of sheltering, however, depends on a number of other factors including the type(s) and concentration(s) of agent(s); pre-emergency or expedient measures taken to enhance various buildings' capacity to inhibit agent infiltration; the ability to communicate instructions to the public in a timely and effective fashion; and the accuracy and speed with which estimates can be made on agent direction, speed, and concentration.

The ability to rapidly implement the most appropriate protective action(s) within the IRZ is critical. The emergency response concept plan for each installation includes a thorough analysis of each IRZ and a methodology for choosing the most effective and feasible protective action(s) under various accident scenarios. The analysis and methodology will be further refined in the EPG for each site. Subzones may be defined for the selective implementation of different protective actions. Given a reasonably effective capability to project the area of impact and agent concentrations at the time of a release, for example, it may be appropriate to implement sheltering in affected areas close to the plume pathway and evacuate areas not immediately impacted.

5.2 PROTECTIVE ACTION ZONE (PAZ)

The PAZ is an area that extends beyond the IRZ to approximately 15 to 50 km (10 to 30 miles) from the potential chemical event location depending on the stockpile. The PAZ is that area where public protective actions may still be necessary in case of an accidental release of chemical agent, but where the available warning and response time is such that most people could evacuate. The primary emergency response is evacuation because it is anticipated that there will be sufficient time to permit an orderly and complete evacuation. However, other responses (e.g., sheltering) may be appropriate for institutions and special populations that could not evacuate within the available time.

The distances used as the outer limit for highly detailed planning are based on available warning and response time and on the hazard potential from the stockpile. This distance also represents the maximum distance for fatalities for most chemical event releases during on-post disposal. For those cases where worst-case accidents may have lethal effects beyond the PAZ sufficient warning and response time will also be available to implement protective actions.

The basis for the risk analyses' predictions of down-wind impacts is a wind speed of about 2.2 miles per hour with a level E stability. Under those conditions, the time required for a chemical agent release to reach the inner boundary of the PAZ would range from approximately 2.5 hours (for a boundary 9 km from the agent source) to about 4.2 hours (for a boundary 15 km from the source). This represents sufficient time to implement most protective actions. With wind speeds of about 6.7 miles per hour or greater it is extremely unlikely that lethal doses would reach the PAZ.

The evacuation response must be considered carefully to ensure effective implementation and to assure public health and safety. Like other protective actions, evacuation requires warning. Because warning time will also be limited in the PAZ, effective warning systems are required to alert people and notify them of the most appropriate actions. Available time for implementing protective action varies with agent type, chemical event scenario, and meteorological conditions at the time. These conditions require careful consideration during the emergency planning at each location, since they affect the selection of potential protective actions and the use of certain types of protective equipment or other protective measures.

5.3 PRECAUTIONARY ZONE (PZ)

The PZ is the outermost EPZ and extends from the PAZ outer boundary to a distance where the risk of adverse impacts to humans is negligible. This distance, which may vary substantially based upon the circumstances of an event, must be determined for each chemical event. Because of the substantial warning and response time available for implementation of response actions in the PZ, detailed local emergency planning is not required, although consequence management planning may be appropriate. The boundaries of this zone will vary and need not be set prior to an actual chemical event.

6.0 CHEMICAL EVENT ASSESSMENT AND EMERGENCY NOTIFICATION

Since a release of chemical agent may affect off-post areas quickly, emergency plans must prescribe mechanisms that minimize the time required to determine the existence and potential consequences of a chemical event, to pass this determination to appropriate officials, and to recommend appropriate responses. Therefore, three of the most critical parts of the CSEPP effort are (1) the accurate assessment of the chemical emergency and its potential impact, (2) the timely notification of officials, and (3) the recommendation for appropriate protective actions. Chemical event assessment and emergency notification are discussed in this section; protective action recommendations are discussed in Sect. 7.

6.1 CHEMICAL EVENT ASSESSMENT

Chemical event assessment involves determining the type and nature of an incident or accident and its potential or actual impact. Assessment is both initial and extended and involves many people. Authority and responsibility for both initial and long-term assessment will be in accordance with appropriate federal, state, and local laws.

Initial assessment primarily involves activities such as analysis and monitoring; agent identification and classification; dispersion modeling and dose projection; and conversion of assessment information to emergency response considerations. Initial emergency assessment will be conducted by installation personnel involved with chemical agent facility operations.

If an agent release affects off-post areas, federal, state, local, and other officials may all be involved in extended or long-term assessment. This assessment will primarily be concerned with evaluating the impact of the chemical event on the population and monitoring conditions to protect them. Subsequently, ongoing assessment will be concerned with long-term environmental health effects, air quality, wildlife, soil contamination, etc.

6.2 CHEMICAL EVENT EMERGENCY NOTIFICATION SYSTEM

Army and local officials must identify the type and detail of information that the installation must communicate to the off-post authorities to assist the latter in deciding upon protective actions. Such information includes, but is not limited to, name of communicator; verification number (if commercial telephone is used) or authenticator; time of notification; emergency level; time of event; brief description of event; projected areas of impact; meteorological data; and a recommendation for the implementation of protective actions. Transmission of a hard copy of this information should follow as soon as possible.

There are significant benefits in a standard emergency assessment and notification system at each Army installation. This system expedites crucial decisions and notifications, establishes a common language between on-post and off-post emergency responders, and fosters a clear understanding of necessary responses at all levels.

Chemical emergency scenarios and probabilities specific to each installation will be identified and quantified, in order for them to be linked to a standard chemical event emergency notification system. This permits notification of off-post authorities to include (1) a brief description of the event; (2) a specifically declared emergency level; and (3) recommended protective actions, if any. The recommendation of protective actions should be based on pre-established criteria agreed to by the installation and off-post officials regarding what protective actions would be appropriate under what circumstances. Off-post plans and procedures can be developed to include a range of preparatory and/or automatic responses based solely on the emergency level. The plans and procedures should be organized to define appropriate actions at each level, and should be able to accommodate escalating levels as well as initial notification at high levels.

The criteria considered in making this notification will be based on predicted dosage and distances. The predicted downwind distance of the chemical agent no-effect dosage will be the specific criterion used. A minimum of three chemical surety emergency levels and one non-surety emergency level will be used for notification purposes and will constitute the chemical event emergency notification system.

6.2.1 Non-Surety Emergency Notification

Description

Events are likely to occur or have occurred that may be perceived as a chemical surety emergency or that may be of general public interest but which pose no chemical surety hazard. This includes non-surety material emergencies.

Notification

The installation notifies the IRZ designated points of contact.

Action

No action is required.

6.2.2 Chemical Event Emergency Notification

6.2.2.1 Limited Area Emergency

Description

Events are likely to occur or have occurred that involve agent release outside engineering controls or approved chemical storage facilities with chemical effects expected to be confined to the chemical limited area. This level will be declared when the predicted chemical agent no-effect dosage does not extend beyond the chemical limited area where the event occurred.

Notification

The installation provides emergency notification to the IRZ and state designated points of contact.

Action

IRZ emergency response officials may go to a level of increased readiness in the event an off-post response is required.

6.2.2.2 Post Only Emergency

Description

Events are likely to occur or have occurred that involve agent release with chemical effects beyond the chemical limited area. Releases are not expected to present a danger to the off-post public. This level will be declared when the predicted chemical agent no-effect dosage extends beyond the chemical limited area but does not extend beyond the installation boundary.

Notification

The installation provides emergency notification to the IRZ, PAZ, and state designated points of contact.

Action

IRZ response organizations mobilize to be capable of immediate action. Precautionary protective actions may be initiated in potentially affected areas near the installation boundary.

6.2.2.3 Community Emergency

Description

Events are likely to occur or have occurred that involve agent release with chemical effects beyond the installation boundary. This level will be declared when the predicted chemical agent no-effects dosage extends beyond the installation boundary.

Notification

The installation provides emergency notification to the IRZ, PAZ, and state designated points of contact. The installation will recommend protective actions.

Action

All emergency response organizations mobilize. Protective actions prescribed in the local emergency plan are implemented for the IRZ and PAZ.

6.2.3 Adaptation of the Chemical Event Emergency Notification System

Additional emergency notification levels may be appropriate within these levels at individual stockpile locations to accommodate greater specificity in installation and/or off-post planning or to account for unique local planning factors. When other levels are needed, they will be added within the four levels stated above, not substituted for any of them. When this is done, the highest notification will not necessarily change from that of the community emergency. The addition of emergency notification levels should be approved by the Army installation, state, and all involved off-post jurisdictions. The chemical event emergency notification system at each CSEPP location should be uniform across all jurisdictions involved.

As further assessment information becomes available during the course of an event, the emergency notification levels and protective action recommendations will be adjusted. The potential effect of the chemical emergency will be determined. This involves projecting areas of impact, the potential severity of the impact, and the time frame of the impact. Computerized dispersion modeling techniques that predict the potential no-effects parameters will be a primary source of this information. Provisions should be made for regular and specific updates to off-post authorities as more assessment information becomes available.

7.0 PROTECTIVE ACTION DECISION MAKING

When a chemical event occurs that may affect off-post areas, officials must determine which protective actions are appropriate for different portions of the affected area. The protective action decision is inherently complex and may have to be made within tight time constraints. Emergency planning should strive to simplify the decision process and minimize the time that must be devoted to it in an emergency situation by carefully analyzing the variables involved in the decision and preestablishing criteria to be used in selecting appropriate protective actions. This section discusses issues that should be considered during emergency response planning to expedite protective action decision making in an actual response situation.

Responsibility for deciding what protective actions to recommend to the public lies with off-post elected officials. While others, such as agency or department heads, may share in the decision-making process, legal responsibility generally rests with elected officials. At the time of a chemical agent event, however, the information needed to determine which protective actions are appropriate is immediately available only to personnel on the Army installation. Installation personnel will have the only available information regarding the type and amount of agent released, the location of the release, and the mode of release (spill, fire, or explosion). The installation is also likely to have immediate access to other information, such as meteorological conditions, that is critical to the protective action decision. Thus, planning for protective action decision making must be carefully performed and fully coordinated between on-post and off-post officials to ensure that appropriate protective actions can be identified within the time constraints of an emergency.

In addition, the Army installation must provide information to off-post officials so that they can confirm the initial protective action recommendations and can revise the recommendations as more information becomes available or as conditions change. Therefore, the plans must specify the type of information that installation personnel will provide to off-post officials and identify the responsible on-post individuals and their alternates authorized to communicate this information.

Protective action decision making is a complex process. Decision makers may have to react within rigid time constraints, relying on limited information and faced with few response options. For example, some chemical emergency scenarios will require a decision within 5 minutes of detection. This complexity comes into focus when the decision process is examined by zones.

7.1 IMMEDIATE RESPONSE ZONE (IRZ)

The IRZ, because of its proximity to the event, is the zone in which protective action decisions are most critical. Various real world constraints may conspire to make decision making extremely difficult, and automatic processes may be required to offset these constraints.

7.1.1 Available Information and Time

It is possible that a chemical emergency with off-post effects may happen so rapidly that initial information remains sketchy for some time. The severity of the event will be obvious, but the details surrounding it will be unclear. Public officials may have to act immediately based on Army installation recommendations. Time will not be available for lengthy considerations and extensive data collection. Critical decisions will be required very rapidly.

7.1.2 Available Options

Perhaps the most significant constraint is the limited choice of realistic protective action options. In the IRZ, evacuation would be the preferred action if time allowed and weather conditions were favorable. Otherwise, shelter-in-place, with or without the additional protection provided by pressurization, would be the most appropriate option.

It is apparent, therefore, that some chemical emergency scenarios require making decisions for the IRZ in less than ideal circumstances. These constraints may require that some jurisdictions plan for more automatic decision making. Automatic responses such as taking shelter at once, sealing a room, etc., may be needed. A call from the Army installation to the off-post notification point would trigger such automatic responses. If this approach is followed, it will be critical that each installation and affected communities identify the fast-occurring scenarios and pre-select the most appropriate automatic responses.

It may be prudent to plan for direct Army installation implementation of IRZ protective actions when extreme urgency requires immediate response. For such cases, it will be necessary to carefully work out on an installation by installation basis the conditions, protocols, procedures, and written agreements for such a response. These analyses must address potential legal ramifications as well as identify potential public misperceptions that must be addressed by the public education and information program.

7.2 PROTECTIVE ACTION ZONE (PAZ)

In PAZ planning, the constraints remain similar in nature but are less restrictive, because the availability of time, staff, and options increases. It will be equally important, however, to look at the range of scenarios that could affect the PAZ and to make planning decisions accordingly. It is possible that a worst-case scenario may also dictate somewhat automatic responses. There is a much better chance, however, that public officials would have time to gather—or at least confer by phone or radio—and make appropriate decisions.

7.3 PRECAUTIONARY ZONE (PZ)

This zone offers planners the advantages of time, distance, and multiple options. It will not require much advance planning, since the constraints facing the IRZ and PAZ planners do not exist here or are substantially reduced. Even for worst-case scenarios, public officials will in all likelihood have ample time to make collective decisions.

7.4 FINAL CHOICES

The protective actions chosen must always be weighed against realistic considerations such as time, weather, highway conditions, and the public's general state of readiness to implement the protective actions. The chemical event emergency notification system will greatly help in selecting protective actions. Such a system allows community officials to react quickly to various emergencies using established procedures.

Choosing protective actions effectively at the time of a chemical event requires the existence of detailed decision criteria. The planning process will identify and classify potential accidents at each location and spell out the implications for all the potentially affected zones around the facility. It may then be appropriate to establish accident-specific "automatic" protective actions for certain areas. Subsequent protective action decisions will depend upon the specific circumstances of a release (i.e., type of agent, amount of agent, meteorological conditions, and warning/evacuation time available) and on additional criteria that can only be applied at the time of a release. It is critical that, to the degree possible, protective action decision-making be embodied in detailed procedures that not only eliminate the chance of guesswork, but also save valuable time.

8.0 PLANNING CONSIDERATIONS

While previous sections of this document have discussed concepts and considerations pertinent to critical aspects of CSEPP planning, this section deals more specifically with how to develop a plan that represents effective preparation for the full range of situations that could occur due to a chemical event at a stockpile location. The section begins with a discussion of the division of responsibilities for different aspects of emergency response among different governmental entities during different stages of a chemical event. Next, the relationship between CSEPP emergency planning and a jurisdiction's existing emergency operations plan is discussed. Finally, the major portion of the section is devoted to a description of the specific issues that collectively define the scope of an adequate emergency response plan under the CSEPP. All emergency response plans developed under the CSEPP should address all of the issues identified in this section.

The response to a chemical emergency will occur in stages. Initial response will include those activities necessary to protect the population from the immediate effects of a chemical agent release. The most expedient and practical means of managing the initial response is for affected local governments to implement their pre-calculated emergency operations plans and procedures.

Because of the need for prompt response in implementing protective actions, state and local governments must manage the initial response in cooperation with local Army officials. There will not normally be enough time for local officials to consult extensively with other federal and state emergency management officials. Therefore, based on information and recommendations from the Army installation, local government officials will have to determine the most appropriate protective responses for their citizens and initiate emergency response efforts. Local governments will need to alert the population at risk and notify them of recommended personal protective actions, control access to the affected area in the short term, provide protective equipment for emergency workers, coordinate immediate emergency medical care, provide for special facilities and populations with special needs, and perform many other emergency activities.

Because of the close interaction that is required between local jurisdictions and the Army installation in responding to a chemical agent emergency, it is important that on-post and off-post emergency planning efforts be carefully coordinated. On-post and off-post response plans and procedures must be based on a common understanding of each party's responsibilities and capabilities to ensure timely and effective performance of all critical emergency response functions. <u>Planning associated with all the checklist items in this section and with all the appended planning guidelines must be closely coordinated between on-post and off-post officials</u>.

To respond to situations that may have a rapid onset and require immediate action, local officials may find it useful to authorize on-post officials to initiate off-post emergency response such as public alert and notification. Such arrangements must anticipate potential legal or political barriers and should be formalized in letters of agreement or mutual aid agreements as part of the planning process. These agreements will also require that the on-post organization notify the off-post response organizations immediately when such an authorized response is implemented.

Although initial response must, as a practical matter, be handled primarily at the local level, federal and state officials must be notified as soon as possible after the event. For a chemical event that exceeds permitted release levels, the Army will notify the National Response Center (NRC) to initiate other federal response agencies, if necessary, and will provide back-up notification to the designated state response agencies to mobilize the state response. Following notification by the Army, the NRC will expedite notification of the Regional Response Team (RRT) and the National Response Team (NRT), interagency groups which may be convened to provide expert advice and recommendations.

Once the population at risk has been protected or removed from the hazard, the chief management considerations for subsequent responses will include intermediate and long-term medical intervention, environmental impact assessments, and clean-up efforts. Federal and state health, environmental, agricultural, and wildlife agencies will become involved in the recovery if there is chemical contamination or exposure of people, crops, foodstuffs, wildlife, or livestock. Liability and compensation issues are sure to arise. Claimants will need to address their claims to federal officials who are part of the on-post response team. To the degree possible, planning should anticipate both short-term and long-term recovery concerns and address them suitably. Some of these are briefly discussed later.

The emergency response may affect many jurisdictions, requiring coordination with and resource support from the federal and state levels. Depending upon the magnitude and impact of the emergency, the long-term recovery may be managed at those levels. Whether for initial response or recovery, all planning and management considerations and activities must be specific to each installation. Emergency plans must describe the orderly coordination of emergency response activities among all federal, state, and local agencies that are likely to be involved. The plans must clearly specify the distribution of authorities and responsibilities among these parties, including any anticipated changes in that distribution over the course of response and recovery. Adequate pre-event coordination will ensure that all necessary functions are performed and that the response effort is handled effectively and expeditiously.

8.1 EMERGENCY PLANS

All jurisdictions potentially subject to effects from a chemical event at a stockpile location should engage in hazard-specific emergency planning following the federally established guidelines prescribed in this document. The CSEPP emergency plan should be appended to the existing all-hazards emergency plan and focus on specific CSEPP planning concerns. It is not anticipated that a totally separate, self-standing emergency operations plan (EOP) for the CSEPP will be needed. Specifically, the CSEPP additions to existing plans will consist of (1) an appendix to the basic plan, which addresses the specific CSEPP planning concerns; (2) a set of functional appendices geared to chemical agent response; and (3) a set of position-specific implementing procedures for key emergency responders. Furthermore the CSEPP additions will include all necessary attachments, tabs, enclosures, etc. All CSEPP additions to the local plan will be geared to the chemical event emergency notification system. Plan content and format for the affected IRZ and PAZ will follow current guidelines used in the host state which, in turn, follow federally approved guidance.

The elected officials who are legally responsible for emergency planning must ensure that CSEPP emergency response plans are properly developed, reviewed by key staff, adopted by the jurisdiction, exercised, and implemented by emergency services personnel. Emergency functional responsibilities will be assigned to the best-suited office or agency, and private sector groups will be enlisted to support the public officials. These same officials must identify the range of emergency situations or conditions to be planned for and work out appropriate mutual response agreements. Public officials cannot delegate their responsibility, but they can authorize others to take specific actions during emergencies.

General planning guidance for emergency plans is presented in the following checklist. More detailed guidance is included in Appendix A.

8.1.1 Emergency Plans Checklist

Every affected county and state jurisdiction shall have a chemical agent response plan or specific appendix to its EOP that shall:

1-1 Bear the signature of the appropriate elected official(s) or chief administrator of the jurisdiction attesting to plan review, acceptance, and promulgation.

1-2 Cite appropriate federal, state and local authorizing legislation, ordinances, and regulations.

1-3 Assign responsibility for all key emergency functions. The descriptions of these functions will include a clear, concise matrix listing all agencies having primary and support responsibilities for each function.

1-4 Identify by title the specific individuals authorized to direct the emergency response.

1-5 Identify federal, state, local, and private sector support organizations and define their respective responsibilities.

1-6 Contain detailed position-specific implementing procedures for emergency officials involved in the off-post emergency operating center (EOC) and field operations.

1-7 State the major geographic, political, and demographic features of the EPZs, emphasizing the features that most affect emergency response.

1-8 Include maps of the EPZs delineating the IRZ and PAZ with all of their subzones.

1-9 Reference the major scenarios or categories of scenarios that form the basis of risk assessment and planning.

1-10 Identify the major population centers at risk.

1-11 Describe the standard chemical event emergency notification system used on- and off-post.

1-12 Contain procedures that provide for appropriate response based on each notification level.

1-13 Identify the responsible on-post individuals and their alternates authorized to communicate information to off-post officials.

1-14 Describe in detail the circumstances under which county governments authorize the Army to directly initiate off-post protective actions and the activities the Army will perform in those circumstances.

1-15 Reference all necessary letters of agreement or MOU between local officials and other public or private groups. These letters or memoranda will be filed in the off-post EOC, with the affected group or organization, and in other places as appropriate.

1-16 Explain all abbreviations and define all program-specific terms used in the plan.

1-17 Contain plan update guidelines and a record-of-change page.

1-18 Include procedures for maintaining, in the EOC or other appropriate place, a record of the distribution of the plan, including the name of each recipient, the number of the plan copy sent to that recipient, and the date of transmittal of the copy.

1-19 Contain a record-of-receipt form.

1-20 Provide for annual plan update following a cycle of drills and exercises.

8.2 COMMAND AND CONTROL

Under the National Contingency Plan (NCP) the federal response to hazardous substance accidents is led by the federal on-scene coordinator (OSC). For chemical events related to military installations, the OSC will be the installation commander while the IRF is operative or a general officer in command of the Army's SRF if it is activated. The OSC will coordinate and direct the federal emergency response. The OSC is the point of contact for coordination of the federal response effort with those of the state and local communities. The OSC is also a source of valuable support and information to the local emergency response community. Further, the position as OSC allows access to extensive federal resources beyond those provided by DOD.

The responsibility for off-post emergency response rests with first response organizations of the affected jurisdictions. If more than one local jurisdiction is affected, or if the situation escalates beyond local capabilities to effectively and efficiently respond, state involvement may be requested. Federal resources and assistance will be available through the OSC.

Command and control of the off-post emergency response will be coordinated from an off-post EOC designed and equipped for this purpose. A chemical emergency lends itself to response from a fixed facility EOC. The highest ranking local elected official or another local government official authorized to act for the head of government directs the EOC staff. It is important that other members of the highest elected body (commissioners, etc.) be present to help make needed policy decisions.

Every emergency plan should designate a primary and an alternate off-post EOC. The primary off-post EOC should be outside the IRZ but can be within the PAZ. The alternate off-post EOC should be within the

PAZ, but further away from the post or in a different wind direction than the primary off-post EOC. Prevailing wind conditions also need to be considered in selecting off-post EOC locations.

Because of the speed with which command and control must be established during a chemical agent emergency, local governments must develop procedures for activating the off-post EOC as quickly as possible after receipt of notification that a release has occurred or is likely to occur. Local governments should consider authorizing the individual staffing the off-post notification point to activate the EOC if certain preestablished conditions are met.

Operational management of the response to the chemical emergency rests with those in charge of day-to-day operational units assisted by volunteer agencies. All organizations whose services are likely to be needed during the response should be represented in the off-post EOC by an official with authority to commit resources from that operational unit.

Many emergency services organizations use the Incident Command System (ICS) to coordinate on-scene emergency response. The system provides for effective and efficient management of personnel, facilities, equipment, and communications. Some types of emergencies (such as major fires, large hazardous materials events, major transportation accidents, etc.) require the coordination of vast resources and especially lend themselves to an ICS application. These events not only require coordination of many resources but may also require a command post close to the operational scene. This command post must remain in constant coordination with the off-post EOC where overall disaster or emergency management decisions are made. Several states and local governments already employ the ICS for emergency response. Therefore, any state or local government may incorporate the ICS into its CSEPP emergency response structure.

Typically, off-post EOC staffing will include elected officials as well as emergency management coordinators and representatives from law enforcement, fire, medical, public information, school, transportation, and social service organizations. Non-government or private sector organizations whose support services are likely to be needed could also be represented in the off-post EOC. The organization of the off-post EOC staff and support entities will vary considerably depending upon the characteristics and resources of the community involved. The principal consideration is that all organizations and agencies potentially involved in the emergency response be represented there to the extent possible.

When multiple jurisdictions are involved, there is need for prior agreements regarding the activation of multiple, separate off-post EOCs and inter-EOC coordination. An important coordination aspect is agreement by all public officials in adopting communication protocols and a common message and information form. This will assure a standardized communication process between off-post EOCs.

The level of local government able to establish and operate an off-post EOC for direction and control purposes will vary from one location to another. Jurisdictions below the county level may lack the resources and capability to do so and may be unable to adequately respond to an emergency. In this case, command and control of emergency operations should be accomplished at the county level. However, where sufficient resources and capabilities exist, sub-county jurisdictions near an installation could perform their own principal command and control functions. A combination of county-level and sub-county-level command and control mechanisms may also be appropriate. Regardless, coordination of responsibilities and procedures always remains critical.

Initial command and control mechanisms should effectively coordinate the use of immediately available resources. Public protective action options available during a chemical emergency are largely self-protective. Although local government resources can facilitate and support these protective actions (e.g., expediting evacuation through traffic control and transportation assistance), the most critical command and control function is to provide timely and accurate public alert, notification, and information to elicit the quickest public response. Other functions (e.g., medical assistance, mass care, etc.) can be provided initially by locally available resources and augmented later when other resources become available.

The Army EOC and local EOCs should exchange liaisons. These liaisons are not to be confused with the public affairs personnel whose task is to coordinate public information matters in the Joint Information Center (JIC).

General planning guidance for command and control is presented in the following checklist. More detailed guidance is provided in Appendix A and Appendix B.

8.2.1 Command and Control Planning Checklist

Each affected county and state jurisdiction with significant population within the EPZ shall

2-1 Establish an off-post EOC which is outside the IRZ and able to accommodate sufficient staff for all decision making, administration, communications, and related support operations on a 24-hour basis during an emergency.

2-2 Provide for protection of off-post EOC personnel to allow for continued functioning of the EOC. This may include positive pressure ventilation and filtration systems.

2-3 Assure that all off-post EOCs are capable of reliable communications with all involved response agencies during all phases of the emergency.

2-4 Designate an alternate off-post EOC outside the IRZ in case relocation of the primary EOC is required.

2-5 Provide for extended EOC operations including emergency power, sleeping accommodations, food preparation, and sanitation for the staff for a minimum of 4 or 5 days.

2-6 Identify the official(s) authorized to activate the plan and the off-post EOC and designate a chain of command for this activation.

2-7 Describe at which chemical event emergency notification levels the off-post EOC will be activated and identify the actions to be taken to activate the facility.

2-8 Indicate how all EOCs involved will be coordinated.

2-9 Designate a liaison to the on-post EOC.

2-10 Assure that Army liaisons to the IRZ and other off-post EOCs have been designated.

2-11 Name the individual by title responsible for technical, administrative, and material management of the off-post EOC.

2-12 Designate a chain of command for notifying key personnel involved in activating and operating the EOC.

2-13 Specify the notification process for key officials at each emergency level.

2-14 Describe the notification and coordination linkages when multiple jurisdictions are involved.

2-15 Describe the relationship between state and local emergency response efforts and the federal response efforts directed by the OSC, and describe procedures to coordinate the efforts of the different levels of government during an emergency.

8.3 COMMUNICATIONS

Coordinating emergency response to a chemical event calls for three critical communication capabilities:

- Direct, reliable, and redundant communication between the Army EOC and the off-post EOCs (both primary and alternate) of all IRZ counties and states;

- Reliable interjurisdictional EOC communications for all affected off-post areas as well as links with the state emergency services or related agencies; and

- Reliable communications between all off-post EOCs and their field units.

Because emergency information must be transmitted quickly and accurately, the emergency communication system must have both a high reliability factor and redundancy. Dedicated, nonpublic telephone lines are an effective means of on-post to off-post communication. However, dedicated lines may have limited application due to the distances involved and telephone facility limitations. In addition, they may become inoperative due to weather, line damage, or system overload. Radio links using dedicated frequencies offer another effective means of communication. A communications network, consisting of redundant telephone and radio systems, should be designed and installed to link the Army installation EOC and notification point with the EOCs and notification points of all IRZ counties and states. Regardless of whether the telephone or radio system is designated the primary method of communication, the other system must be provided to serve as a backup. Both primary and alternate systems must have high reliability.

On-post to off-post initial notification should be handled in a way that gains the attention of the off-post personnel and provides needed information. This initial notification must go to a facility staffed around the clock, capable of further disseminating the messages and activating resources within time frames that will ensure protection of the population at risk. Systems must also provide for timely interagency and interjurisdictional communications.

Once the off-post coordinating agencies have received the initial information, they must be able to communicate with, activate, and mobilize their respective response units such as law enforcement, fire, emergency medical, rescue, and other public safety resources as well as governmental, health, school, and other special facility authorities. Communicators must be able to handle information related to chemical emergencies accurately and in a timely manner because of the nature of the hazards. As local emergency plans are updated, internal communication protocols should be reviewed and modified as needed to assure rapid and accurate information transfer.

General planning guidance for communications is presented in the following checklist. More detailed guidance regarding communications equipment and systems is provided in Appendix C, and communication practices and protocols are addressed in more detail in Appendix A.

8.3.1 Communications Planning Checklist

Each off-post plan shall

3-1 Identify, by title, the on-post individuals and their alternates authorized to communicate necessary information to off-post authorities.

3-2 Provide for daily testing of primary and back-up communication links between designated on-post and off-post notification points.

3-3 State how all involved local and state governments will promptly and reliably receive emergency notification and related information either from the post directly or through designated contact points.

3-4 Indicate how exchange of information between all involved off-post agencies and governments will occur.

3-5 Require that each off-post response agency have the capability to alert and communicate with all its field response units.

3-6 Require that all contact lists be updated whenever changes in personnel occur or be reviewed at least on a monthly basis.

3-7 Require interagency and interjurisdictional radio communication between emergency communication centers.

3-8 Require both a dedicated telephone link and a dedicated radio link to tie the on-post notification point and EOC to the notification points and EOCs of IRZ counties and states.

3-9 Require the capability for high-speed transfer of hard copy via computer or telephone facsimile between on-post and off-post EOCs.

3-10 Establish a communication system with maximum practicable reliability between on-post and off-post EOCs.

3-11 Require that communications between the primary alerting and notification points on post and off post be tested during regular work hours at least once a month.

3-12 Require that the monthly test of communications between primary alerting and notification points be conducted during nonworking hours at least twice a year.

3-13 Require regular communication checks between on-post and off-post EOCs.

3-14 Require monthly communication checks between EOCs and response units.

8.4 CHEMICAL EVENT EMERGENCY NOTIFICATION

Section 6 discusses in detail the chemical event assessment process and the related standard chemical event emergency notification system. The responsibilities associated with these two areas belong primarily to the Army installations. The goal of these responsibilities is accurate, complete, and timely communication of critical chemical event information to local officials to allow them appropriate response.

Planning must adequately cover this critical communication between on- and off-post officials. Army representatives and local officials must understand and mutually agree to the protocols the Army will follow in communicating the critical chemical event information. Local plans must have procedures for receiving and acknowledging this information and acting appropriately on it.

8.4.1 Chemical Event Emergency Notification Planning Checklist

4-1 Within 5 minutes from initial detection of an actual or likely chemical agent release at APG, ANAD, BGAD, NAAP, and PBA, and within 10 minutes from initial detection of an actual or likely release at PUDA, TEAD, and UMDA, the Army installation will notify the designated off-post point(s) of contact of the actual or likely occurrence, its chemical event emergency notification level, and recommended protective actions.

Each affected county and state jurisdiction plan shall have procedures for receiving and acting upon chemical event assessment information that shall:

4-2 Identify, by title, the on-post officials responsible for accident assessment and for initiating off-post notification.

4-3 Require a 24-hour capability for receiving emergency notification and protective action recommendations from the installation.

4-4 Include a standardized format for receiving timely chemical event assessment information and recommendations from on-post authorities.

4-5 Describe how information (including computerized information) on chemical event assessment and plume pathway predictions will be received and used.

4-6 Tie all emergency response decisions and actions to the chemical event emergency notification system.

4-7 Require the capability of receiving a hard copy of the initial chemical event assessment information and subsequent assessments and updates.

8.5 PROTECTIVE ACTION DECISION MAKING

State and local officials are responsible for deciding what protective actions to recommend to the public in the event of a release of chemical agent. Because of the limited time available to make this complex decision during an emergency, it is important that the protective action issue be thoroughly examined during the readiness phase. The emergency plan should prescribe the most time-efficient process for deciding on protective action recommendations and should specify the circumstances and conditions under which the process would be implemented.

Under some release scenarios, exposure of populations could occur before local decision makers could collect the necessary information and implement the prescribed decision making process. Therefore, the emergency decision process included in the local emergency plan should be incorporated into the installation's chemical event emergency notification procedures. Thus, the protective action recommendations conveyed by the installation as part of the initial notification process would be based on the decision criteria developed by the off-post officials. This method does not transfer the local officials' decision making authority to the Army; instead, it assigns the installation responsibility for implementing the decision making process developed by off-post officials.

8.5.1 Protective Action Decision Making Planning Checklist

Each off-post plan shall have procedures for rapid and effective protective action decision making that shall

5-1 Designate a 24-hour notification point for each affected state, county, and municipal government.

5-2 Identify, by title, the individuals and their alternates authorized to make protective action decisions.

5-3 Provide for 24-hour decision making capability.

5-4 Specify the decision criteria to be used by Army installation personnel to select protective action recommendations for inclusion in the initial off-post notification.

5-5 List clearly the off-post response actions that local officials authorize the Army to implement in cases of extreme urgency and the conditions under which they are to be implemented.

5-6 Describe the protective action decision making process.

5-7 Contain a schematic diagram showing the individuals responsible for decision making.

5-8 Base protective action decision making on the standard chemical event emergency notification system used at each Army installation.

5-9 Identify protective actions for each population group within the EPZ by accident scenario.

8.6 PROTECTIVE ACTIONS AND RESPONSES

The basic goal of any emergency management program is to protect people from exposure. Stimulating prompt and effective actions by the public is crucial in achieving this goal. Once the basic protective action options are selected, other activities help implement those protective actions. There are two basic protective actions to a chemical emergency: evacuation and shelter-in-place.

Evacuation consists of removing individuals from an area of actual or potential hazard to a safe area. It is the most effective of all protective actions provided it is completed before the arrival of the toxic plume. Evacuation may be precautionary or responsive in nature. Precautionary evacuation is desirable because it occurs before the population is at high risk. A responsive evacuation, in contrast, occurs after a release and could expose some or all evacuees to the hazard. Both types entail similar planning tasks: estimating the number of potential evacuees, with particular emphasis on special populations; identifying the most appropriate evacuation routes; designating needed traffic control; estimating the time needed for evacuation; and anticipating potential problems. These tasks must be well coordinated with all the other emergency functions described in this document.

Shelter-in-place is accomplished by shielding the public from a hazard. Shelters may be congregate (for many people) or individualized (a home). Shelters may be existing structures, with or without upgraded protective measures, or facilities specifically designed to provide shelter from toxic chemicals.

In CSEPP there are four types of shelter-in-place: normal, expedient, enhanced, and pressurized.

Normal shelter-in-place involves taking cover in a building, closing all doors and windows, and turning off ventilation systems. Effectiveness is improved by going into an interior room. The shelter should be opened up or abandoned after the toxic plume has passed.

Expedient shelter-in-place is similar to normal shelter-in-place except that, after going into the room selected as a shelter, the inhabitants take measures to reduce the rate at which air or chemical agent enters the room. Such measures would include taping around doors and windows and covering vents and electrical outlets with plastic. Effectiveness is improved if the room selected as a shelter is an interior room. The shelter should be opened up or abandoned after the plume has passed.

Enhanced shelter-in-place is similar to normal shelter-in-place except that it involves taking shelter in a structure to which weatherization techniques have been applied before the emergency to permanently reduce the rate at which air or chemical agent seeps into the structure. Effectiveness is improved by going into an interior room. The shelter should be opened up or abandoned after the toxic plume has passed.

Pressurized shelter-in-place is similar to normal shelter-in-place except that the infiltration of contaminated air from outside the shelter is effectively prohibited by drawing outside air into the shelter through a filter that removes chemical agent. This filtered air creates a positive pressure in the shelter so that clean air is leaking out instead of contaminated air leaking in.

The duration of protection offered by unpressurized shelters is limited. Because such shelters cannot be made completely air-tight, they will be gradually infiltrated by chemical agent. People in the shelter will be exposed to gradually increasing concentrations of agent, and exposure will continue even after the chemical agent plume has passed by outside. Consequently, unpressurized shelters should be used only for chemical agent releases whose duration is shorter than the length of time that it would take agent to infiltrate the available shelters. In addition, use of unpressurized shelters requires the capability to advise sheltered people to abandon their shelters when the plume has passed.

General planning guidance regarding protective actions and responses is presented in the following checklist. More detailed guidance is provided in Appendix E.

8.6.1 Protective Actions and Responses Planning Checklist

Each plan shall provide guidance on protective action options by planning zone and shall

6-1 Establish protective action procedures keyed to the chemical event emergency notification system for all emergency officials.

6-2 Specify potential protective action responses for each chemical event emergency notification level on a zone-by-zone basis.

6-3 Include procedures for estimating the number of potential evacuees.

6-4 Identify the most appropriate evacuation routes for the evacuees.

6-5 Incorporate the results of evacuation time estimates for the potential evacuees.

6-6 Identify all structures for which positive pressure and filtering equipment is needed or is in place.

8.7 PUBLIC ALERT AND NOTIFICATION

Emergency planning must provide for one or more methods of alerting the public. These methods must cover the emergency zones, must be reliable, and must be capable of instantaneous activation.

Alert and notification rely upon two separate and distinct steps: (1) attracting the attention of the public (alerting) and (2) providing information concerning appropriate protective actions (notifying). The public must be aware of this two-step process, so that when alerted, it will listen for information from designated systems like the Emergency Broadcast System (EBS).

Currently available systems are capable of alerting and notifying most individuals before the arrival of a potentially lethal agent concentration. The primary alert and notification system for the IRZ should consist of a network of outdoor warning devices covering all populated areas of the zone along with indoor devices in each inhabited residential dwelling unit. Electronic sirens with voice message capability should be used for outdoor alert and notification. Tone-alert radio units should be used for indoor warning. This primary system may be supplemented with other warning methods where warranted (e.g., flares to alert power boat users). Route alerting procedures should be developed as a back-up system in case the primary system fails. However, the limitations of the route alerting procedures must be carefully anticipated, especially in the IRZ.

Within the PAZ, given the greater warning time available, a different combination of warning measures can be designed for specific applications to population centers, institutions, and other special facilities. Coupled with media and EBS announcements, route alerting would provide effective warning within most areas of the PAZ.

To the extent possible, public notification messages should be prescripted to allow for thoughtful preparation of brief, complete, and accurate messages containing carefully prioritized information. Protocols must be developed to govern the use of these prescripted messages under variable conditions to ensure that the appropriate message will be selected when required for an ongoing chemical event. Given the complexity of the off-post planning, it is anticipated that separate and distinct messages will be needed for each of the three emergency zones and possibly within individual zones. In all likelihood, protective actions will differ in each zone, even though parts of all three zones may be in the same plume pathway.

Public notification messages should provide for non-English speaking populations and refer to familiar highways and streets, landmarks, or other well-known designators in presenting clear, unambiguous directions. Such messages also should recommend specific protective actions, give pertinent instructions for implementing the action (e.g., indicate what personal belongings to take if evacuation is recommended), and clearly state the time frame for implementing the protective action.

General planning guidance for public alert and notification is presented in the following checklist. More detailed guidance is provided in Appendix F.

8.7.1 Public Alert and Notification Planning Checklist

Each plan shall provide for comprehensive public alert and notification procedures for potential populations at risk. The plan shall

7-1 Require that people in the IRZ be covered by adequate and reliable public alert and notification systems.

7-2 Require that outdoor recreation areas and populated areas within the IRZ be equipped with outdoor alerting and notification systems.

7-3 Require that outdoor alerting and notification systems have an alert signal standard of at least 10 decibels above ambient noise levels.

7-4 Provide for indoor alerting and notification of inhabited residential units within the IRZ.

7-5 Provide for alert and notification of any significant populations of non-English speaking residents within the IRZ.

7-6 Require that the population within the PAZ receive warning and notification via the electronic media, the EBS, route alerting, or other means appropriate to the zone.

7-7 Provide for alert and notification of each institution in the IRZ and PAZ.

7-8 Require that the sensory impaired have suitable mechanisms to receive alert and notification such as teletype devices for the deaf (TDDs) or flashing lights.

7-9 Establish procedures for alerting and notifying special populations and non-English speaking groups, isolated individuals, and people in unique situations such as campers, hunters, etc.

7-10 Require that the alert and notification system within the IRZ be tested on a monthly basis.

7-11 Require that the alert and notification system in each jurisdiction and in all affected institutions, population centers, recreational areas, and major employment centers within the PAZ be tested at least annually.

7-12 Require that public notification messages be prescripted and available to the appropriate radio and television stations at the time of the chemical event.

7-13 Require that public notification messages clearly identify areas at risk by using well-known, local designators such as streets, highways, landmarks, etc.

7-14 Require that all public messages on protective actions provide as much detail as necessary to implement the recommended protective actions.

8.8 TRAFFIC AND ACCESS CONTROL

When an emergency is imminent or has occurred, access into the affected area must be quickly controlled to prevent additional people from becoming unnecessarily exposed to the hazard as well as to protect the property within the area. Access control points (ACPs) must be carefully planned at locations that permit traffic turn-around or continued exit from the restricted area. These points will be pre-designated to allow the immediate dispatch of personnel and commitment of resources. If any of the predesignated locations are in or near another local government jurisdiction, agreements should be arranged for using uniformed personnel from the other jurisdiction. All arrangements need to be approved by the officials of both jurisdictions.

Access control for a chemical event affecting off-post areas will also be necessary if the Army creates a National Defense Area (NDA) off the installation. Off-post law enforcement officials may be needed to assist on-post security personnel in this event. The creation of an NDA permits the Army to use military forces to effectively control nonfederal lands or areas when necessary for reasons of national security. An NDA may not encompass the entire area of contamination. Security of those portions of the contaminated area outside of the NDA will be the responsibility of the local authorities, although military support can be requested. The military commander is authorized to set up an NDA and must define its boundaries. Once defined, the NDA will be closely marked or identified with appropriate barriers, signs, tapes, etc. Warning signs will be written in any languages necessary to cover special populations in the area.

Local civil authorities may be asked to restrict unauthorized access to and remove unauthorized personnel from the NDA and may need to arrest or apprehend transgressors. Close cooperation between federal and local authorities (in accordance with DOD Directive 5200.8 as specified in DA PAM 50-6) is essential in planning for such an eventuality.

Experience has shown that official, uniformed personnel are more effective at ACPs than nonuniformed personnel. ACPs may also be unstaffed. Signs, barricades or traffic barriers are the simplest forms of control, but these measures may not be effective because they are easily moved or bypassed. "Fixed" barriers such as parked vehicles and piles of stone, gravel, or sand are more effective controllers, and their effectiveness probably outweighs the inconvenience of positioning them. Electronic signs that can be rapidly activated from the communication center are very effective when used with automatically lowered gates or other remotely activated roadblocks. Selected methods should prevent unnecessary access. Admission of individuals with legitimate reasons to reenter the restricted area must be carefully controlled to assure that those permitted to reenter are not endangering themselves or others.

Law enforcement personnel may also be called on to provide security in and around the evacuated area. Residents who comply with official recommendations to evacuate have a right to expect that their property will be secure and that law enforcement personnel will, to the degree that safety permits, patrol the evacuated areas.

In any mass evacuation, traffic control is crucial to the timeliness and efficiency of the evacuation, especially in urban areas where potential for traffic congestion is greater. Traffic control depends less upon uniformed law enforcement personnel for effectiveness than access control, since traffic controllers do not have a security function. Personnel and equipment from the public works or highway departments represent resources readily available and ideal for controlling traffic. Judicious use of traffic control devices (barricades, traffic cones, and flares) can supplement staff for traffic control, within the limitations pointed out above.

Evacuation time estimates (ETEs) will help identify potential traffic congestion points, probable vehicle loading, the most efficient evacuation routes and the best locations for control points. Local law enforcement officials can be very helpful when doing ETEs because they deal with traffic congestion on a daily basis and can provide insight into traffic problems within the community. A well-designed traffic control plan will significantly improve the flow of traffic in an evacuation, resulting in a shorter evacuation time and reduced hazard exposure for evacuees. Planners need to include the results of CSEPP technical studies on evacuation in the planning process.

Local topographical features directly impact planning for traffic and access control. Close coordination between on-post and off-post officials is critical to minimize problems associated with the movement of large groups of people over evacuation routes. Equally close coordination among public officials is essential to avoid problems caused by the movement of people from and through multiple jurisdictions. Therefore, it is imperative that planners review all arrangements and procedures with all affected local officials to assure that plans do not work at cross purposes.

Effective plans will establish procedures for adapting in response to road maintenance or construction projects that were not foreseen when the evacuation plans were prepared. Alternative routing may be needed. Similarly, plans must anticipate seasonal problems such as ice and snow, heavy tourist influx, summer recreational loading, etc. Evaluating commercial utilization of routes is also important so that evacuees are not forced to compete with semitrailers for space on heavily traveled main roads and secondary roads.

Reentry into evacuated or restricted areas also requires careful consideration. The plan must address acceptable ways to identify persons who have a right to return to the restricted area. Criteria, required protective equipment, and procedures for reentry should be stated clearly. Equally important is identification of control or reentry points.

General planning guidance for traffic and access control is presented in the following checklist. More detailed guidance is provided in Appendix G.

8.8.1 Traffic and Access Control Planning Checklist

Each plan shall contain detailed instructions on limiting access to risk areas and controlling traffic during evacuation or reentry. The plan shall

8-1 Designate ACPs around all zones where protective actions may be taken and coordinate such designations with the installation and neighboring jurisdictions.

8-2 Designate locations for traffic control points (TCPs) based on traffic flow patterns.

8-3 Establish procedures for mobilization of personnel for access or traffic control and sequential activation of control points.

8-4 Identify necessary staff and specialized equipment resources to support initial and long-term control operations.

8-5 Identify evacuation routes.

8-6 Establish procedures for controlling access and traffic during reentry.

8-7 Prepare for the possibility of long-term access control if reentry is delayed because of contamination.

8-8 Prepare for the possible implementation of a NDA by the Army.

8-9 Require that all EOCs and response organizations list all ACPs and TCPs and locate them on maps.

8-10 Require that ETEs be made for each location on a zone-by-zone basis for all areas that are potential evacuation zones.

8-11 Assure that when ETEs are made, special population groups are carefully considered and their particular requirements are factored into the estimates.

8-12 Designate buses, vans, or other vehicles for individuals in need of transportation.

8-13 Require the coordination of off-post and on-post evacuation plans.

8-14 Have procedures for monitoring current road conditions.

8.9 SPECIAL POPULATIONS

An emergency response program must provide for individuals and groups both in and out of institutions who require special consideration in emergencies. These special populations include, but are not limited to, the sensory, mobility or mentally impaired; unattended children; children in preschool facilities; school students; hospital patients; nursing home residents; individuals in correctional facilities; individuals living at home with special equipment needs due to medical conditions; chronically ill persons particularly susceptible to agent exposure; people who do not own or have access to an automobile; and residents of private care or convalescent homes.

The first task involving special populations is identifying such individuals and groups. Institutionalized populations are generally easy to locate; however, noninstitutionalized persons are sometimes very difficult to identify. Planners have to work closely with welfare or social service agencies, religious, fraternal, sororal, and service organizations, and volunteer and nonprofit groups at the state, county, and community levels. Typical agencies are those dealing with the aging, day-care youth, exceptional children, the homeless or those needing shelter, people with language or cultural differences, the mentally or physically disabled, etc. While the need for confidentiality generally prevents such agencies from providing direct information, these agencies are usually quite willing to provide questionnaires, referral information and assistance to their clients who can then identify themselves to planners. Direct surveys have also been used to identify special needs populations. One source of information will be the owners, managers, or operators of apartments, condominiums, or other housing complexes. Other sources are utility billings, tax lists, trash or refuse billings, volunteer fire company rosters, or ambulance service subscriber lists.

The lists of special needs individuals and the arrangements made on their behalf should be filed in the off-post EOC, clearly stamped as restricted under the Privacy Act, and restricted to those emergency responders with a need to know. The same rules of confidentiality apply if this information is also maintained in electronic form on an automated system. The same procedure applies on the installation. These confidential lists must be updated as often as needed but at least annually. The procedures for doing this must be spelled out. As much as possible, people named on confidential lists or responsible for someone on such a list should be encouraged to furnish updated information as needed when conditions change as a result of therapy, improvement, moving, or death.

The community public education and information program should include input from representatives of the special population groups. An important part of the education program is mailing information on "what to do in an emergency." A "special needs" postcard or questionnaire can be included in this mailing to allow individuals to respond if they believe they require special consideration during an emergency. In other programs the response to this type of mailing has been significant. Direct verification of the special need is vitally important.

In the event of an emergency, alerting and notifying the special needs population is the second challenge. The sensory impaired require special considerations. Various devices are available. One- or two-way personal communicators, such as digital transmitters or tactile paging systems, can be used. Also tone-alert radios can be altered to add a light, and the television portion of the emergency public information system can include printed as well as oral instructions. Some of the hearing impaired have telephones equipped with a TDD that allows printed communications from point to point via commercial telephone lines. This device displays the communication on either a light-emitting diode (LED) or a printed hard copy. These devices could be included in the alert and notification system with the addition of a TDD in all EOCs. Individuals who are both hearing impaired and sight impaired will require additional attention to assure they are supported by a friend, relative, or other designated contact who can receive appropriate instructions.

For non-English speaking populations public education or awareness literature or media announcements should be provided in a language that can be understood. Common sense dictates that some limits will have to exist on just how many languages can be reasonably handled in an emergency response situation. The Census Bureau publishes a list of counties in which minority populations are sufficiently large to warrant publishing voting information or having educational programs in a minority language.

Identifying noninstitutionalized persons with a mobility problem will be necessary to accurately assess their overall requirements for transportation. Many of the mobility impaired will not require outside assistance for transportation but may require special help in terms of mass care accommodations in the event of an evacuation. The availability of sanitary and other facilities for the handicapped is essential in buildings to be used as mass care centers.

There may be noninstitutionalized individuals within the community with a medical condition requiring specialized transportation and specialized medical care like ventilatory support or dialysis. Special arrangements for these cases should be made at hospitals outside the PAZ.

Youngsters in public and private schools and in child care facilities as well as people not having personal transportation must be included when assessing overall transportation needs. Arrangements for transporting these groups should be widely publicized as a part of the public information program. Special attention should be given to informing parents about arrangements for the protection of school children. Repeated efforts will be required to persuade parents that their children's safety has been adequately assured. Major logistical problems could occur if parents attempt to pick up their children at schools during evacuation. Parents need to be confident that their children are being cared for and need to know where the children can be found after the evacuation. Such information should be disseminated through public awareness materials and EBS messages.

Hospitals, nursing homes, and correctional facilities within the IRZ and PAZ present the greatest planning challenge. Highly detailed hospital plans are necessary if protective actions are to be implemented successfully for a chemical event. Nursing homes present primarily a transportation and evacuation problem. Planning will determine approximately what percentage of the residents requires ambulances, wheelchair-equipped vans, buses, etc. Many such facilities may routinely classify patient transportation needs during their admission and can access this data very quickly. Others can easily be trained to do so.

Correctional facilities will present significant challenges in balancing protective responses and security considerations. Given the problems in secure transportation and the requirements for secure relocation facilities, it may be necessary to evaluate other options, such as providing large correctional facilities with positive pressure filtered ventilation systems, rather than to attempt the evacuation of such populations.

8.9.1 Special Populations Planning Checklist

Each plan shall provide for adequate protection of all special population groups. As necessary or appropriate, special facility plans will be prepared for hospitals, intermediate- and long-term care nursing facilities, schools, and correctional facilities. Each plan shall

9-1 Identify all special population groups including

A. attendees at day-care facilities, nursery schools, kindergartens, schools, colleges, or other educational institutions;

B. occupants of hospitals, intermediate- and long-term care nursing facilities;

C. the sensory, mobility, or mentally impaired;

D. homebound people requiring specialized medical assistance;

E. people without access to transportation;

F. inmates of correctional facilities;

G. people without access to electricity, telephones, or public media;

H. non-English speaking groups; and

I. transients and homeless.

9-2 Specify ways to maintain the confidentiality of anyone requiring special assistance.

9-3 Require that lists of noninstitutionalized people with special needs are updated regularly.

9-4 Identify specialized protective, transportation, and care options for special groups.

9-5 Specify protective, transportation and care options for the noninstitutionalized handicapped. This includes designating a relative, friend, or neighbor responsible to contact and help the impaired at the time of an emergency.

9-6 Establish how information on the special needs populations will be collected and processed.

9-7 Specify how evacuation route maps will be given to drivers of buses, vans, or other vehicles carrying special populations prior to an emergency.

9-8 Assure that emergency plans for inmates of correctional facilities are kept secure and confidential.

9-9 Specify ways for previously unknown special needs individuals, such as migrant workers, to identify themselves at the time of the emergency.

8.10 EMERGENCY SUPPORT OPERATIONS

Many emergency operations require deploying emergency workers in field activities, some of which may expose the workers to a hazard. Therefore, emergency workers need to take appropriate protective measures. Emergency workers involved with chemical agent emergencies face an uncommon and highly dangerous threat from substances designed to kill.

The definition of "employer" in the Occupational Safety and Health Act does not include state or local governments and so the Occupational Safety and Health Administration (OSHA) does not automatically have jurisdiction over the working conditions of public sector employees. States have the option, with OSHA approval, of adopting and enforcing occupational safety and health rules that are equivalent to or more stringent than OSHA rules. Those States which have not adopted OSHA-approved rules must comply with Federal Environmental Protection Agency (EPA) rules for occupational safety.

There is a differentiation between an employee responding directly to a chemical stockpile release for the purpose of containing the release and an employee responding in a support capacity, such as traffic control. The interpretation of these rules must be made by the State, in the case of those States with OSHA-approved rules, and by EPA in every other case.

The Army has obtained concurrence from the National Institute of Occupational Safety and Health (NIOSH) and OSHA on the recommended protective clothing and equipment ensemble for civilian emergency responders in CSEPP. For the specific requirements and additional information, refer to Appendix H, "Planning Guidelines for Emergency Support Operations."

Emergency workers must become fully aware of the hazards associated with the agents and the severe danger of approaching known or suspected contaminated sources or conducting decontamination without appropriate protective equipment.

8.10.1 Emergency Support Operations Planning Checklist

Each plan shall provide for the safety and protection of emergency workers. The plan shall

10-1 Require proper identification of all emergency workers and vehicles.

10-2 Require that all emergency workers who may be exposed to chemical agents as a result of their assignment receive personal protective equipment approved for the CSEPP.

10-3 Require that emergency personnel receive training in decontamination and in the effective use of protective equipment.

10-4 Require that appropriate emergency workers receive adequate training on the chemical agents, their hazard, and the symptoms they produce.

10-5 Establish procedures for monitoring and decontaminating workers.

10-6 Identify adequate facilities for monitoring and decontaminating emergency workers.

8.11 EMERGENCY MEDICAL SERVICES

This section is under development.

8.12 TRANSPORTATION

During an emergency, especially when evacuation is one of the protective actions chosen, transportation of people and resources becomes critical. Planning should anticipate providing adequate transportation for the special populations identified in the planning process.

For those special populations not having their own transportation, a primary source can be school or transit buses. Buses serving schools within the affected area cannot be counted on for other use in an evacuation until their primary school evacuation mission has been completed. Planning must also consider whether the number of buses is adequate to evacuate the schools if each bus makes only one trip. If not, additional buses and drivers or other means of transportation will be necessary just for the school population. Should school buses be needed from other jurisdictions, prior arrangements should be made.

Public transit buses, if available in the jurisdiction, can carry people who do not need special assistance, such as the mobile elderly and people without cars of their own. They could also be used to evacuate school populations if these transit buses are closer to schools than school buses from other districts. They may also serve to handle other special populations such as day-care centers, nursery schools, special education facilities, and private schools.

Long-distance coaches used by national, regional, or charter bus companies can provide a source for hospital, convalescent, and nursing home patients. These vehicles may need some adaptation for use. However, the evacuation-bed concept provides for adapting these and school or transit buses to carry litters. Plans should include detailed lists of the kind and amount of equipment needed to make required adaptations.

Regardless of the type of bus, there are four planning concerns common to all buses used.

- Communication is critical. Arrangements for proper linkages among EOCs, the bus dispatch agency, and the bus operators must be carefully established. Not all bus radio systems cover the same range nor are they all on similar frequencies. School buses may not be radio-equipped.

- Detailed bus assignments including anticipated capacities, destinations, and routing are needed. This involves providing routing maps, guides, or other needed documentation.

- Up-to-date contact lists of bus drivers with lists of back-up drivers available during an emergency are needed. As with other such lists, they should be updated regularly, annually at a minimum. Mobilization procedures for off-duty drivers must be developed and mobilization time factored into the decision making process.

- Planning must anticipate local road problems or constraints such as terrain, road and bridge conditions (especially in rural areas), maneuverability, and other factors that can impact on a safe and timely evacuation.

Besides buses, other community resources exist for transportation during evacuation. Trucks and vans with hydraulic lifts can be placed near nursing home ramps, and bed-ridden patients, accompanied by a staff member or a volunteer, can be lifted into the vehicle for transport to an evacuation center. Buses equipped for the handicapped and wheelchair vans also fall within this category. In addition, some military installations may be able to provide transportation resources and personnel.

Another important aspect of transportation planning for evacuation is the need to carefully identify and arrange for the staging and use of resources from outside the IRZ, perhaps even beyond the PAZ. The extent to which such outside resources are required will vary greatly from one chemical agent stockpile location to another; however, it is unlikely any IRZ will have adequate resources within its borders.

The importance of maintaining up-to-date lists of anyone requiring transportation is discussed in Sect. 8.9, Special Populations. In addition, the plan must include a method of verifying transportation needs at the time of the event. Such a procedure eliminates unnecessary runs. Lastly, the plan must also anticipate that many people not on any list may request transportation when the emergency occurs.

The communities around each installation differ widely, and transportation needs will require different solutions. Local transportation needs must be determined, locally available resources assessed, and unmet needs identified. Additional resources to satisfy unmet needs must be sought from other sources and their availability confirmed by written agreements.

Throughout the planning and training for protective actions, it is important to keep emphasizing that whenever local people realistically plan for self-reliance and self-help, such efforts reduce the need for dependence on distant resources that may require time to deploy. Since time is a critical factor during a chemical agent event, such self-reliance will prove very beneficial.

8.12.1 Transportation Planning Checklist

Each plan shall include detailed information on providing all necessary transportation support during evacuation. The plan shall

12-1 Identify transportation requirements for persons needing special assistance, including those with mobility impairments.

12-2 Identify transportation resources adequate to meet special needs and document their availability for emergency use. Such resources may include providers not normally considered such as church or private school buses, rental fleets, etc.

12-3 Provide detailed procedures to establish priorities for notifying providers and mobilizing, staging, and using various transportation resources.

12-4 Establish staging areas and specific procedures for dispatching transportation resources.

12-5 Provide for development and distribution of maps of staging areas and transportation routes to all transportation providers prior to an emergency.

12-6 Provide information on routes to special facilities and pickup routes for persons needing transportation prior to an emergency.

12-7 Assure that adequate communication links exist among the vehicles, dispatch agencies, and EOCs.

12-8 Establish and maintain procedures for notifying drivers of buses, vans, or other vehicles and ascertain availability and response time.

12-9 Establish procedures for providing transportation to those persons who are unable to identify their needs until the actual emergency.

12-10 Develop priority assignments for transportation resources.

12-11 Specify how lists of the handicapped with special transportation needs are updated regularly and kept confidential.

12-12 Coordinate all transportation plans with on-post planners.

8.13 COMMUNITY RESOURCE COORDINATION

Emergency planning seeks to anticipate possible emergencies and the resources that will be needed at that time. It identifies available resources as well as any resource shortfall so that the deficit can be eliminated or at least reduced.

Any emergency response program will initially depend primarily upon local resources to carry out its activities. Some resources such as communications equipment and protective gear can be acquired and stockpiled. Some vehicles can be prepositioned. Many other resources like transportation resources (buses and ambulances) and mass care centers cannot. They must be systematically identified, committed to, and confirmed as part of the planning process. Planning should be carefully coordinated to ensure that resources are not over committed. Furthermore, the resources a jurisdiction has to operate its day-to-day emergency organization can differ markedly from those needed during a major emergency. Not only are demands on the emergency organization increased, but demands on other components of the jurisdiction may exceed local capabilities. The type of emergency will dictate to what degree this resource drain will occur. Unusual types of emergencies, unless carefully anticipated, could find the jurisdiction underprepared.

A chemical agent event is just such an unusual emergency—it has special response and resource requirements not normally associated with more common emergencies such as floods, windstorms, or most other hazardous materials accidents. For this reason, planning for resource coordination and allocation becomes especially critical and should be coordinated with respect to planning zones and their related protective actions. Chemical event response may well require highly specialized decontamination capabilities that are likely to be found primarily in the Army or some National Guard units. In addition, the customary protective equipment used by fire and hazardous materials response units may not be acceptable for this hazard.

Before specific resource identification can occur with any degree of accuracy, it will be necessary to identify all feasible risks and the appropriate protective actions for those risks as well as to estimate the potentially affected populations.

Planning issues for resource coordination will vary somewhat from zone to zone.

8.13.1 Resource Planning in the IRZ

If the evacuation of some or all population groups is anticipated for the IRZ (i.e., if time permits), resource coordination planning should assure that sufficient resources are readily available to safely and rapidly evacuate the affected persons. These resources include, at a minimum, sufficient transportation for all affected persons, including special populations and people in special facilities who are to be evacuated; security assistance for access and traffic control; and personnel and equipment for alerting and notification (including route alerting if necessary).

Resource planning should be based on a realistic estimate of the population base. This will allow for more accurate planning since it is unlikely that the entire population of the IRZ would be evacuated.

An important planning consideration is staging of resources. This requires careful attention, especially when large numbers of resources are involved. Staging areas should be strategically chosen so they are accessible, near the areas served, have adequate space and logistics, and do not interfere with the flow of evacuation traffic.

8.13.2 Resource Planning in the PAZ

Resource planning for the PAZ is less restrictive in terms of time constraints and degree of resource availability. However, because the PAZ often includes a larger population spread out over a larger area, it may require more resources. The options available in the PAZ are generally the same as for the IRZ.

Planning concepts discussed for the IRZ apply here as well, with appropriate modification. A primary focus of resource planning for the PAZ becomes evacuee support. In addition to what was stated for the IRZ, other resources include service or tow trucks for emergency road service and adequate personnel and equipment for access and traffic control. In addition, mass care centers must have adequate emergency supplies for the anticipated numbers of evacuees.

8.13.3 Resource Planning in the PZ

The concentration of chemical agent reaching the PZ would be much lower than that experienced in areas closer to the release site, and additional time would be available before this exposure could occur. Therefore, consequence management planning is adequate for resource coordination to protect the PZ's people and property; detailed planning for this purpose is not necessary. Providing support to the IRZ and PAZ—particularly providing reception and mass care services to evacuees from those zones—will place the greatest burden on PZ resources.

8.13.4 Summary

Of special concern throughout resource planning is the support that one EPZ can offer another. Because the IRZ is at the greatest risk and may in many cases be the only zone affected by a chemical event, consideration must be given to the priority use of resources within the PAZ. Rather than plan for immediate and automatic requests for resources from far beyond the PAZ, planning should anticipate the likelihood that major resources may be more readily available within the PAZ. In a similar way the PZ provides resources for the PAZ and the IRZ.

Throughout the planning effort, local officials also must include federal and state government resources. However, except for law enforcement and some military resources such as National Guard units, these will most likely be available during later parts of the response phase rather than during the initial stages. As these resources become available, staging areas will have to be activated to handle the arrival, storage, and distribution of these resources.

Arrangements for use of additional resources should be formalized. This may affect many different jurisdictions, as well as the private sector. What is needed in the planning process is a precise, detailed, and clear understanding on the part of all parties involved regarding arrangements for supply, procurement, and use and the time frames within which these can be accomplished.

Finally, good resource planning requires that resource lists—like the plan itself—be current, complete, accessible, and accurate. Plans should require that resource lists be reviewed regularly, preferably quarterly, or upon any significant changes. Use of computerized lists would be beneficial, but officials should have back-up, hard copies available, should contingencies make computer operations unavailable.

8.13.5 Community Resource Coordination Planning Checklist

Each plan shall contain detailed information on community resources. The plan shall

13-1 Require reviewing resource lists at least quarterly and updating sooner as required.

13-2 Catalog resources in such a way that the community's primary resources are clearly identified and distinguished from resources available through mutual aid or other agreement.

13-3 List the location, type and number of available resources, the name and phone number of the resource provider or controller, and written commitment of the resources.

13-4 Require that hard copy resource lists be kept.

13-5 Identify the type, number, and location of any specialized resources that the Army, National Guard units, or other federal or state agencies will provide.

13-6 Identify equipment needs and the resources to meet these needs on a zone-by-zone basis.

13-7 Identify the special population resource needs on a zone-by-zone basis.

13-8 Reference written agreements governing use of resources not owned or controlled by the jurisdiction.

13-9 Identify the major area-wide or regional sources of food, water, and other essentials likely to be needed during reentry if local sources are unusable.

13-10 Describe mechanisms for obtaining temporary housing for residents unable to use contaminated residences.

13-11 List sources of replacement vehicles, equipment, and machinery should contaminated items be unusable.

13-12 Designate staging areas for receiving, storing, and allocating supplementary resources including emergency power and water sources.

8.14 PUBLIC EDUCATION AND INFORMATION

Public education consists of programs conducted prior to a chemical event to educate, inform, and prepare the community to respond effectively to emergencies. Emergency public information includes information released during a chemical event to advise the affected public of what actions to take and to keep the community informed on the current situation.

8.14.1 Public Education

It is important that the general public be familiar with the community-based emergency preparedness program. Since the options for community response and the time available to exercise these options could be very limited, the public must fully understand the required actions.

Risk communication is a critical part of public education in emergency preparedness activities because of the public's need to know about and participate in decisions regarding their safety. Risk communication, which strives to keep the public well informed and supportive of emergency planning and response efforts, is more effective when it is carefully planned. The public's concerns must be heard and addressed. Open communication fosters trust and credibility. Technical jargon should only be used to the extent that it is necessary to convey the intended message.

The media are the important channels for risk communication and are important resources in any preparedness program. It is important that the needs of the media be anticipated and accommodated when possible. It is also important to use all other channels of communication, such as public meetings, direct mail, telephone hotlines, and brochures.

Public education includes public awareness and public communication. Public awareness is built through informing the public of activities associated with developing and implementing an emergency preparedness program. Participation and support of community officials and citizens is essential to any preparedness program. The public awareness program should begin concurrently with the initiation of the emergency planning and program development process. The emergency planning process involves community groups; planners should solicit input from government, schools, health care institutions, fire and law enforcement departments, the business community, and others. Special population groups and on-post populations should also be incorporated in the planning process.

The planning and program development process should be well publicized. It is critical that the media be involved in the planning process to promote education, public awareness, and community acceptance of the emergency preparedness program. Media involvement in the program's early stages brings valuable communications capabilities, skills and experience into the program.

Later, the planning process presents various opportunities to maintain public awareness. Public information brochures should be used to provide information to households within and near the emergency planning zone. During an event, local emergency broadcasts are most effective when messages contain basic information. Specific information regarding relocation points, special facility plans, items to take to a mass care center, etc., should be included in printed public information materials such as telephone directory inserts and brochures; and reference should be made to these materials in the emergency broadcasts. This frees up air time for other critical messages. Other effective emergency materials for the public include posters and displays in areas where transient populations pass. Information should also be placed in potentially affected special facilities such as schools, nursing homes, and hospitals.

An aggressive outreach program can be an effective public education tool. Presentations can be made before civic and fraternal organizations and other informal groups. The media can be involved in training programs and exercises. Specific programs can be scheduled to educate the media as well as the general public. Well-prepared school programs educate the school population and provide an excellent source of information to homes with school-age populations.

The public education program should be developed in consideration of the various EPZs. The content of the program may differ among the EPZs. Education programs should recognize differing needs of diverse ethnic and socioeconomic groups. Education programs should also follow existing federal guidelines on providing information to these groups.

8.14.2 Emergency Public Information

An effective emergency public information program anticipates and monitors the concerns of the public and provides timely information on necessary actions. It is the best way to dispel rumors and misinformation during an emergency, and can reduce the burden on rumor control operations. An effective rumor control program can alert officials to prevalent rumors and identify public information needs. Local governments must be able to provide information to the public via regularly advertised telephone numbers, different from the emergency numbers in use.

There are distinct advantages to creating a public information system for use by on-post and off-post officials during an emergency. Local government representatives should address the activities that are being considered by local government in response to an emergency. Specific information about the chemical event site, chemical agent(s) involved, mitigative measures to resolve the chemical event, etc., should be provided by an Army Public Affairs official at the same location.

This is best accomplished in a Joint Information Center (JIC). The JIC is the location where the public information specialists from the Army, federal, state, and local jurisdictions, as well as volunteer agencies, meet to collaborate on and coordinate the release of emergency public information. The JIC team becomes responsible for preparing timely and factual information appropriate and essential to the public. The collaboration of all affected parties should allow for the release of balanced, thorough, accurate, and well-timed information to the public and to the media.

Planning for the JIC should anticipate that Army and other federal and state public information officials may be unable or choose not to report to the JIC. In particular, the Army may rely on a separate media center until the SRF is activated. Therefore, adequate phone or radio linkage between officials in the JIC and other public information officials is required. It is critical that all public information officials be able to communicate effectively and make joint announcements as if the officials were in the same facility.

Ideally, the JIC should be separate from, but in close proximity to, the off-post EOC. Obviously, JIC officials need to be in constant touch with the OSC and with the executive and operations groups in the off-post EOC. Ideally, the JIC should be located outside of the IRZ.

Planning for the JIC means anticipating the staff, office equipment, and supplies needed for speedy information processing. Another planning consideration is the need or benefit of carefully determining public information requirements by zone. General information may be required at some time; however, the public will more likely need zone-specific information. Initial response activities will affect the IRZ first and therefore, should have priority. If public announcements fail to properly identify the intended audience or zone, confusion could result.

Public information should be disseminated in stages. The initial stage should focus on immediate, urgent protective activities such as taking shelter or evacuating. Some of this may even occur before the off-post EOC or JIC is fully operational. With time, however, the off-post EOC will become operational, and public information during this stage will center on response. As the hours (or days) advance, response becomes recovery. This new phase has a different focus and will involve different information.

Different population groups have varied public information needs. Hearing-, sight- or language-impaired audiences have special requirements for public information. Information needed for nursing and convalescent homes and hospitals will differ from that needed by correctional institutions or schools. Planners need to anticipate these differences as much as possible and prepare scripted messages for each identified "special" category.

8.14.3 Public Education and Information Planning Checklist

General planning guidance for public education and information is presented in the following checklist. More detailed guidance is provided in Appendix J.

Public Education

Each plan must establish a public education program to help familiarize the public with the emergency preparedness program. The plan shall

14-1 Establish a comprehensive public education program that will include printed materials for households and special facilities. Educational needs may be differentiated by zone.

14-2 Require that the public education program include risk communication information.

14-3 Provide for the involvement of special population groups in developing the public education program and material.

14-4 Establish procedures for revising these materials annually or whenever significant changes occur.

14-5 Establish procedures for providing the news media with ongoing information on emergency preparedness events and activities.

14-6 Identify means to disseminate appropriate education information to the various planning zones.

14-7 Provide for local news media involvement in the planning, training, and exercise activities.

Emergency Public Information

Each plan must develop a public information capability in conjunction with the Army installation. The plan shall

14-8 Provide for the coordinated dissemination of emergency public information through a JIC.

14-9 Assure that adequate communications links exist between the JIC and public information officials who may not be there.

14-10 Set and coordinate procedures for the activation and operation of the EBS.

14-11 Provide for a rumor control system.

14-12 Require that the JIC be separate from, but in close proximity to, the off-post EOC and be sufficiently equipped and large enough to accommodate the public information staff and media representatives.

14-13 Develop prescripted, generic emergency public information announcements and distribute them to the news media.

14-14 Establish procedures for providing public information on the different requirements of the emergency zones and phases of the emergency.

14-15 Require that all public information releases also be issued in an appropriate language if a jurisdiction has a significant non-English speaking population.

14-16 Specify that all emergency public information be prepared to meet the special needs of sensory or emotionally impaired persons.

14-17 Provide procedures for conducting periodic/timely news briefings to keep the media informed of updated or changing activities.

8.15 EVACUEE SUPPORT

Evacuee support consists of various activities designed to process and accommodate evacuees. This includes the population living around the post in the affected zone(s) as well as civilian and military personnel employed at the post but not considered essential to the chemical event response. The evacuation of nonessential, on-post personnel must be coordinated with the evacuation of the general public. Plans should specify a process for receiving potentially contaminated persons and training evacuation and mass care personnel to recognize symptoms of agent exposure.

There are two primary components of an evacuee support system: reception and mass care. Reception is the process of receiving and registering evacuees, determining their needs (i.e., medical, housing, family reunification, etc.) and assigning them to appropriate resources. Mass care is providing shelter, food, family reunification, limited medical care, and social services for evacuees.

Reception and mass care facilities may be collocated when a small number of evacuees are involved. Separate reception and mass-care facilities are appropriate in a larger-scale evacuation. This more structured approach calls for evacuees to report to a reception center located on a main evacuation route, have their needs determined, and be referred to a separate mass care center or other appropriate facility. Although more complex, this allows for a more efficient allocation of resources in a large-scale evacuation.

FEMA and the American Red Cross (ARC) have entered into a formal agreement at the federal level whereby ARC is responsible for operating mass care centers during a natural or technological disaster. Planners should verify that ARC and local government have pursued this agreement at the local level.

ARC is a national organization with local chapters. In the event of any emergency, regardless of the local chapter's location or size, support is available from other ARC units on a regional and national basis. In addition, ARC coordinates other regional and local social service organizations.

Mass care operations are likely to extend beyond one day. Historically, emergencies involving the release of hazardous chemicals have led to population evacuations for more than one day.

The number of people evacuated directly affects the ability of ARC units to provide the needed support. Based on past evacuations from various natural and technological emergencies, the percentage of evacuees receiving assistance in mass care facilities normally ranges from 15 to 30%. Using these data to establish a planning base is probably not unreasonable. However, appropriate estimates will have to be made for each stockpile location. In making these estimates planners should consider the proximity of large population groups to post perimeters and the characteristics of the population.

Once agreements between ARC and local governments are in place, ARC will arrange to survey the proposed mass care centers. The number of persons that can be accommodated in each facility is based on a specific square footage per person. ARC also requires that there be shower and toilet facilities as well as cooking and feeding facilities in proportion to spaces available. Agreements between ARC, local authorities, and the host provider should be formalized to ensure that areas of responsibility are clear to all. Under existing ARC procedures, mass care centers will assist with family reunification and tracking of missing persons. Essentially, this involves keeping accurate rosters of all registrants at mass care centers. In addition it also entails keeping track of individuals who go or who are transported to hospitals from the reception centers or the mass care centers. ARC is in an ideal position to serve as focal point of this activity because of its shelter management expertise and close links with other volunteer agencies.

ARC activities in the mass care centers must be coordinated with the off-post EOC. This may require having a person at the off-post EOC tasked with this specific responsibility (such as an ARC liaison) or having a person at one of the larger mass care centers who coordinates activities for all mass care centers. It is important that someone be assigned the task of coordinating all inquiries on missing persons, tracking overall population information, and coordinating with public officials. This person must be provided with suitable equipment to accomplish this task.

ARC personnel trained in mass care center operation and management will need assistance from local authorities at the mass care center in areas like security, fire protection, plant operation, transportation of resources, and medical care.

All mass care centers should be outside the IRZ, and preferably outside the PAZ. However, the latter approach may present serious logistical problems in some rural areas, due to the distances involved and the limited services available. Planners should at least ensure that all mass care centers in the PAZ have designated back-up centers. Supply sources for extended stays need to be identified outside the PAZ to provide an adequate and noncontaminated source of foodstuffs and other necessities.

Local planning bodies must at least anticipate the implications of indefinitely relocating many members of their communities. Planning should identify potential relocation areas and available accommodations. Related to this is the concern for providing essential human services such as water, sanitation, schooling, fire protection, and medical coverage, financial claims and reimbursement, etc., on short notice.

General planning guidance for evacuee support is presented in the following checklist. More detailed guidance is provided in Appendix K.

8.15.1 Evacuee Support Planning Checklist

Each plan shall provide specific information on the major evacuee support activities needed. The plan shall

15-1 Identify mass care centers and related support services that are located outside the IRZ and, where possible, outside the PAZ.

15-2 Identify, by name and location, reception centers located along or near evacuation routes. These centers should be outside of the IRZ and, where possible, outside the PAZ. All reception centers should be located, designed, staffed, and equipped so that they can process evacuees expeditiously without hindering the flow of traffic out of the risk area.

15-3 Establish procedures for reception centers to provide evacuees with information, maps, and referral to needed services.

15-4 Ensure that mass care centers provide the following:

A. registration;

B. emergency medical care with documentation of all actions taken;

C. family reunification services; and

D. ongoing public information on the event.

15-5 Identify the mechanisms for providing for extended relocation and temporary housing outside the PAZ.

15-6 Provide for prior coordination and MOUs for mass care arrangements with local or regional ARC officials.

15-7 Provide for adequate law enforcement, fire protection, and other such support services at all mass care centers or other temporary relocation centers.

15-8 Provide for security at all reception and mass care centers.

8.16 AGENT DETECTION AND MONITORING

This section is under development.

8.17 DECONTAMINATION

Emergency plans should incorporate provisions for performing effective decontamination after a chemical agent release. Planners should address the personnel, resources, and procedures needed to ensure that decontamination actions will be timely and effective. The expenditure of decontamination resources will vary over the course of the emergency. During the response phase, when the critical objective is to minimize injuries to humans, decontamination activities should be focused on the people, critical support animals (e.g., Seeing Eye dogs), and essential equipment (e.g., ambulances) that may have been contaminated. All other animals and property suspected of being contaminated should be quaratined for disposition after the emergency response phase has ended.

The need for decontamination is affected by the type, form, and amount of chemical agent released. Significant contamination is more likely to result from agent released in liquid (including droplet and aerosol) form than in vapor form. Nerve agent GB presents little contamination hazard because it is not likely to be encountered in liquid form off post and is not persistent. Nerve agent VX and mustard agents H and HD, on the other hand, are more likely to be encountered in liquid form and are quite persistent. Thus, they pose a greater potential for contamination. Only releases of very large amounts of chemical agent would result in hazardous levels of contamination in off-post areas.

The most urgent decontamination priority in the aftermath of a chemical agent release is decontamination of all people who may have been contaminated. Decontamination of a person has two objectives: minimization of the health effects to that person and prevention of the spread of contamination to other people. Minimizing the health effects to the contaminated person requires that decontamination be performed within a very few minutes of exposure. Preventing the spread of contamination to others requires that decontamination be thorough. To ensure that both of these aspects are addressed, decontamination plans should provide for immediate self- and buddy-decontamination by potentially contaminated individuals and for thorough decontamination at official facilities.

Decontamination is an integral part of the treatment of people contaminated with nerve agent. A person exposed to low levels of nerve agent vapor may require only decontamination and some observation; a severe exposure to vapor or any exposure to nerve agent in liquid form requires immediate decontamination, antidote administration, and supporting medical attention.

Immediate decontamination is the only recognized method of reducing the health effects of exposure to mustard agent. Mustard agent is highly reactive chemically with living tissue, and the reaction is irreversible for all practical purposes. In addition, there is no known antidote for mustard poisoning. Army manuals that discuss therapy for various chemical warfare agents emphasize that instantaneous decontamination is the best form of treatment for mustard agent exposure.

Regardless of the type of chemical agent involved, personal decontamination may be performed by flushing undiluted household bleach on all contaminated areas (except the face) and rinsing off with lukewarm, soapy water. The face should be washed with lukewarm soapy water after the eyes have been flushed with large quantities of clear water. Washing should be followed by a clear water rinse. Both processes should be performed at least twice. Washing all body surfaces with lukewarm, soapy water is acceptable if bleach is not available. Clothing subjected to heavy contamination should be removed, placed in an airtight container, and reported.

General planning guidance for decontamination is presented in the checklist below. More detailed guidance is provided in Appendix L.

8.17.1 Decontamination Planning Checklist

Each plan should contain guidance on decontamination. The plan shall

17-1 Identify the agencies responsible for decontamination.

17-2 Identify possible decontamination personnel and resouce needs and formalize arrangements to address these needs.

17-3 Set priorities that will be used to guide the assignment of decontamination personnel and resources.

17-4 Specify how the Army, other federal, state, and local agencies will cooperate in off-post decontamination.

17-5 Include provisions to ensure that decontamination of potentially contaminated people is both timely (to minimize health effects to those people) and thorough (to minimize the spread of contamination to other people).

17-6 Establish procedures for educating and informing the public of procedures for decontamination.

8.18 REENTRY

This section is under development.

8.19 TRAINING

Training within CSEPP is critical since without proper training emergency response personnel may not develop the requisite skills or obtain the necessary knowledge to plan for and respond to a crisis. Training is an essential emergency planning activity for all types of emergency response efforts. Training for CSEPP must be performance-based; that is, it must be tailored to (1) the different functions identified in the emergency operations plan, (2) the characteristics of the personnel who will implement those functions, and (3) the environment in which the response will take place. Personnel should receive job-specific training to ensure they can perform the functions for which they are responsible. Where applicable, training programs will incorporate an evaluation procedure or technique that verifies that the trainees are gaining the skills and knowledge to perform their emergency responsibilities both during exercises and actual crises.

Individual training plans should be based on a needs assessment that attempts to identify the training requirements for the various response personnel. Topics for such training include but are not limited to EOC operations, decision making, medical care, recognition of chemical agent exposure symptoms, contamination avoidance and control, emergency care, and use of automation systems. The training program for these areas should include drills to ensure proficiency. The need for training materials should be identified through analysis of CSEPP operational requirements as well as documented performance deficiencies noted during CSEPP training drills and CSEPP exercises.

8.19.1 Training Courses

Training courses will be developed through the coordinated efforts of federal, state, and local officials. Planning and implementation assistance will be provided by the appropriate federal and state emergency preparedness officials. While basic training program issues such as definition of audience, objectives, design, location, and type of training will be coordinated and decided by several organizations, the local training program will be administered primarily by the local emergency management organization, which will need to maintain training records.

There will be a maximum use of existing general emergency training opportunities and materials. All training should be accomplished in the most appropriate and effective manner possible. The CSEPP training management team is available to provide implementation guidance and assistance.

Public education techniques (e.g., use of mass media, oral presentations, printed and audio-visual materials) will normally be used to provide the general public with protective action information. However, formal training of the public (e.g., through structured, hands-on classroom training) may be required to equip certain members of the general public with the verifiable ability to implement certain protective actions, such as overpressurizing shelters.

8.19.2 Training Drills

Training drills are intended to develop, maintain, and test skills specific to a single response activity. Individual planning elements (such as alert and notification, communications, rescue, etc.) can be evaluated in a drill. The value of a drill is that it addresses a single component of the response activity at a minimum cost by using only personnel and equipment identified for that specific function. The frequency of such training drills is determined by such factors as personnel turnover, plan and procedure complexity, and change and criticality of the function. While simultaneous drills can be conducted for several elements (e.g., a communications drill and an alert and notification drill), each should be relatively limited in scope.

8.19.3 Training Planning Checklist

General planning guidance for training is presented in the following checklist. Additional guidance is provided in Volume III, *Chemical Stockpile Emergency Preparedness Program Training Plan.*

Each state and local jurisdiction shall

19-1 Identify all individuals with emergency planning, management, operational, and response assignments who are to receive training based on the needs assessment.

19-2 Specify performance levels for all functional units in the response organization.

19-3 Include provisions for periodic refresher training for the emergency response personnel based on the needs assessment.

19-4 Identify personnel within each organization or functional group responsible for coordinating training.

19-5 Require that all training be properly documented and copies of the training records be filed with the state and local civil defense or emergency services offices.

19-6 Specify that training may be required for the public relative to protective actions that require specific skills.

8.20 EXERCISES

A federally-managed exercise program involving federal, state, and local agencies has been developed as part of the increased emphasis on emergency preparedness for CSEPP. The purpose of CSEPP exercises is to provide a timely assessment of the level of preparedness at and around each stockpile installation to protect the general public, the workforce, and the environment. The adequacy of CSEPP cannot be judged until participants in this emergency response program have demonstrated their ability to implement their plans and procedures jointly. To evaluate this ability, an integrated exercise program has been established between the state and local communities and the Army installation. In turn, these exercises must be properly evaluated in order to determine what changes, if any, need to be made in plans or procedures.

Exercises are an integral component of an effective emergency management program. An exercise program that has clear objectives and is well organized and well executed can effectively evaluate the validity of written plans, procedures, and training. The program will also allow participants to practice the skills learned and to interface with other responders. The exercise program demonstrates response functions and roles and provides emergency planning and response personnel with a critique of the emergency response system.

The federally-managed exercise program includes two types of exercises: a direction and control exercise (DCX) and a full-scale exercise (FSX). (An initial tabletop exercise was conducted at the beginning of the program.) These exercises will involve both Army installations and the potentially affected state and local jurisdictions. The state may develop a supplemental exercise program.

Federally managed CSEPP exercises will be conducted in a 2-year cycle, with a DCX and FSX held in alternating years. This cycle will be repeated until the chemical agent and munitions are no longer present at that location. Exercises will be scheduled to address corrective actions if required; however, corrective actions will normally be demonstrated in the next annual exercise.

8.20.1 Types of Exercises

Direction and Control Exercise—The DCX takes the place of a functional exercise or Army-style command post exercise in the CSEPP exercise program. A DCX is a scenario-driven exercise in which all EOCs, communications, and automation links are exercised. Key response decision makers play in this federally-evaluated exercise, which may last up to 24 continuous hours.

Full-Scale Exercise—A FSX is the best way to test the entire emergency response effort and evaluate the interaction of all components. The FSX involves mobilization of all emergency service and response agencies and the activation of communications centers and emergency facilities such as EOCs and command posts. The duration of the CSEPP FSX is limited to 48 continuous hours. Play may be continuous or intermittent within the 48-hour window, but must be scheduled for a minimum of 4.5 hours.

8.20.2 General

The scheduling of exercises should consider the availability of emergency personnel from all participating groups. Availability may be limited when most personnel are volunteers. The exercise schedule must be agreed to early and maintained. Exercise dates should be determined two years in advance, if posssible, to allow time for planning and coordination.

The exercise program must involve federal (installation), state, and local authorities and staff on a regular basis. Federally managed CSEPP exercises will be planned and conducted by Exercise Co-directors from FEMA and the Army, assisted by representatives from the installation and state and local organizations. This team will determine the objectives to be evaluated in the exercise, develop the exercise scenario, and define the extent of play for the exercise. Development of an exercise scenario requires that a significant amount of time be spent to obtain the desired emergency response both on-post and in the off-post community. This is especially critical for full-scale exercises. It is also imperative that the scenario elements be properly designed so that the exercise objectives can be demonstrated by those agencies participating.

All exercises must have clearly stated objectives and be evaluated against the objectives. Standard objectives and evaluation materials are used in each exercise. Designated core objectives will be evaluated in each exercise. Other objectives will be demonstrated for evaluation by each applicable jurisdiction at least once every 4 years. A successful exercise program will identify response deficiencies and make participants more aware of everyone's emergency responsibilities.

Federally-managed exercises will be evaluated by qualified exercise evaluators who are not part of any participating organization. Outside evaluators can offer a more objective performance assessment or raise procedural questions. As such, evaluators provide a valuable service. These types of exercises conclude with a formal critique period during which exercise participants and evaluators comment on the exercise. The intent should be to offer positive constructive criticism. An after-action report that summarizes the lessons learned and documents the major issues and recommended actions will be prepared by the Army and FEMA.

In summary, the federally-managed exercise program will accomplish the following goals:

- help evaluate emergency plans, response capability and training adequacy;
- provide feedback necessary to improve plans and procedures;
- improve coordination and relationships between Army and community personnel;
- ensure continued involvement of key community organizations; and
- serve as visible demonstrations of the commitment of the Army, FEMA, states, and local jurisdictions to protect the public.

8.20.3 Exercise Planning Checklist

The following checklist provides general planning guidance for exercises. More detailed guidance is provided in *Chemical Stockpile Emergency Preparedness Program Exercise Program* February 23, 1994.

Each off-post exercise plan shall:

20-1 Meet the requirements of the CSEPP exercise program.

20-2 Provide for the jurisdiction's participation in all exercises required by the CSEPP exercise program. The local jurisdiction may, at its discretion, schedule additional exercises and drills.

20-3 Identify the exercise objectives defined in the CSEPP exercise program that are included in the jurisdiction's emergency operations plan and are appropriate for formal evaluation during CSEPP exercises.

20-4 Require, for each exercise, clear identification of the exercise objectives that are to be demonstrated and the response groups which will demonstrate them.

20-5 Identify the jurisdiction's representative on the exercise planning team for each exercise. (If possible, the representative should be someone who will not be participating in the exercise as players).

20-6 Describe the procedures that will be followed, in conjunction with the FEMA regional office, to track actions assigned and agreed upon as a result of exercise evaluations.

8.21 AUTOMATION SUPPORT SYSTEMS

Automated systems can provide important assistance in performing many of the planning functions described in this document. The quickness with which a chemical agent release could affect on-post and off-post populations argues strongly in favor of using automated tools to help perform complex analyses during planning and manage the deployment of personnel and resources during response. State and local jurisdictions are strongly encouraged to make maximum use of automation tools being developed for CSEPP.

Automation can play an important role in all phases of an emergency. The readiness phase is dominated by planning activities in which a great deal of information is gathered and analyzed to produce the plans, strategies, and procedures that will guide emergency response. Automation can assist in the development of plans and procedures by organizing information on response personnel and resources so that it can be rapidly recalled and acted upon during the response phase. Computerized tools will be especially valuable in performing complex modeling (including dispersion, protective action, and evacuation modeling) to assist planners and decision makers in developing the most effective protective action and response strategies. Emergency response procedures can be input into an automated system where their adequacy and comprehensiveness can be tested and they can be organized for quick activation during an emergency. In addition to these planning activities, the readiness phase includes routine operations such as meteorological and chemical agent monitoring which can also be automated to ensure that significant changes in conditions are recognized quickly and acted upon appropriately.

At the beginning of the response phase, emphasis shifts from gathering and analyzing data to executing predeveloped procedures to control the incident and protect the public, managing resources and personnel, communicating with response forces, other organizations, and the public, and documenting response decisions and activities. Because of the time-critical nature of this phase, automation can provide particularly important assistance in the performance of these functions. Execution of procedures (e.g., activation of the chemical event emergency notification system, notification of key personnel, selection of appropriate protective actions, alert and notification of the public) can be completely automated or can be prompted by automatic messages to human actors. Computer systems can promote efficient communications through automatic dialing and message logging as well as by providing an avenue for the exchange of information in electronic form. Automation systems can assume much of the burden associated with documenting decisions and actions taken, allowing key personnel to concentrate on the response itself.

As the response phase gives way to the recovery phase, the collection and analysis of data will again become a major focus. Automation can assist in these efforts through organizing and analyzing the data collected and running models to identify the extent of the area affected and the degrees to which various portions of this area have been impacted. The results will help decision makers determine what actions, if any, are needed to return the area to normal and when people may safely return to affected areas.

Capabilities to be provided by automation systems developed for CSEPP are described in more detail in *Functional Requirements for the Chemical Stockpile Emergency Preparedness Program Automated Emergency Management Information System* (Appendix N). That volume lists the following assumptions as guides to the development of automated tools for CSEPP:

- There will be a continuous exchange of information between the installation and affected parties to coordinate planning, exercise, response, and recovery actions. During an event notification, there will be an immediate exchange of information followed by positive "man-in-the-loop" confirmation.
- The automation system will be used for both daily operations and emergencies.
- The initial emergency response shall be based on precomputed action elements.
- All essential resources will be identified, preassigned, and, if necessary, contracted for in advance.
- In addition to the automation system, there will be an alternate means of communication between the on-post EOC and a local point of contact that can be used to alert the local off-post EOC of an imminent notification.

9.0 RELATED DOCUMENTS

This planning guidance document is but one of many documents relating to emergency response planning for the CSEPP. This section lists other documents that emergency management officials and planners may find useful in preparing an effective emergency response plan. It is divided into two subsections: (1) documents which provide complementary programmatic guidance for emergency planning, and (2) documents which supply technical information developed specifically for the CSEPP. Documents in the latter subsection are categorized according to the functional area to which they pertain.

9.1 COMPLEMENTARY PROGRAMMATIC GUIDANCE

1. "Acceptance Criteria for Evacuation Plans." FEMA Guidance Memorandum 21. February 29, 1984. This memorandum provides guidelines and criteria for reviewing and evaluating evacuation time estimates and procedures within emergency planning zones for nuclear power plants.

2. *Chemical Accident or Incident Response and Assistance (CAIRA) Operations*. (DA PAM 50-6). Headquarters, Department of the Army, May 1991. This document describes the functions, responsibilities, organization, and procedures that the Army would follow in responding to, managing, and recovering from a chemical surety material accident or incident.

3. *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. November 1980. A document prepared by FEMA and the NRC that provides a basis for state and local governments and nuclear facility operators to develop radiological emergency plans and improve emergency preparedness. The criteria are also used by federal reviewers in determining the adequacy of state, local and facility emergency plans.

4. *Criteria for Review of Hazardous Materials Emergency Plans* (NRT 1-A). May 1988. A companion document to NRT-1, which contains the NRT's supplementary criteria for reviewing local plans following SARA Title III legislation.

5. *Developing a Hazardous Materials Exercises Program: A Handbook for State and Local Officials*. NRT-2. September 1990.

6. *Federal Assistance Handbook: Emergency Management, Direction and Control Programs*. FEMA, CPG 1-3. January 1984.

7. "FEMA Action to Qualify Alert and Notification Systems Against NUREG-0654/FEMA-REP-1 and FEMA-REP-10." FEMA Guidance Memorandum AN-1. April 21, 1987. This memorandum describes policy and procedures for FEMA officials in assessing the adequacy of alert and notification systems around commercial nuclear facilities.

8. "Foreign Language Translation of Public Education Brochures and Safety Messages." FEMA Guidance Memorandum 20. October 19, 1983. The memorandum provides guidance on preparing emergency information for minority groups.

9. *Guide for the Development of State and Local Emergency Operations Plans*. FEMA, CPG 1-8. October 1985. Provides detailed information for emergency planners on the integrated emergency management approach. CPG 1-8A is a companion document for reviewing plans prepared following CPG 1-8.

10. *Hazardous Materials Emergency Planning Guide*. NRT-1. March 1987. Developed by the National Response Team to provide unified federal guidance for hazardous materials emergency planning.

11. "The National Contingency Plan," February 18, 1986. *Federal Register*, 53: 245. December 21, 1988. A revision of the "National Oil and Hazardous Substances Pollution Contingency Plan" that aims to streamline response mechanisms; to ensure prompt, cost-effective response; to respond to issues raised in litigation; and to clarify responsibilities and authorities in the NCP. Changes mandated by the SARA legislation and EPA's proposed approach in implementing SARA are pending.

12. *Objectives for Local Emergency Management.* FEMA, CPG 1-5. July 1984. Describes and explains the program and functional objectives that represent an integrated emergency management program.

9.2 CSEPP TECHNICAL ANALYSES AND SUPPORT STUDIES

General Planning and Preparedness

1. *Chemical Stockpile Emergency Preparedness Program Management Plan.* Argonne National Laboratory, DA, and FEMA. March 1990. This document establishes a tool for presentation, management, and oversight of the CSEPP. It provides a general overview of the program for federal, state, and local authorities and their contractors, involved in programmatic activities. The management plan will be periodically revised and updated.

2. *Emergency Response Concept Plan for (each installation) and Vicinity.* Energy Division, Oak Ridge National Laboratory. October 1989. These documents consist of local applications of generic concepts for each of the eight United States chemical stockpile locations [Aberdeen Proving Ground (ORNL/TM-11096), Anniston Army Depot (ORNL/TM-11093), Lexington-Blue Grass Army Depot (ORNL/TM-11099), Newport Army Ammunitions Plant (ORNL/TM-11095), Pine Bluff Arsenal (ORNL/TM-11092), Pueblo Depot Activity (ORNL/TM-11098), Tooele Army Depot (ORNL/TM -11094), and Umatilla Depot Activity (ORNL/TM-11097)]. The guidance provided by these documents will be replaced by the site-specific EPGs.

3. *Evacuation Time Estimates for (each installation) and Vicinity.* (Draft). Oak Ridge National Laboratory. [Aberdeen Proving Ground, November 1990; Anniston Army Depot, November 1991; Lexington-Blue Grass Army Depot, September 1991; Newport Army Ammunition Plant, February 1991; Pine Bluff Arsenal, February 1992; Pueblo Depot Activity, April 1992; Tooele Army Depot, December 1990; and Umatilla Depot Activity, May 1991.] These reports generate, for each of the eight stockpile locations, an estimate of the time it will take populations both on-post and in the vicinity to evacuate should a significant chemical agent release occur. The reports consist of (1) development of a database for evacuation simulation studies, (2) simulation analysis to estimate evacuation times under different scenarios, and
(3) documentation of study findings.

4. *Evaluating Protective Actions for Chemical Agent Emergencies.* ORNL/TM-6615. Oak Ridge National Laboratory. April 1990. This report describes a methodology for evaluating the effectiveness of various strategies for protecting civilians from accidental releases of chemical agents. Protective action

strategies include evacuation, sheltering, enhanced sheltering, personal respiratory protection, positive pressure filtering, and administration of antidotes. The study develops a model planners can use to select one or more workable protective actions for a known set of emergency parameters. This study can be used in combination with evacuation studies to prepare a list of recommended workable, location-specific protective actions implementable under credible release scenarios.

Reentry/Restoration

5. "Currently Available Permeability and Breakthrough Data Characterizing Organophosphates and Warfare Agent Simulants in Civilian Protective Clothing Materials." Oak Ridge National Laboratory. *Journal of Hazardous Materials*, 1992. This article reviews available hazmat data characterizing integrity of commercial chemical protective clothing materials when in contact with unitary agents or their simulants.

6. *Reentry Planning: The Technical Basis for Offsite Recovery Following Warfare Agent Contamination.* ORNL-6628. Oak Ridge National Laboratory. April 1990. At some point response will focus on determining whether and when the evacuated area can be reentered. Reentry planning involves such issues as the amount of chemical agent deposited on individuals and affected property, whether decontamination is needed, and how effective that decontamination would be. This report reviews existing guidance on these issues and identifies pertinent information and data needs. Recommendations have been prepared in cooperation with DHHS and other involved agencies (e.g., U.S. Department of Agriculture and the Food and Drug Administration).

7. "Results of a Workshop Meeting to Discuss Protection of Public Health and Safety During Reentry into Areas Potentially Contaminated with a Lethal Chemical Agent (GB, VX, or Mustard Agent)." DHHS, Centers for Disease Control (availability announced in 55 FR 28940, July 16, 1990). This document provides response guidance from the Centers for Disease Control and presents the results of evaluation by a U.S. Surgeon General's Working Group.

Training

8. *Training Plan for the Chemical Stockpile Emergency Preparedness Program.* FEMA and DA, 1993. This plan details the structure, tasks, and delivery systems required to meet the training requirements associated with implementing the full preparedness program.

Public Affairs

9. *Guidelines for Conducting Public Affairs Activities in Support of Alert and Notification System Development, Installation, and Operation.* September 7, 1991. This document provides guidance to local and state public affairs and information officers in implementing a public information and education program in support of development and installation of alert and notification systems. (This document is included as an attachment to Appendix J.)

Exercises

10. Chemical Stockpile Emergency Preparedness Program Exercises. Oak Ridge National Laboratory. February 1994. This document provided program guidance and supporting information for implementation of the CSEPP Exercise program.

Other

11. *Chemical Stockpile Disposal Program Accident Assessment.* ORNL/TM-11354. Energy Division, Oak Ridge National Laboratory, August 1990. This report presents a method for rapidly classifying emergencies. Information on potential accidents, source terms, downwind hazard potentials, and detection and recognition capabilities are integrated into a procedure for recognizing and classifying anomalous events. It includes a decision tree for accident classification.

12. *Decision Making Technical Support Study for the U.S. Army's Chemical Stockpile Disposal Program: Enhancing Command, Control, and Computer Operations at Aberdeen Proving Ground and Pine Bluff Arsenal.* ORNL/TM-11412. August 1990. In a fast-breaking release scenario, recommendation of appropriate protective actions for civilians will be needed quickly. To facilitate timely decision

making, a command and control system will address who will make decisions, what information is needed to make those decisions, what decision aids or support systems are needed, how decision information will be communicated, and on what criteria decisions will be based.

13. *Emergency Response Concept Plan for the Chemical Stockpile Disposal Program* (ERCP). July 1989. The conceptual basis for developing related emergency response programs. It provides general guidance; explores various programs, planning issues, and options; and is the chief source of the guidance contained in this document.

14. *Final Programmatic Environmental Impact Statement*. January 1988. U.S. Army, Program Manager for Chemical Demilitarization. The official statement of environmental assessment of the CSDP project as a whole. As a result of this assessment, the Army decided to incinerate the agents on-post because incineration is viewed as the most environmentally prudent alternative.

15. Personal Computer Program for Chemical Hazard Prediction (D2PC). CRDEC-TR-87021. 1986. U.S. Army Chemical Research, Development and Engineering Center.

10.0 GLOSSARY

access control point (ACP)—a location staffed to restrict the entry of unauthorized personnel into a risk area. Access control is normally performed just outside of the risk area. It involves the deployment of vehicles, barricades, or other measures to deny access to a particular area.

accident assessment—the evaluation of the nature, severity, and impact of an accident. In CSEPP, the Army will be primarily responsible for accident assessment.

alert and notification system—a combination of sirens and tone-alert radios to be used in the IRZ and selected portions of the PAZ to provide alert and emergency instructions to the public.

blister agent—see vesicant agent.

Chemical Accident/Incident Response and Assistance (CAIRA) Plan—a federal plan that defines the federal response at an Army installation which is the emergency response to and recovery from a chemical event. This plan must be coordinated carefully with local and state plans.

chemical agent (military term)—a chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate a person through its physiological effects. Excluded from consideration are riot control agents, chemical herbicides, smoke, and flame.

chemical event (military term)—a term used by the military that deals with chemical accidents or incidents that involve chemical surety materiel. It includes (1) chemical accidents resulting from nondeliberate events where safety is of primary concern and (2) chemical incidents resulting from deliberate acts or criminal acts where security is a concern.

Chemical Event Emergency Notification System—a tiered system whereby the Army classifies chemical surety emergencies according to predetermined levels and provides appropriate notification to off-post public officials. The system consists of a minimum of three surety emergency levels (based on the predicted downwind distance of the no-effects dosage) and one non-surety event level.

chemical limited area—see limited area.

Chemical Stockpile Disposal Program (CSDP)—the congressionally mandated program that requires the Army to dispose of all its unitary chemical agents. The preferred mode of disposition is on-post incineration.

Chemical Stockpile Emergency Preparedness Program (CSEPP)—a joint DA/FEMA program to oversee and assist in the development of adequate emergency response plans and capabilities for all jurisdictions that might be affected by a chemical release associated with CSDP activities.

chemical surety (military term)—those controls, procedures, and actions that contribute to the safety, security, and reliability of chemical agents and their associated weapon systems throughout their life cycle without degrading operational performance.

chemical surety materiel (military term)—chemical agents and their associated weapons systems or storage and shipping containers that are either adopted or being considered for military use.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)—a law that deals with hazardous substance releases into the environment and the cleanup of hazardous waste sites. This act was amended by SARA in 1986.

D2PC—a dispersion model developed by the Army to estimate downwind hazard distances from releases of chemical agents.

decontamination (military term)—the process of decreasing the amount of chemical agent on any person, object, or area by absorbing, neutralizing, destroying, ventilating, or removing chemical agents.

direction and control exercise—an activity in which emergency preparedness officials respond to a simulated incident. It mobilizes emergency management and communications organizations and officials. Some field response organizations may be involved.

demilitarization—the mutilation, destruction, or neutralization of chemical surety materiel, rendering it harmless and ineffectual for military purposes.

Emergency Broadcast System (EBS)—a federally established network of commercial radio stations that voluntarily provide official emergency instructions or directions to the public during an emergency. Priorities for EBS activation and use are: (1) federal government, (2) local government, and (3) state government. For CSEPP the EBS will provide supplementary alert and notification for the IRZ.

emergency operating center (EOC)—the location or facility where responsible officials gather during an emergency to direct and coordinate emergency operations, to communicate with other jurisdictions and with field emergency forces, and to formulate protective action decisions.

emergency operations plan (EOP)—a plan developed in accord with the guidance in *Civil Preparedness Guide 1-8* and other similar guides. EOPs are multihazard, functional plans that treat emergency management activities generically. EOPs have a basic section that provides generally applicable information without reference to any particular hazard. Plans also address the unique aspects of individual disasters in hazard-specific appendixes.

Emergency Planning Guide (EPG)-a set of location-specific documents being developed to analyze the characteristics of each chemical agent stockpile location that are pertinent to emergency planning and to provide a step-by-step guide for preparing site-specific Protective Action Strategy Plans. The EPG will supersede the site-specific ERCP.

emergency planning zone (EPZ)—a geographical area delineated around a potential hazard generator that defines the potential area of impact. Zones facilitate planning for the protection of people during an emergency.

Emergency Response Concept Plan (ERCP)—the conceptual basis for developing local emergency response programs for the CSDP, developed as a supporting document to the "Final Programmatic Environmental Impact Statement."

enhanced shelter-in-place-a protective action that is similar to normal shelter-in-place except that it involves taking shelter in a structure to which weatherization techniques have been applied before the emergency to permanently reduce the rate at which air or chemical agent seeps into the structure. Effectiveness is improved by going into an interior room. The shelter should be opened up or abandoned after the toxic plume has passed.

evacuation—a protective action that involves leaving an area of risk until the hazard has passed and the area is safe for return.

exclusion area (military term)—the area immediately surrounding one or more receptacles in which chemical agents are contained. Normally, the boundaries of an exclusion area are the walls, floor, and ceiling of a storage structure, secure container, or a barrier that establishes the boundary (such as an igloo or fence).

Executive Council-a committee established by a DA/FEMA Joint Memorandum for the Record in February 1994. The Executive Council, which is made up of members from DA and FEMA, is the principal policy-setting and decision-making body for CSEPP.

expedient shelter-in-place-a protective action that is similar to normal shelter-in-place except that, after going into the room selected as a shelter at the time of an emergency, the inhabitants take measures to reduce the rate at which air or chemical agent enters the room. Such measures would include taping around doors and windows and covering vents and electrical outlets with plastic. Effectiveness is improved if the room selected as a shelter is an interior room. The shelter should be opened up or abandoned after the plume has passed.

first federal official (FFO)—the first federal representative of a participating agency of the National Response Team arriving at the scene of discharge or release. The FFO coordinates activities under the National Contingency Plan.

full-scale exercise—an activity in which emergency preparedness officials respond to a simulated incident. It mobilizes the entire emergency organization or its major parts.

GA—see nerve agent.

GB—see nerve agent.

H—see mustard agent.

HD—see mustard agent.

HT—see mustard agent.

immediate response zone (IRZ)—the planning zone immediately surrounding each Army installation. Generally it extends to about 10 km (6 miles) from the installation's chemical storage area. At some installations, it extends to about 15 km (9 miles).

incident command system (ICS)—the combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure to manage assigned resources to effectively respond to an incident.

Initial Response Force (IRF)—an emergency action organization tasked to provide first response to a chemical event at an installation assigned a chemical surety mission. Under command of the installation commander, the IRF is comprised of command and control elements and emergency teams capable of providing emergency medical services and initiating those actions necessary to prevent, minimize, or mitigate hazards to public health and safety or to the environment.

institutional populations—people in schools, hospitals, nursing homes, prisons or other facilities that require special care or consideration by virtue of their dependency on others for appropriate protection.

intergovernmental consultation and coordination boards (ICCBs)—the national and local boards composed of federal, state, and local members that provide for information transfer in the Chemical Stockpile Disposal Program.

Joint Information Center (JIC)—a single location where public information officials gather to collaborate on and coordinate the release of emergency public information.

Lewisite—a brown or colorless liquid that is part of the chemical stockpile of vesicants.

limited area (military term)—the area immediately surrounding one or more exclusion areas. Normally, the area between the boundaries of the exclusion areas and the perimeter boundary.

Local Emergency Planning Committee (LEPC)—the planning body designated by Superfund Amendments and Reauthorization Act, Title III legislation as the planning body for preparing local hazardous materials plans.

mass care center—a facility for providing emergency lodging and care for people made temporarily homeless by an emergency. Essential basic services (feeding, family reunification, etc.) are provided.

maximum credible event—the worst single event likely to occur from the release of chemical agent as a result of an unintended, unplanned, or accidental event. It has a reasonable probability of happening.

Memorandum of Understanding (MOU)—the written agreement (August 1988) whereby the Army and Federal Emergency Management Agency have agreed to collaborate on the emergency preparedness aspects of the Chemical Stockpile Disposal Program.

mustard agent—the vesicant agents (H, HD, and HT) that cause blistering. In sufficient amounts they can be fatal if not quickly removed from exposed skin or if inhaled.

National Contingency Plan (NCP)—"The National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR Part 300) prepared by the Environmental Protection Agency to put into effect the response powers and responsibilities created by the Comprehensive Environmental Response, Compensation, and Liability Act and the authorities established by Sect. 311 of the Clean Water Act.

National Defense Area (NDA) (military term)—an area established on nonfederal lands located within the United States, its possessions, or territories for the purpose of safeguarding classified defense information or protecting Department of Defense equipment or material.

National Response Center—a communications center for activities related to hazardous materials response actions, located at Coast Guard headquarters in Washington, DC. The center receives and relays notices of discharges or releases to the appropriate on-scene coordinator, disseminates on-scene coordinator and

Regional Response Team reports to the National Response Team when appropriate, and provides facilities for the National Response Team to use in coordinating a national response action when required.

National Response Team—the group consisting of representatives of 14 government agencies (Department of Defense, Department of Interior, Department of Transportation/Research and Special Programs Administration, Department of Transportation/U.S. Coast Guard, Environmental Protection Agency, Department of Commerce, Federal Emergency Management Agency, Department of State, Department of Agriculture, Department of Justice, Department of Health and Human Services, Department of Labor, Nuclear Regulatory Commission, and Department of Energy) that implements the National Contingency Plan.

nerve agent—the nerve agents (GA, GB, and VX) are lethal colorless, odorless, and tasteless agents that can be fatal upon skin contact or when inhaled. These agents attack the central nervous system by inhibiting the production of acetylcholinesterase, which is essential for proper operation of the nervous system.

no deaths distance-a calculated distance downwind from a chemical agent release beyond which a toxicity level is not expected to result in human fatalities.

no effects distance—a calculated distance downwind from a chemical agent release beyond which a toxicity level is not expected to have short-term adverse effects on humans.

normal shelter-in-place-a protective action that involves taking cover in a building, closing all doors and windows, and turning off ventilation systems. Effectiveness is improved by going into an interior room. The shelter should be opened up or abandoned after the toxic plume has passed.

off-post—the area surrounding a military installation or facility.

on-post—a military installation or facility.

on-scene coordinator (OSC)—the federal official predesignated by the EPA or the Coast Guard to coordinate and direct federal responses under subpart D of the NCP, or the official designated by the lead agency to coordinate and direct removal actions under subpart E of the NCP. DOD and DOE are included as OSC under subpart E.

percutaneous exposure—exposure that occurs through the skin.

population at risk (PAR)—the population potentially affected by concentrations of agent. The PAR is calculated by determining the population within the radial distance estimated to be affected by lethal dosages of agent from a release.

precautionary zone (PZ)—the outermost zone extending beyond the protective action zone. Theoretically, it has no limits. Practically, its furthest point is that beyond which emergency planning for the CSEPP would not be required under most conditions.

pressurized shelter-in-place-a protective action that is similar to normal shelter-in-place except that the infiltration of contaminated air from outside the shelter is effectively prohibited by drawing outside air into the shelter through a filter that removes chemical agent. This filtered air creates a positive pressure in the shelter so that clean air is leaking out instead of contaminated air leaking in.

protection factor—the measure of exposure reduction provided by a protective device or shelter. A protection factor of 100 means that the protected exposure is 1/100th of the unprotected exposure.

protective action—an action or measure taken to avoid or reduce exposure to a hazard.

protective action decision making—the process whereby off-post public officials make a selection of one or more actions to protect the threatened population. The Army will make recommendations as part of its accident assessment and off-post notification processes.

protective action zone (PAZ)—the second planning zone beyond the immediate response zone. Generally it extends to about 21 miles from the installation's chemical storage area, and at some installations it extends further.

public alert and notification system—the system for obtaining the attention of the public and providing appropriate emergency information. Sirens are the most commonly used public alert devices but frequently are supplemented by tone alert radios, visual warning devices for the hearing impaired, and telephone-based alert/notification systems.

public affairs officer (PAO)—the Army installation person responsible for public affairs. The PAO is the installation counterpart to the off-post Public Information Officer (PIO).

public information officer (PIO)—the person on the emergency management team who is in charge of public information affairs. The PIO is the counterpart to the on-post Public Affairs Officer (PAO).

Regional Response Team (RRT)—the representatives of federal agencies and a representative from each state in the federal region. During a response to a major hazardous materials incident involving transportation or a fixed facility, the on-scene coordinator may request that the RRT be convened to provide advice or recommendations in specific issues requiring resolution.

route alerting—this is normally a supplement to the public alert system and is a method for alerting people in areas not covered by the primary system or in the event of failure of the primary system. Route alerting is accomplished by emergency personnel in vehicles traveling along assigned roads and delivering emergency instructions with public address systems or by door-to-door notification.

Service Response Force (SRF) (military term)—a DA-level emergency response organization, commanded by a general officer, capable of performing and sustaining the chemical accident/incident response and assistance mission. The SRF is comprised of the IRF and follow-on forces consisting of a staff and specialized teams from various agencies and organizations involved in the response to and recovery from a chemical event.

shelter-in-place—a protective action that involves taking cover in a building. Generally, any building suitable for winter habitation will provide some protection with windows and doors closed and heating, ventilation, and air conditioning systems turned off. Effectiveness can be increased by methods such as using an interior room or basement, taping doors and windows, and employing other systems to limit natural ventilation. In CSEPP there are four types of shelter-in-place: normal, expedient, enhanced, and pressurized.

Site-specific Emergency Response Concept Plan—a concept plan developed for a specific chemical agent stockpile location by applying the concepts and methodologies of the ERCP. Each site-specific concept plan categorizes the chemical events that could occur at that location and examines the topographic, meteorological, and population characteristics of the area to develop proposed EPZ boundaries and identify appropriate protective actions. (See Sect. 9, Item 11.)

special populations—those individuals or groups that may be institutionalized or have needs that require special consideration in emergencies.

State Emergency Response Commission (SERC)—the state planning group designated by SARA, Title III legislation as the state coordinating body for hazardous materials activities.

Superfund Amendments and Reauthorization Act of 1986 (SARA)—Public law that amended CERCLA. Title III of SARA includes detailed provisions for community emergency planning for fixed chemical facilities.

surety—see chemical surety.

Title III—the "Emergency Planning and Community Right-to-Know Act of 1986." A law that requires the establishment of state and local planning structures (SERCs and LEPCs) for emergency planning for hazardous materials incidents. It requires (1) location site-specific planning around extremely hazardous substances, (2) participation in the planning process by facilities storing or using hazardous substances, and (3) notifications to SERCs and LEPCs of releases of certain hazardous substances. It also provides for mechanisms to provide information on hazardous chemicals to the public.

traffic control point (TCP)—a location that is staffed to ensure the continued movement of traffic inside or outside an area of risk. Traffic control is a temporary function to be implemented at points where normal traffic controls are inadequate or where redirection of traffic becomes necessary due to emergency conditions.

vesicant agent—a chemical agent that induces blistering.

VX—see nerve agent.

APPENDIX A

PLANNING GUIDELINES FOR COMMAND AND CONTROL
FOR
THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX A

PLANNING GUIDELINES FOR COMMAND AND CONTROL

A quick and effective response to a chemical agent release requires that the Army installation and affected jurisdictions have in place a management structure and a suitably designed and equipped facility to coordinate the actions of response forces and the provision of needed resources. This appendix presents guidelines to guide communities in developing the capabilities to provide the necessary command and control functions. The guidelines are divided into two areas: (1) requirements for the overall organizational structure for command and control and (2) requirements for staffing, organizing, and operating the emergency operating center (EOC). (Guidelines regarding the physical aspects of the EOC are presented in Appendix B.) These guidelines incorporate recommendations relevant to the Chemical Stockpile Emergency Preparedness Program (CSEPP) command and control from four Federal Emergency Management Agency (FEMA) publications—*Objectives for Local Emergency Management*, CPG 1-5; *Disaster Operations: A Handbook for Local Governments*, CPG 1-6; *Guide for the Review of State and Local Emergency Operations Plans*, CPG 1-8A; and *Emergency Operating Centers Handbook*, CPG 1-20—and a U.S. Army publication—*Chemical Accident or Incident Response and Assistance (CAIRA) Operations*, DA PAM 50-6.

ORGANIZATIONAL STRUCTURE

As a part of its emergency planning activity, each jurisdiction must identify the organizational structure it will employ to respond to a chemical agent release. Key components of the structure include (1) the individual (and alternates) with authority to provide central management of the community's emergency response, (2) other parties that will support the management function by providing advice and information, (3) the response forces and other resources available to respond to the emergency (including those under direct control of the jurisdiction as well as those to be obtained from other governments or from private sources), and (4) the organizational framework that will be used to coordinate the input of all parties to ensure an effective and comprehensive response to the emergency.

Because the chemical agent stockpile is under federal jurisdiction, the National Contingency Plan delegates the responsibility for on-scene coordination to the Department of Defense. Therefore, the federal On-scene Coordinator (OSC) will be an Army representative. Each jurisdiction's command

and control procedures should include consideration of the relationship between the OSC and the civilian emergency management structure.

Guidelines

A.1 The Emergency Operations Plan (EOP) for each jurisdiction shall identify, by title,

a. the individual having legal authority for central direction of the emergency response activities (this is normally the jurisdiction's chief executive),
b. the line of succession of that legal authority, including at least two individuals, and
c. other individuals and their alternates assigned responsibilities for assisting in the central direction of emergency response activities.

A.2 The EOP for each jurisdiction will identify emergency response functions required for an adequate response to all potential emergencies for the CSEPP. In addition, the plan will include or reference written and signed agreements with governmental or private sector organizations having primary or supporting responsibilities for each function. The written agreements should

a. identify the emergency response measures to be provided by each organization,
b. specify mutually acceptable criteria for the implementation of those measures, and
c. list arrangements for the exchange of information.

A.3 Emergency operations procedures will be developed for all emergency response functions identified in Guideline A.2. The procedures will provide step-by-step instructions for accomplishing the functions during an emergency. Where appropriate, the procedures will state the time frames within which specific actions will be completed and the relationships among actions (e.g., the dependence of one action on the completion of another action). The procedures should be designed to ensure that all necessary aspects of each function are considered; however, they should not unduly constrain the ability of emergency managers to respond appropriately to the unique requirements of a specific emergency situation.

A.4 Each jurisdiction should provide the capability to mobilize emergency response on a 24-hour per day basis, including

a. 24-hour per day staffing of communication links (warning point) with the Army installation, and

b. the capability to sustain around-the-clock emergency management and response operations for a protracted period once activated.

A.5 The EOP should identify key command and control personnel and should reference and specify the location of procedures, keyed to the chemical event emergency notification levels, for contacting these personnel in the event of a chemical agent release. The notification procedures (see Guideline A.10) should be constantly available to personnel staffing the communication links with the Army installation, and should enable key officials to be notified within two minutes of receipt of notification of a community emergency by the off-post point of contact. The time frame for notifying key officials of a post-only emergency shall be seven minutes, and ten minutes for a limited-area emergency.

A.6 Each jurisdiction should appoint a liaison to report to the Army installation EOC in the event of a chemical agent release. (If desired, a single individual could be appointed as the joint liaison for multiple off-post jurisdictions.) The liaison's authorities and responsibilities in coordinating the emergency response efforts of the installation and the local jurisdiction(s) should be agreed to with emergency response officials of the installation and listed in the EOP.

A.7 Each jurisdiction's plan should describe the hierarchy of command and control among multiple jurisdictions (i.e., identify who has responsibility for overall coordination if more than one jurisdiction is involved in the emergency response). If the plan calls for passing command and control authority from one jurisdiction or agency to another, the plan should specify the conditions under which this transfer would occur and outline the procedures for accomplishing the transfer.

A.8 Each jurisdiction's plan shall detail how command and control will be exercised within the time available for decision making. The plan should note

a. the time frame available for decision making under all conditions specified in the facility Emergency Response Concept Plan (ERCP) and other technical guidance and studies. At a minimum, the plan must integrate the Maximum Credible Events (MCEs) in the ERCP with site meteorological conditions, topography, and population resources; and

b. the method by which the command and control structure would respond to such events within acceptable time frames.

EMERGENCY OPERATING CENTER—STAFFING, ORGANIZATION, AND OPERATIONS

The purpose of the EOC is to facilitate coordinated management of the jurisdiction's emergency response by gathering all officials with key command and control roles (along with support staff) at a central location. To maximize the effectiveness of the EOC, the jurisdiction should define the functions to be performed there, organize the staff to ensure that these functions are accomplished, and develop the operating procedures and capabilities needed for comprehensive, coordinated, and adequate management of emergency response efforts.

An EOC developed under the CSEPP should provide a command and control center for potential emergencies related to the storage and disposal of the chemical agent stockpile as well as for other potential emergencies identified in the community's hazard assessment. An effective EOC consists of the combination of physical facilities, equipment, personnel, and procedures that enables the jurisdiction to apply its resources efficiently and effectively to respond to an emergency situation. The guidelines presented below address staffing, organization, and operation of the EOC. They integrate recommendations from three FEMA publications: *CCA General Program Guidelines* (CPG 1-3), *Emergency Operating Centers Handbook* (CPG 1-20), and *Objectives for Local Emergency Management* (CPG 1-5). Guidelines regarding the EOC physical facility are presented in Appendix B.

Guidelines

A.9 Each jurisdiction with land area in the IRZ will develop a plan for staffing and organizing the EOC according to the following criteria:

a. Each jurisdiction will appoint an EOC director (usually the emergency manager) to be responsible for coordinating all activity within the EOC and reporting directly to the individual having legal authority for central direction of emergency response activities (see Guideline A.1).

b. The EOC should be staffed and organized to provide the following functions:

(1) Reviewing policy. The EOC staff must review the emergency response policy established in the EOP to enact any changes required for effective response to the emergency situation. Normally this group would include the elected official(s), the emergency manager, the public information officer, the liaison officer from the Army installation, and key department heads and executive staff.

(2) Disaster analysis and coordination. The EOC staff must collect and interpret any data needed to estimate the actual or potential impact of disasters on the community and on the emergency response operations.

(3) Operations. The EOC staff must direct and provide logistical and administrative support for the actions of emergency responders in the field. The EOC operations staff normally consists of the department chief or chief operations officer, appropriate support staff, and dispatching or communications personnel from each department or agency involved in emergency response (e.g., police, fire, public works, welfare, medical, and shelter).

(4) Resource coordination. The EOC staff is responsible for working with community businesses, government, volunteer groups, and individuals to ensure maximum availability of resources for emergency needs. Each organization whose resources or services may be needed to respond to the emergency should be represented on the EOC staff by a representative with the knowledge and authority to commit the organization's resources.

A.10 Each jurisdiction will incorporate CSEPP management issues into the standard operating procedures (SOPs) for its EOC. These SOPs should be distributed to all EOC staff members. The SOPs should describe the layout and function of the EOC as a whole and the duties of major staff groups and individuals. The SOPs should be reviewed annually to ensure their consistency with current plans, procedures, equipment, record keeping systems, display devices, and communications capabilities. The SOPs should

a. list, by title, at least three officials with authority to activate the EOC;

b. state the conditions under which the EOC may/will be activated. In particular, the SOPs will specify the relationship between CSEPP chemical event emergency notification levels and activation/staffing of the EOC;

c. include a list of all EOC staff members, along with the home, work, and other telephone numbers where they may be reached and specify procedures for contacting them in the event of an emergency. Other organizations and jurisdictions to be notified should also be listed;

d. assign responsibility and include instructions for setting up the EOC (if not maintained in ready-to-use condition during non-emergency periods). At a minimum, the SOPs will identify the location of keys to the EOC facility, the storage location and EOC layout of any stored furniture, communications equipment, display boards, office equipment and supplies;

e. specify, by title, the person responsible for determining that the EOC should be deactivated and the person(s) or organization(s) responsible for returning the facility to its pre-emergency conditions (i.e., storing furniture and equipment and cleaning up) and replenishing expended supplies;

f. describe procedures for handling information within the EOC, including,

    (1) identify the individual (by title) responsible for routing messages to appropriate staff within the EOC,

    (2) list methods to be used for internal communications,

    (3) list procedures and protocols for transfer of information within the EOC (e.g., determining message priority, retaining of file copies by both sender and receiver), and

    (4) provide for the display and frequent updating of commonly needed information regarding damage assessment, response force assignments, and resource availability and commitment. Displays should include

        - a hard copy map of the emergency planning zone depicting the immediate response zone, protective action zone, and all subzones (e.g., sectors) adopted by the jurisdiction,

- map(s) showing evacuation areas (with populations), evacuation routes, reception centers, congregate care centers, and traffic control points,
- a map showing the area projected or known to be affected by the agent release, and
- displays depicting emergency notification levels, current weather data, damage assessment information, the availability and assignment of response forces, and the availability and commitment of resources;

g. describe procedures for external communications, including

(1) a list of communications tasks and the personnel and equipment assigned to each,

(2) a chart depicting the jurisdiction's emergency communications network, including back-up equipment available from other agencies or private citizens,

(3) a list of local sources for emergency repair and resupply of communications equipment, and

(4) a complete list of procedures to be followed in external communications, including

- the frequencies to be used for communicating with the on-post EOC, the EOCs of other jurisdictions, and emergency response field units,
- protocols (e.g., send procedures, receive procedures, receipt verification procedures, and coded formats) to be used in communicating with the on-post EOC, the EOCs of other jurisdictions, and emergency response field units,
- the method to be used to assign message priorities,
- procedures for handling messages (e.g., logging of outgoing and incoming messages);

h. assign responsibility and describe procedures for maintaining a significant events log for the duration of the emergency situation. The log will be used to record key disaster-related information (commitment of response resources, casualty information, health concerns, property damage, fire status, size of risk area, scope of hazard to public, number of evacuees, etc.);

i. assign responsibility and describe procedures for ensuring that EOC occupants are protected from chemical agent exposure. The procedures must be compatible with the protective equipment provided for the EOC pursuant to Appendix B (Planning Guidelines for EOC Location, Design, and Equipment); and

j. describe procedures to be followed in transferring to and operating the alternate EOC, including

   (1) conditions under which the alternate EOC would be activated and staffed,

   (2) provisions for transferring staff and critical equipment to the alternate location,

   (3) instructions for installing communications and automation equipment in the alternate EOC,

   (4) conditions that must be met and procedures to be followed to transfer direction and control authority from the primary EOC, and

   (5) arrangements for meeting any critical operational capabilities provided by the primary EOC that cannot be accommodated at the alternate location.

APPENDIX B

PLANNING GUIDELINES FOR OFF-POST EOC LOCATION, DESIGN, AND EQUIPMENT FOR IRZ COUNTIES FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX B

PLANNING GUIDELINES FOR OFF-POST EOC LOCATION, DESIGN, AND EQUIPMENT FOR IRZ COUNTIES

Each county with land area in the IRZ should develop an Emergency Operating Center (EOC) meeting the requirements of the following guidelines. An EOC developed under the CSEPP should provide a command and control center for potential emergencies related to storage and disposal of the chemical agent stockpile as well as for all other potential emergencies identified in the community's hazard assessment. The multi-hazard capability is needed because another hazard, such as an earthquake or tornado, could initiate a chemical agent release. An effective EOC consists of the combination of physical facilities, equipment, personnel, and procedures that enables the jurisdiction to efficiently and effectively apply its resources to respond to an emergency situation. Recommendations for ensuring the adequacy of all aspects of multi-hazard EOCs are found in three FEMA publications: *Federal Assistance Handbook: Emergency Management, Direction and Control Programs* (CPG 1-3), *Emergency Operating Centers Handbook* (CPG 1-20), and *Objectives for Local Emergency Management* (CPG 1-5).

The list of guidelines presented here integrates recommendations from these publications related to physical aspects of an EOC facility (i.e., location, design, and equipment) appropriate for the CSEPP. EOC staffing and operating procedures, which are equally as important in developing an effective emergency management and response capability, are addressed in Appendix A, Planning Guidelines for Command and Control.

The guidelines are classified into six categories, each addressing a different aspect of the physical concerns that must be considered in developing an EOC facility.

- Location guidelines include factors pertinent to the process of situating the EOC so that it is quickly accessible to key staff members, contributes to effective control of response activities, avoids hazardous conditions, and minimizes costs.
- Guidelines for size and layout include recommendations to ensure that the EOC contains adequate space for command and control functions as well as necessary supporting facilities and that the EOC is arranged for maximum efficiency.

- Protection and security guidelines are concerned with ensuring that the EOC is protected from the hazardous conditions associated with the emergency and can continue to provide its command and control function for the duration of the emergency situation.
- Guidelines for communications capabilities are important because they imply the need for equipment that must be housed in the EOC. The EOC must include adequate and appropriately arranged space for accomplishing critical communications functions.
- Guidelines for information processing capabilities, like those for communications, are significant since equipment will be needed to provide the listed capabilities. The EOC facility must provide sufficient room in appropriate locations for this equipment.
- Other equipment and supplies include miscellaneous items and services necessary to ensure that the EOC can function for the duration of a sustained emergency. These items and services include those required for emergency management operations as well as those required for staff support.

GUIDELINES

B.1 The location of the EOC will be selected according to the following criteria:

a. The relationship between the EOC and its host building should be determined by the following considerations:

(1) The preferred location is in an existing government-owned building providing adequate protection from all hazards identified in the community's hazard assessment;

(2) If suitable existing or adaptable space is not available in an existing building, consideration should be given to incorporating the EOC into a planned multi-purpose, government-owned building;

(3) Renovation of a separate structure for the EOC should be considered only if the two preceding options prove impractical.

b. The EOC should be located

(1) outside or on the periphery of the risk areas for all hazards for which risk areas have been identified, and, specifically outside the CSEPP immediate response zone (IRZ),

(2) near the center of the area served,

(3) near the offices of the jurisdiction's key elected officials, preferably in the same building,

(4) adjacent to police and fire dispatch centers,

(5) in an area where surface access is expected to remain free of congestion during emergency situations (e.g., due to evacuation traffic, collapsed buildings, or destroyed bridges),

(6) at a location that allows good radio transmission and reception,

(7) at a location that facilitates securing the EOC quickly (i.e., allows efficient control of entrance and egress),

(8) at a location that allows short-term expandability to meet different contingencies, and

(9) at a location that allows potential long-term expandability to respond to potential population growth or other changing conditions.

B.2 If possible, the EOC should be occupied by the offices of the emergency management agency during non-emergency periods. It is not required that the EOC be staffed on a 24-hour basis during non-emergency periods.

B.3 An alternate EOC location should be preselected and pre-prepared. The alternate EOC should be outside the CSEPP IRZ, and, compared to the primary EOC, should be further away or in a different wind direction from the chemical stockpile storage and disposal facility. If there is more than one IRZ county, the EOC of each county will serve as the other county's alternate EOC.

B.4 The EOC facility should be designed according to the following criteria regarding size and layout:

a. The facility should provide a minimum of 50 ft^2/person for the number of staff that would be assigned to the EOC in an emergency on a sustained 24-hour basis.

b. The operational areas of the EOC (operations room, communications center, and message center) should be arranged for maximum efficiency in exchange of information.

c. The operations area and the communications/message center area should be located in separate but adjoining rooms.

d. Support areas should be provided, including

   (1) sleeping accommodations adequate for 1/2 of total assigned staff at a time,

   (2) a food service area near the sleeping area,

   (3) a medical dispensary area,

   (4) sanitary facilities (toilets, showers, laundry, garbage disposal), and

   (5) adequate storage space near the EOC for medicines, food, office supplies, and equipment.

e. The EOC layout should ensure minimum interference between operational areas and support areas.

f. The operations room should be used exclusively for EOC operations or used for permissible activities during periods of normalcy.

g. If the EOC is occupied during non-emergency periods by people not associated with emergency management, a checklist should be posted outlining the procedures for rapidly converting the space into an EOC.

B.5 The EOC should provide adequate protection and security to ensure its ability to function during an emergency.

a. The EOC and the building in which it is located should, if practicable, have sufficient structural integrity to ensure survivability and operability during a wide range of emergency events.

b. Continued functioning of the EOC during a chemical agent event should be ensured by providing for protection of the staff from toxic agents. This protection may be provided by positive pressure ventilation and filtration equipment.

c. With respect to seismic safety, all CSEPP-funded EOC's that are new construction shall conform to established local building codes or to the Uniform Building Code, Standard Building Code, or American Building Code.

d. No CSEPP-funded EOC shall be constructed in an area that has been designated a 500-year floodplain.

B.6 The EOC should be designed to accommodate the following communications capabilities:

a. ability to receive warning of all relevant emergencies,

b. ability to receive emergency notification and protective action recommendations regarding a CSEPP chemical event by a communications facility staffed around the clock through direct, reliable, and redundant communications with the on-post notification point. A dedicated telephone line should serve as the primary link and a radio as the secondary link,

c. ability to alert EOC staff (paging systems, etc.),

d. ability to communicate with the off-post notification point in order to control the jurisdiction's alert and notification system,

e. direct, 100% reliable, and redundant communications with the on-post EOC from both the primary and alternate off-post EOCs,

f. capability for high-speed exchange of hard copy with the on-post EOC via computer or telephone facsimile,

g. direct communications, that can be reliably maintained under emergency conditions, with other EOCs, public shelters, state emergency services or related agencies, hospitals, the Emergency Broadcast System (EBS), and the Joint Information Center,

h. direct and reliable two-way communications with police, fire, rescue, health, engineering, and other operating units with emergency response functions,

i. constant two-way communications with the on-scene command post, if the jurisdiction proposes to use an incident command system,

j. adequate communications links with public evacuation vehicles and their dispatch agencies,

k. the ability to receive and disseminate all relevant hazard data,

l. the ability to monitor weather data,

m. TV and commercial radio receivers for monitoring news reports and emergency announcements,

n. communications equipment designed, installed, and maintained to withstand disaster conditions,

o. easily installed spare parts available for vulnerable critical components of the communications system (e.g., antennas),

p. adequate on-site emergency power (with fuel) for communications equipment,

q. provisions for backup communications systems (e.g., amateur radio and citizens band) in case primary systems should become overloaded,

r. intercom and public address system for efficient communications within the EOC, and

s. status and situation boards permitting immediate visual access to information by all EOC staff members.

B.7 The EOC should be designed to accommodate the following information processing capabilities:

a. rapid assessment of all relevant hazards, and

b. use of computerized information on chemical agent event assessment and plume pathway predictions received from the on-post EOC.

B.8 The EOC should provide the following miscellaneous equipment and supplies:

a. adequate suitable office furniture available in or very near the EOC (preferably foldable or collapsible to reduce required storage space unless EOC is maintained in ready-to-use condition),

b. adequate office equipment and supplies present or readily available to support operations for two weeks (copying machines, typewriters, calculators, maps, grease pencils, cloth and chalkboard erasers, forms, staplers, staple removers, pens, pencils, paper, printer cartridges, etc.)

c. file cabinets for lists of resources available for responding to emergencies, written agreements with other agencies or jurisdictions to provide resources or assistance, and confidential lists of people requiring special consideration during emergencies,

d. emergency power supply adequate for all necessary equipment with a 4- to 5-day independent fuel supply,

e. water supply adequate to support fully staffed EOC for 4-5 days and which does not depend on commercial power and is not susceptible to disruption by disaster conditions,

f. mechanical ventilation equipment supplying 15 cubic feet of air per minute for each person in the occupied space,

g. food supply adequate to feed full staff for 4-5 days (may rely on public fallout shelter food supply, on commercial foods with a long shelf life, or on a combination),

h. food preparation equipment appropriate for the nature of the food supply (e.g., refrigerator, hot plate or microwave, sink, and coffee maker),

i. dining furniture (may use conference table if practical),

j. sanitary supplies adequate for 4-5 days,

k. administrative supplies and services adequate to support operations and janitorial services for 4-5 days,

l. spare parts for essential items (e.g., backup lighting, automation, communications, and ventilation),

m. auxiliary lighting (e.g., flashlights, lanterns, batteries, bulbs),

n. recording equipment (e.g., instant cameras, tape recorders) to simplify and expedite recording of significant information and equipment, and

o. medical supplies adequate for a dispensary-type operation serving the assigned staff for 4-5 days.

APPENDIX C

COMMUNICATIONS SUPPORT NETWORK:
SYSTEM DESIGN CRITERIA AND EVALUATION GUIDE FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX C

COMMUNICATIONS SUPPORT NETWORK: SYSTEM DESIGN CRITERIA AND EVALUATION GUIDE

INTRODUCTION

Purpose

This document describes the system design criteria and the evaluation guidelines that the Federal Emergency Management Agency (FEMA) will use to ensure the adequacy and effectiveness of Communications Support Networks for the Chemical Stockpile Emergency Preparedness Program (CSEPP). It is the intent of this guidance to establish **minimally acceptable** criteria for CSEPP Communications Support Networks.

Need for Communications Support Networks

In the event of a chemical emergency that can or will affect areas outside of the Army installation, accurate information must be relayed within predetermined time constraints to identified off-post officials and decision makers.

Very reliable communication systems must be in place to ensure that the notification and subsequent information sharing can occur without delay. At least two independent methods of simultaneous communications must be available to protect against the possibility of equipment failure.

The systems currently available that offer a high degree of reliability include dedicated, non-public switched telephone links and specifically designed two-way radio links.

When properly designed, two-way radio systems can be utilized for many required functions, thereby providing both high reliability and cost effectiveness. These functions include the following considerations:

- initial notification fan out
- continued information exchange
- activation of outdoor warning systems
- activation of indoor warning systems
- routine system testing without activation
- warning systems activation from various locations

A dedicated telephone "hot line" ring-down system provides direct point to point(s) communication paths that are dedicated for a single function. Such a system does not rely on telephone central office switching equipment and offers improved reliability over commercial telephones. Properly designed systems can ring multiple lines to pre-designated locations simultaneously and without requiring dialing.

OPERATIONAL CONCEPTS

This section identifies the need for systems dedicated to the CSEPP and explains the interrelationships of components. Examples include utilization of dedicated non-public telephone systems to support facsimile equipment and the use of dedicated radio systems for activation of outdoor and indoor alert and notification components.

Systems Integration

Highly reliable 24-hour communications links must exist that interconnect the on-post decision makers with the appropriate local and state agencies having CSEPP responsibilities and decision-making authority. The communications links should be designed to integrate with the public alert and warning system (see Appendix F). A properly designed two-way radio system can provide the required interconnect and additionally be used to activate radio controlled sirens, indoor alert monitors, pagers, and related hardware. The CSEPP communications support system may be used to link terminals on the CSEPP automation system network, since the automation system will likely link all of the points that must also be linked by the communications support system. However, dual use of the same dedicated telephone lines or radio channels for both voice and automated data transfer is not acceptable. The use of the CSEPP communications support system to link automation system sites must be done on dedicated lines/channels utilized solely for data transfer.

Dedicated Use Requirements

Any communications systems installed for the CSEPP must be available for use in the program on a priority basis. This does not mean that day to day use is discouraged because such use supplies continuous testing. It does however, mean that should a chemical emergency take place the system will be dedicated to the incident for as long as the emergency exists.

Interface with Existing Systems

Exhibit "A" is a generic diagram of a typical system for use in the event of an on-post chemical emergency that might affect areas off post. The diagram represents a combination of dedicated telephone and radio components that may vary from site to site, but indicates the communication paths that should exist.

There is also a need for each of the identified contact points to communicate with its own field units. In most cases, this need is presently met with existing systems. The proposed systems must be considered as "Command and Control Networks"; however, a need may also exist for some command vehicle mobile and portable units to operate on the proposed radio network. This need should be addressed in very limited situations to avoid overcrowding of the radio frequency.

The CSEPP Communications Support System must also be capable of interfacing with and incorporating existing national and regional emergency communications networks including the National Warning System (NAWAS), the Operation SECURE (State Emergency Communications Using Radio Effectively) radio network, and amateur radio emergency services.

National Warning System (NAWAS)

NAWAS is a nationwide leased dedicated voice warning network with the primary purpose of providing information regarding impending attack to the United States. NAWAS is also used extensively in response to natural and man-made emergencies.

NAWAS is a dedicated 24-hour nationwide party-line type telephone warning system controlled from a National Warning Center (NWC) at Colorado Springs, CO and an Alternate National Warning Center (ANWC) at Olney, MD which are manned continuously by Attack Warning Officers. NAWAS consists of 63 circuits connecting approximately 2,400 terminals across the United States including FEMA Headquarters, FEMA Regional offices, and state, county and municipal warning points. The National Oceanic and Atmospheric Administration is connected to NAWAS for dissemination of warning via the weather network.

Operation SECURE

Operation SECURE is a frequency allocation and assignment program initiated by the Federal Cmmunications Commission (FCC) and administered by FEMA. Operation SECURE provides each state emergency management agency the opportunity to obtain an FCC license for emergency management communications in the 2-10 Mhz high frequency range. Local emergency management agencies may be authorized by states to operate on these state assigned frequencies.

Operation SECURE offers networking capabilities with other state and local emergency management agencies, state National Guard units, FEMA, the U.S. Dept. of Transportation, U.S. military forces, and amateur radio operators. Operation SECURE equipment is available in base station, mobile and portable configurations with voice and data transmission capabilities.

Amateur Radio

The Radio Amateur Civil Emergency Service (RACES) is a part of the amateur service serving civil defense under a separate subpart of the amateur regulations. RACES provides radio communications for civil defense purposes **only** during periods of local, regional or national civil emergencies. These emergencies are not limited to war-related activities, but can include natural disasters such as fires, floods and earthquakes. As defined in the rules, RACES is a radio communication service, conducted by volunteer licensed amateurs, designated to provide emergency radio communication to local, regional or state civil defense organizations. RACES works principally at the local level through local and state civil defense agencies organized by state government to provide emergency communications in the event the FCC authorizes its use. RACES is a separate entity from the Amateur Radio Emergency Service (ARES). ARES is the "emergency" division of the Amateur Radio Relay League (ARRL) Field Organization (Amateur Radio Relay League 1988). It consists of licensed amateurs who have voluntarily registered their qualifications and equipment for communication duty in the event of a disaster. ARES is administered on a local, section-wide and national basis. RACES is sponsored by the federal government and is under the jurisdiction of the FCC. It is intended that RACES, when properly authorized, will remain on the air in the event of any officially declared emergency, although the rest of Amateur Radio may be silenced.

It is important to note that RACES operation is authorized by the FCC upon request of a local, state or federal official, and is strictly limited to official civil defense activities in the event of an emergency communications situation.

Packet technology is a means of digital amateur communications using a computer-to-radio interface with a built-in error checking, "handshake" acknowledgment feature. This is generally written under a protocol referred to as AX.25 which defines the acknowledgment handshake process, length of data stream and number of re-tries prior to "failing" the transmission. This error checking system is ideal for the emergency management communicator since messages may at times become difficult to understand in the voice mode due to heavy traffic on channels, poor reception and equipment malfunctions. Under the AX.25 protocol, simple multi-word sentences may be transmitted or complex data or text files may be moved about the system. The AX.25 protocol allows for directivity of messages; that is, one message to one receiver (person) or a type of "group message" which is transmitted to multiple reception sites. Priority may be assigned to the transmissions to permit higher priority emergency messages to overtake lower priority messages. Packet technology permits hard copy transmission of messages as well as storage of the messages in the form of magnetic media. Through the use of portable equipment, the computer, packet controller and radio may be configured in a briefcase and carried to a site. Due to the digital nature of the transmissions and the handshake process, it is possible to configure the system to send and receive from a site through a digital repeater which is actually another packet installation. Some systems have portable units communicating with others via a vehicle mounted digital repeater or via a mountain top site. Applications include the forwarding of simple messages as well as the forwarding of entire documents such as lists of individuals registered at a mass care center, passenger lists for modes of transportation, equipment lists and other large data bases. Any file that is capable of being transferred from one computer to another may be transferred via the packet medium.

Extension to the Protective Action Zone

Due to the longer lead time available before a response action must be initiated, extension of the dedicated nonpublic telephone system beyond the IRZ is not required except where necessary to reach IRZ county facilities, IRZ county alternate EOCs, and the state EOC. Notification to other state agencies, other federal agencies, and Protective Action Zone (PAZ) counties may be processed via the state EOC using various existing systems such as NAWAS, Operation SECURE radio, state computer links, public telephones, state radio systems, and teletypes.

The same criteria apply to any special radio networks implemented in support of the CSEPP. In those cases where sirens or indoor alert monitors are installed beyond the IRZ, it is necessary to ensure that adequate radio coverage exists to activate these devices.

Specific CSEPP communications systems are not **required** for notification to PAZ jurisdictions unless no alternative systems exist.

MINIMUM SYSTEMS REQUIREMENTS

This section specifies operational and technical requirements of the systems to assure a high degree of reliability and system simplicity to ensure that all equipment is user friendly.

Dedicated Telephone Systems

C.1 The system must operate independently of the public switched telephone system.

C.2 The system must permit simultaneous activation of all stations, as well as selected groups of stations within time frames suitable for the range of chemical agent events considered feasible at the site.

C.3 True conferencing must be possible with sufficient ringing current and amplification to permit all stations to be signaled simultaneously and to speak/listen with all instruments on line.

C.4 The system must be equipped with a means to priority rank instruments (stations), as well as to permit the on-post EOC to signal users if off-hook (call waiting) and/or to "barge-in".

C.5 Each station must have the ability to signal any other station on the system and conduct a two-way conversation provided the called party is not using the instrument.

C.6 Multiple call group telephone systems should be considered. Options that should be evaluated include

a. One group dedicated to connection of all on-post and IRZ and state off-post EOCs.
b. One group dedicated to selective conferencing among fewer than all parties.
c. One group for coordination of emergency public information/public affairs.
d. One group dedicated to hard copy (facsimile) and/or computer data transmission.

Arrangements should be made for the inclusion of "extension" lines and instruments at the same address to permit use of the same line both at the 24-hour dispatch console and the EOC operations room (when activated).

C.7 The entire system must have stand-by power in the form of batteries which will operate the system for a minimum of eight (8) hours on a thirty (30) percent transmit, one hundred (100) percent receive duty cycle. Additionally, the system must have an alternate power source for maintaining the batteries in a charged state for no less than seven (7) days at the 30/100 percent duty cycle should commercial power be interrupted. This alternate source may be in the form of solar cells, generator, etc.; however, it must be a proven demonstrated method.

C.8 The system should employ only high quality voice grade circuits and 56 kbps data circuits as appropriate.

C.9 Selection of cable/communication locations should consider path reliability.

C.10 Alternate paths must be included in the system to permit two-hour maximum return to service should a primary path be removed from service for any reason.

C.11 The system must contain status monitoring equipment to assure on-post personnel that power, alternate power and communications pathways are operational. The system must report, via a visual display, loss of commercial power and the switch over to battery. The length of time on standby power must also be displayed to on-post staff. Communications pathways may be monitored by means of the presence of a sub-audible pilot tone applied to all paths. Absence of the tone or interruption of the tone will signal staff of a problem similar to supervised alarm circuits used by financial institutions.

C.12 Communications plans must address the integration of the CSEPP telephone communication systems with existing telephone based communication systems such as NAWAS.

Radio Systems

C.13 The system linking the on-post EOC and IRZ off-post EOCs should operate independently of the existing public-safety systems in use in the area. That is, the primary CSEPP Command and Control radio link should not share a common frequency with any other public safety function.

C.14 The specific area of the radio spectrum in which the system operates should be determined by local availability, propagation requirements, and type of system.

C.15 Systems utilizing multiple base stations or a repeater and control stations are acceptable. The system must be "user friendly" utilizing off-the-shelf, commercial grade equipment and components. The equipment and components must be type accepted only if type acceptance is required under FCC licensing regulations authorizing transmission.

C.16 Encryption is not required; however, if this option is included it should be factory preset to avoid operational mistakes that could delay message receipt.

C.17 Base station or control station equipment must be installed and tested with back-up power systems for continued operation in the event of loss of commercial power.

C.18 Written protocols must be developed that identify radio network control and priorities.

C.19 Mobile units assigned to operate on the radio network should be limited to agency(s) command vehicles with specific responsibility to the CSEPP.

C.20 The on-post EOC and each off-post warning system activation point must be equipped with tone or digital signaling (encoding/decoding) for use in activating outdoor sirens, indoor alert monitors, pagers, etc. The encoding/decoding devices must be capable of selective signaling for use in signaling individual addresses or zones.

C.21 The system must be capable of integration with existing radio emergency communication systems including Operation SECURE and amateur radio emergency services (RACES and ARES).

Systems Operability

C.22 A program should be implemented that regularly tests both the human and hardware aspects of the communications support systems. At a minimum, the hard wire non-public telephone system should be tested daily, with the on-post EOC conducting a system roll call at a predesignated time. Additionally a point to point roll call on the special radio network should be conducted at the same time.

C.23 A full scale test of the communication systems, outdoor and indoor alert systems and notification systems should be conducted at least every month, with detailed records made of component failures. Any component determined inoperative should be repaired and placed back in service within 12 hours. The system tests of the communications and warning systems should be conducted simultaneously because of the integration of the warning system activation hardware into the communications support network.

C.24 Maintenance agreements must be in place that require at least quarterly preventative maintenance inspections for all components of the communications systems. The agreements should also provide for response, repair and return to service within designated times for each system component, but in no case longer than 12 hours.

SYSTEMS EVALUATION

This section describes the process that FEMA will use for evaluating the adequacy and effectiveness of CSEPP Communications Support Systems. The process of identifying, procuring and installing equipment is discussed in Task P-2 of the "Chemical Stockpile Emergency Preparedness Program Management Plan," (Argonne National Laboratory 1990).

The design of the communications support network for each CSEPP location is critical not only to the communications function but also in support of the CSEPP public alert and notification function. The design of the communications support network at each location is the determinant to the successful integration of each public alert and notification system, in that the communications support system must be capable of activating both indoor and outdoor warning systems.

FEMA has made funds available to states around each CSDP location to procure technical support for designing communications support systems. These design reports should comply with the guidance included in this document, and will be the basis for states to request funds to procure the hardware and engineering support to implement their CSEPP communications support networks. FEMA will critique all aspects of each state's design report, and will recommend changes as necessary before authorizing transfer of the necessary funds.

During procurement, installation, and integration of the CSEPP communications support network, FEMA will continue to provide technical support as needed by the states. Specifically, FEMA will review the vendor proposals selected by state and local governments and must approve the proposals before the states are authorized to expend procurement funds. Upon completion of the installation of the CSEPP communications support network and public alert and notification system at each location, FEMA will perform an engineering analysis of the integrated system including communications, outdoor warning devices, and indoor warning devices. Further evaluation of the communication support systems will be accomplished through FEMA's evaluation of emergency drills and exercises.

REFERENCES

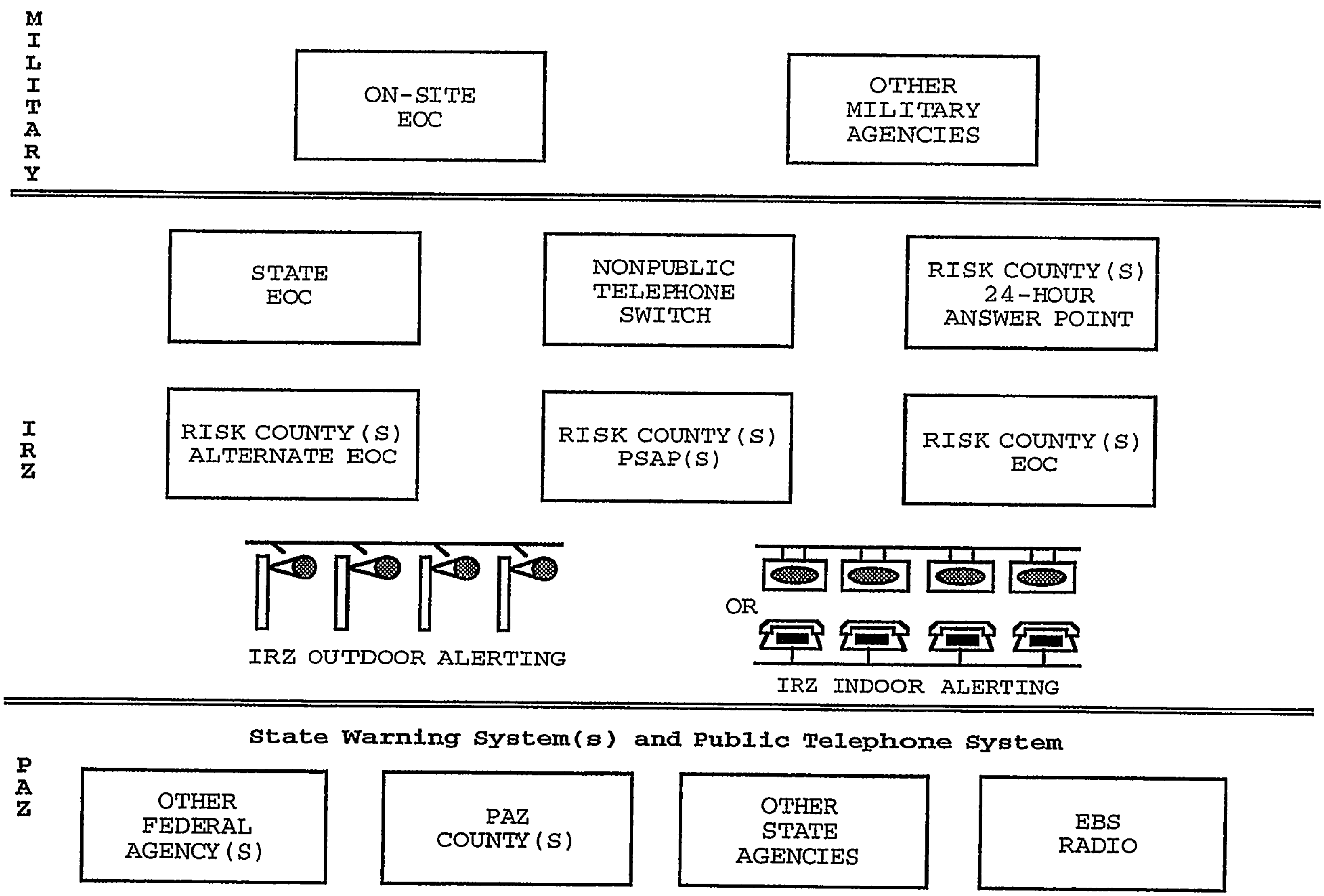
Amateur Radio Relay League 1988. *The FCC Rule Book.*

Argonne National Laboratory March 1990. *Chemical Stockpile Emergency Preparedness Program: Management Plan.*

Exhibit A

CSEPP

Generic Communications and Public Alert and Notification Design



APPENDIX D

PLANNING GUIDELINES FOR PROTECTIVE ACTION DECISION MAKING
FOR THE
CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX D

PLANNING GUIDELINES FOR PROTECTIVE ACTION DECISION MAKING

In the event of a release of chemical agent affecting the general public, appropriate protective actions must be selected quickly so that they can be communicated to and implemented by the public before the arrival of the toxic plume. The process of determining what set of protective actions will be effective for the entire affected area under a given set of accident and environmental conditions is far too complex and time consuming to be performed entirely at the time of an emergency. Sets of protective actions appropriate for given ranges of conditions should be defined during the preparedness phase and agreed upon by all appropriate parties. Thus, in the event of an actual emergency, officials will be implementing predetermined and approved protective actions.

The number of options for protecting the public from exposure to a chemical agent release is limited. The basic choices are evacuation and shelter-in-place (including normal shelter-in-place shelter and sheltering improved by expedient measures, permanent enhancements, or pressurization). Planning requirements associated with these options are found in Appendix E.

The design of the emergency decision process is likely to be reasonably simple in concept but difficult in implementation. While the number of protective action options is limited, the process of identifying the conditions under which each option would be appropriate is complex and needs to be completed in the planning process. A location-specific analysis may find, for example, that a given segment of the population should evacuate whenever possible and take some other action whenever evacuation is inappropriate. The protective action decision process for this population segment consists of (1) identifying the situations under which evacuation would not be appropriate, (2) determining what action provides the best protection when evacuation is inappropriate, and (3) evaluating the situation at the time of an emergency to determine whether evacuation or the alternative action should be implemented. To ensure quick and appropriate emergency response, planners should perform the first two steps during emergency planning and should design a process for accomplishing the third step most efficiently.

The guidelines presented in this appendix prescribe general requirements for protective action analysis and decision making but leave specific methodology up to the state and local planners. Careful and detailed analysis during the preparedness phase is necessary to allow speedy decisions during the emergency response phase. Before the occurrence of a chemical agent release, all decision makers must thoroughly understand the protective action options that are available and the conditions under which each option would be effective.

OPERATIONAL CONCEPTS

Scope of Considerations in the Protective Action Decision

Selection of appropriate protective actions for a given event must consider all relevant aspects of the release, meteorological conditions, and characteristics of the surrounding population. These factors interact to define the populations at risk from a particular release, the concentration and duration of the toxic plume from which they will require protection, and the time available for them to implement protective actions. Pertinent release characteristics include the type and amount of agent and the duration of the release. Relevant meteorological conditions include wind speed, wind direction, and atmospheric stability. Pertinent population characteristics include the distance between the location of the release and populated areas, the distribution and density of population, and the locations of institutions and special population groups. Relevant information regarding release characteristics and meteorological conditions is embodied in the accident categories defined in the location-specific Emergency Planning Guide (EPG). Planners should employ these accident categories, applying additional information about local population characteristics, to develop protective action strategies.

Decision Criteria

The determination of which action provides adequate protection for a given area or population group should consider (1) the protective capacity of the action (i.e., its ability to provide protection once implemented), (2) the likelihood of the action being implemented by people in the risk area, (3) the time required to implement the action versus the time available before the arrival of the toxic plume, (4) the social and psychological impacts of planning and implementing the action, and (5) risk to the public when implementing the action.

The protective capacity of a given action refers to its ability to provide protection once implemented. Considerations relevant to determining this capacity include (1) the probability that the action will not be successfully implemented, and (2) the limitations on the action's ability to provide protection for the duration of a chemical agent event.

The likelihood of an action being implemented by people in the risk area depends on several factors. First, the public must believe that the action will be effective. Second, they must know how to implement the action. Finally, when warned, they must have the capability to implement the action. The first two factors can be fostered by a strong public education program. The third factor, however, depends not only on the education effort but also on the nature of the protective action.

The technical study, *Evaluating Protective Actions for Chemical Agent Emergencies*, (Rogers et al. 1990) has concluded that evacuation provides maximum protection wherever it can be completed before arrival of the toxic plume. Thus, evacuation should always be the principal protective action for the general public in the Protective Action Zone, although other actions may be appropriate for special populations and institutions. Within the Immediate Response Zone, evacuation should be recommended for the general population in specific areas when it can be completed in time. For areas of the IRZ that cannot evacuate in time, shelter-in-place should be recommended. When determined to be necessary (see Guideline D.2), simple sheltering may be improved through permanent or expedient enhancements.

Evacuation feasibility is largely determined by the length of time required to mobilize people into vehicles and to move vehicles out of the area at risk. Shelter feasibility is determined by the infiltration rate into the structure and the duration that structure is in the plume. In general sheltering is not a good protective action when the accident is of a long duration or if the structure has a high infiltration rate. Moreover, people must vacate or air out the shelter when the plume has passed in order to minimize exposure to chemical vapors that entered the shelter while it was in the plume

If neither evacuation nor shelter-in-place adequately protects the public from all credible accident categories, then a study should be conducted to determine if other measures would provide adequate protection.

Two-part Decision Process

To ensure that appropriate protective actions are selected in the shortest possible time during an emergency, the overall protective action decision-making process should be divided into two steps. The first step, to be accomplished during the planning phase, consists of deciding what sets of protective actions will be recommended under given sets of emergency conditions. This step includes the complex and time-consuming analytical portion of the decision process. The second step, to be performed at the time of the emergency situation, consists simply of determining what conditions exist in that situation and, thus, which of the pre-determined sets of protective actions should be implemented.

Under this concept, all substantive decision making takes place in the planning phase; emergency activities are limited to implementing the decisions that have already been made. In the interest of obtaining the quickest possible response during an emergency, the second step could be performed by the Army installation, using decision criteria defined by the off-post jurisdiction(s), and the results communicated to the jurisdiction(s) as a part of the emergency notification process.

The division of the protective action decision process into planning and emergency components and the possible assignment of responsibility for performing the emergency component to the Army installation greatly increase the need for coordination. All officials with decision-making authority must be involved in the development of, and must indicate their agreement with, the protective action strategies and the emergency decision making process. In addition, the protective action strategies and emergency decision process must be coordinated with the installation and with all other jurisdictions with area in the emergency planning zone (EPZ). This coordination is crucial since installation personnel <u>may</u> make the first determination of which strategy to implement in an emergency. Coordination among the strategies of all jurisdictions involved will simplify and expedite this determination. In particular, all protective action strategies that call for the Army installation to directly initiate off-post protective action measures must be thoroughly coordinated and mutually agreed to in a memorandum of agreement between the local jurisdiction(s) and the installation in accordance with DA PAM 50-6 and AR 50-6. Written agreements must be executed to specify exactly what actions the installation agrees to perform and under what conditions it will perform them.

Development of Protective Action Strategies

Emergency planners should analyze the interaction of accident categories, as defined by the EPG, and population characteristics to identify the protective actions that would be appropriate for different segments of the population under different accident categories. The results of this analysis can be classified into a set of protective action strategies. Each strategy would list the protective action recommended for the population of each area and for each special population and institution under a given set of release and meteorological conditions.

Each protective action strategy should be concisely summarized in table form. Each table would identify the protective action that would be recommended, under that strategy, for pertinent population groups at various distances from the release. Pertinent population groups (e.g., general public, disabled persons, hospitals, and schools) and distance increments should be defined by local planners and officials based on their analysis of the protective action decision.

The number of strategies identified should be sufficient to protect the public from the full range of potential chemical agent accidents as defined by the EPG accident categories. In the interest of simplifying the decision to be made at the time of an emergency, however, the number of strategies should be kept to the minimum necessary. Because the range of protective action options is quite limited, it is likely that only a very few alternative protective action strategies will be required. It is conceivable that a single strategy will prove adequate for the EPZs surrounding some installations.

Design of an Emergency Decision Process

Once the protective action strategies have been defined, planners can specify a decision process to be followed by Army installation personnel and local officials at the time of a chemical agent release. The design of this process should be driven by the overall goal of promoting the selection of the appropriate strategy in the shortest possible time. A crucial part of this design effort is the clear specification of all information that will be needed to select among the strategies.

The decision-making process must be fully and clearly described. The process should focus on the factors required to select among the protective action strategies. These factors are embodied in the accident categories defined by the EPG and include the type and amount of chemical agent released, the duration of the release, wind speed, and atmospheric stability. The procedures to be followed in making the protective action decision should be listed, including the information required and the time limit for taking each procedural step.

To the maximum extent possible, the emergency decision-making process should be coordinated with the standard chemical event emergency notification system agreed to by the jurisdiction and the Army installation. Different decision processes might be developed for the various emergency levels. A more complicated decision process may be warranted, for example, for a "community emergency" than for a "post-only emergency." Where appropriate, a specific protective action strategy may be associated with a particular chemical event emergency notification level (e.g., evacuation of people within a given distance as an automatic response to a "post-only emergency").

The most efficient decision process is likely to take the form of a decision table, which is a predefined method of employing the minimum necessary information to decide among alternative courses of action. Depending on the complexity of the stockpile configuration and the range of feasible meteorological conditions, a separate decision table may be needed for each agent and/or each planning subzone.

The emergency decision process described in the decision tables should be incorporated into the automation system and should be readily available in hard-copy form to all decision makers. The recommended strategy can then be communicated to local officials as a part of the initial off-post notification process.

GUIDELINES

D.1 Each jurisdiction will adopt and incorporate a Protective Action Strategy Plan into the hazard-specific appendix of its Emergency Operations Plan. The plan will

a. identify the chemical agent accident categories identified in the location-specific Emergency Planning Guide;

b. for each category, develop a strategy for protective actions that would be recommended for the general population and for each special population group and institutionalized population in each geographic area of the EPZ;

c. identify, for each strategy, the conditions (e.g., release characteristics and meteorological conditions) that would lead decision makers to select that strategy for implementation;

d. identify any protective action strategies and the conditions under which the alert and notification of off-post areas will be initiated;

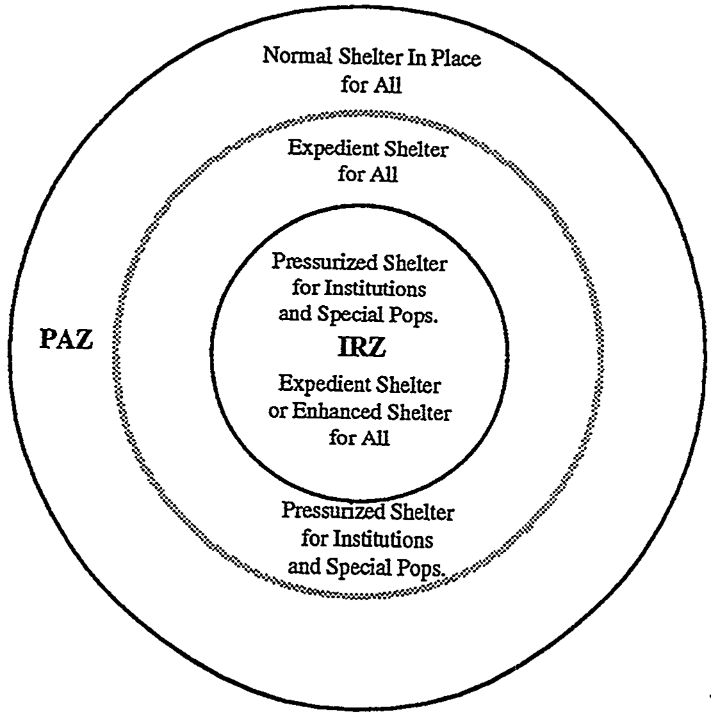
e. state the conditions under which the Protective Action Strategy Plan will be revised (e.g., completion of the destruction of one or more types of agent or munitions, or significant changes in population distribution in the EPZ); and

f. be coordinated with the Army installation.

D.2 The protective actions to be included in each protective action strategy should be selected according to the following criteria:

a. Evacuation should be recommended under all situations when it can be completed before arrival of the toxic plume.

b. Sheltering options are graphically depicted in Fig. 1. Normal shelter-in-place should be recommended for the general population and for special populations and institutions in the IRZ and PAZ under conditions that would not allow



Case 1
Shelter Policy when the No Death Distance is in the PAZ

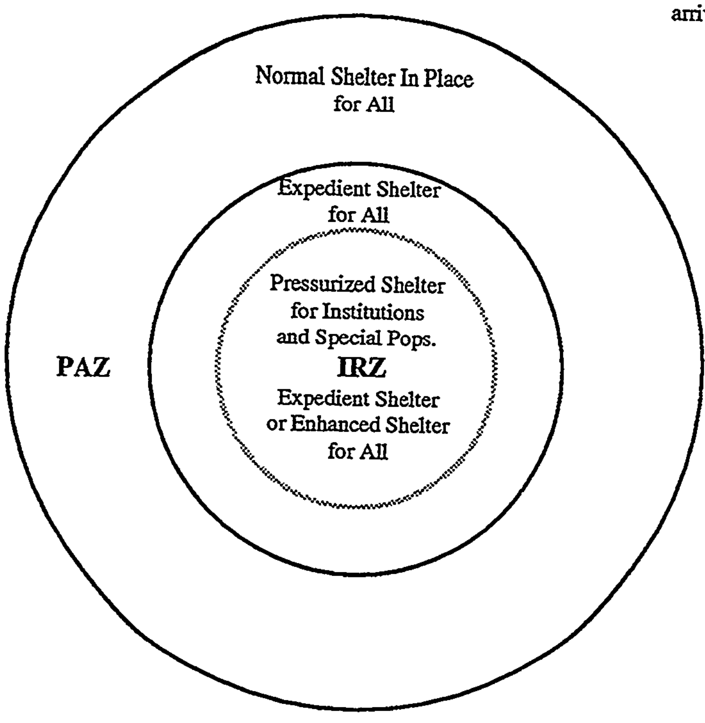
GENERAL PA POLICY

Evacuation should be recommended under all situations when it can be completed before arrival of the toxic plume.

Sheltering is recommended under conditions that would not allow evacuation before the arrival of a potentially life threatening level of chemical agent.

Normal In place shelter is recommended for all when it provides adequate protection.

Other Sheltering Options are for situations where Normal In Place Sheltering does not provide adequate protection



Case 2
Shelter Policy when the No Death Distance is in the IRZ

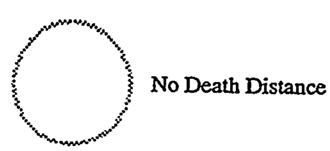


Fig. 1 Shelter Policy

evacuation before the arrival of a potentially life threatening level of chemical agent. If normal shelter-in-place does not provide adequate protection for any category of accident, members of the general public, institutions, and special populations within the no death distance or within the IRZ boundary if the no death distance exceeds the IRZ are eligible for the Enhanced Shelter Program and/or for expedient sheltering of one room in a house.

Members of the general public, institutions, and special populations who cannot evacuate before the arrival of a potentially life threatening level of chemical agent and who are beyond the no death distance but are in the IRZ or within the no death distance and in the PAZ are eligible for expedient sheltering of one room in a house.

Members of the general public, institutions, and special populations who cannot evacuate before the arrival of a potentially life threatening level of chemical agent and are outside the no death distance in the PAZ are only eligible for normal shelter-in-place.

c. Pressurized/filtered shelter-in-place should be recommended for special populations and institutions within the no death distance who cannot evacuate before the arrival of a potentially life threatening level of chemical agent and for which the measures listed in item b would not provide adequate protection. Facilities/structures that are pressurized would not be eligible for transportation resources to aid an evacuation.

D.3 Each jurisdiction will prepare an analysis providing the rationale for the strategies identified in the Protective Action Strategy Plan. The analysis will describe how the following issues have been considered in developing the jurisdiction's protective action strategies:

a. accident categories as defined by the location-specific EPG

b. other factors

(1) population distribution

(2) presence and location of special populations and institutions

(3) transportation network characteristics

(4) time of day

(5) time of year

c. organizational and behavioral factors and assumptions affecting response times

(1) time required for officials to decide on a recommended protective action strategy

(2) time required to communicate the protective action recommendation to the public

(3) time required for the public to decide to respond

d. characteristics of protective actions

(1) time required for the public to implement

(2) degree of protection

(3) duration of protection

(4) suitability for special populations and institutions

D.4 Each jurisdiction will incorporate an emergency decision process into the CSEPP-specific appendix of its Emergency Operations Plan. The process will

a. specify the procedures that will be followed at the time of an emergency to decide which protective action strategy to implement. These procedures should consist of the minimum steps necessary to decide among the protective action strategies identified during pre-emergency planning. The procedures should

(1) be organized according to the chemical event emergency notification system agreed to between the jurisdiction(s) and the Army installation,

(2) prescribe the system to be used for deciding which protective action strategy to implement and in which sectors the strategy should be implemented. The system should

- identify the critical information (e.g., release and meteorological conditions) required to make the decision,
- identify the protective action strategy to be implemented and
- identify the portion of the EPZ affected.

(3) prescribe time limits for the performance of each step in the decision process along with the protective action strategy to be adopted in the event that any step cannot be completed within the time constraint. Different time limits may be appropriate for different chemical event emergency notification levels.

b. list, in order, the actions local officials should take upon receiving a protective action recommendation from the Army installation.

D.5 All individuals with protective action decision-making authority will thoroughly review the Protective Action Strategy Plan and the emergency decision process at least annually. These annual reviews will be documented by signed statements, filed in both the on-post and off-post emergency operating centers, indicating that primary and alternate protective action decision makers understand and agree to the plan's protective action strategies and that they agree to implement the prescribed emergency decision process in the event of a chemical agent release, and that appropriate personnel understand the emergency decision process.

REFERENCE

Rogers, G. O., et al. 1990. *Evaluating Protective Actions for Chemical Agent Emergencies*, ORNL-6615, Oak Ridge National Laboratory, Oak Ridge, Tenn.

APPENDIX E

PLANNING GUIDELINES FOR PROTECTIVE ACTIONS AND RESPONSES FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX E

PLANNING GUIDELINES FOR PROTECTIVE ACTIONS AND RESPONSES

This appendix presents guidelines to guide local and state planners in maximizing the effectiveness of the protective actions they have identified for possible implementation in their jurisdictions. The various protective action options are described in detail in technical studies prepared for the Chemical Stockpile Emergency Preparedness Program (CSEPP) such as, *Technical Options for Protecting Civilians from Toxic Vapors and Gases* (Chester 1988) and *Evaluating Protective Actions for Chemical Agent Emergencies* (Rogers et al. 1990). Planners are strongly encouraged to review these studies in applying the guidelines set forth in this appendix.

Once a jurisdiction has identified the protective actions that may be appropriate for protecting its citizens from exposure to chemical agents, it must prepare for the implementation of those actions. This preparation includes planning for functions that the local government will have to perform at the time of an emergency as well as providing citizens with the equipment and knowledge that they will need to implement recommended self-protective measures.

The successful implementation of any protective action requires the involvement of emergency response forces. A speedy and efficient evacuation, for instance, will likely require traffic control personnel acting according to a pre-established plan to expedite the departure of people from the risk area. Similarly, the successful use of non-pressurized shelter-in-place will depend on the ability of officials of the jurisdiction and Army installation to determine when a toxic plume has passed a given area and to advise people in that area to leave their shelters. As a part of its pre-emergency planning effort, each jurisdiction should examine the protective actions it anticipates using and identify ways it can expedite or improve the effectiveness of those actions. The planners should identify the equipment and personnel which the jurisdiction will need to assist the self-protective actions of the public and should make arrangements to ensure that those resources will be available at the time of an emergency.

The public can successfully respond to a chemical agent emergency only if it has the equipment and materials to implement appropriate self-protective actions and knows how to use them. The local jurisdiction must ensure that the affected public possesses all resources (equipment, supplies, and instructions) necessary to implement the recommended protective actions. This involves determining the resources required to implement the protective actions, assessing the availability of those resources, and providing any resources that the affected public lacks. The required resources will vary, depending on the protective actions involved.

For evacuation, the primary planning task is the identification of the evacuation routes that will remove people from the risk area most efficiently. The results of this planning effort should be conveyed to all people in the affected area in a form that tells them as precisely as possible how to respond if an evacuation is recommended.

Jurisdictions that have identified enhanced shelter-in-place as a possible protective action (either as a stand-alone action or in combination with expedient infiltration-reduction measures) should develop and implement a program to reduce the infiltration rate of all structures that may be used as shelters. Similarly, if expedient shelter-in-place is considered a possibility, the jurisdiction should distribute the supplies that will be needed to reduce infiltration. These non-pressurized shelter-in-place options entail a particularly ambitious public education and training effort: (1) the affected public must be convinced that it is in their interest to seek shelter rather than give in to their (likely) impulse to flee the hazard; (2) they must know how to maximize the protection afforded by their shelter; (3) they must understand the necessity of abandoning the shelter when advised to do so (another action that is likely to be counter-intuitive); (4) they must know how to avoid exposure after leaving the shelter (e.g., contact with surfaces contaminated with a persistent agent could be hazardous); and (5) they must know what action is appropriate for evacuating the contaminated area (e.g., evacuation in private automobiles or assembling at specified locations to be picked up by mass transit vehicles).

If pressurized shelter-in-place has been identified as a possible protective action, the jurisdiction should implement a program to install pressurization and filtration equipment in all appropriate structures. In addition, it may also be necessary to implement measures to reduce the leakage of structures that have high infiltration rates. Public education and training requirements include instructing the affected public on how to activate the pressurization/filtration system and on how to evacuate the risk area after the hazard has passed. The jurisdiction should undertake a monitoring program to ensure that each pressurization/filtration system remains in working order and that the protective capacity of charcoal filters does not deteriorate.

GUIDELINES

E.1 Each jurisdiction which, as a result of the analysis required by Appendix D, develops a protective action strategy that includes evacuation for any area or special population will

a. identify the optimum evacuation strategy for each area and special population (including any on-post personnel who may be evacuated) for which evacuation has been identified as a possible protective action. Identify the quantitative evacuation time estimates used to identify the optimum strategies. Include an analysis of (1) the number of people and vehicles to be evacuated compared with capacities of the roadways that can be used for the evacuation, (2) the number and location of people without access to automobiles compared with the supply of mass transportation vehicles that can be made available, and(3) the number and location of persons with special evacuation needs (e.g., the disabled) compared with the availability of personnel and vehicles with the capability to meet those needs.

b. incorporate an evacuation plan into the emergency operations plan (EOP). The plan will be based on the identified optimum evacuation strategies and will be keyed to the protective action strategies included in the jurisdiction's protective action strategy plan (see Appendix D). The evacuation plan will

(1) identify, on a map and through clear written description, each area and special population that is subject to evacuation,

(2) identify, on a map and through clear written description, the major evacuation route(s), reception centers, and destination shelter(s) for each evacuation area and special population,

(3) identify the individual(s) responsible for determining the need to evacuate and possessing the authority to issue evacuation recommendations (should include Army installation commander if on-post populations may be evacuated),

(4) describe the plans and procedures and assign personnel for effecting traffic control, including any extraordinary measures (e.g., use of shoulders, reverse flow) that are necessary for timely evacuation of the area,

(5) if a multi-stage evacuation process is envisioned to minimize serious traffic delays, describe the plan for timing the evacuation warning for different areas,

(6) describe the plans, procedures, resources, and personnel to be used in evacuating people who do not have access to private automobiles, including

- locations where these people can assemble to be picked up by mass transportation vehicles,

- the number of mass transit vehicles (e.g., school buses or public t ransportation buses) that will serve each assembly point,
- the individual by title or agency responsible for coordinating all mass transportation resources planned for use in an evacuation,
- procedures for notifying key personnel (e.g., drivers) involved in the evacuation effort,

(7) describe methods to be used in evacuating people with mobility impairments, including the handicapped, elderly, and people in institutions (e.g., prisoners, hospital patients, students), and

(8) describe methods for handling vehicles that impede the evacuation because of mechanical problems.

c. prepare a detailed description of evacuation-related issues to be addressed in public education materials and emergency public information releases.

d. describe any training needed by emergency managers or responders to implement the evacuation plan. The description will identify the types of training required and the number and titles of individuals needing each type.

E.2 Each jurisdiction which, as a result of the analysis required by and criteria specified in Appendix D, develops a protective action strategy that includes enhanced shelter-in-place for any area or special population will perform the following preparatory activities. (The inclusion of the following requirements in these guidelines does not imply that any jurisdiction is required to adopt these protective actions.)

a. develop a plan to reduce infiltration for all structures proposed to be used as enhanced shelters. The plan will identify all structures to be used as enhanced shelters and will describe the program the jurisdiction will pursue to reduce infiltration in these structures. The plan will determine the resources necessary to reduce infiltration in all affected structures and present a checklist of actions that inspectors will consider for reducing infiltration in each structure, including, but not necessarily limited to, the following:

(1) packing cracks,

(2) weatherstripping windows and doors,

(3) caulking windows and doors,

(4) installing door sweeps,

(5) weatherstripping attic hatches,

(6) repairing fireplace dampers,

(7) closing off fireplaces, and

(8) replacing broken window panes.

b. develop capabilities to, assign responsibilities for, and ensure the availability of resources to accomplish the following:

(1) notify people in appropriate areas to implement shelter-in-place,

(2) determine (in consultation with the Army installation) when it is appropriate to abandon the shelters,

(3) advise people in selected areas to abandon their shelters without risking the inappropriate abandonment of shelters in other areas, and

c. incorporate a shelter-in-place plan into the EOP. This plan will include

(1) a list (incorporated into the plan by reference) of all structures included in the enhanced sheltering program along with their street addresses and the telephone numbers of occupants and owners,

(2) procedures for issuing a recommendation of shelter-in-place for appropriate areas,

(3) procedures for determining, in consultation with the Army installation, when the shelters in a specific area should be abandoned,

(4) procedures for advising people in selected areas to abandon their shelters,

(5) procedures for evacuating people who have been instructed to abandon their shelters.

E.3 Each jurisdiction which, as a result of the analysis required by and criteria specified in Appendix D, develops a protective action strategy that includes expedient shelter-in-place for any area or special population will perform the following preparatory activities. (The inclusion of the following requirements in these guidelines does not imply that any jurisdiction is required to adopt this protective action.)

a. develop a plan for ensuring expedient sheltering capability for all inhabited structures in areas where expedient shelter-in-place may be recommended. The plan will identify the structures to be provided with expedient sheltering capabilities and will describe the program the jurisdiction will pursue to provide these materials to inhabitants and give instructions in their use. The plan will

(1) describe the program the jurisdiction will employ to assist the inhabitants of each affected structure in choosing a room to be used as a shelter. Rooms should be selected according to the following criteria:

- the preferred room is relatively small and has no outside walls,
- the room should be above ground and, above the ground floor if practical,
- if no room meeting the preceding criteria is available, the preference is a relatively small room with no windows,
- if no room meeting any of the preceding criteria is available, select the room with the smallest number of windows and doors,
- avoid rooms with window air conditioners, windows that leak, vents to outside such as automatic dryer vents, and circulation vents,
- do not select rooms with exhaust vents that automatically start when the light is turned on,
- if more than one room meets all the above criteria, choose the room that is free of plumbing fixtures.

(2) describe the manner in which the inhabitants of each affected structure will have access to the materials needed for expedient sheltering and know how to use those materials. The inhabitants of each structure will be provided with and trained in the use of an expedient sheltering kit tailored to the room they have selected as a shelter. The kit will contain the following materials in quantities appropriate for the selected room:

- polyethylene plastic tape for sealing vents, windows, doors, electrical fixtures, and cabinets,
- plastic sheeting providing no less protection than 0.02 in-thick polyethylene for covering door hinges and handles, unused lighting fixtures, switch boxes, broken or cracked window panes, window joints, entire windows and large vents,
- modeling clay or caulking compound for plugging small gaps and holes and sealing around pipes that penetrate walls,
- screwdriver,
- scissors,
- written instructions for using the kit, and
- a list of useful items to bring into the shelter (e.g., drinking water, battery-operated radio, expedient sanitary facilities).

b. develop the capabilities to, assign responsibilities for, and ensure the availability of resources to accomplish the following:

(1) notify people in appropriate areas to implement expedient shelter-in-place,

(2) determine (in consultation with the Army installation) when the shelters should be abandoned),

(3) advise people in selected areas to abandon their shelters without risking the inappropriate abandonment of shelters in other areas, and

(4) ensure prompt evacuation of all people who have been advised to leave their shelters.

c. incorporate a shelter-in-place plan into the EOP. This plan will include

(1) a list (incorporated into the plan by reference) of all structures included in the expedient sheltering program along with their street addresses and the telephone numbers of occupants and owners,

(2) procedures for issuing a recommendation of shelter-in-place for appropriate areas,

(3) procedures for determining, in consultation with the Army installation, when the shelters in a specific area should be abandoned,

(4) procedures for advising people in selected areas to abandon their shelters,

(5) procedures for evacuating people who have been instructed to abandon their shelters.

E.4 The following guideline is written for available charcoal filtration technology. Alternative technologies will be considered provided they are functionally equivalent to charcoal filtration in meeting the requirements in this guideline. Each jurisdiction which, as a result of the analysis required by and criteria specified in Appendix D, develops a protective action strategy that includes pressurized shelter-in-place for any special population or institution will perform the following preparatory activities. (The inclusion of the following requirements in these guidelines does not imply that any jurisdiction is required to adopt this protective action.)

a. identify the number of rooms, dwellings, and mass shelters to be equipped with pressurization/filtration equipment in each area,

b. describe the program to be followed for reducing infiltration in rooms and structures to be provided with pressurization/filtration equipment,

c. install in each affected structure pressurization/filtration equipment meeting the following guidelines:

(1) provides a minimum filtered air flow of 3 cubic feet per minute per person sheltered,

(2) produces a minimum pressure within the shelter of 0.05 pascal (5 mm of water),

(3) provides a minimum residence time (the time unfiltered air spends in contact with the charcoal) of 0.15 seconds,

(4) has a maximum pressure drop through the filter of 10 cm of water,

(5) uses charcoal capable of absorbing 20% of its weight in agent GB,

(6) uses charcoal particles which pass a 12 mesh screen and are retained on a 32 mesh screen,

(7) is capable of providing safe breathable air (all contaminants below maximum agent control limits for the general population) under all location-specific environmental conditions for two hours longer than the duration of the longest accident identified in the location-specific EPG,

(8) ensures that the charcoal filters are protected from exposure to moisture (e.g., through use of vapor-tight doors or valves) when not in use, and

(9) is capable of continuously filtering air contaminated with the largest concentration for the largest source term identified in the EPG at the distance to the nearest civilian population over a period of two hours longer than the duration of the longest accident identified in the EPG.

d. periodically (at least annually) inspect all pressurization/filtration units, replacing filters, and performing maintenance,

e. develop capabilities to, assign responsibilities for, and ensure availability of resources to

(1) notify people in appropriate areas to implement pressurized shelter-in-place,

(2) determine (in consultation with the Army installation) when people can leave their shelters, and

(3) ensure prompt evacuation of all people when it is safe for them to leave their shelters,

f. incorporate procedures for pressurized shelter-in-place into the EOP. These procedures will include

(1) a list (incorporated into the plan by reference) of all structures provided with pressurization/filtration equipment along with their street addresses and the telephone numbers of occupants and owners,

(2) procedures for issuing a recommendation of pressurized shelter-in-place for appropriate areas,

(3) procedures for determining, in consultation with the Army installation, when it is safe for people to leave their pressurized shelters, and

(4) procedures for evacuating people when it is safe for them to leave their pressurized shelters. Organized rescue teams should be assigned to remove people from pressurized shelters and escort them out of the hazardous area. People should remain in their pressurized shelters until a rescue team arrives.

E.5 To minimize unnecessary human casualties, provide instructions to the general public that they should take protective actions first and not take unnecessary risks to rescue domestic pets and livestock.

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APPENDIX F

PUBLIC ALERT AND NOTIFICATION SYSTEMS:
SYSTEM DESIGN CRITERIA AND EVALUATION GUIDE FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX F

PUBLIC ALERT AND NOTIFICATION SYSTEMS: SYSTEM DESIGN CRITERIA AND EVALUATION GUIDE

INTRODUCTION

Purpose

This document will describe the system design criteria and the evaluation guidelines that the Federal Emergency Management Agency (FEMA) and the Department of the Army (DA) will use to evaluate the adequacy and effectiveness of public alert and notification systems for the Chemical Stockpile Emergency Preparedness Program (CSEPP).

Public Warning Systems

The dual goal of emergency preparedness is to save lives and minimize property loss. An essential component in saving lives is an ability to warn members of the public who may be at risk of exposure to a hazard. This ability to warn is especially important when the hazard involves toxic chemicals.

A public warning is accomplished through an alerting phase and a notification phase. The alerting phase aims to stimulate one or more of the senses, usually hearing. Following the alert, information is communicated (the notification phase). Audible warning devices commonly used for alerting include sirens, bells, horns, whistles, public address speakers and other such devices designed to produce a signal within the average human hearing range. Notification methods include public address speakers, commercial broadcast radio and television stations as a part of the Emergency Broadcast System (EBS), special purpose locally-activated radio stations, and combinations of broadcast radio and television stations, cable television systems and other systems such as the National Oceanic and Atmospheric Administration (NOAA) radio system. The public must be aware of the two-phase alert and notification process and must recognize when it is "alerted" and know where to listen for notification information.

Assessments have been made of various systems' ability to provide a timely warning to individuals before the arrival of a potentially lethal agent concentration. Results indicate that a combined system, using indoor and outdoor warning, is the most effective warning system for the Immediate Response Zone (IRZ). Within the Protective Action Zone (PAZ), given the greater warning time available, a system designed for specific applications, such as population centers and institutions, coupled with electronic media, EBS broadcasts, and route alerting would provide effective warning.

OPERATIONAL CONCEPTS

System Integration

An integrated command and control system must be implemented at each chemical agent stockpile location to provide the capability to alert the public and notify it of appropriate protective actions to take, within the time limits available, in case of any emergency. The command and control system must encompass accident detection and assessment, the decision to warn the public, protective action recommendations, and the activation of public alerting and notification systems. The demanding time restrictions dictate that the total system, from on-post decision makers through public notification, must be treated as one entity with the capability for activation of public alert and notification devices by designated government officials.

Communications

Highly reliable 24-hour communication links must exist that interconnect on-post decision makers with appropriate local and state decision makers and agencies having responsibility for public alert and notification. Primary and secondary links should be available that provide the capability for direct on-post activation of the public alert and notification system in an extremely fast breaking emergency. Appropriate procedures should be developed, and agreed to, between on-post and off-post officials that identify the conditions under which direct on-post activation would be advantageous and authorized.

Specific details of communication requirements, including interfaces with commercial broadcast radio and television stations as a part of the EBS, special purpose locally-activated radio stations, television stations, cable television systems and other systems such as the NOAA radio system are contained in Appendix C.

Alert and Notification

The objectives of the public alert and notification system (ANS) are (1) to alert essentially every person within the immediate response zone (IRZ) of an emergency that has the potential of causing harm to those persons, and (2) to notify essentially every affected person within the IRZ of applicable protective action information. The time that elapses from the occurrence an accident creating a hazard to the recognition of danger to the public and then to the decision to warn the public is of paramount importance to the success of a public alert and notification system. The series of site-specific emergency response concept plans (Carnes, et al. 1989a–1989h) calculate the available lead times for public warning for each of the Chemical Stockpile Disposal Program (CSDP) sites. Five of the sites (APG, ANAD, LBAD, NAAP, and PBA) allow only 5 minutes and the other three sites (PUDA, TEAD, and UMDA) allow 10 minutes. These "decision times" encompass many complex actions which are largely dependent on human performance; therefore, the activation of the public alert and notification system, which can be almost completely automated, must be designed to be simple and fast.

These rigorous objectives can be achieved only if the ANS includes both outdoor and indoor alerting devices that are utilized simultaneously. The outdoor and indoor systems will essentially be designed separately; however, activation will be coordinated so that the outdoor and indoor systems will complement each other and appear to the public to function as one integrated ANS.

The outdoor system must be capable of providing both an alerting signal and instructional message within a total of 8 minutes from the time that a decision has been made that the public is in danger. The alerting signal will be the broadcast of a steady tone for 3 minutes. The instructional message will probably be less than 1 minute, but can be up to 3 minutes, in duration. Therefore, only omni-directional electronic sirens with voice message capability are acceptable as the primary outdoor alerting and notification devices for the areas surrounding the chemical agent stockpile locations. Electronic sirens that rotate are not acceptable because of the time necessary to repeat messages every 45 degrees of rotation. Three supporting technologies can be used to augment the sirens; electronic message signs, individual pagers, and visual alerting (strobes, flares, smoke, etc.) devices. Neither signs nor visual devices have the capability to provide both an alerting signal and a notification message. Individual pagers are subject to selective usage, are easily lost or misplaced, and have message limitations.

Modern omni-directional electronic sirens (siren/voice units) have the capability to produce alerting tones and understandable voice communications uniformly throughout 360° around the siren. They are operated by internal batteries that are maintained at peak charge by 120 volt alternating current or solar cells. The units can, therefore, continue to function for a period of time if the local electrical service should fail. The siren/voice units can be controlled and monitored by radio from the central control point(s) with the individual siren/voice units equipped to report successful operation and current status by radio link back to the central control point(s).

Electronic message signs have the capability to provide remotely controlled, changeable messages to motorists driving within, or approaching, the IRZ. The electronic signs could be permanently mounted over or beside major roadways and messages could be composed at a central location and transmitted to individual signs as needed to notify motorists of emergency situations and instruct them to take appropriate protective actions.

State-of-the-art changeable message signs use reflective disc message displays with fiber optic lighting. The highly reflective disc elements increase in visibility in bright ambient light conditions, unlike bulb signs that can become dim and unreadable in bright sunlight. The fiber optics collect light from redundant low-voltage halogen lamps and direct light to the individual reflective discs. Messages are generated and transmitted from a personal computer which can be located in a central control point. Messages can be transmitted to the individual signs via telephone leased or dial-up lines, twisted pair cables, coaxial cables, microwave, radio, or fiber optic cable. The sign messages can travel left or right, scroll up or down, and flash.

Reflective disc signs are composed of matrix modules (10 x 7 disc elements) that each create a single character. The modules are typically arranged in 1 to 4 lines of up to 100 modules each. The modules can be procured in various sizes, producing character heights with viewing distances up to 900 feet. Individual pagers can provide an alerting signal and a short message. The individual pagers could be provided to persons that spend a lot of time outdoors in areas that would be covered by relatively low siren sound pressure levels; farmers, hunters, and fishermen for example.

There may be unique circumstances where visual alerting (strobes, flares, smoke) may be an acceptable, cost effective method to alert persons in the IRZ of an emergency. Large bodies of water, expansive hunting areas, and hiking and camping areas would be candidates for visual alerting.

An acceptable indoor alert and notification device must possess some specific capabilities; it must not be easily disabled or "turned off", it must not have any other use or purpose; it must not be easily removed from the structure; and it must always work. There is only one currently available technology that is considered adequate for providing the required indoor alerting and notification within the IRZ; specially equipped tone alert receivers. Two supporting technologies can be used to augment the receivers; simultaneous telephone activations, and interruption of cable television programming for special announcements. Telephones can be "taken off the hook", their ringers can be turned down or off, and they can be attached to silenced answering machines; therefore telephone systems are not considered adequate for primary indoor alerting devices. The dependence on television sets for primary indoor alerting is not adequate for obvious reasons.

Tone alert receivers have the ability to provide both an alert signal and verbal information. There are four basic types of tone alert receivers in current use. These include models that are fixed tuned to the local Emergency Broadcast System (EBS) station and activated by the familiar EBS dual tone; models that are similar to EBS receivers but are tuned to the appropriate National Oceanic and Atmospheric Administration (NOAA) continuous broadcast radio station and that are activated by the special weather alert tone; models that can be set to one of several commercial FM frequencies and then activated by an FM subcarrier frequency if present; and models that are fixed tuned to a specific radio transmitter installed solely for the purpose of emergency warning. For reasons discussed later, only the last type is considered acceptable for the CSEPP.

The alert signal must be able to penetrate closed doors and be heard over a bedroom's ambient noise level with sufficient intensity to awaken sleeping occupants. The National Fire Protection Association (1989) indicates that a device producing 85 dBA sound pressure level and installed outside a closed bedroom can produce about 15 dB over an ambient of 55 dBA and should be able to awaken the average sleeping person.

There are two basic types of alerting systems that rely on the use of residential and commercial telephones. The first of these is referred to as a "central office based" or non-dialing system that uses specially designed telephone ringing and message delivery equipment which is installed between the telephone subscriber and the telephone central office. This type of system can be activated in a variety of ways. This system can be utilized as a notification method for emergency response personnel or as an alert/notification system for a wide area. Since such systems are physically located in the telephone company switching office, they do not require that the community telephone system be fully operational.

The second type of telephone alert/notification system, referred to as an "autodial" system, involves the use of one or more microcomputer(s) to automatically dial telephones within a given area and deliver a (generally recorded) audible message. This system can be programmed to dial numbers sequentially and give recorded instructions. Each call takes approximately 20-25 seconds. The system can be set up for multiple lines. The system relies on the dial-up method and is ineffective for busy lines and non-answers, although it can be programmed to re-try those numbers for a designated period of time. This type of system requires that the telephone system for a given area be fully operational.

In areas having a high rate of cable television subscription, the use of cable television based notification systems may be used as a redundant system. Equipment can be incorporated into the local cable TV systems which overrides the video broadcasts on all cable system stations. This addition to other systems can enhance emergency notification by reaching viewers who may not have received the emergency message by other means.

The outdoor systems installed in the CSEPP IRZs will be similar to siren systems designed in accordance with FEMA-REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants" (Federal Emergency Management Agency 1985), with certain clarifications as discussed later. The primary focus of the CSEPP indoor systems will be inhabited residences within the IRZs.

A typical siren/voice unit will consist of an omni-directional speaker assembly, mounting bracket, speaker control cable pre-wired to the speaker assembly, and a control case that houses all modules required for operation of the siren/voice unit. The units will normally be installed on top of poles permanently fixed in the ground; however, special circumstances may dictate that the units be uniquely mounted (floating platforms in water recreation areas, on buildings, etc.).

A standard for determining acoustic performance ratings for outdoor warning sirens has been developed under the American National Standards Institute (ANSI) Accredited Standards Committee Procedures under the Secretariat of the Acoustical Society of America. This standard ("Methods for the Field Measurement of the Sound Output of Audible Public Warning Devices Installed at Fixed Locations Outdoors," ANSI S12.14-1992) describes methods for the measurement of the maximum C-weighted sound level and fundamental frequency of tonal sounds produced by audible warning devices at a distance of 100 feet, at the mounted height, from the device.

The outdoor alerting and notification systems around the chemical stockpile locations must be capable of quickly providing both an alerting signal and instructional message; therefore only omni-directional electronic sirens with voice message capability are acceptable as the primary outdoor alerting and notification devices for CSDP sites. FEMA-REP-10 (Federal Emergency Management Agency 1985) states that, for public alerting, siren sound pressure levels should exceed 70 dBC in geographical areas where the population density is greater than 2000 persons per square mile and should exceed 60 dBC in populated areas where the density is equal to or less than 2000 persons per square mile. These sound pressure levels were chosen to provide sound pressure at least 10 dB over expected average ambient levels. The experience gained by FEMA in evaluating public alerting systems for nuclear power plants suggests that more cost effective public alerting systems could be designed if the characteristics of the communities to be covered were defined in narrower terms. This approach is reflected in the system requirements for the CSEPP outdoor warning system.

An emergency response program must provide for individuals and groups both in and out of institutions who require special consideration. These special populations include, but are not limited to, the sensory, mobility or mentally impaired; unattended children; children in preschool facilities; school students; hospital patients; nursing home residents; individuals in correctional facilities; individuals living at home with special equipment needs due to medical conditions; chronically ill persons; and residents of private care or convalescent homes. These special populations can be categorized as either special-needs individuals or institutionalized persons. Special-needs individuals and institutional facilities create unique problems of identification and alert and notification and must be addressed on a case-by-case basis.

Institutions, transient populations, and special-needs individuals must be identified and addressed. Institutions are those facilities that have controlled populations such as hospitals, schools, nursing homes, theaters, and jails; public congregation centers such as airport terminals, train stations, and bus depots; and large business establishments. Ongoing transient population areas include places that are in regular use at least 1 hour per day at least 45 days per year. Temporary transient population areas are areas not being used enough to be considered ongoing transient and need only be addressed under special circumstances as determined by local officials. Special-needs individuals include the sensory, mobility, or mentally impaired; unattended children; and individuals living at home with special equipment needs due to medical conditions.

Alert and notification for the population in the protective action zone (PAZ), given the greater warning time available, will be provided by a system designed for specific applications such as population centers and institutions, coupled with electronic media, EBS broadcasts, and route alerting. As the site-specific emergency response concept plans (Carnes, et al. 1989a–1989h) note, differentiating actions for the IRZ and PAZ is not always clear-cut; people living near the inner boundary of the PAZ may need to implement IRZ-protective actions. Therefore public alert and notification system requirements within the PAZ should be viewed as transitioning between the exacting requirements for the IRZ to basically no requirements for the Precautionary Zone (PZ).

MINIMUM SYSTEM REQUIREMENTS

F.1 Initial alerting and notification processes for the IRZ should be completed within a total of 8 minutes from the time that a decision has been made that the public is in danger.

a. The initial alerting of the public is to be initiated within 2 minutes and completed within 5 minutes of the time that a decision has been made that the public is in danger.

b. Initial notification is to start immediately after the completion of the initial alerting and should be completed within 3 additional minutes.

F.2 The alerting and notification processes for the IRZ should then continue at regular intervals, initiated at least every 12 minutes for the first hour and every 20 minutes thereafter, until the danger to the public is determined to be past.

F.3 The primary alert and notification systems (siren/voice units and tone alert radio receivers) will be controlled by radio from at least two control points. One of the control points should be on the Army site, in a 24-hour facility with chemical emergency responsibility. The second control point can be located in the local jurisdiction's 24-hour communications center. Each control point should be equipped to provide radio control encoding of primary outdoor and indoor warning devices.

Immediate Response Zone Outdoor Systems

F.4 The outdoor alert and notification systems for the IRZ will utilize omni-directional electronic sirens with voice message capability.

F.5 The network of siren/voice units will be configured so that the alert signals and notification messages received in each area of the IRZ are of sufficient volume to be heard distinctly above ambient noise levels in the area. Community characteristic descriptions, with their associated sound pressure level requirements, are as follows:

a. Uninhabited areas where there are no permanent dwellings, no agricultural land use, and no identified recreation (hunting, fishing, etc.) areas. No alerting is required.

b. Rural areas where single-family housing density is less than 1 dwelling per 100 acres (may include agricultural land use but no recreation areas used by transient populations). Average ambient background noise level is estimated to be less than 30 dBC; therefore, sirens should provide sound pressure level of at least 40 dBC in these areas.

c. Suburban residential areas including primarily single-family housing with density less than 1 dwelling per 5 acres, and which may include agricultural land use or recreation areas used by transient populations, but no significant industrial or commercial activity. Average ambient background noise level is estimated to be 40 dBC; therefore, sirens should provide sound pressure level of at least 50 dBC in these areas.

d. Residential areas consisting primarily of single-family housing with density less than 1 dwelling per 1/4 acre, and with no significant industrial or commercial activity. Average ambient background noise level is estimated to be 50 dBC; therefore, sirens should provide sound pressure level of at least 60 dBC in these areas.

e. Urban residential areas consisting of single- and multiple-family housing with density equal to or greater than 1 dwelling per 1/4 acre, but with no significant industrial or commercial activity. Average ambient background noise level is estimated to be 60 dBC; therefore, sirens should provide sound pressure level of at least 70 dBC in these areas.

f. Commercial/industrial areas where land use is primarily commercial or industrial with daytime population density greater than 2500 persons per square mile or containing major highways or thoroughfares with vehicle counts in excess of 300 per hour for any one hour period. Average ambient background noise level is estimated to be 70 dBC; therefore, sirens should provide sound pressure level of at least 80 dBC in these areas.

F.6 The acoustic performance rating of any siren/voice unit proposed for use in the CSEPP should be approximately uniform, within plus or minus 3 dBC, throughout 360° around the unit. The method used by the manufacturer of each device to specify its acoustic performance rating must conform to the "American National Standard, Methods for the Field Measurement of the Sound Output of Audible Public Warning Devices Installed at Fixed Locations Outdoors" (ANSI S12.14-1992).

F.7 In order to optimize placement of siren/voice units for population coverage, similar siren/voice unit models with possibly three different acoustic performance ratings, encompassing sound pressure levels between 110 dBC and 120 dBC, are desired. The models must be of comparable construction and operation to facilitate common maintenance procedures. The siren/voice unit speaker assembly may be composed of multiple cells, or horns, and speaker drivers, as needed to achieve the power levels and patterning requirements.

F.8 The siren/voice units will be monitored by radio from the alert and notification system control points (see Guideline F.3). Each control point should be equipped to provide continuous siren/voice unit monitoring. The siren/voice units will be equipped with diagnostic equipment that may be radio controlled. Each of the individual siren/voice units will be equipped to report its successful operation and current status by radio link back to one or both of the central control points.

F.9 Each siren/voice unit will be capable of public address broadcasts including both local broadcasts (at the unit) via an input microphone jack for a noise canceling microphone and remote broadcasts via the integral radio control provided for the siren/voice unit. Each siren/voice unit shall be capable of increasing power amplification in the voice mode of operation so that voice broadcasting capability meets the siren warning signal performance levels. In determining the ability of a siren/voice unit to produce voice broadcasting at siren warning signal performance levels, an undistorted sine wave signal of a frequency between 300 Hz and 1000 Hz will be injected into the siren/voice unit tone generator and will be amplified and broadcast by the system in the same manner as a public address message broadcast. Only a single, "pure" tone may be used, because the use of a pair of tones of different frequencies could result in inaccurate measurements of siren output, indicating higher sound pressure levels than are actually produced. The measured sound level of this broadcast should be within 2 dBC of the siren/voice unit's sound pressure level performance rating and should be approximately uniform, within plus or minus 3 dBC, throughout 360° around the siren/voice unit.

F.10 Each siren/voice unit will have an integral timer which provides a 0- to 5-minute activation of each siren signal or voice broadcast upon local or radio activation. The timed duration of each siren signal may be determined for any period from 0 to 5 minutes. The time will reset upon the initiation of the most recent local or radio command, and may be cleared, ceasing the operation in progress, by local or radio command.

F.11 Each siren/voice unit will have the capability to produce an inaudible tone for the purpose of testing the unit without disturbing the public. This inaudible test may be actuated by local or radio command. Test results will also be retrievable by radio control. The inaudible test will cause an exercise of the siren/voice unit system components and system diagnostic routine, permitting the status verification of the following on a local LED display:

a. AC site power,
b. DC power,
c. partial speaker driver/amplifier operation, and
d. full speaker driver/amplifier operation.

F.12 The complete results of an inaudible test will be presented to the radio control module for encoding and status reporting transmission back to both of the central control points. Additionally, the siren/voice unit diagnostic module will have the capability to present the following unit status conditions to the system status encoder:

a. DC voltage (unit battery voltage),
b. AC line voltage,
c. ambient temperature in two-digit representation,
d. unit receiver link S/N ratio in two-digit representation, and
e. activation count.

F.13 Each siren/voice unit will operate from a self-contained 24 VDC battery power source and be connected to a 120 VAC single-phase power source for the purpose of charging the 24 VDC source. The fully charged battery supply will provide not less than 90 minutes of continuous siren/voice unit activation, without the benefit of recharging, in expected "worst-case" ambient temperature conditions. A 24 VDC battery charger will be provided for each siren/voice unit. The battery charger will be of sufficient capacity to replenish the battery supply consumed by one three-minute full power activation within 15 minutes of charging.

F.14 The siren/voice unit encoder and decoder will be integral parts of the siren/voice unit control module. The status encoder will receive information that is collected by the diagnostic module, encode the information, and transmit that information back to the control points via the siren/voice unit transmitter link. At a minimum, the status encoder will be capable of encoding the following information for transmission via siren/voice unit transmitter:

a. area code,
b. siren/voice unit address code,
c. unit AC power: on/off,
d. AC voltage: 3-digit representation, i.e., 120 (volts),
e. DC voltage: 2-digit representation, i.e., 24 (volts),
f. partial amplifier and speaker driver operation: on/off,
g. full amplifier and speaker driver operation: on/off,
h. ambient temperature: 2-digit representation,
i. system power-up status: on/off,
j. intrusion alarm: instant status response for open door,
k. low battery condition: low battery status has been reached,
l. receiver signal/noise ratio: 2-digit representation, and
m. activation count.

F.15 The system of siren/voice units in the IRZ may be augmented by other warning devices where appropriate to reach particular segments of the population. Three possible supporting outdoor warning technologies are available: electronic message signs, individual pagers, and visual alerting devices (e.g., strobes, flares, smoke). Considerations regarding these supplemental warning methods are as follows:

a. Electronic message signs may be appropriate if there is a significant need to provide remotely controlled, changeable messages to motorists driving within or approaching the IRZ. The electronic signs could be permanently mounted over or beside major roadways. Messages could be composed at a central location and transmitted to individual signs as needed to notify motorists of emergency situations and instruct them to take appropriate protective actions.
b. Individual pagers may be appropriate to provide an alerting signal and short messages to persons (e.g., farmers, hunters, and fisherman) who spend a lot of time outdoors in areas that would be covered by relatively low siren sound pressure levels. There are numerous individual paging devices commercially available that would be adequate for

use in the CSEPP. The following requirements are associated with the use of individual pagers:

(1) The basic requirements for a satisfactory paging system are that activation of the pagers must be unique to the CSEPP public alert and notification system being served and that all of the pagers should be simultaneously activated by the communication system support network. The pagers should serve no other purpose such as being available for personal and private use (which would be the case if they were telephone-activated). The pagers must allow the users to differentiate between test activations and actual emergency activations; therefore, the pagers should be able to respond to at least two activation signals and display numeric or alpha/numeric codes to identify which signal has been received. The use of different tones, without visual indications, to identify test and emergency signals is not considered adequate because of the increased possibility of user confusion. Other desirable factors are use of commonly available batteries, a low battery indicator, and an illuminated display for low-light reading.

(2) An automated database and register system must be developed to record individuals who are identified to receive pagers, control pager distribution, compile maintenance and loss records, and account for all pagers.

(3) Each user must be provided basic user information including a 24 hour toll-free telephone number for reporting malfunctions. A capability must exist to respond to all reported pager malfunctions within 24 hours of their being reported.

c. The use of visual alerting devices (e.g., strobes, flares, smoke) may be appropriate in some unusual circumstances. Elevated strobe lights focused on large bodies of water could be used to assist in attracting the attention of persons on boats with loud motors and unable to hear a siren signal. Hunters, fishermen, hikers, and campers in normally uninhabited areas could be alerted by columns of colored smoke in the daytime and by airborne flares at night.

(1) The use of visual alerting devices must be considered on a case-by-case basis and the rationale for their use should be understood by the responsible local officials. Judgments should be made that it will be reasonable to expect that

individuals within the area will be alerted by the chosen device under the expected range of weather and day/night conditions. Conservative estimates should be made of the time required to position required equipment and execute any necessary procedures.

(2) Since visual alerting devices are unable to provide any instructional message, the success of these devices will depend almost entirely upon the effectiveness of the associated public education program. Members of the public must know to look for the device, must know what the device looks like when activated, and must know what to do if the device is seen.

Immediate Response Zone Indoor Systems

F.16 The indoor alert and notification system for the IRZ will utilize tone alert receivers capable of providing both an alerting signal and an instructional message.

F.17 Each occupied residence in the IRZ will be provided with a tone alert receiver for installation near the main sleeping area in the immediate vicinity of the bedrooms. For the purposes of this requirement residences will be considered to include single- and multi-family detached dwellings, mobile homes, and each living unit of single-family attached dwellings and multi-family buildings.

F.18 The tone alert receivers must be a self-contained devices with the following characteristics:

a. The tone alert receivers must be activated by a discrete radio signal specifically dedicated to the CSEPP alerting function. (Tone alert receivers solely activated by EBS or NOAA signals are not acceptable.) Wherever practical, the tone alert receivers will be activated by the same radio signal utilized to activate the outdoor siren/voice units. As with the siren/voice units, the tone alert receivers must be capable of group call activation utilizing the same call groups as the siren system.

b. The tone alert receivers must comply with state and local electrical and fire codes, and Underwriters Laboratory (UL) requirements for such types of devices.

c. The tone alert receivers must operate from a nine volt, extended life battery. The battery must be continuously trickle charged from a 110 volts alternating current (AC) commercial power source, while the battery is installed in the tone alert receiver. Each tone alert receiver must be capable of 15 minutes continuous operation per hour from a nine volt battery, for not less than six hours, with no 110 volts AC commercial power input.

d. The tone alert receivers' electric power plugs must be compatible with a standard 110 volt AC wall outlet. The unit should contain a standard 110 volt AC outlet in its casing internally wired so that the household does not lose the use of the outlet.

e. The tone alert receiver must be capable of emitting an alert signal within the 500-1,000 Hz frequency range, producing a sound pressure level of not less than 85 dBA measured at a height 60 inches above floor level at a distance of 10 feet from the signal source. The alert signal volume must be factory pre-set and not user adjustable. The audible message portion of the broadcast must be adjustable between 50 and 85 dBA. The minimum message volume must be factory preset at no less than 50dBA, and there must not be a feature for the user to switch off the tone alert receiver.

f. The tone alert receiver must feature a visual indicator for verification that the receivers are turned on and are receiving electrical power, and light emitting diode (LED) indicators for battery condition and test status. Logic circuits within the receiver must be programmed to expect activation signals at predetermined time intervals and failure to receive two successive <u>expected</u> activation signals would activate the unit fault indicators consisting of a flashing LED <u>and</u> an audible "chirp" at regular intervals.

g. The tone alert receiver must be equipped with an output jack for an optional high intensity strobe light rated at 100 candela flashing at 75 repetitions per minute. The tone alert receiver must also feature a jack for an external antenna.

h. A capability must exist to respond to all reported tone alert receiver malfunctions within 24 hours of their being reported. Each tone alert receiver must have a permanent label or decal, affixed in a prominent location on the receiver, which provides basic user information and prominently displays a 24-hour toll-free telephone number for reporting malfunctions. A more detailed user information sheet must also be provided with each device that includes a toll-free daytime telephone number for user information. This information sheet must also include recommendations on radio placement, instructions on battery testing, and information on how to obtain a replacement battery.

F.19 If appropriate for specific applications, the tone alert receivers may be augmented by other types of indoor alerting devices. Two types of supplemental indoor warning technologies are available: simultaneous telephone activation and interruption of cable television programming for special announcements. Considerations regarding those supplemental technologies are as follows:

a. Telephone-based warning systems include two basic types:

(1) Non-dialing/central office based systems that utilize equipment located at the telephone central office and do not depend on the standard telephone switching equipment. Specially designed equipment is placed between the central office and the subscriber telephone set and is physically attached to the telephone line leading to the subscriber's home, business or office. Any system of this type employed for the CSEPP should

- have the capability to simultaneously ring all telephones physically located within the IRZ as well as only the telephones in pre-determined sectors or sub-areas of the IRZ,
- provide a call-waiting signal to all telephones which are in use when ringed by the system,
- ring telephones using a distinctive ring cycle consisting of a 1/2-second ring, a 2-second pause, a 1/2-second ring, etc.,
- be capable of providing live or recorded audible messages and of providing different messages to different sectors on a sequential basis,
- be capable of activation from a minimum of two (2) permanent activation points, one of which must be located in a 24-hour facility at the Army installation,
- be capable of remote activation via commercial telephone,
- have activation systems that are independent of commercial telephone circuits,
- have system ringing generators that are independent of central office switching and are provided with battery backup, and

- have a fault monitoring capability and a system status reporting capability at all activation points; and

(2) Dialing type systems that utilize automatic means to dial the actual telephone numbers of the households to be contacted in the event of an emergency. Any system of this type employed for the CSEPP should

- utilize a computerized data base of the telephone numbers to be called. The data base must include both published and unpublished telephone numbers and must be updated every 24 hours,
- use a computer which, by means of a telephone interface (or series of interfaces), sequentially dials the telephone numbers and provides a stored audio message when the call is answered,
- register, in the program directing the dialing process, the telephone numbers which have been dialed so that busy lines and no-answers can be retried,
- include, in the program directing the dialing process, a priority package so that telephone numbers associated with households, offices, and businesses closest to the emergency or in the direct path of a hazard may be called first,
- utilize digital speech processing and be capable of storing and delivering multiple messages in multiple languages (if appropriate) as directed by the data base information,
- limit the total number of telephones to be dialed to no more than 30% of the telephones served by any central telephone office,
- use only electronic switch central offices which are provided with emergency power,
- be capable of activating all telephones within the IRZ within ten minutes and of activating all telephones within any 90° sector of the IRZ within a five-mile radius of the chemical stockpile location within two minutes,
- be capable of activation by sector,

- be capable of providing live or recorded audible messages and of providing different messages to different sectors of the IRZ on a sequential basis,
- have all hardware used for the automatic dialing operation located within a 15-mile radius of the stockpile location,
- be capable of activation from a minimum of two activation points, one of which must be installed in a 24-hour facility at the Army installation, and
- be equipped with a fault/failure indicator and be capable of providing a status report to all activation points.

b. Cable television-based systems may be appropriate to supplement the system of tone alert receivers in areas having a high rate of cable television subscription. This type of system relies on equipment incorporated into the local cable TV system which overrides the video broadcast on all cable system stations to provide an emergency warning message. Any system of this type employed for the CSEPP should

(1) include a cable television headend override system capable of generating a blank screen on all standard VHF, mid-band, super-band, and hyper-band system channels to be followed by an "emergency notification" screen that clearly indicates that a warning message is forthcoming,

(2) provide an audible warning tone accompanying the emergency notification screen followed by an audible warning message,

(3) where technically compatible, provide a written version of the audible message via full screen or "crawl" formats, and

(4) be capable of remote activation via dedicated or commercial telephone. Activation points should be the same as those selected for the primary indoor and outdoor systems.

F.20 The alert and notification system will incorporate indoor alert/notification devices, designed on a case-by-case basis, to provide appropriate warning to institutions and to individuals with special needs. To accomplish this requirement, the following functions will be performed:

a. All special-needs individuals and institutions in the IRZ will be identified. Institutions include, but are not limited to, the following:

(1) facilities with controlled populations (e.g., hospitals, schools, day-care centers, nursing homes, theaters, jails),

(2) public congregation centers (e.g., airport terminals, train stations, bus depots, sporting event stadiums, civic auditoriums),

(3) large business establishments (establishments with more than 50 employees in attendance or a fire-code maximum capacity of more than 500 patrons),

(4) manufacturing facilities with a noise environment loud enough to require worker ear-protection under Occupational Safety and Health Administration rules,

(5) indoor construction projects with greater than 10,000 square feet under roof,

(6) outdoor construction areas where heavy, noisy equipment is being used on a long-term basis (e.g., road building projects, utility projects),

b. A facility-specific alert and notification plan will be prepared for each institution in the IRZ. An acceptable plan should, at a minimum, encompass the following:

(1) specification of the organizations and the individuals, by title, within those organizations responsible for receiving and acting upon any alert and notification message to the institution,

(2) description of the procedures to be employed to notify those responsible individuals,

(3) description of the procedures and equipment to be used by the responsible individuals to carry out any recommended protective actions affecting the institution, and

(4) description of a training and drill program to ensure institutional readiness.

F.21 An automated database and register system must be developed to

a. record residents, institutions, and special-needs individuals,

b. control the distribution of indoor alert and notification devices,

c. compile maintenance and loss records for the indoor devices, and

d. account for all indoor devices.

Protective Action Zone Systems

F.22 Alert and notification systems for the PAZ will include outdoor siren/voice unit coverage of selected urban residential areas and indoor coverage of selected institutions and public congregation centers, supplemented by electronic media broadcasts, EBS broadcasts, NOAA broadcasts or by route alerting by emergency officials such as police officers going door-to-door or through the streets with loudspeakers. Eligible alert and notification systems for the PAZ will include the following:

a. For PAZ areas within 20 radial kilometers of the stockpile location community characteristics will be assessed and siren/voice units will be located so that urban residential areas (single- and multiple-family housing with density equal to or greater than 1 dwelling per 1/4 acre) are provided with sound pressure level coverage of at least 70 dBC; and

b. For PAZ areas within 20 radial kilometers of the stockpile location, community characteristics will be assessed and siren/voice units will be located so that recreation areas with ongoing transient populations (places that are in regular use at least 1 hour per day at least 45 days per year) are provided with sound pressure level coverage of at least 50dBC;

c. For PAZ areas within 20 radial kilometers of the stockpile location, public congregation centers (e.g., airport terminals, train stations, bus depots, sporting event stadiums, civic auditoriums) will be identified and treated as if they were institutions in the IRZ (see F.20);

d. All facilities within the entire PAZ with controlled populations (e.g., hospitals, schools, day-care centers, nursing homes, theaters, jails) will be identified and treated as if they were institutions in the IRZ (see F.20); and

e. Appropriate alert and notification measures (electronic media broadcasts, EBS broadcasts, NOAA braodcasts, or route alerting) will be developed for all areas of the PAZ not covered by items a, b, c, and d.

System Operability

F.23 A program should be implemented that regularly tests both the human and hardware aspects of the primary outdoor (siren/voice units) and indoor (tone alert receivers) alert and notification systems. At a minimum, the testing program should include silent tests of the siren/voice units after every shift change and full-scale tests of both siren/voice units and tone alert receivers every month. These tests should be performed as follows:

a. At the beginning of each personnel shift in the alert and notification system central control point, the silent test feature, as described in F-10, of all of the siren/voice units should be exercised, the test results should be recorded at the central control point, and any unit determined inoperative should be repaired and placed back in service within 12 hours. (The tone alert receivers do not have a silent test feature and, therefore, can not be tested every shift.);

b. A full-scale system test, encompassing the entire chain of events required to implement a decision that an emergency exists and that the public should be so warned, should be conducted at least every month and should culminate in actual activation of the outdoor and indoor alerting tones followed by messages broadcast via the siren/voice units and tone alert receivers that a test has been conducted. The full-scale test offers members of the public their only opportunity to determine if their tone alert receivers are operational. As discussed in F.18h, receivers found to be inoperative should be replaced within 24 hours of being reported. Any siren/voice unit determined inoperative in a full-scale test should be repaired and placed back in service within 12 hours;

c. It is important to monitor the continuing capability of the outdoor and indoor systems to adequately respond to activation commands.

   (1) In the case of the indoor tone alert receivers, data should be compiled on the date, location, and type of failure for receivers reported as inoperative. Failure rates that appear unusual or higher than normal should cause an investigation and resolution of identified problems.

   (2) For every outdoor system test conducted, data should be compiled on whether or not each siren/voice unit responded adequately to a silent test or tone broadcast command. Outdoor system average operability may be computed as the simple quotient of successful test activations divided by total activation attempts. Tests conducted in conjunction with maintenance checks should not be included in this calculation. The average operability of the outdoor system should exceed 90% at all times. If average operability drops below 90% during

any system test, an investigation should be initiated as soon as possible to identify and rectify the reasons for the failures; and

d. Operability data records should be kept for at least 12 months.

F.24 A maintenance program should be established for the siren/voice units to include

a. a maintenance service visit to each unit at least every 90 days to

(1) conduct an external visual inspection of the mounting pole, antenna, cabling, AC service connection, electric meter and grounding connections,

(2) conduct an internal visual inspection of control cabinet components, battery cabinet components, and speaker assembly components, and

(3) functionally test batteries and battery charger;

b. addition of the following items on every fourth maintenance service visit:

(1) verification of all timer functions,

(2) verification of tone generator frequency for alert tone,

(3) verification of radio receiver alignment and sensitivity, and

(4) verification of radio transmitter alignment.

F.25 Although maintenance control of tone alert receivers is lost once they are given to the public, a continuing program of public education should be instituted to help to alleviate potential problems resulting from individual misuse of the receivers. Written guidance should accompany each receiver to address general usage, explain testing frequency and methods, and give a telephone number to call for repair or replacement.

SYSTEM EVALUATION

This section describes the process that the FEMA and the DA will use to evaluate the adequacy and effectiveness of public alert and notification systems for the CSEPP. Some prediction of system adequacy will be necessary at certain points in the funding approval cycle; therefore, methods of assessing system performance as they apply to funding approvals is also discussed. The process of identifying, acquiring, procuring, and installing equipment is discussed in Task P-2 of the "Chemical Stockpile Emergency Preparedness Program Management Plan (Argonne National Laboratory 1990).

Each CSEPP public alert and notification system will include three major components; communications support network, outdoor devices, and indoor devices. These three components probably will be designed, procured, and implemented separately and concurrently for each of the eight sites. The design of the communications support network at each site is the determinant to the successful integration of each public alert and notification system. Specific details of communication design and evaluation requirements are contained in Appendix C.

The states around each chemical agent stockpile location should prepare design estimates of their public alert and notification system hardware needs. The states should first assess community characteristic categories as discussed in Guideline F.5 for the IRZ and as discussed in Guideline F.22 for the PAZ. Judgment must be exercised in selecting the size of geographical areas to use when performing population density calculations supporting community characteristic determinations. It is not reasonable to consider that several residences built on small lots next to each other in an otherwise rural area would constitute an urban residential area; nor is it reasonable to degrade adjacent urban residential areas by including a relatively unpopulated area between the urban areas in the density calculations for the urban areas.

Candidate locations for siren/voice units should be chosen considering such things as desired sound coverage, topography, local pole permits, electricity service, maintenance access, and public acceptance. An estimate should be made of the number and locations of siren/voice units needed to satisfy the sound pressure coverage guidelines for each of the identified community characteristic areas. Siren/voice unit sound coverage can be estimated by (1) using expected siren acoustic performance ratings (siren output in dBC at 100 feet, see Guideline F.6); (2) applying the commonly accepted sound attenuation factor of 10 dB loss per distance doubled from the siren; and (3) applying an additional attenuation factor to account for the effect of topographical features that act as sound barriers. The presence of intervening hills, or other topographical barriers, along a siren's sound path will introduce an additional attenuation factor of approximately 20 dB (Beranek 1971). This additional attenuation is essentially independent of the number of intervening barriers; therefore, the first topographical feature that blocks the line-of-sight between a siren and a person standing along the siren's sound path introduces the 20 dB attenuation, and subsequent barriers do not further reduce the sound pressure level. In determining topographical barriers, it is acceptable to ignore those barriers that protrude above the line-of-sight by less than 5 feet for every 2000 feet of distance from the siren to the listener.

Utilizing these guidelines in conjunction with an accurate assessment of community characteristics can result in a fairly accurate estimate of the number and size of siren/voice units needed. The states should prepare maps of the IRZ depicting siren locations and estimated siren sound pressure level contours for 50 dBC, 60 dBC, and 70 dBC. A similar map also should be prepared for those portions of the PAZ requiring siren coverage. This process should be accurate enough to support the continuation of the funding and procurement process without the expenditure of time and money by each state to perform extensive computer modeling.

Concurrently, the states should determine, in accordance with Guidelines F.17 and F.20, the number of inhabited residences and institutions needing tone alert receivers. Any needs for simultaneous telephone activation systems or supporting outdoor devices, such as electronic signs, should also be identified.

The states can use these design estimates to prepare requests to FEMA for funds to procure the hardware and engineering support necessary to implement their public alert and notification systems. FEMA will perform a design evaluation of each proposed system before authorizing transfer of funds. Using the information (estimated number, output, and locations of sirens) received from the states, FEMA will perform computer sound propagation calculations necessary to confirm that each proposed outdoor system conforms with the guidance contained in this document. Based on its analysis FEMA may recommend modifications, additions, or deletions to each state's estimated number of siren/voice units or their recommended locations. FEMA also will critique the other aspects of each state's request and will suggest changes as necessary before authorizing transfer of the necessary funds.

During procurement, installation, and integration of the public alert and notification systems, FEMA will continue to provide engineering support as needed by the states. Specifically, FEMA will review all vendor proposals and must approve the proposals before the states are authorized to expend procurement funds. Upon completion of the installation of the public alert and notification system at each stockpile location, FEMA will perform an engineering analysis of the integrated system of communication support network, outdoor devices, and indoor devices.

A final evaluation of the effectiveness of a public alert and notification system could rest with the public being served. Do members of the public recognize the alerting signals, comprehend the notification messages, understand the urgency of complying with suggested protective actions, and know exactly how to execute the protective actions? To assist in answering these questions, FEMA may choose to conduct a telephone survey of the residents in each of the IRZs immediately following full-scale activations of the public alert and notification system. If public surveys are conducted, the methodology used will be similar to that described in FEMA-REP-10, Appendix 3 (Federal Emergency Management Agency 1985), but with more emphasis being placed on ascertaining the public's knowledge of what the alerting signals mean and how correctly to respond to messages.

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APPENDIX G

PLANNING GUIDELINES FOR TRAFFIC AND ACCESS CONTROL FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX G

PLANNING GUIDELINES FOR TRAFFIC AND ACCESS CONTROL

In the event of a chemical agent emergency, access to the affected area must be controlled to prevent additional persons from becoming endangered by the hazard and to protect property within the area and the area, must be evacuated as soon as this can be accomplished safely. Access control encompasses all actions taken to control entry into a restricted area (i.e., preventing the general public from entering the restricted area while permitting entry by emergency workers with essential missions). Traffic control includes all actions taken to facilitate evacuation of the population in vehicles along specific routes. These planning guidelines incorporate some provisions found in three FEMA publications: *Transportation Planning Guidelines for the Evacuation of Large Populations* (CPG 2-15), *Objectives for Local Emergency Management* (CPG 1-5), and *Guide for Development of State and Local Emergency Operations Plans* (CPG 1-8). Supplemental information on the implementation of a National Defense Area (NDA) by the Department of Defense (DOD) can be found in DOD Directive 5200.8, *Security of Military Installations and Resources*, and in Title 50 USC 797.

During an emergency, access control must be established as quickly as possible to prevent additional people from entering the hazardous area. Once access control has been achieved, available resources should be assigned to traffic control functions to expedite evacuation of people from the affected area. These planning guidelines address traffic and access control in the early stages of a chemical emergency. As the traffic and access control functions evolve in the course of an emergency, decision makers and managers will find themselves with progressively more time to give individual attention to problems that arise. It is in the early stages of an emergency, when the demands on managers are high and the time available to react is scarce, that the existence of pre-established procedures is crucial.

These guidelines deal solely with the traffic and access control functions. Other emergency response issues, which are incidental to traffic and access control, are not addressed in these guidelines. For example, many traffic control personnel must be equipped and trained to protect themselves from exposure to chemical agent. This issue is addressed in Appendix H. Traffic and access control personnel may encounter situations where an evacuee needs decontamination or medical attention. The personnel should be prepared to solicit aid that will be available as prescribed by Appendices I and L. However, the personnel should not neglect the traffic or access control function to provide such aid directly.

GUIDELINES

G.1 The emergency operations plan for each jurisdiction must incorporate an **access control plan** for restricting entry into emergency areas. The access control plan must

a. Identify methods to be used to restrict access to emergency areas. The methods may include barricades on transportation routes (roadways, railways, waterways and airways), full perimeter control, or other methods. If appropriate, alternative methods of access control may be specified for use depending on the nature and scope of the emergency.

b. Assign responsibility for and identify procedures to be followed in providing security within the restricted area.

c. Identify and provide for the timely availability of and access to all facilities, equipment, and personnel that may be needed to implement the access control plan, including

(1) procedures for maintaining a current inventory of all facilities, equipment, and personnel, and

(2) procedures for obtaining outside resources, if the required facilities, equipment, and personnel exceed those normally available to the jurisdiction. Arrangements for obtaining all outside resources should be formalized through interagency agreements, federal-state-local agreements, interjurisdictional agreements, agreements with the private sector, etc.

d. Identify the procedures necessary to implement the access control plan, including

(1) identification of all access control points (ACPs);

(2) procedures for calling up additional personnel (if necessary);

(3) provisions for timely access to all material and equipment needed to implement ACPs;

(4) procedures for transporting personnel and equipment to each ACP;

(5) procedures for providing needed security vehicles to access control personnel;

(6) provisions for communications between each ACP and the emergency operating center (EOC) or other central coordination point including

requirements for periodic check-in reporting and protocols for emergency communications; and

(7) identification of the process to be used to accomplish orderly shift changes at each ACP.

e. Provide for the distribution to all emergency personnel of detailed maps depicting all ACPs, traffic control points (TCPs), evacuation routes, reception centers, and mass care facilities.

f. Identify the procedures to be followed for controlling entry into restricted areas, including

(1) clear identification of the criteria that will be applied in deciding who is permitted to enter a restricted area;

(2) identification, by function, of all essential emergency workers allowed access to restricted areas;

(3) identification of the methods to be used to assure that only authorized personnel are allowed to enter restricted areas, including

- procedures for communicating authorization to access control personnel (from EOC or from individual seeking entry),
- specification of the types or methods of enforcement to be used by access control personnel to prohibit unauthorized entry into a restricted area, and
- specification of the types or methods of enforcement to be used by access control personnel to apprehend and remove individuals who have entered a restricted area without authorization;

(4) identification of the criteria that access control personnel will use to determine whether people authorized to enter restricted areas are using appropriate self-protective equipment;

(5) identification of the record-keeping responsibilities of access control personnel (e.g., logging authorized entry and exit, recording information on attempts at unauthorized entry);

(6) description of the process by which people not initially identified as essential emergency workers can gain authorization to enter the restricted area, including

- identification of the official(s) responsible for authorizing entry,
- description of the required process for applying for authorization to enter restricted areas, and
- definition of the criteria which will be used to decide whether to authorize entry; and

(7) identification of procedures that access control personnel will follow in the event that persons who have entered the restricted area do not exit within the allotted time.

g. Identify additional measures that will be required if a NDA is declared by the DOD, including the following:

(1) procedures for coordinating actions of the state/local jurisdiction's personnel and Army personnel, including

- coordination of access control policy through the provision of a representative from all participating local law enforcement agencies to the security operations center or command post established by the Army,
- identification of any changes in the jurisdiction's chain of command, including methods the Army will use to request the jurisdiction's assistance, and
- provisions, coordinated with the Army installation, for the orderly transfer of responsibility when the NDA is being reduced or disestablished;

(2) additional resources (e.g., personnel and equipment) that would be required to provide necessary assistance to the Army personnel (e.g., for the apprehension and arrest of civilians violating the security requirements of the NDA); and

(3) any special training that the jurisdiction's personnel will require to perform responsibilities associated with the NDA.

G.2 The emergency operations plan for each jurisdiction must incorporate a **traffic control strategy** based on the evacuation plan prepared by federal, state, and/or local emergency planning agencies (see Appendix E). The strategy must address the following functions:

a. Identify and provide for the timely availability of all facilities, equipment, and personnel that may be needed to implement the traffic control strategy, including:

(1) procedures for maintaining a current inventory of all facilities, equipment, and personnel, and

(2) procedures for obtaining outside resources in a timely manner, if the required facilities, equipment, and personnel exceed those normally available to the jurisdiction. Arrangements for obtaining outside resources should be formalized through interagency agreements, federal-state-local agreements, interjurisdictional agreements, agreements with the private sector, etc.

b. Identify procedures for implementing the traffic control strategy, including

(1) identification, by title, of the individual responsible for coordinating and directing implementation of the strategy;

(2) identification of all TCPs along each evacuation route;

(3) procedures for calling up additional personnel (if necessary);

(4) provisions for a centralized work/control/dispatch area to manage traffic control, resources, and personnel and to maintain contact with the EOC during an emergency situation;

(5) provision of adequate and timely access to materials and equipment needed to implement TCPs;

(6) identification of methods to be used to control and expedite the flow of traffic (e.g., soil barriers, pylons, plastic cones or barrels, parked vehicles, pre-prepared signs, visuals, personnel, etc.);

(7) assignment of responsibility for implementing the traffic control measures (e.g., placement of soil barriers, plastic cones, etc.) at each TCP;

(8) procedures for transporting personnel and equipment to the TCPs;

(9) procedures for providing needed vehicles for traffic control personnel;

(10) provisions for the distribution to TCP personnel of detailed maps (including sufficient extra copies for distribution to evacuees as needed) depicting all evacuation routes, TCPs, ACPs, reception centers, and mass care facilities; and

(11) provisions for adapting the traffic control strategy in response to changes in road conditions (due to construction, inclement weather, etc.) and to changes

in the nature of the emergency (due to changes in the amount of agent released, direction of plume travel, etc.).

c. Specify the procedures to be followed by TCP personnel during an evacuation, including

(1) their responsibilities for setting up and maintaining traffic control equipment (e.g., barriers, cones, barrels, etc.);

(2) the methods used to handle emergency and special population vehicles (e.g., priority of movement, alternative routing patterns);

(3) procedures to follow for removing any disabled vehicles that hinder the flow of evacuation traffic. Prior written agreements are required for any outside resources (e.g., pre-positioned private tow-trucks) to be used for vehicle removal;

(4) procedures for regular and emergency communications with the central work/control/dispatch area, including

- specification of a standard timetable (e.g., staggered 10-, 15-, or 30-minute intervals) for TCP personnel to provide and receive informational updates in communications with the central work/control/dispatch area, and
- definition of emergency situations requiring immediate communication with the central work/control/dispatch area and specification of procedures for such communication;

(5) methods for providing directions and evacuation information to evacuees either verbally or by passing on the maps to those who need them (requires that TCP personnel be knowledgeable of evacuation routes and locations of reception centers and mass care facilities).

d. Be coordinated with the Army installation and with all other jurisdictions affected by the traffic control strategy (e.g., those through which evacuation routes pass and those with populations that might normally be traveling into or through the emergency area).

APPENDIX H

PLANNING GUIDELINES FOR
EMERGENCY SUPPORT OPERATIONS
FOR THE
CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

PLANNING GUIDELINES FOR
EMERGENCY SUPPORT OPERATIONS

The purpose of this appendix is to promote planning by state and local jurisdictions that ensures essential emergency response functions will be accomplished during a chemical agent emergency without exposing the emergency workers involved to undue danger. These guidelines pertain only to off-post operations by civilian responders. Requirements for on- and off-post response operations by Army personnel and contractors are described in DA Pamphlet 50-6, *Chemical Accident or Incident Response and Assistance (CAIRA) Operations*.

These guidelines take a two-pronged approach to advancing the safety of civilian emergency response personnel. First, the guidelines require that no civilian workers will be intentionally placed in positions where they will encounter chemical agent during the performance of their duties. Second, workers who may incidentally encounter chemical agent while performing their duties will be provided with appropriate protective clothing, equipment, and training.

Under these guidelines, civilian responders will not enter any area where chemical agent is known or suspected to be present while the release of agent is ongoing. While the release is in progress, civilian emergency workers may perform duties (such as traffic and access control and emergency medical services) outside the known/suspected hazard area. After the release has stopped and chemical agent monitoring has confirmed that agent concentrations are within the range for which the protective clothing and equipment provides protection,

GUIDELINES

H.1 Each jurisdiction with area in the IRZ or PAZ will develop a plan for emergency worker operations. The plan will address all off-post civilian personnel who will be involved in the following types of operations:

a. Emergency response operations that (1) are conducted outside a designated hazard area before the jurisdiction is notified by the Army installation that the release of chemical agent has ended and (2) entail a reasonable possibility that the worker will encounter chemical agent in vapor, aerosol, droplet, or liquid form (e.g., from contact with or proximity to people or objects leaving the hazard area). Examples of operations in this category include access control, traffic control, emergency medical services, and decontamination station operations;

b. Response- and recovery-phase operations conducted within a designated hazard area after the jurisdiction has been notified by the Army installation that the release of chemical agent has ended and that chemical agent concentrations are within the range for which the personal protective equipment provides protection. Operations in this category might include such activities as search and rescue, livestock caretaking, and accompaniment of off-site Army monitoring teams. For the purposes of this guideline, the hazard area may be defined in either of the following ways:

- any area where protective actions have been recommended for the public, or
- any area where accident conditions indicate chemical agent may be present as vapor or deposited on the ground.

H.2 The plan for emergency worker operations will address the following issues:

a. The command structure and organization for the types of operations described in guideline H-1. The plan will clearly outline the command structure that the jurisdiction will use to manage field operations in such areas. The plan will deal explicitly with the following concerns:

(1) the relationship between the field command structure and the jurisdiction's EOC,

(2) the composition and responsibilities of the field response team which would be dispatched immediately upon receipt of notification of a chemical agent release,

(3) evolution of field command and control authority as the event evolves and as different personnel arrive on the scene, and

(4) coordination of actions among different organizations and different jurisdictions,

b. Requirements for chemical protective clothing and equipment to protect emergency workers in performing the types of operations described in guideline H-1 from exposure to chemical agent. The plan will

(1) identify, by name and position, the individuals who will be responsible for participating in operations of the types described in guideline H-1 and who, therefore, will be provided with personal protective equipment (PPE) and training,

(2) list the specific items of PPE to be provided to each identified individual. PPE items will consist of protective equipment listed in Attachment 1 and should conform to the worker safety and health plan required by Appendix M ("Planning Guidelines for Recovery Phase Activities"). All emergency workers who require corrective eye wear will be provided with spectacle kits appropriate for the assigned respiratory protective equipment. All emergency workers (e.g., decontamination personnel) who are expected to perform duties in which they will likely be splashed with water will be provided with waterproof aprons,

(3) specify criteria that emergency workers must meet to receive and maintain authorization to use PPE (such requirements will include absence of any type of facial hair that prevents proper fitting of respiratory protective equipment, along with medical screening, fitness testing, maintaining records of baseline cholinesterase levels, and completion of appropriate training),

(4) reference instructions to be provided to all persons assigned PPE regarding storage, care, maintenance, handling, and disposition of the protective clothing and equipment. These instructions must be in accordance with guidance provided by the supplier(s) of the PPE and with applicable federal and state regulations,

(5) reference arrangements for making backup and training PPE available for each emergency worker.

c. The program that will be undertaken during the emergency preparedness phase to ensure the readiness of emergency workers and PPE. This program should conform to the worker safety and health plan required by Appendix M, "Planning Guidelines for Recovery Phase Activities." The program should address logistical operations and accountability issues and include provisions for

(1) tracking all emergency workers who are assigned PPE to monitor their continued participation in the CSEPP emergency response program and to retrieve the PPE assigned to them in the event they leave the program,

(2) periodic medical screening of emergency workers who are assigned PPE,

(3) periodically inspecting PPE assigned to emergency workers to ensure that all requirements regarding storage and maintenance of the equipment are being met,

(4) maintaining records on personnel and equipment, including status of each worker assigned PPE, results of medical screening of emergency workers, training completed by each worker, and results of periodic inspections of PPE.

d. Procedures that will be enacted during the emergency response phase to ensure the safety of emergency workers. These procedures will assign responsibility for and describe the methods to be used to accomplish the following actions:

(1) determine whether an emergency situation warrants the use of PPE by emergency response personnel. Use of PPE is warranted in any situation in which there is a reasonable possibility that emergency personnel will encounter chemical agent in vapor, aerosol, droplet, or liquid form during the performance of their duties;

(2) instruct emergency response personnel to don PPE before undertaking their emergency responsibilities;

(3) secure the perimeter of the designated hazard area to control access (see also Appendix G);

(4) prohibit all access to the hazard area by off-post civilian personnel while the release is ongoing and restrict access to the hazard area to authorized response personnel after the release has ended;

(5) establish staging areas outside the hazard area where personnel and resources will be marshaled to support emergency operations. (The location of such staging areas should be communicated to surrounding jurisdictions, and volunteer responders from those jurisdictions should be clearly advised to report to the staging areas and not to attempt entering the hazard area);

(6) rescue any emergency responder who requires assistance because of exposure to chemical agent or other impairment;

(7) ensure communication between members of a work group wearing PPE and between each work group and the field command post. Regardless of the primary communication system used, simple hand signals should be developed as a backup for essential communications between work group members;

(8) minimize the possibility of exhaustion of response personnel through monitoring and controlling the length of unrelieved time each worker spends in PPE (stay time) and specifying required rest periods in which the PPE is completely or partially removed and the worker is provided with liquids. These provisions should conform to the worker safety and health plan required by Appendix M, "Planning Guidelines for Recovery Phase Activities." The length of stay times and rest periods should be based on ambient temperature, as follows:

- at temperatures between 50°F and 70°F wet bulb/globe temperature (WBGT), personnel may work for 30 to 45 minutes at a time, followed by a rest period of 10 to 15 minutes,
- at temperatures between 70°F and 85°F WBGT, personnel may work for 20 to 30 minutes at a time, followed by a rest period of 40 to 60 minutes,
- at temperatures between 85°F and 100°F WBGT, personnel may work for 15 to 20 minutes followed by a rest period of indefinite length.

In addition, at temperatures above 75°F WBGT, heat stress monitoring and management, including measurement of pertinent vital signs, should be implemented to determine the need for adjustment of work-to-rest ratios and opportunities for fluid replacement, as well as the possible need for cooling devices and acclimation of workers;

(9) monitor and control the total length of time each worker spends in PPE during the emergency response and recovery phases;

(10) decontaminate all PPE-equipped personnel who may have encountered chemical agent. Decontamination should be performed at a time and location that minimizes the possibility of cross-contamination of other individuals. Decontamination procedures should address decontamination site layout; methods to be used and equipment needed; number of personnel

needed; type of protective clothing and equipment that will be processed; containment of used decontamination solutions; disposition of possibly contaminated clothing, equipment, and property; and emergency medical requirements;

(11) terminate emergency operations in the hazard area;

(12) debrief emergency workers involved in hazard area operations; and

(13) record, for each individual involved, the type of PPE used, the time PPE was initially donned, the time and length of all rest periods, the time decontamination was performed and PPE was doffed, the types of response activities undertaken, any likely exposure encountered, and medical problems experienced.

e. Methods that will be used for search and rescue operations in the hazard area after official notification by the Army installation that the release of chemical agent has ended and that chemical agent concentrations are within the range for which the PPE provides protection. The plan will address

(1) decontamination and medical treatment of injured persons, including (a) protocols that search and rescue personnel will use to decide what medical treatment will be undertaken at the scene, and (b) supplies that search and rescue personnel will carry to perform decontamination and medical treatment.

(2) methods to be used in rescuing contaminated people,

(3) methods to be used in rescuing uncontaminated people (e.g., people who had sheltered-in-place),

(4) protocol for determining whether people are contaminated or uncontaminated.

H.3 The plan for emergency worker operations will cite written agreements with the Army installation and any other parties who have responsibilities under the plan.

H.4 Each jurisdiction will identify the training needs associated with the plan for emergency worker operations. The inventory of training needs will

a. Identify, by name, each individual requiring training,

b. Identify the type(s) of training required by each individual. This determination should be made in accordance with the CSEPP Training Plan. CSEPP-approved training materials should be used to train all personnel who may be involved in the types of operations described in guideline H.1. Training to be provided includes maintaining and using PPE, providing first aid and buddy aid; and decontamination procedures.

H.5 Each jurisdiction will evaluate its plan for emergency worker operations during CSEPP exercises. Exercises will evaluate the ability of personnel in PPE to perform their assigned duties within appropriate time restrictions as well as their observance of the plan's procedures governing operations in hazard areas.

APPENDIX H
ATTACHMENT 1

LIST OF
PERSONAL PROTECTIVE EQUIPMENT
FOR USE IN CSEPP

ATTACHMENT 1

LIST OF
PERSONAL PROTECTIVE EQUIPMENT FOR USE IN CSEPP

1. **Respiratory protection**. Each set of personal protective equipment (PPE) will include the respiratory protective equipment listed below. Other brands and models of equipment may be used provided that their manufacturers have demonstrated that they are functionally equivalent to the listed equipment in providing protection from chemical warfare agents. Three other models of respiratory protective equipment have been tested and found to be suitable; however, state and local governments cannot yet procure these models through the U.S. Army. These models are Omnistar PAPR (manufactured by Cabot Safety Products), OptimAir 6A VAPR (manufactured by Mine Safety Appliances, and Survivair PAPR (manufactured by Survivair).

   Respiratory protective equipment (manufactured by Racal Health and Safety, Inc., Frederick, Maryland) consisting of:

Item name	National Stock Number
Breathe-Easy 7 PAPR (mask and breathing tube)	4240-01-312-2770
Replacement facemask	4240-01-323-3418
Turbo unit	4240-01-311-1951
Organic vapor cartridge	4240-01-308-5730
Extra long hose	NA*
Replacement battery	NA*
Spectacle kit (only for workers requiring corrective eyewear)	NA*

   *NA-National Stock Number not available; awaiting approval.

2. **Protective Clothing**. Each set of PPE will include one each of the items of chemical protective clothing listed below. Other brands and models of protective clothing may be used provided that their manufacturers have demonstrated that they are functionally equivalent to the listed clothing in providing protection from chemical warfare agents.

   a. U.S. Army-approved and -provided Battle Dress Overgarment (BDO).
   b. U.S. Army-approved and -provided hood.
   c. U.S. Army-approved and -provided gloves.
   d. U.S. Army-approved and -provided overshoes
   e. U.S. Army-approved and -provided apron (required only for workers, such as decontamination station personnel, who are likely to be wetted with water during performance of their duties).

3. **Chemical Detection Kit**. Each set of PPE will include the U.S. Army M256 series Chemical Agent Detector Kit including a booklet of ABC-M8 VGH chemical agent detection paper.

APPENDIX I

PLANNING GUIDELINES FOR EMERGENCY MEDICAL SERVICES FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

The Centers for Disease Control and Prevention have developed the following draft recommendations for prehospital and hospital care following a chemical stockpile emergency. These draft recommendations have been published in the Federal Register. Following public comment and possible revision, the recommendations will be available to CSEPP. The final recommendations will be used as emergency guidelines for CSEPP.

Date="07/27/94"
Citation="59 FR 38191"
Group="health"
Type="NOTICE"
Department="DEPARTMENT OF HEALTH AND HUMAN SERVICES"
Agency="CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC), PUBLIC HEALTH SERVICE, HHS"
Subject="CDC Recommendations for Civilian Communities Near Chemical Weapons Depots: Guidelines for Medical Preparedness"
<HEADER>
DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Disease Control and Prevention

CDC Recommendations for Civilian Communities Near Chemical Weapons Depots: Guidelines for Medical Preparedness

AGENCY: Centers for Disease Control and Prevention (CDC), Public Health Service, HHS.

ACTION: Request for comment.
</HEADER>
DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Disease Control and Prevention

CDC Recommendations for Civilian Communities Near Chemical Weapons Depots: Guidelines for Medical Preparedness

AGENCY: Centers for Disease Control and Prevention (CDC), Public Health Service, HHS.

ACTION: Request for comment.
+

SUMMARY: The National Center for Environmental Health, CDC, is recommending minimum standards for prehospital and hospital emergency medical services' readiness in communities near the eight locations where the U.S. stockpile of lethal chemical weapons is stored.

DATES: Comments must be received on or before August 26, 1994.

ADDRESSES: Comments may be mailed to Director, National Center for Environmental Health, (NCEH), CDC, 4770 Buford Highway NE., Mailstop F29, Atlanta, GA 30341-3724.

FOR FURTHER INFORMATION CONTACT: Linda W. Anderson, Chief, Special Programs Group, NCEH, CDC, 4770 Buford Highway NE., Mailstop

F29, Atlanta, GA 30341-3724, telephone (404) 488-7071.

SUPPLEMENTARY INFORMATION: CDC Recommendations for Civilian Communities Near Chemical Weapons Depots: Guidelines for Medical Preparedness.

I. Executive Summary

In 1985, Congress mandated that unitary chemical warfare agents be destroyed in such a manner as to provide maximum protection for the environment, the public, and personnel involved in destroying the agents. The National Center for Environmental Health (NCEH), Centers for Disease Control and Prevention (CDC), was delegated review and oversight responsibility for any Department of the Army (DA) plans to dispose of or transport chemical weapons (Public Law 91-121 and 91-441, Armed Forces Appropriation Authorization of 1970 and 1971).

As part of its ongoing efforts to improve medical preparedness within the medical sector of civilian communities surrounding chemical agent depots, CDC has developed the following medical preparedness and response guidelines. These guidelines represent minimum standards of medical preparedness for civilian communities that might be exposed to chemical warfare agents during the incineration or storage process. These guidelines were developed in cooperation with a panel of recognized experts in the fields of emergency medicine, disaster preparedness, nursing, chemical warfare preparedness, and the prehospital emergency medical system.

II. Background

In 1985, Congress mandated that unitary chemical warfare agents be destroyed in such a manner as to provide maximum protection for the environment, the public, and the personnel involved in destroying the agents. This mandate was further defined in the Department of Defense (DOD) Authorization Act of 1986, Public Law 99-145. Consistent with its desire to promote the most environmentally safe method of destroying chemical agents, the National Research Council determined that incineration is the best method for disposing of the weapons(1). In 1988, The Authorization Act was amended to permit DA to set up a prototype incineration facility on Johnston Island in the Pacific in order to verify the safety of such an operation. To date, more than 700,000 pounds of chemical agent have been safely incinerated there.

NCEH, CDC, was delegated the responsibility of reviewing and overseeing any DA plans to dispose of or transport chemical weapons (Public Law 91-121 and 91-441, Armed Forces Appropriation Authorization of 1970 and 1971). In addition, an interagency agreement between CDC and DA requires CDC to provide technical assistance to the DA in protecting the public health in nearby communities during the destruction of unitary chemical agents and weapon systems.

Currently, large quantities of chemical warfare agents are stored in eight facilities in the continental United States. These chemical stockpiles consist primarily of nerve agents, mustard agents, or a combination of both. In Tooele, Utah, construction of the chemical agent incinerator is now complete, and destruction of the weapons and chemicals in this depot is scheduled to begin in Spring of 1995. To improve the ability of local health care personnel to handle emergencies related to a chemical agent release, CDC has presented medical preparedness courses to civilian medical personnel on sites adjacent to the eight chemical weapons depots on 13 occasions. Emergency physicians, nurses, internists, surgeons, hospital administrators, and prehospital emergency medical responders have attended these courses.

As part of its ongoing efforts to improve medical readiness in civilian communities surrounding chemical agent depots, CDC developed medical preparedness and response guidelines. These guidelines represent minimum standards for medical preparedness in civilian communities that might be inadvertently exposed to chemical warfare agents during the incineration or storage process. These guidelines were developed in cooperation with a working group of recognized experts in the fields of emergency medicine, disaster preparedness, nursing, chemical stockpile emergency preparedness, and prehospital emergency medical systems. These guidelines do not supersede current medical and public health practices and requirements (e.g., precautions for handling bodily fluids).

The following recommendations for civilian community response to the release of a chemical agent are divided into prehospital and hospital. The recommendations are designed to ensure high quality medical preparedness for chemical agent emergencies. Appendix A is a summary of important questions to ask when evaluating medical preparedness in the civilian prehospital and hospital environments. The prehospital environment encompasses all areas outside both the installation boundaries and the hospital grounds. People potentially affected in the prehospital environment include the general public, and first responders. First responders include police, sheriff's, and fire department personnel, hazardous materials response teams, and medical response teams (including emergency medical technicians, paramedics, and any other medically-trained personnel responding to the site of injury with the ambulance teams). The hospital environment includes primarily the emergency department but encompasses outside areas which might be used for triage and decontamination and other hospital departments which might support the hospital's response.

III. Recommendations for Prehospital Medical Preparedness

+ Integrate all local medical emergency response plans related to the release of a chemical agent into the overall State or local disaster response plan.

+ Provide protective equipment for all members of the local medical response team.

+ Train members of the local medical response team in these measures:

-Prevention of secondary contamination from chemically exposed patients.
-Decontamination procedures.
-Evaluation of the medical needs of chemically exposed patients.
-Treatment of large groups of patients.
-Transportation of victims to a medical facility.

1. Personal Protective Equipment (PPE)

Chemical protective clothing and respiratory protection enable responders to care for patients exposed to chemicals while protecting themselves from secondary contamination.

+ Ensure that such equipment protects the skin, eyes, and respiratory tracts of the emergency responders.

+ Use DA battledress overgarments (BDOs) and portable air-purifying respirators (PAPRs) with an organic vapor cartridge to protect civilians from chemical warfare agents. BDOs can be used for up to 24 hours in an agent-contaminated environment at levels of up to 10 grams of agent per square meter of surface area. Notwithstanding this recommendation, however, civilian emergency responders should use the equipment with which they are most familiar, providing that the equipment used is at least as protective as the above CDC recommendations.

+ Train personnel required to use personal protective equipment when responding to chemical agent-related emergencies in accordance with the guidelines published by the Occupational Safety and Health Administration (OSHA).

2. First Responders

+ Ensure that all persons (e.g., medics, paramedics, fire fighters, or medical personnel) designated by the State or local disaster plans as members of the initial medical team that responds to a chemical warfare agent release have the appropriate level of PPE and are trained in its proper use (2).

+ Ensure that equipment of first responders is adequately maintained and available at all times.

+ Schedule regular drills and training sessions designed to maintain first responders' familiarity with equipment into State and local disaster plans.

3. The Public

CDC does not recommend distributing PPE (e.g., gas masks or protective suits) to the public. In the unlikely event that a chemical agent release threatens the civilian population adjacent to a military facility, CDC recommends the following graded emergency response:

+ Evacuate the population at risk in accordance with State or local disaster management guidelines. If no local guidelines exist, follow the Federal Emergency Management Agency (FEMA) and DA joint guidelines for evacuating civilian populations threatened by chemical warfare agents (3).

+ Follow FEMA and DA recommendations for sheltering the population in place (e.g., keep people in their homes, institutions, or places of business and seal windows and doors from an external vapor threat) if it is not practical to evacuate the population (3).

4. Decontamination

Decontamination is the careful and systematic removal of hazardous substances from victims, equipment, and the environment. Transporting contaminated patients exposes emergency response personnel to chemical warfare agents and contaminates rescue vehicles. Proper decontamination prevents secondary contamination and chemical injury to medical and rescue personnel. Acceptable decontamination guidelines for persons who may possibly have been exposed to chemical warfare agents are published by FEMA and DA (3,4).

+ Decontamination of patients can be achieved by mechanically removing, diluting, absorbing, or neutralizing the chemical agent.

+ Decontaminate all persons who may possibly have been contaminated with a chemical warfare agent before they are transported to a hospital.

+ Decontamination substances should be readily available. Suitable decontamination substances include soap, water, and 5% hypochlorite.

+ To protect the environment, include in State and local disaster plans a method for containing and disposing of contaminated runoff. CDC does not recommend establishing fixed decontamination units in prehospital areas because of the expense and inflexibility of such units.

5. Level of Medical Preparedness Training

+ At a minimum, train persons designated as prehospital medical responders in evaluating patients exposed to chemical warfare agents, managing patients' airways (excluding intubation), transporting patients, and decontaminating patients.

+ Train prehospital responders who have been designated in State or local disaster plans to operate in environments contaminated by a chemical warfare agent in the proper use of PPE in accordance with OSHA guidelines (2).

+ Ensure that, at a minimum, physicians who have been designated in State and local disaster plans to provide medical supervision for prehospital emergency responders and medical care for victims of a chemical agent release receive specialized training through continuing education in the emergency response areas specified for prehospital responders.

6. Patient Triage

+ The basic premise of patient triage, to provide maximum benefit to the greatest number of victims, is of utmost importance during a mass-casualty event involving chemical agents.

+ Have the most experienced responder conduct triage operations.

+ Base decisions regarding patient triage on local resources, the extent of patient contamination, the type of chemical warfare agent to which the patient is exposed, the patient's clinical status, and the likelihood of additional traumatic injuries.

7. Public Information

+ Inform the public appropriately, accurately, and rapidly about chemical agent exposures that have or may have occurred.

+ Establish, through the local emergency medical services (EMS) and hospital community, a coordinated public information policy for chemical emergencies.

+ Contact local and regional news media in advance to establish an accurate and rapid way of disseminating critical information to the public concerning a chemical agent emergency.

+ Ensure that hospital and EMS personnel coordinate their plans to provide public information with the plans of those who have overall responsibility for emergency response.

8. Communication

Medical personnel must have access to the emergency communication network 24 hours a day. Such a network should link the chemical agent depot, local and regional EMS, and all potential receiving hospitals.

+ Have medical personnel demonstrate the ability to access the emergency communications network during any evaluation of preparedness for a chemical warfare release into civilian communities.

+ Ensure that the hospitals' emergency communications system allows hospital personnel to verify rapidly whether a chemical warfare agent release has occurred.

9. Transporting Exposed Victims

+ Coordinate the transportation of chemical agent-exposed victims with the overall disaster response plan, and include a method for tracking transported patients during an emergency response.

+ Transport patients only after they have been properly decontaminated.

+ Transport decontaminated patients to medical facilities (e.g., hospitals, clinics, and urgent care centers).

+ Formal agreements such as memorandums of understanding (MOUs) between organizations that transport patients and the medical facilities that receive them must be part of the planning process. Medical facilities designated to receive should be capable of evaluating and managing patients exposed to chemical agents as described later in the hospital section (Section IV) of this document.

+ Base decisions regarding urgent and emergency transfers of decontaminated patients on the capabilities of the receiving facilities, transportation resources, demand for hospital services, and the clinical condition of the patients. Certain medical care (e.g., for burns, pediatric emergencies, trauma, or pulmonary complications) might require prearrangements for patients to be transferred to a tertiary treatment center. CDC recommends that transfer and evacuation plans for victims exposed to chemical warfare agents call for land-rather than air-transportation.

10. Medical Evaluation and Treatment

+ Train medical response personnel specifically to assess and manage patients exposed to chemical agents stored at the nearby military depot.

+ Decontaminate all exposed patients as described above.

+ Provide medical treatment (during or after contamination), according to accepted treatment modalities, to patients exposed to nerve or mustard agents. If antidotes to nerve agents are used in the field by civilian medical responders as designated in State or local disaster plans, CDC recommends using single-dose, pre-armed autoinjectors, unless a higher level of medical response has already been integrated into EMS operations. Additional information on the effects of chemical warfare agents and accepted medical protocols for caring for patients exposed to mustard or nerve agents is available (5-14).

IV. Recommendations for Hospital Preparedness

1. Primary Receiving Hospitals

A primary receiving hospital is a hospital that is designated by State or local disaster plans to provide initial medical care to the civilian population in the event of a chemical warfare agent release. Such hospitals must have established protocols detailing evaluation, decontamination, and treatment procedures for patients exposed to chemical warfare agents.

+ Include evaluation, treatment, and decontamination protocols in the hospitals' disaster plans.
+ Include chemical warfare agent scenarios in disaster drills for hospitals that have been designated in State or local disaster plans to receive patients exposed to chemical warfare agents.

2. Triage Considerations

+ Do not allow patients exposed to a chemical warfare agent to enter the emergency department without adequate evaluation and decontamination. Signs of mustard agent exposure, in particular, may require 24-48 hours before they become clinically evident.
+ Train medical staff designated by the hospital disaster plan to perform triage during an emergency related to chemical warfare agents to recognize the physical signs and symptoms of patients who have been exposed to such agents.
+ Base modifications to patient triage procedures on the extent of patient contamination, the type of chemical warfare agent to which the patient has been exposed, the patient's clinical status, and the possibility of additional traumatic injuries. Priorities for medical treatment of patients should be determined by the most appropriately trained and experienced medical professional.

3. Security

+ Address issues related to emergency department security during disasters in the hospital disaster plan.
+ Restrict access to the hospital to prevent contaminated patients from entering the hospital. During a chemical agent release, security personnel should direct all patients to enter the hospital only through the triage area.

4. Decontamination

+ Decontaminate all persons who may have been contaminated with a chemical warfare agent. Proper decontamination prevents secondary contamination and chemical injury to medical and rescue personnel. Acceptable decontamination guidelines for persons exposed to chemical warfare agents are published by FEMA and DA (3,4).
+ Have decontamination substances readily available. Suitable decontamination substances include soap, water, and 5% hypochlorite.
+ In the hospital disaster plan, detail a method for catching

contaminated runoff from patients whether decontamination is done inside or outside the hospital.

+ At a minimum, be capable of decontaminating at least one nonambulatory patient.

+ During and after chemical agent releases that cause mass casualties, decontaminate patients outdoors. Having indoor decontamination facilities does not obviate a hospital's need to have plans for decontaminating patients outdoors during mass casualty situations.

+ Design hospital disaster plans, keeping in mind the possibility of integrating local emergency response resources. Such resources could include hazardous materials emergency response teams or portable decontamination vehicles or facilities.

+ In cold weather, set up temporary shelters and heaters to protect patients from extreme environmental conditions when undergoing decontamination outdoors.

+ Have in place a method of controlling the flow of air in the decontamination area to prevent such air from contaminating other areas of the hospital.

+ Set up a system to allow medical personnel in the decontamination area to be in continuous communication with other medical personnel in the emergency department.

5. Personal Protective Equipment (PPE)

Chemical protective clothing and respiratory protection enable responders to care for chemically exposed patients while protecting themselves from secondary contamination. This equipment must protect the skin, eyes, and respiratory tracts of the responders.

+ Use DA BDOs and PAPRs with organic vapor cartridges to protect civilian personnel against chemical warfare agents. The BDO can be used in an agent-contaminated environment for up to 24 hours at contamination levels of up to 10 grams of agent per square meter of surface area.

+ Have hospital personnel follow Environmental Protection Agency (EPA) and National Institute for Occupational Safety and Health (NIOSH) guidelines when managing patients exposed to unknown chemicals.

+ Have hospital emergency responders use the equipment with which they are most familiar, providing that such equipment is at least as protective as the equipment recommended by CDC.

+ Train response personnel to use PPE when responding to a chemical agent emergency according to OSHA guidelines (2).

6. Level of Training

+ Train medical staff designated by the hospital disaster plan to provide direct patient care during a chemical warfare agent emergency to a level of medical preparedness that allows them to assess, decontaminate, and manage the treatment of victims of chemical warfare agent releases.

+ Medical staff who are required to wear decontamination attire in decontamination procedures must receive training in the use of PPE according to OSHA regulations (2-4).

7. Transportation of Patients to Other Medical Facilities

+ Have prearranged written agreements with those medical facilities that agree to accept patients who are exposed to military chemical agents.

+ Do not transfer patients without notifying the hospital and having the patient accepted by a physician.

+ Have standardized forms available to record patient information and management status.

8. Specific Antidotes

+ Have decontaminating solutions available in the emergency department. If nerve agents are stored adjacent to the civilian community, have atropine in multiple-dose units available in the emergency department and in the hospital pharmacy. In addition, have the hospital pharmacy stock atropine and pralidoxime in sufficient quantities to cope with the anticipated number of patients who could be managed by that facility in response to a chemical warfare agent release. Atropine and pralidoxime should be administered intravenously in the emergency environment.

9. Hospital Disaster Plan

+ Include plans for providing medical care for patients exposed to chemical agents in the hospital's disaster plan.

+ Have in place a method for using the emergency communication system so that reports of a chemical warfare agent release can be verified rapidly. Also include provisions to coordinate activities with State and local disaster plans for mass decontamination.

+ Include in disaster drills scenarios in which patients have become exposed to chemical warfare agents.

+ Use the hospital quality assurance program to review disaster drills and decontamination procedures and to assist in maintaining the professional skills of hospital personnel necessary to treat the effects of exposure to a chemical warfare agent.

10. Tertiary Hospitals

A tertiary receiving hospital is a hospital that receives referrals from primary receiving hospitals. Additional services such as burn care, psychiatric service, and toxicologic consultation are available at the level of care.

+ Ensure that tertiary hospitals designated by State or local disaster plans to provide care for persons exposed to chemical warfare agents have, at a minimum, emergency response capabilities similar to those of the primary receiving hospital.

+ Ensure that tertiary hospitals coordinate their disaster plans with State and local disaster plans for mass decontamination of persons exposed to chemical warfare agents.

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Dated: July 21, 1994.

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Appendix A Summary of Important Medical Preparedness Considerations for Communities Surrounding Chemical Agent Stockpiles

1. Do the communities that surround chemical warfare agent depots have a disaster plan that details the role of the prehospital and hospital medical community during a chemical warfare agent emergency?
2. If medical personnel are designated to treat chemical warfare agent casualties, do they have adequate training to meet minimal standards for evaluating, decontaminating, and treating victims of a chemical warfare agent release?
3. Do medical personnel who are designated by State, local, and hospital disaster plans to use PPE in response to an emergency related to chemical warfare agents have the necessary OSHA level of training to use these devices effectively and safely?
4. If the local disaster plan has provisions to evacuate or transfer patients to other hospitals for further treatment and evaluation, do existing MOUs cover the transfer of chemically contaminated patients?
5. Do hospitals named in the State or local disaster plans have an adequate stockpile of antidotes and decontamination solutions to provide complete medical treatment to at least one chemically contaminated patient?
6. Are hospitals named in the State or local disaster plans able to decontaminate at least one nonambulatory patient exposed to chemical warfare agent?
7. Do the disaster plans of hospitals named to receive patients by State and local disaster plans have specific provisions which detail how they will control access to their medical facilities during a chemical warfare agent emergency?
8. Are all levels of the medical community that are designated by State or local disaster plans to respond to a chemical warfare agent emergency able to communicate via either the State or local disaster communication network?

Appendix B

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APPENDIX J

PLANNING GUIDELINES FOR PUBLIC EDUCATION AND INFORMATION FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX J

PLANNING GUIDELINES FOR PUBLIC EDUCATION AND INFORMATION

INTRODUCTION

Purpose

The purpose of this document is to provide a rationale and guidelines to guide local, State and Department of the Army public affairs and information officers in the implementation of the Public Information and Education elements of the Chemical Stockpile Emergency Preparedness Program (CSEPP).

In two sections, Pre-Emergency Public Education and Emergency Public Information, operational concepts are presented (the rationale), which are followed by guidelines.

Staff from the Federal Emergency Management Agency will utilize this document and other guidance from FEMA and the Department of the Army, as a basis for evaluating the adequacy and effectiveness of Pre-Emergency Public Education and Emergency Public Information programs developed to deal with potential or actual chemical agent emergencies.

Preamble

An aggressive public education and information campaign is an essential ingredient of an effective emergency preparedness program. The pre-emergency public education program raises public awareness of the hazards associated with the chemical agent stockpile and advises citizens of actions they can take, both before and during an emergency, to reduce risks to themselves and their property. Public education also informs individuals of the progress of Chemical Stockpile and Chemical Demilitarization activities as they relate to emergency preparedness. The emergency public information program identifies the information that will need to be communicated to the public in the event of a chemical agent release and a strategy for disseminating this information rapidly.

Both pre-emergency public education and emergency information must dovetail with and support other elements of a community's emergency preparedness program. Decisions made throughout the program and incorporated into the emergency operations plan and other documents will influence the information needed by the public as well as the way the information should be communicated. The design of the protective action decision system and the alert and notification system, for example, will directly affect the recommendations and instructions to be included in the public education and information materials as well as the dissemination strategy.

It is important to recognize that the CSEPP public education and information programs are fundamentally different from typical public affairs and public information efforts. The primary goal of the emergency programs is to promote public actions that will reduce casualties in the event of a chemical release. (An important secondary goal of the CSEPP public information/education programs is to support other efforts to enhance the public's understanding of the Chemical Stockpile and Chemical Demilitarization programs and maintain or develop public confidence in the Government's ability to protect public health and safety.) Other public information activities (e.g., cultivating a positive image for the program) are appropriate only insofar as they contribute to that goal. Recognition of this distinction is particularly important since it is likely that many jurisdictions[1] will assign responsibility for the emergency public education and information functions to their public affairs officials.

Selection of qualified Public Affairs or Public Information Officers (PIOs) is critical to the development and implementation of a successful CSEPP public education and emergency information program. A list of public relations/information skills and experience levels follows. The list may be used to assist in the identification and hiring of qualified individuals is provided as Attachment 1 for your consideration. Use of this attachment is not mandatory.

PRE-EMERGENCY PUBLIC EDUCATION

In addition to the quality of a community's emergency preparedness system, successful response to a chemical agent emergency ultimately depends on individual citizens' taking appropriate actions to protect themselves. Under some accident scenarios, the time available to implement protective actions would be quite limited for people near the source of the chemical agent emergency. For these adjacent populations, evacuation, the most common and (possibly) most natural defensive action, would not be prudent under some conditions. Individuals can protect themselves, then, only if they understand what protective actions will be most effective and have the knowledge and motivation to implement those actions quickly. Consequently, pre-emergency public education is a necessary component of an effective emergency preparedness program.

The term "jurisdiction(s)" used throughout this document is intended to refer to cities, counties, States, and Army installations participating in the Chemical Stockpile Emergency Preparedness Program (CSEPP).

The fundamental goal of emergency preparedness is to minimize casualties in the event of an emergency. The pre-emergency public education program supports this goal through two principal objectives: (1) to encourage people to take appropriate pre-emergency protective measures, and (2) to promote quick and appropriate response during an emergency by informing the public about the emergency warning process and the procedures for implementing appropriate protective actions.

The effort to ensure that all people living, working, or traveling through a community at the time of a chemical agent emergency have access to the information they need to protect themselves is a complex and ambitious undertaking. This effort requires the development and use of strategies similar to those employed in other public awareness programs. Program personnel responsible for public information must divide the community into target audiences based on the type of information required and on the audience's need for information to be presented in particular ways. CSEPP PIOs must then develop public education strategies according to exactly what information will be presented to each audience and what methods of presentation will be most effective in communicating that information to them. Finally, PIOs must design and dessiminate the public education materials (brochures, television and radio spots, newspaper ads, public presentations, etc.). Furthermore, since research indicates that repetition is an important ingredient in emergency public education efforts, the entire process must be repeated periodically.

Consideration must be given to significant program dates and milestones. Certain events at the installation and in the community should be anticipated. Examples include the installation of sirens in the community, ground-breaking ceremonies for new buildings or the demilitarization plant, public scoping meetings, hazardous materials accidents in other locations, etc. Public education activities should be planned and executed to meet the community's need for information which such events will create. Coordination should occur, as appropriate, with the Army Installation and Public Affairs Office, Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Maryland.

Operational Concepts

Identification of Target Groups

The identification of target audiences is a crucial step in developing an effective public education program. Information needs and communication methods cannot be selected with confidence until decision makers have considered critical characteristics of the affected public. Two types of characteristics are important in identifying target audiences: (1) characteristics which indicate special needs regarding the ways in which information is presented, and

(2) characteristics indicating a need for specific types of information.

People who require that general public education information be presented in specific ways include those with perceptual difficulties as well as transients and visitors to the area who would not be exposed to information provided through normal channels. Groups to be considered include the hearing-impaired, visually-impaired, mentally handicapped, non-English-speaking, as well as migrant workers, tourists, and visiting travelers.

Different segments of the community will need different types of information to guide their response to an emergency. For example, different responses may be appropriate for people in different emergency planning zones; people who are physically handicapped will often need special information about the protective actions they should take and how to implement them, and some people may require instructions on actions they should take that go beyond personal protection. An effective public education program will recognize varying information needs within the community and try to provide appropriate information for all groups.

Identification of Information To Be Presented

The specific types of information to be communicated to each target audience should be identified, preferably with the involvement of representatives of the target audience. Information needs that are common to all audiences can be addressed in general public education materials, and special materials or presentations can be developed to meet the specific needs of some groups.

Three basic types of information may be included in the public education program: (1) general educational information, (2) general public information, and (3) protective action instructions. Clearly the most important information is that which informs recipients how to protect themselves from a release of chemical agent. Protective action instructions should address both actions that can be taken before a chemical agent emergency occurs and actions that should be taken upon receipt of an emergency warning. Instructions for actions to be taken during an emergency must be compatible with messages prepared for dissemination at that time (see Emergency Public Information). General educational information should be provided to inform the public of the nature of the hazard posed by the chemical stockpile and disposal program. General public information, explaining the role of the emergency management agency and the on-going emergency preparedness capabilities and safety measures in place at the stockpile and demilitarization site, must be included to increase the credibility of the emergency information materials, foster confidence in the storage and demilitarization processes, and encourage the public to implement appropriate protective actions when required.

Identification of Media

A variety of methods are available to communicate emergency information to the identified target groups, including electronic media, print media, special purpose publications, specialized media, and community outreach programs. In selecting the media to be used to reach each target audience, program planners should consider (1) the information to be communicated to that audience, and (2) any characteristics of the audience that may indicate that particular media are likely to be more effective in reaching them. If possible, selection of media should be made in consultation with representatives of the target audience involved. It is desirable to use more than one media type for each target audience because different media reinforce each other, increasing both the credibility and memorability of the emergency information.

Special purpose publications (e.g., pamphlets) will likely play an important role in most pre-emergency public education efforts. Such publications offer an opportunity to provide detailed information focusing specifically on emergency preparedness related to the chemical agent stockpile. Program planners should consider the possibility of using more than one such publication for each target audience. It may be advisable, for instance, to devote one pamphlet to protective action instructions and to provide one or more additional publications containing background information on the nature of the chemical agent hazard and the emergency preparedness program.

Format and Style Considerations

While a few guidelines are appropriate regarding the format and style of pre-emergency education materials, these issues are largely subjective and judgmental in nature. In general, questions regarding format and style can be decided by applying two principles that are fundamental to an effective education program. First, the primary goal of the pre-emergency public education program is to increase the likelihood that individuals will take appropriate actions to protect themselves from a release of chemical agent. Consequently, protective action instructions must occupy the central point in the program. Other types of information, such as descriptions of the nature of the threat and material about the emergency preparedness program, must be subordinate to and must support the single principal purpose of promoting the timely implementation of protective actions by the public.

The second principle that should guide decisions on format and style is that all materials must be effective in communicating their information to the public. Each element of the public education program should be carefully designed to present information that is clear, specific, accurate, consistent, and conveyed with certainty. The chemical agent stockpile hazard, and the associated emergency response program, are inherently complex, and care must be taken to avoid apparent inconsistencies in the descriptions of these programs. In addition, all materials should match the comprehension level of their respective target audiences. This requirement presents a considerable challenge, since it often means that very complex issues must be described in simple terms. Ideally, the educational/comprehension level of each audience should be determined through research, polling of state and local organizations, or analysis of census data. Since these techniques often involve skills not readily available at the local, state or installation level, assistance in securing such data may be available via technical assistance from the CSEPP Public Affairs staff at the Federal Emergency Management Agency. In the absence of such an audience analysis, some experts suggest that public education materials should be designed for a grade 7-9 reading level. An alternative strategy would be to develop public information materials that are tiered to reach a variety of reading levels.

Guidelines

J.1 Each jurisdiction will provide a coordinated, periodic (at least annual) dissemination of information to the public telling them how they will be notified in the event of a chemical agent emergency and what actions they should take to protect themselves. (See Attachment 2 for additional guidance on public affairs activities related to public alert and notification systems.)

J.2 Each jurisdiction shall prepare a description of the methods used to systematically identify all relevant target audiences for the pre-emergency public education effort.

J.3 Target audiences to be considered for inclusion in the pre-emergency public education program include, but are not necessarily limited to, the following:

a. People who live or work in different segments of the Emergency Planning Zones (EPZs)
b. People with movement impairments (physically handicapped, elderly, and life-support-hindered)
c. People with sensory impairments (hearing and visually-impaired)
d. People with mental or emotional impairments (retarded, emotionally disturbed, senile, acute alcoholic/drug-abuse cases)
e. Non-English-speaking people
f. Illiterate people
g. Farmers and stockmen

h. Managers of food-processing facilities

i. Transients

j. Recreational visitors

k. Migrant workers

l. Different age groups

m. Groups with specific ethnic or cultural characteristics that require special sensitivities

n. Elected officials at the local, state, and federal levels.

o. Institutionalized persons (e.g., prison inmates)

p. School children and staff

J.4 Whenever possible, target audiences or their representatives should be involved in determining the information that they need and the media that are appropriate for communicating with them. Where feasible, professionally-conducted focus group discussion should be used to elicit such information. Assistance may be available from state offices or from the CSEPP Public Affairs staff at FEMA.

J.5 Specific information that should be communicated to all people in the Immediate Response Zone (IRZ) and Protective Action Zone (PAZ) includes

a. A clear statement of the purpose of each publication or presentation.

b. A clear discussion of notification methods and emergency action levels, including how the notification will be made. The materials should indicate what the recipient should expect to hear or see and in what order. The recipient should also be told where to turn for additional instruction during an emergency, including any radio or television stations participating in the Emergency Broadcast System.

c. Instructions on implementation of protective actions, telling the recipient what actions, in order of priority, should be taken in response to an emergency notification. Publications containing this information should include a highly visible statement advising the recipient to save the document for use during an emergency. All materials and information developed and disseminated must be in compliance with protective action guidance developed for this program (see Appendix E).

(1) Where in-place sheltering has been identified as a possible protective action, the materials should inform recipients of what actions they should take to achieve the

protection offered by this option (e.g., closing and sealing doors and windows, turning off ventilation systems).

(2) Where evacuation has been identified as a possible protective action, evacuation routes and the location of reception centers and shelters should be indicated, using both maps and written directions. Information should also be included regarding critical items that should be taken when evacuating.

(3) Where the use of personal protective gear has been identified as a part of a possible protective action strategy, the materials should inform the recipient how to use and maintain the equipment. Materials for dissemination to the public must be developed in accordance with relevant guidance documents.

d. Descriptions of any pre-emergency steps that recipients can take to increase the effectiveness of protective actions or to minimize the time required to implement them (e.g., development of a household emergency plan; pre-positioning materials for sealing a room; pre-packing an evacuation supply kit).

e. Provision for the recipient to notify emergency planners of special needs. Such provision could consist of a pre-paid, tear-off postcard or, in the case of booklet-type publications, a bound/stapled pre-paid card.

f. An emergency assistance phone number and instructions on its use. (This point depends on whether the local emergency plan calls for an emergency phone number or makes other provisions.) `Hotline' numbers for use during emergencies should be distinguished from information numbers to be used during non-emergency times. At least one Telecommunications Device for the Deaf (TDD) should be installed by the jurisdiction at this point to permit hearing-impaired people with such devices to communicate with the jurisdiction.

g. Description of plans for transporting students in public and private schools and people without access to private transportation.

h. Some blank space in the emergency procedures section for personal notes.

i. Date of issue and name of issuing agency.

j. Explanations of the significance and effectiveness of emergency procedures and protective actions. This is particularly important in instructions relative to school children and personal property.

k. Educational information on the sources and health effects of chemical agents, including the nature of the hazard, the range of possible accidents, possible consequences of accidents, the risk of accidents, and the geographic distribution of the threat.

J.6 "Promotional material", including letters and quotes from political, agency, or Army officials, may be included if they contribute to the credibility of the message or the organization.

J.7 Each jurisdiction must be prepared to demonstrate that its public information program has given consideration to the use of a variety of methods of communicating with the public, which may include but not necessarily be limited to

a. Electronic media (radio and TV)
   (1) News or public affairs programs
   (2) Public service announcements
   (3) Video news releases
   (4) TV specials
b. Visual Media
   (1) Films/videos
   (2) Slide shows
c. Aural Media
   (1) Recordings
d. Print Media
   (1) Ads
   (2) Feature stories
e. Special Publications
   (1) Pamphlets
   (2) Comic books
   (3) Instructional books
   (4) Flyers
   (5) Phone book inserts
   (6) Newsletters
f. Specialized Media
   (1) Signs, bulletin boards in parks, highway rest areas, and other public places

(2) Stickers

(3) Magnets

(4) Calendars

(5) Phone book covers

g. Community Outreach

NOTE: Community relations standards are being developed and will be added. Until such standards are adopted and disseminated, community outreach to each of the target audiences should include the following types of activities.

h. Community meetings

(1) Presentations at civic meetings, business and professional group meetings, and other assemblies (including medical society meetings, public and private school staff and students)

(2) Door-to-door canvassing

(3) Information center

(4) Displays in public buildings, (e.g., city hall, hospitals, schools)

(5) Hotlines

(6) Agricultural Extension Service (USDA)

(7) For school children:

- field trips and/or Depot Visitor Center orientations
- incorporation of educational materials, or additions to science class syllabus for grades 6 through 12.

J.8 Signs or other measures (e.g., decals, posted notices, or other items, placed in hotels, motels, gasoline stations, highway rest areas, parks, recreation areas, docks and boat ramps, and phone booths) shall be used to disseminate to any transient population within the EPZ appropriate information that would be helpful if an emergency or accident occurred. Such notices should refer the transient to the telephone directory or to other sources of local emergency information and guide the visitor to appropriate radio/television frequencies.

J.9 Each jurisdiction shall conduct coordinated programs at least annually to acquaint news media with emergency plans, information concerning chemical agents and the disposal program, and points of contact for release of public information. In addition, procedures will be developed to ensure that local news media will be notified of significant emergency preparedness activities (e.g., training activities and exercises) or significant changes in the local CSEPP.

J.10 The purpose of each publication or presentation should be clearly stated. If the publication or presentation is not intended to present protective action instructions, it should refer the recipient to other items that do contain such information.

J.11 For publications containing emergency response instructions,

a. Emergency information should be positioned in a prominent place in the front of the document.

b. Background educational information, if included, should be placed after the emergency information. Many organizations put the bulk of educational information in a separate document to ensure the effectiveness of the emergency message.

c. Public relations passages, including letters and quotes from political, agency, or installation officials, should be examined for their overall contribution to the objectives of the publication before they are included. If included because they contribute to the credibility of the message, they should be placed so as to not distract the reader from important emergency information.

J.12 To ensure the public's full comprehension of the information presented, all pre-emergency educational materials should conform to the following guidelines:

a. The vocabulary used should be simple and appropriate to the audience. General documents and presentations should be prepared for either (a) a reading level of grade 7 or below, as characterized by the Dale-Chall readability formula (Dale and Chall, 1948), or (b) a different reading level that analysis has determined to be appropriate for the target audience. Special publications and sidebars can be designed to reach a more advanced reading level.

b. Sentences should be brief and concise.

c. Typography should be legible and easy to read.

d. For documents, the layout should be such that the text is easy to follow from paragraph to paragraph and from page to page.

e. Information should presented in such a way that there is a logical sequence of topics. The `flow' of information should be smooth and not disjointed.

f. Document covers should encourage one to open the publication to read what it contains. The title should indicate the purpose of the document, and, for documents including protective action instructions, the cover should indicate that the document should be retained for use in an emergency.

g. Documents should be large enough to be easily located during an emergency. In addition, documents which contain evacuation maps and directions should be sized so that they can be easily handled and read in a moving vehicle.

h. Photographs, maps, charts, tables, and artwork should be used in ways that effectively enhance the text and are not distracting.

i. The various elements of graphic design should work together harmoniously to achieve the desired effect.

j. Color should be used effectively to enhance and highlight important details relative to the emergency information. Color selection must consider the needs of visually-impaired ("color blind") individuals.

k. The format should encourage retention.

l. Publications containing protective action instructions should be durable enough to withstand the wear and tear of typical household storage places.

J.13 All public education materials (brochures and safety messages) will be translated into a non-English language if the state determines through survey or other means that the non-English language speaking minority population of exceeds one percent of a IRZ or PAZ county's population. If minority language individuals in the IRZ or PAZ counties do not exceed one percent of the population and there are no foreign language materials provided, other efforts must be made to afford them information equivalent to that provided the general population. Examples of acceptable methods are periodic public meetings announced and conducted in the minority language and presented with the cooperation of minority language community members; providing qualified translators at public meetings conducted in other languages; and making provision with language banks to answer inquiries made by minority language speakers. NOTE: The 1 percent figure above refers to **one** non-English language; it is **not** a cumulative figure of all non-English languages.

J.14 Jurisdictions must install at least one Telecommunications Device for the Deaf (TDD) so that hearing-impaired people already possessing TDD's may communicate with the jurisdiction. A dedicated phone line for the TDD must be installed and efforts made to publicize the phone number among hearing-impaired people.

J.15 *THIS SECTION RESERVED FOR COMMUNITY RELATIONS GUIDELINES*

EMERGENCY PUBLIC INFORMATION

The principal objective of the emergency public information program is to minimize casualties and property damage by ensuring that appropriate instructions are distributed to the public in a timely manner during a chemical agent emergency. Planning is necessary to accomplish this objective. Before an emergency occurs, communities must consider what information will be needed by the public and develop a strategy for disseminating that information quickly.

In the interest of a coordinated planning process, it is suggested that the state emergency management agency initiate Joint Information Center (JIC) planning in close cooperation with all other jurisdictions.

It should be noted that the primary means established for emergency alert and notification of the public in the Immediate Response Zone (IRZ) are tone alert radios and voice-capable sirens. Communities must develop pre-scripted, pre-tested messages for transmission via these media. The FEMA CSEPP Public Affairs staff are developing and testing such messages for use and appropriate modification by local or state officials. The Joint Information Center's activities must be supportive of and coordinated with information provided via tone alert radios, sirens, and the Emergency Broadcast System (EBS). A community emergency is naturally a confused scene; carefully prepared and carefully timed public information can reduce the confusion and minimize the community's loss.

Operational Concepts

Interagency and Interjurisdiction Coordination

Since the effectiveness of the CSEPP depends on the public's taking appropriate protective actions, it is imperative that the public information presented during a chemical agent emergency be clear, accurate, and consistent. Considering the variety of agencies and jurisdictions that are likely to be involved in responding to a chemical agent incident, these qualities can be ensured only through careful coordination among the agencies and jurisdictions involved. In the pre-emergency phase, each agency's or jurisdiction's procedures for disseminating public information should be coordinated and made compatible with the strategies developed by all other agencies and jurisdictions who may be affected by a chemical agent event.

During an emergency, a Joint Information Center (JIC) should be established in a timely manner to support information provided via the public alert and notification systems (and in recognition of the requirement that outdoor alert and notification be accomplished within eight minutes of the decision to alert.) The JIC must facilitate the coordination and compatibility of the information disseminated by the various agencies and jurisdictions. The coordinated public information strategies and the organization and operation of the JIC should be tested and refined through CSEPP exercises.

It should be recognized that non-surety events, such as smokey on-post fires not involving chemical agents, may be responsible for creating considerable public interest and concern. Therefore, plans should provide for either ***partial*** or ***full*** JIC activation. Partial activation will take place when it is apparent to the Army and/or the county(s) that public perception either has or will create significant public interest or concern.

Organization for Emergency Public Information

As a part of its planning activities, each jurisdiction must establish an organization to handle the emergency public information function. Each jurisdiction will appoint a spokesperson and alternate spokesperson. The spokesperson should be involved in planning activities for public education and public information, including the coordination of the public information strategy with other jurisdictions and agencies. Each jurisdiction will also identify staff resources that will be available to the spokesperson at the time of a chemical agent emergency. The staff will be responsible for assisting the spokesperson by providing secretarial services, communications with other officials, and communications with the public.

Emergency Public Information Procedures

Each jurisdiction will develop emergency public information procedures to ensure that clear, accurate, appropriate, timely and consistent information is provided to all people directly affected by the chemical agent emergency. The procedures should be coordinated with other jurisdictions and agencies and should indicate what types of information will be provided to which groups in which order of priority. The strategy should recognize the needs of some groups for specialized information or for generic information presented in specific ways. The procedures should also specify how prescripted information (e.g., protective action recommendations) and news briefings will be handled.

The JIC should be activated at the earliest possible time during the emergency to provide a single location for coordinated emergency information. Activities in the initial phase of the chemical event will be dominated by dissemination of protective action recommendations. The JIC will **support** the dissemination of protective action information via the alert and notification system; the latter shall at all times be considered the first medium to be used for the dissemination of protective action information.

Methods for disseminating these recommendations in support of alert and notification include the EBS, other TV and radio stations, and cable TV. Recommendations should complement and be consistent with pre-emergency public education materials and with messages disseminated via the alert and notification system. Whenever possible, the messages should refer recipients to pre-emergency educational materials that are likely to be available for more complete instructions and should provide a telephone number for contacting authorities for additional information or instructions.

As the chemical agent emergency progresses, the emphasis of efforts at the JIC will shift from protective action recommendations to informing the public about the nature of the emergency and its causes and response and recovery activities. All information regarding Department of the Army actions in connection with the emergency—its causes and direct actions to contain and control it—should be provided by the Army Public Affairs Officer (PAO). The Army PAO will also be responsible for coordinating information about the on-base activities of other federal agencies and departments which are operating in support of the Army as the Lead Federal Agency. The Army PAO will coordinate and consult with local, state, and volunteer organizations (e.g., Red Cross, Salvation Army, etc.) public information officers, but will exercise no control over their actions. The Army PAO will also coordinate his information activities with those of federal agency public affairs officers operating off-site.

Local, state, and federal agency spokespersons should communicate instructions to the public; describe completed, ongoing, and planned activities to respond to the emergency and recover from it; and advise the public of likely outcomes (e.g., expected duration of exclusion from evacuated areas) to the extent this can be done with reasonable reliability.

Rumor Control

Events following the release of a chemical agent are likely to be confusing to the public, and, partly because of the nature of the hazard, inaccurate accounts are likely to circulate. Yet, the public's well-being depends on their understanding and properly responding to the recommendations made by emergency management officials. Inappropriate action based on erroneous information could be disastrous. Consequently, the control of rumors is a critical aspect of the public information program. Rumor control includes two steps: (1) recognizing the existence of a rumor, and (2) providing information to correct the rumor. Both steps can be accomplished on an individual basis, in part by advertising a telephone number that citizens can call for answers to questions about the emergency or perceived emergency. (*It is important that sufficient telephone lines and operators be connected to this number to avoid undue delays in answering incoming calls*).

Emergency responders can also be trained to report any significant rumors they encounter to the EOC and JIC. Rumors that are widespread or particularly troublesome should be corrected through an official information release.

The JIC should also actively monitor broadcast and print media coverage to identify erroneous information or indications that some members of the public may be reacting to the emergency inappropriately.

Guidelines

J.16 Each jurisdiction shall appoint a spokesperson and alternate spokesperson. The spokesperson will report to the Emergency Manager and will have the following responsibilities:

a. to be the sole source for the dissemination of official emergency public information and instructions through the media to the public;

b. to participate in the development of the emergency public information strategy;

c. to coordinate the public information strategy with other affected jurisdictions and agencies, including the Army installation.

J.17 Sufficient staff to support the spokesperson during an emergency will be identified, procedures for making them available will be set forth, and any training needs will be identified. At a minimum, staff will be required for secretarial assistance, communications with on-post and off-post EOC's and other officials, and telephone communications with the public and the media.

J.18 Each jurisdiction shall prepare pre-scripted messages containing the protective action recommendations to be disseminated to the public in an emergency. These messages will be disseminated via the alert and notification system, EBS, and other broadcast media. A range of pre-scripted messages shall be prepared based on the most likely and alternative actions identified in the jurisdiction's analysis of protective actions (see Appendix D). A clear method of distinguishing among the alternative sets (e.g., printing on different colored paper) will be adopted. Appropriate messages will be prepared for all groups identified in the emergency public education program as having special needs regarding the content or presentation of emergency information. At a minimum, protective action recommendation messages will be prepared meeting the specific needs of the following groups:

a. people located in specific sectors of different emergency planning zones at the time the emergency occurs;

b. people who are mobility-, hearing-, or visually-impaired. Jurisdictions will operate equipment such as Telecommunications Devices for the Deaf (TDD's) to permit communication with hearing-impaired individuals;

c. non-English-speaking people; and

d. institutions (e.g., schools, hospitals, nursing homes, jails/prisons).

J.19 The protective action recommendation messages will be as clear and succinct as possible. The messages must be written so that they may be read in three minutes or less. At a minimum each message will contain the following information:

a. the time the message was authorized for release;

b. the name of the agency authorizing the release and other sources contributing information which led to the authorization;

c. a brief description of the reason for the protective action recommendation, including the nature of the threat;

d. a clear identification of the individuals or groups and areas to whom the message is addressed, and identification of who is not at risk;

e. a clear statement of the recommended protective action;

f. an indication of the time period available for implementing the recommended action,

g. a reference to relevant public information materials that are readily available and would provide more detail regarding implementation of the recommended protective action; and

h. a repetition of detailed instructions for implementing the recommended action.

J.20 Each jurisdiction shall develop procedures for disseminating the protective action recommendation messages keyed to the jurisdiction's protective action decision-making process to ensure that each message will be issued at the earliest possible point in the process. The procedures will establish dissemination procedures that are consistent with alert and notification procedures naming tone alert radios as the primary means of delivering protective action messages within the IRZ, and which address the following issues:

a. identification of officials authorized to issue protective action recommendation messages;

b. identification of the radio and TV stations (including EBS) through which the messages are to be disseminated;

c. requesting participating radio and television stations to broadcast the messages, including procedures for activation of the EBS (see items J.22b and c below);

d. the order, based on urgency, in which messages will be issued;

e. the method by which the messages will be communicated to the distributing media in an accurate and timely manner (e.g., pre-positioning the pre-scripted messages at the media broadcast offices); and

f. obtaining and supplying to the media any incident-specific information necessary to complete the protective action recommendation messages.

J.21 Each jurisdiction will document the arrangements that it has made for disseminating protective action recommendation messages in a manner that has been coordinated and is compatible with the plans of other local jurisdictions in the EPZ, state emergency management officials, and the Army installation.

J.22 Each jurisdiction will document the arrangements that have been made for effective distribution of protective action recommendation messages to broadcast media serving the community, including

a. that a local operational area plan for the EBS has been developed with the participation of local broadcasters and state officials and that the plan will provide an effective response in the event of a chemical agent release;

b. that a list of the persons authorized to activate the EBS and the explicit procedures to be followed have been made available to all concerned parties;

c. copies of written agreements which the jurisdiction has executed with the broadcast media (e.g., radio stations, TV stations, cable TV, educational TV) serving the jurisdiction to receive and disseminate warning messages and emergency information; and

d. indications that reliable and redundant communications links are available linking the jurisdiction's Emergency Operations Center (EOC) with the EBS system and with other local broadcast stations.

J.23 A single JIC permits the most efficient gathering, coordination and dissemination of emergency information. Therefore, only one JIC will be established and operate in connection with perceived or real chemical agent emergencies described in this document. The principles of the Joint Information System requiring on-going coordination and consultation among responding organizations shall be followed [see Federal Preparedness Circular #8 (FPC #8), "Public Affairs in Emergencies", issued by the Federal Emergency Management Agency and approved by the Office of the White House Press Secretary]. The principles of FPC-8 are incorporated throughout this document. Each jurisdiction will develop agreements and procedures, in cooperation with all affected local jurisdictions, state emergency management officials, and the Army installation, that will be followed to ensure the coordinated release of information during an emergency. Specifically, these items will include

a. arrangements for timely exchange of information with the designated spokespersons of all jurisdictions and agencies involved, and

b. the jurisdiction's commitment to participate in a JIC that will provide a single location for the release of official information from all jurisdictions and agencies regarding the chemical agent emergency and response activities.

J.24 Each jurisdiction will prepare, as part of its Emergency Response (or Operations) Plan, a JIC plan, developed in cooperation with all affected local jurisdictions, state emergency management officials, and the Army installation, which describes the location, facilities, and operational procedures for the JIC. For an example, reference is made to the federal government's draft Joint Information Center standard operating procedures (Interagency Committee for Public Affairs in Emergencies, March 14, 1990 or subsequent revisions). The plan will include

a. the name and street address of the facility to be used as the JIC. As a general rule, the JIC should be located outside the IRZ.

b. reference to an agreement with the facility's owner for use of the facility as a JIC, including any restrictions or provisions regarding such use.

c. an estimate of the maximum number of public information, Congressional relations/legislative affairs personnel, and media representatives expected to be present in the JIC.

d. confirmation that the facility includes adequate and suitably-arranged space and basic equipment for the following functions:

(1) work areas for official public information personnel separated from media areas and other ordinary traffic;

(2) work areas for news media representatives that are separated from public information personnel and other ordinary traffic;

(3) a conference area large enough to accommodate all anticipated media and other participants for news briefings and conferences;

(4) two or more separate areas where media can conduct personal interviews with response force personnel;

(5) space for telephones for receiving calls from the public;

(6) sufficient electrical power and outlets to satisfy the surge from typewriters, computers, lights, cameras, microphones, radio equipment, telex, and other equipment, plus a stand-by, back-up power capability;

(7) adequate parking for the expected maximum number of governmental public information personnel and media representatives;

(8) adequate restroom facilities for the maximum expected number of participants; and

(9) an area where media representatives and other participants can obtain food and beverages at cost or on a reimbursable basis.

e. a list of equipment not currently available in the facility that will be required for functioning of the JIC along with the jurisdiction and agency responsible for supplying each item at the time of an emergency. The equipment list should include

(1) bulletin, message, and picture boards along with tables for press releases and handouts;

(2) a minimum of ten telephones for media representatives (arrangements may be made with the phone company to permit only local, credit card and collect long distance calls), and at least one telephone line for each person assigned media or Congressional relations responsibilities. Each JIC organization shall have at least one dedicated phone line available for data or facsimile transmission.

(3) office furniture, equipment, and supplies;

(4) equipment allowing adequate and reliable communications with the on-post EOC, the off-post EOC's of all jurisdictions represented at the JIC, and with any public information officials who are unable to report to the JIC;

(5) equipment allowing adequate and reliable communications with the all media serving the EPZ; and

(6) sufficient telephones with a common number for receiving calls from citizens seeking more information or instructions. At least one line must be dedicated to a Telecommunications Device for the Deaf (TDD);

(7) provisions for rapid activation of back-up communications, including voice and or data (packet) radio systems.

f. procedures for activating the JIC, including

(1) a list of people authorized to activate the JIC;

(2) a list of the individuals to be contacted upon activation of the JIC, including public information officials and critical support staff, and the news media; and

(3) procedures for converting the facility from its current use into a JIC, including the location of needed equipment and the identification of individuals responsible for moving the equipment to the JIC and setting it up.

g. procedures for conducting periodic, timely news briefings to keep the media informed of updated or changing activities and to communicate additional information/instructions to the public after protective action recommendations have been issued. These procedures will address

(1) the required coordination of information among public information representatives before its release;

(2) any division of responsibilities among public information representatives for the release of specific types of information (e.g., release of information regarding the accident site only by the Army representative; release of information regarding a single jurisdiction only by that jurisdiction's designated spokesperson);

(3) the method of resolving any disagreements regarding information to be released or the priority of information; and

(4) the organization and format of press conferences.

h. a program for detecting and correcting rumors. The program will include (but will not necessarily be limited to)

(1) the use of a bank of telephones with a common number which the public can call to ask questions regarding the emergency;

(2) procedures for logging all calls received and noting any rumors reported by the callers;

(3) review of telephone logs by public information officials.

(4) monitoring of media coverage of the event for any inaccuracies that might reflect or encourage inappropriate action by the public;

(5) timely analysis of "rumors" or erroneous information circulating among members of the media or public by officials who are charged with evaluating the information and determining the need for action in response to it.

i. provisions for restricting access to the JIC to persons who can best help in disseminating information to a large segment of the public (e.g., public officials and media representatives).

j. procedures for deactivating the JIC, including designation of officials authorized to deactivate and conditions under which deactivation is allowed or required.

k. identification of the location of, and procedures for activating, a JIC at an alternate location should relocation of the JIC be required. The plan should ensure that the alternate JIC will be available on short notice. The alternate JIC should be equipped with enough equipment to permit a rapid transfer of operations to it from the primary JIC. At a minimum, stand-by phone lines should be available to permit immediate activation of the stand-by facility. Other equipment may be transferred from the primary JIC.

J.25 The emergency public information program will be evaluated as a part of each CSEPP full-scale exercise. Exercise activities may include (1) timely and adequate activation, staffing, and equipping of the JIC. (Timely *partial* activation of the JIC will take place within two hours after the event triggering activation; *full* activation shall take place within two to four hours); (2) timely and adequate communications with the on-post EOC, off-post EOC's of the affected jurisdictions, and participating radio and television stations and print media; (3) mock dissemination of emergency information appropriate to the exercise scenario; and (4) timely and appropriate coordination of emergency public information among all responding jurisdictions and organizations.

Every effort must be made to enlist the participation in the exercise of actual news media. In any event, adequate and realistic play must be ensured by supplementing actual media with qualified media "players."

Within one month following the exercise, all participating public information officials will meet to evaluate and consider improvements in the public information program.

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APPENDIX J

ATTACHMENT 1

QUALIFICATIONS FOR PUBLIC INFORMATION AND PUBLIC AFFAIRS OFFICERS

The proper execution of CSEPP public education and information programs requires implementation by qualified personnel. Included among the suggested knowledge and skills for personnel implementing this program are

J-1-1 A B.A. degree in journalism, public relations, communications, advertising or related fields **OR** significant prior experience with the news media, public relations, advertising or related fields.

J-1-2 Experience in conducting community awareness programs.

J-1-3 Knowledge of the organization and functions of the mass media, with particular attention to news functions.

J-1-4 Experience in reporting on, or managing public affairs/information activities connected with, sensitive or controversial issues.

J-1-5 Knowledge of the organization and inter-relationship of the civil and military branches of the federal government, and similar knowledge of local, and state government.

J-1-6 Ability to successfully carry out assignments during stressful situations.

J-1-7 Successful completion of Basic and Advanced Public Information Officers courses at the Emergency Management Institute (EMI) is encouraged. If hired without completion of the courses, attendance is encouraged as soon as possible thereafter. Public information officers are also encouraged to apply for, and if accepted, attend the Joint Information System Conference held at EMI. (Attendance at the Conference is normally by invitation only).

The CSEPP Public Information/Affairs Officers carrying out Public Information/Education responsibilities likely will have both emergency and non-emergency assignments. They must help design and implement the pre-emergency education and information tasks, and they will likely perform those functions alone, with support from other personnel from their agency or jurisdiction, or those from other CSEPP jurisdictions. Assistance may also be available from FEMA or Army public affairs personnel, or from experts provided by them.

Emergency public information tasks will without a doubt require assistance from others. The CSEPP Public Information/Affairs Officer must expect to recruit, brief and train other qualified people to help him or her carry out his jurisdiction's responsibilities under these standards.

APPENDIX J

ATTACHMENT 2

GUIDELINES FOR CONDUCTING PUBLIC AFFAIRS ACTIVITIES IN SUPPORT OF ALERT & NOTIFICATION SYSTEM DEVELOPMENT, INSTALLATION, AND OPERATION

Guidelines for conducting Public Affairs Activities in support of Alert & Notification System Development, Installation and Operation

FINAL INTERIM GUIDANCE
September 7, 1991

developed by

Federal Emergency Management Agency
Offices of Public & Intergovernmental and Congressional Affairs
Washington, D.C. 20472

in support of the
Chemical Stockpile Emergency Preparedness Program

INTRODUCTION

Purpose

The purpose of this document is to provide guidance to local and State public affairs and information officers in the implementation of a public information and education program in support of development and installation of Alert and Notification systems in connection with the Chemical Stockpile Emergency Preparedness Program (CSEPP).

Staff from the Federal Emergency Management Agency will utilize this document, the Public Information and Education standards and other guidance from FEMA and the Department of the Army, as a basis for evaluating the adequacy and effectiveness of the public education program.

Goals and Objectives

GOAL: An aggressive public education campaign is an essential ingredient of the CSEPP Alert and Notification system if the public is to understand and accept it. The program, if properly conceived and implemented, will achieve the following objectives:

OBJECTIVES:

1. It will explain why an alert and notification system is required.
2. It will explain the components of the system, and where and why the components will be located.
3. It will explain how decisions about the system were made, and it will describe the role of local, state and federal agencies in arriving at those decisions.
4. It will provide for public comment, both formal and informal, and make it easy for citizens to have questions about the system answered.
5. It will educate citizens about how the system operates and what its warning signals and messages mean.
6. It will fully involve citizens, business, industry and government.
7. It will be fully coordinated among affected Army installations, local and state governments.
8. It will adequately *precede* the events about which it is designed to inform.

ASSUMPTION

This program will proceed on the assumption that the Alert and Notification system will be installed. It will assume the cooperation of individuals living within the area but will respect their right and desire to evaluate the value of the system based on the facts provided by CSEPP organizations and others.

RELATIONSHIP TO OTHER PUBLIC EDUCATION PROGRAMS

Pre-emergency public education must complement and support other elements of the community's emergency preparedness program. Decisions made throughout the program and incorporated into the emergency operations plan and other documents will influence the information needed by the public as well as the way the information should be communicated. The design of the protective action decision system and the alert and notification system, for example, will directly affect the recommendations and instructions to be included in the public education and information materials as well as the dissemination strategy.

PRE-EMERGENCY ALERT & NOTIFICATION SYSTEM PUBLIC EDUCATION

In addition to the quality of a community's emergency preparedness system, successful response to a chemical agent emergency ultimately depends on individual citizens taking appropriate actions to protect themselves. Fundamental to timely and correct citizen response is acceptance and understanding of the Alert & Notification System.

Under some accident scenarios, the time available to implement protective actions would be quite limited for people near the source of the chemical agent emergency. For these adjacent populations, evacuation, the most common and (possibly) most natural defensive action, would not be prudent under some conditions.

Individuals can protect themselves, then, only if they understand what protective actions will be most effective and have the knowledge and motivation to implement those actions *quickly*. Consequently, pre-emergency public education supporting the Alert and Notification system is a necessary component of an effective emergency preparedness program.

The fundamental goal of emergency preparedness is to minimize casualties in the event of an emergency. The pre-emergency public education program supports this goal through two principal objectives: (1) to encourage people to take appropriate pre-emergency protective measures, and (2) to promote quick and appropriate response during an emergency by informing the public about the emergency warning process and the procedures for implementing appropriate protective actions.

The effort to ensure that all people living, working, or traveling through a community at the time of a chemical agent emergency have access to the information they need to protect themselves is a complex and ambitious undertaking. This effort requires the development and use of strategies similar to those employed in other public awareness programs. Program planners must divide the community into target audiences based on the type of information required and on the audience's need for information to be presented in particular ways.

Strategies must then be developed according to exactly what information will be presented to each audience and what methods of presentation will be most effective in communicating that information to them. The strategy must also consider the sequence in which information is presented to specific audiences. Finally, the public education materials (brochures, television and radio spots, newspaper ads, public presentations, etc.) must be designed and disseminated to target audiences. It should be recognized that public education materials produced for broad general population groups are not necessarily suitable or most effective for use with specific targeted groups. Furthermore, since research indicates that repetition is an important ingredient in emergency public education efforts, the entire process must be repeated periodically. It is also important that the same message is heard in different ways as well.

It is strongly recommended that a coordination meeting be held among public affairs personnel before beginning their activities in support of the Alert & Notification system. This meeting should serve as the first of regular, on-going contacts among the jurisdictions, thereby assuring coordinated, consistent and mutually supportive activities are underway at and around each storage site.

Consideration must be given to significant program dates and milestones. Certain events at the installation and in the community should be anticipated. Examples include the awarding of contracts for the installation of sirens in the community, installation activities, and surveys of the public in connection with tone-alert radios (TAR's), etc. Public education activities should be planned and executed to meet the community's need for information which such events will create.

The FEMA CSEPP Public Affairs Management Team will assist with this coordination upon request.

It is important for the State Public Affairs Officer to include the installation's Public Affairs Officer in all aspects of the planning and implementation of the Alert & Notification Public Education program.

BASIC VS. ENHANCED PUBLIC AFFAIRS ACTIVITIES

Depending on the time and resources available, it is suggested that two levels of public affairs activities be conducted; more fundamental activities fall within the category of ***"Basic"*** public affairs activities. Activities requiring greater time, funds, skills, and generally of a more complex nature are deemed ***"Enhanced"*** activities.

The ability to implement "Basic" public affairs activities in support of A & N systems presumes the implementor has complete familiarity with the details of the Alert and Notification system so he or she can respond quickly to events as required.

All states are expected to conduct some "Basic" activities; "Enhanced" activities are encouraged as resources permit.

For examples of suggested "Basic" and "Enhanced" activities see Appendix 1.

Operational Concepts

Identification of Target Groups

The identification of target audiences is a crucial step in developing an effective public education program. Information needs and communication methods cannot be selected with confidence until decision makers have considered critical characteristics of the affected public. Two types of characteristics are important in identifying target audiences: (1) characteristics which indicate special needs regarding the ways in which information is presented, and (2) characteristics indicating a need for specific types of information.

People who require that general public education information be presented in specific ways include those with perceptual difficulties as well as transients and visitors to the area who would not be exposed to information provided through normal channels. Groups to be considered include the hearing-impaired, visually-impaired, mentally handicapped, non-English-speaking, as well as migrant workers, tourists, and visiting travellers.

Different segments of the community will need different types of information to properly understand the Alert and Notification System. For example, parents of school-aged children will need information on what the siren / tone alert radio signals mean to them when their children are in school when the systems are activated or tested. Workers who are primarily employed outdoors will want to know what to do when the system is activated under those conditions. Occupants and workers of nursing homes and hospitals, for example, will have other questions.

An effective public education program will recognize varying information needs within the community and try to provide appropriate information for all groups.

Identification of Information To Be Presented

The specific types of information to be communicated to each target audience should be identified, preferably with the involvement of representatives of the target audience. Information needs that are common to all audiences can be addressed in general public education materials, and special materials or presentations can be developed to meet the specific needs of some groups. Questions which citizens might have were developed during joint meetings of local, state and federal public affairs personnel involved with CSEPP and are included in this document at Appendix Two.

Two basic types of information may be included in the public education program: (1) general information about the alert and notification system, (2) specific information about what the system means to people living or working in specific locations.

Later, when protective action instructions are developed by local officials that information will need to be conveyed to the public.

Identification of Media

A variety of methods are available to communicate Alert & Notification Public Education information to the identified target groups, including electronic media, print media, special purpose publications, specialized media, and community outreach programs. In selecting the media to be used to reach each target audience, program planners should consider (1) the information to be communicated to that audience, and (2) any characteristics of the audience that may indicate that particular media are likely to be more effective in reaching them. If possible, selection of media should be made in consultation with representatives of the target audience involved. It is desirable to use more than one media type for each target audience because different media reinforce each other, increasing both the credibility and memorability of the public education information.

Special purpose publications (e.g., pamphlets) will likely play an important role in most pre-emergency public education efforts. Such publications offer an opportunity to provide detailed information focusing specifically on emergency preparedness related to the chemical agent stockpile. Program planners should consider the possibility of using more than one such publication for each target audience. It may be advisable, for instance, to devote one pamphlet to the rationale for the alert & notification system, and to provide one or more additional publications detailing the proper public response to signals and messages which are transmitted by the system.

STANDARDS

1. Target audiences to be considered for inclusion in the alert and notification public information and education program include, but are not necessarily limited to, the following:
    a. People who live or work in different segments of the Emergency Planning Zones (EPZ's)
    b. People with movement impairments (physically handicapped, elderly, and life-support-hindered)
    c. People with sensory impairments (hearing and visually-impaired)
    d. People with mental or emotional impairments (retarded, emotionally disturbed, senile, acute alcoholic/drug-abuse cases)
    e. Non-English-speaking people

f. Illiterate people
g. Farmers and stockmen
h. Managers of food-processing facilities
i. Transients
j. Recreational visitors
k. Migrant workers
l. Different age groups
m. Groups with specific ethnic or cultural characteristics that require special sensitivities
n. Elected officials at the local, state, and federal levels.
o. Institutionalized persons (i.e., prison inmates)
p. School children and staff
q. Facilities within the IRZ and PAZ which attract large numbers of people; e.g., stadiums, malls, transit centers, etc.

2. Whenever possible, target audiences or their representatives should be involved in determining the information that they need and the media that are appropriate for communicating with them. Where feasible, professionally-conducted focus group discussion should be used to elicit such information. Assistance may be available from state offices or from the CSEPP Public Affairs staff at FEMA.

3. Specific information that should be communicated to all people in the Immediate Response Zone (IRZ) and Protective Action Zone (PAZ) includes

a. A clear statement of the purpose of each publication or presentation.
b. A clear discussion of Alert and Notification system elements. The materials should indicate why and how the system was designed, and the schedule proposed for installation, testing and operation.
c. Provision for the recipient to notify emergency planners of special needs. Such provision could consist of a pre-paid, tear-off postcard or, in the case of booklet-type publications, a bound/stapled pre-paid card. Hearing-impaired people could use such a card, for example, to alert planners of their special requirements.
d. An non-emergency "alert & notification system" assistance phone number and instructions on its use. ('Hotline' numbers for use during emergencies should be distinguished from information numbers to be used during non-emergency times.) At least one Telecommunications Device for the Deaf (TDD) should be installed

by the jurisdiction at this point to permit hearing-impaired people with such devices to communicate with the jurisdiction.

e. Date of issue and name of issuing agency.

4. In formulating its Alert and Notification System public affairs program, each jurisdiction must be prepared to demonstrate that its program has given consideration to the use of a variety of methods of communicating with the public, which may include but not necessarily be limited to

a. Electronic Media (Radio and TV)
(1)News or public affairs programs
(2)Public service announcements
(3)Video news releases
(4)TV specials

b. Visual Media
(1)Films/videos
(2)Slide shows

c. Aural Media
(1)Recordings

d. Print Media
(1)Ads
(2)Feature stories

e. Special Publications
(1)Pamphlets
(2)Comic Books
(3)Instructional Books
(4)Flyers
(5)Phone book inserts
(6)Newsletters

f. Specialized Media
(1)Signs, bulletin boards in parks, highway rest areas, and other public places
(2)Stickers
(3)Magnets
(4)Calendars
(5)Phone book covers

g. Community Outreach

NOTE: Community relations standards are being developed and will be added. Until such standards are adopted and disseminated, community outreach to each of the target audiences should include the following types of activities.

h. Community meetings

(1)Presentations at civic meetings, business and professional group meetings, and other assemblies (including medical society meetings, public and private school staff and students)

(2)Door-to-door canvassing

(3)Information center

(4)Displays in public buildings, (e.g., city hall, hospitals, schools)

(5)Hotlines

(6)Agricultural Extension Service (USDA)

(7)For school children:

- equipment demonstrations and A & N system orientations
- incorporation of educational materials, or additions to class syllabus for grades 6 through 12.

5. Signs or other measures (e.g., decals, posted notices, or other items, placed in hotels, motels, gasoline stations, highway rest areas, parks, recreation areas, docks and boat ramps, and phone booths) shall be used to disseminate to any transient population within the EPZ appropriate information that would be helpful if an emergency or accident occurred. Such notices should refer the transient to the telephone directory or to other sources of local emergency information and guide the visitor to appropriate radio/television frequencies.

6. The purpose of each publication or presentation should be clearly stated. If the publication or presentation is not intended to present protective action instructions, it should refer the recipient to other items that do contain such information.

7. To ensure the public's full comprehension of the information presented, all pre-emergency educational materials should conform to the following guidelines:

   a. The vocabulary used should be simple and appropriate to the audience. General documents and presentations should be prepared for either (a) a reading level of grade 7 or below, as characterized by the Dale-Chall readability formula (Dale and Chall,1948), or (b) a different reading level that analysis has determined to be appropriate for the target audience. Special publications and sidebars can be designed to reach a more advanced reading level.

b. Sentences should be brief and concise.

c. Typography should be legible and easy to read.

d. For documents, the layout should be such that the text is easy to follow from paragraph to paragraph and from page to page.

e. Information should be presented in such a way that there is a logical sequence of topics. The 'flow' of information should be smooth and not disjointed.

f. Document covers should encourage one to open the publication to read what it contains. The title should indicate the purpose of the document, and, for documents including protective action instructions, the cover should indicate that the document should be retained for use in an emergency.

g. Documents should be large enough to be easily located during an emergency. In addition, documents which contain evacuation maps and directions should be sized so that they can be easily handled and read in a moving vehicle.

h. Photographs, maps, charts, tables, and artwork should be used in ways that effectively enhance the text and are not distracting.

i. The various elements of graphic design should work together harmoniously to achieve the desired effect.

j. Color should be used effectively to enhance and highlight important details relative to the emergency information. Color selection must consider the needs of visually-impaired ("color blind") individuals.

k. The format should encourage retention.

l. Publications containing protective action instructions should be durable enough to withstand the wear and tear of typical household storage places.

8. All public education materials (brochures and safety messages) will be translated into a non-English language if the state determines through survey or other means that the non-English language speaking minority population exceeds one percent of an IRZ or PAZ county's population. If minority language individuals in the IRZ or PAZ counties do not exceed one percent of the population and there are no foreign language materials provided, other efforts must be made to afford them information equivalent to that provided the general population. Examples of acceptable methods are periodic public meetings announced and conducted in the minority language and presented with the cooperation of minority language community members; providing qualified

translators at public meetings conducted in other languages; and making provision with language banks to answer inquiries made by minority language speakers. NOTE: The one percent figure above refers to one non-English language; it is not a cumulative figure of all non-English languages.

9. Jurisdictions must install at least one Telecommunications Device for the Deaf (TDD) so that hearing-impaired people already possessing TDD's may communicate with the jurisdiction. A dedicated phone line for the TDD must be installed and efforts made to publicize the phone number among hearing-impaired people.

10. As previously noted, public affairs activities in support of the Alert and Notification system must adequately precede certain key events if such activities are to be effective and achieve program goals. Examples of key events and suggested lead times appear at Appendix Three.

APPENDIX ONE

Examples of Basic and Enhanced Public Affairs Activities

BASIC

Briefings presented to local officials, state legislators, district staff of federal Congressional offices

Prepare and issue news releases

Schedule and attend media editorial board meetings with local officials attending as active participants

Establish and operate telephone line to receive public inquiries

Establish, maintain and utilize mailing lists of persons with expressed interest in CSEPP

Establish and maintain one or more information depositories for Alert and Notification / CSEPP program materials

Organize and conduct neighborhood and/or community informational meetings

Draft and issue radio / TV public service announcements

Acquire and maintain resource files (fact sheets on system components)

Prepare and distribute information for special needs populations

Develop and utilize Alert & Notification Question & Answer (Response to Query [RTQ]) document

ENHANCED

Develop materials for inclusion in local school curriculum

Establish and operate speakers bureau

Conduct community involvement activities (e.g., calendar art competition, mall demonstrations, county fair exhibits

Develop promotional items for distribution at community fairs, malls, meetings, etc.

Conduct specialized briefings for targeted opinion leader groups (e.g., medical, legal, political, educational, religious, agricultural, etc.)

APPENDIX TWO

Questions About the Alert & Notification System Which May Be Asked by the Public

The following questions were developed by a group of local, state and federal public affairs and public information professionals as an aid in developing the Alert & Notification Public Affairs program. They are presented in the order in which they occurred to the group, and therefore no hierarchy should be assumed.

1. How much will the system cost?

2a. Why do we need such a system?

2b. Why do we need it (the system) now, after so many years of *not* needing it?

3. Do I have to have a siren in my neighborhood? A tone alert radio in my home?

4. How often will the siren/tone alert radio be sounded?

5. How loud are they?

6. Will the sirens hurt my livestock? Affect their production or growth?

7. How will I learn about an incident at the depot if I'm away from home?

8. Why is the siren being put in my backyard / neighborhood?

9. When I go to sell my house I think the presence of the sirens in the area will lower my property values. What can I do about that?

10. Who controls and activates the sirens / tone alert radios?

11. Will I be able to hear the sirens / tone alert radios?

12. If I break the tone alert radio, will I have to pay to repair or replace it?

13. I am (a friend) is deaf. How will I (they) be warned?

14. Do I need a tone alert radio in every room?

15. Who maintains the radios?

16. If I move, do I take the tone alert radio with me?

17. What if I don't want a tone alert radio placed in my home?

18. Will it interfere with Pacemakers?

19. Will a fire set off the tone alert radio?

20. What if I'm not at home when the tone alert radio goes off?

21. Will the tone alert radios reset themselves?

22. Will the tone alert radios work when there's a power failure? How long will the batteries last before they completely discharge or need to be replaced?

23. Can there be false alarms with either the tone alert radios or sirens?

24. Will the remote controls from VCR's or garage door openers affect the tone alert radios?

ADDITIONAL QUESTIONS:

25. What happens to the sirens / tone alert radios after the chemical agents have been destroyed? Will they be taken down or will they be used for other purposes?

26. Will the sirens / tone alert radios be used for warning about other types of emergencies besides those involving chemical agents?

APPENDIX THREE

Recommended Lead Time for Public Affairs Activities in Support of Sample Key Alert & Notification System Activities

A & N EVENT	PUBLIC AFFAIRS SHOULD PRECEDE EVENT BY	SAMPLE TYPES OF ACTIVITIES
Soliciting Bids for Sirens and/or Tone Alert Radios	3 weeks	Inform local officials, news release, community meeting, mailing, hotline
Surveys of Community Members	3 to 4 weeks	Inform local officials, news release, mailing, community meeting(s)
Awarding Contract	act simultaneously	Inform local officials, news release
Siren Construction	4 weeks	Inform local officials, news release, brochure, neighborhood meeting
Tone Alert Radio Installation	4 weeks	Inform local officials, neighborhood meetings, demonstrations in public places, mailings, distribution of brochure
Siren testing and activation	4 weeks	Inform local officials, neighborhood meetings, radio/TV talk shows / demonstrations, brochures, mailings

APPENDIX K

PLANNING GUIDELINES FOR EVACUEE SUPPORT FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX K

PLANNING GUIDELINES FOR EVACUEE SUPPORT

Evacuee support involves all activities designed to process and accommodate evacuees from both on-post and off-post areas. There are two primary components of an evacuee support system: reception and mass care. The number of evacuees involved and the availability of adequate facilities will determine which of the following approaches will be used in developing an effective evacuee support system. The first approach requires both on- and off-post evacuees to report to a reception center located directly along an evacuation route, go through medical screening, register, have their needs assessed. The evacuees would then be referred to a mass care facility that is located some distance from the reception center and farther away from the source of the hazard. The second approach is identical, except that the reception area and mass care facility are collocated. This approach may be appropriate if a relatively small number of evacuees is involved, particularly if all evacuees can be accommodated at a single mass care facility.

Both short-term and long-term evacuee support mechanisms must be addressed in the planning phase of the operation. Short-term care applies to those needs (e.g., food, water, shelter, medical care, etc.) that must be met immediately after a chemical accident. Long-term evacuee support mechanisms involve providing adequate housing and basic necessities (clothing, food, shelter, etc.) to evacuees who are unable to return to their residences for an extended period of time. During the planning phase, all aspects of short-term evacuee support must be addressed; agreements must be formalized, and all pertinent resources must be identified and made available for emergency use. Planning for long-term support will probably be considerably less detailed because such support is more unlikely to be required, the degree of support needed could vary widely, and adequate time will be available for finalizing long-term support arrangements at the time of the emergency. During the planning phase, the jurisdiction should inventory available long-term support resources for evacuee support. The Department of the Army may rely on the Corps of Engineers to relocate installation residents.

Planning for a successful evacuee support program requires a high degree of interagency cooperation. Local and national chapters of the American Red Cross (ARC), other support organizations, and the Army installation should participate in planning for aspects of the evacuee support program that they will be involved in implementing. Interagency cooperation is especially appropriate in choosing facilities for reception and mass care centers, ensuring the availability of all necessary resources, and establishing staffing needs and providing qualified personnel. Participation of the ARC is particularly important because of the high level of expertise and capability this agency has developed in its long history of assisting people affected by emergencies. The ARC and Federal Emergency Management Agency (FEMA) have executed formal agreements at the federal level assigning the ARC responsibility for operating mass care centers during natural and technological disasters. Evacuee support planning for Chemical Stockpile Emergency Preparedness Program (CSEPP) should include determining what arrangements have been made for implementing these national agreements at the state and local level.

Interjurisdictional cooperation in evacuee support planning is imperative. Evacuee support activities will almost certainly involve resources and personnel from multiple jurisdictions, including the Army installation. The planning effort must identify the responsibilities of each affected jurisdiction and establish mechanisms for coordinating the employment of all resources and personnel during an emergency. The plans should incorporate appropriate mutual aid agreements. The necessary coordination can probably be achieved most effectively if the state leads the local jurisdictions in preparing a comprehensive evacuee support plan for the entire emergency planning zone (EPZ). In some cases, coordination of the plans of two states may also be necessary.

The following guidelines incorporate some provisions found in three FEMA publications: *Sheltering and Care Operations* (CPG 2-8), *Life Support Operations in Shelters* (CPG 2-20), and *Habitability and Human Problems in Shelters* (CPG 2-21). An overview of the ARC mass care program can be found in *Mass Care—Preparedness and Operations* (ARC 3031). Additional information pertaining to animal care and protection during a disaster may be found in *Emergency Animal Relief and Disaster Planning: Operational Guide for Animal Care and Control Agencies* by the American Humane Society.

GUIDELINES

Each jurisdiction will incorporate provisions for evacuee support into the hazard-specific appendix of its emergency operations plan. These provisions will

K.1 Identify the official and at least one alternate official authorized to coordinate all of the evacuee support activities, including coordination with Army installation officials to accommodate potential evacuees from the installation. This official should be assigned to the jurisdiction's emergency operating center (EOC) during an emergency.

K.2 Describe the equipment to be used and procedures to be followed in two-way communications between the EOC and each evacuee support facility (reception center and mass care center).

K.3 Specify what evacuee support services will be provided and identify the agency responsible for providing each. Written and signed agreements are required for all services to be provided by agencies, private organizations, or individuals that are not a part of the jurisdiction's governmental structure.

K.4 Identify facilities that will serve as reception centers in the event of a chemical agent release. A reception center should be located along each major evacuation route leading out of the immediate response zone (IRZ). Each reception center should be

a. located outside the PAZ. If no facility meeting the requirements of items b, c, and d of this guideline is available outside the PAZ, consideration should be given to facilities that are inside the PAZ but outside the IRZ;

b. directly accessible from the evacuation route it serves;

c. capable of providing sufficient parking and storage areas (so as not to slow or backup traffic on the evacuation routes);

d. capable of expeditiously processing the population using the designated major evacuation route on which the reception center is located; and

e. clearly depicted on maps provided through the public education program and maps distributed by traffic control personnel.

K.5 Assign responsibility and identify resources for providing the following services at reception centers:

a. medical screening and treatment, incorporating procedures and protocols described in *General Guidelines for Medically Screening Mixed Population Groups Potentially Exposed to Nerve or Vesicant Agents* (Watson, et al. 1992), and including

(1) medical screening of all evacuees arriving at the reception center,

(2) emergency or other first-aid medical treatment of evacuees who require it,

(3) documentation, for each evacuee, of the results of medical screening and all treatment administered, and

(4) emergency transportation to hospitals for evacuees requiring medical treatment beyond the capabilities of the reception center;

b. registration of each evacuee, including, at a minimum,

(1) name,

(2) address, and

(3) family members' names;

c. assessment of the needs of each evacuee, including needs for

(1) medical treatment (physical and emotional),

(2) housing,

(3) family reunification, and

(4) transportation to appropriate support facilities as needed;

d. assignment of evacuees to mass care centers or other facilities that can meet their critical needs.

K.6 Identify at least two facilities, located in contrasting directions from the Army installation, that will be used as mass care centers in the event of a chemical agent release. The total capacity of all mass care centers must equal between 15% and 30% of the population of the entire IRZ plus the most highly populated quarter of the protective action zone (PAZ). The capacity, within this range, to use for planning purposes should be determined based on the findings of "Toward an Explanation of Mass Care Shelter Use in Evacuations" (Mileti, et al. 1991). (This study concludes that the age and socio-economic status of evacuees are the primary determinants of shelter use. A shelter use rate of approximately 15% is likely to be appropriate if the age and income characteristics of the evacuating population resemble those of the general population. Higher shelter use rates are appropriate if the evacuees are older or poorer than the general population.) Each mass care center should

a. be located outside the PAZ, and not situated in low-lying areas where an agent plume may accumulate. If no facility meeting the requirements of items b, c, d, and e of this guideline is available outside the PAZ, consideration should be given to facilities that are inside the PAZ but outside the IRZ.

b. be located within easy access of evacuation routes;

c. be capable of handling between 15% and 30% of the population of the area served by the evacuation routes leading to the center. The findings of Mileti, et al. (1991) should be used to determine the capacity, within this range, to use for planning purposes;

d. provide the following

    (1) at least 40 square feet of sleeping space for each individual in the shelter,

    (2) a constant temperature between 60°F (15.6°C) and 80°F (26.7°C),

    (3) adequate parking for all evacuee vehicles;

e. provide separate areas adequately sized and equipped to provide the entire mass care center population with the following services

    (1) administration,

    (2) food and water storage,

    (3) food preparation,

    (4) medical care (including mental health),

    (5) sanitation facilities,

    (6) living/sleeping areas, and

    (7) decontamination of any mass care center residents whose contamination may have escaped detection at the reception center;

f. be clearly identified on maps provided in the public education program and maps distributed by traffic control personnel.

K.7 Assign responsibility for and identify all resources required to ensure that all mass care facilities are capable of providing the following services. (Written agreements are required for all services to be provided by agencies, organizations, or individuals that are not part of the jurisdiction's governmental structure.)

a. water

    (1) arrangements (e.g., written agreements) must be in-place to ensure the provision of a safe and adequate supply of water for each mass care facility,

    (2) water should meet all applicable drinking water standards and should be adequate to provide at least 5 gallons of water per person per day for the population of the mass care centers;

b. food

(1) written agreements must be executed to ensure the provision of a safe and adequate supply of food (including baby food and formula) for evacuees during their stay in the mass care center,

(2) the supply of food should be adequate to provide 2500 calories per person per day of nutritionally balanced food for the entire population of the mass care centers,

(3) the food supply should allow for special diets (e.g., soft foods, vegetarians, low salt or cholesterol, etc.), and

(4) all needed cooking equipment and eating and drinking utensils for both adults and infants must be provided;

c. sanitary facilities

(1) facilities should be provided for washing, bathing, toileting, diaper disposal, general cleaning (e.g., washing dishes), and for the collecting and disposing of waste and refuse,

(2) sanitation facilities must be capable of handling the maximum number of evacuees each mass care center will support,

(3) a minimum of one toilet should be provided for every 40 occupants of shelter capacity,

(4) chemical or other portable toilets, not dependent on the normal water supply, should be available on the basis of one toilet for every 50 shelter occupants, and

(5) an adequate supply of diapers should be available for all infants housed at the shelter;

d. prior arrangements should be made with local Goodwill, Salvation Army, or similar organizations to obtain clean, used clothing in a wide variety of sizes;

e. medical services

(1) each mass care center must provide space for medical screening and treatment,

(2) each mass care center must be capable of providing emergency medical care including documentation of all medical actions taken,

(3) medical care providers in the mass care center must be familiar with procedures for obtaining transportation to a hospital for any shelter occupants

who require medical treatment that cannot be provided at the mass care center, and

(4) mass care center staff must be knowledgeable of the symptoms of chemical agent poisoning, and at least two staff members must be on duty at all times in each shelter who have been trained in procedures for

- effectively treating and assisting the contaminated individual and
- decontaminating the environment with which the individual was in contact;

f. social services

(1) qualified personnel should provide individual and family counseling to shelter evacuees,

(2) children's recreational activities should be provided, and

(3) communication between evacuees and family members residing in unaffected areas should be facilitated by providing an adequate number of telephones to be used for both incoming and outgoing communications;

g. provide adequate law enforcement and protection for each mass care center;

h. provide adequate fire protection for each mass care center;

i. management

(1) provide adequate space for a shelter manager and associated staff to function 24 hours per day, including separate stations for receiving evacuees, checking decontamination certification, and registering evacuees,

(2) provide a public information officer who, in coordination with the joint information center, will provide updated information, at least once per day, to each mass care center population on the status and scope of the chemical emergency and response efforts, and

(3) develop an accurate record keeping system to track evacuees, assist in locating missing persons and assist in the reunification of family members who become separated during the evacuation period.

K.8 Identify the official(s) authorized to order the activation of evacuee support facilities and describe the procedures to be followed to bring the facilities to operational status in a timely fashion, including

a. assign responsibility for and identify the procedures to be followed for the timely call-up of personnel who will staff evacuee support facilities;

b. identify the agencies responsible for

(1) removing unneeded items from each facility,

(2) transporting needed equipment and supplies to each facility, setting it up, and

(3) posting signs to direct evacuation traffic to the support facilities and to clearly identify each facility.

K.9 Identify the procedures to be followed for expanding the evacuee support services if warranted by the situation. Procedures should address methods to obtain

a. increased shelter capacity (e.g., opening additional mass care centers);

b. additional support staff as needed;

c. additional supplies (e.g., food, water, clothing).

K.10 Address the provision of temporary housing and relocation services in the event that evacuees are displaced from their homes for an extended period. The plan should

a. identify the agency(ies) responsible for providing relocation services;

b. identify resources (e.g., hotels, motels, apartment complexes, trailer parks) that could potentially provide temporary housing furnished with basic life necessities (e.g., beds, bed linens, towels, dishes, cookware, food, and water). (Food and water may be supplied by rations obtained from mass care centers.)

K.11 Describe arrangements, consistent with protective action response plans developed under Appendix E, for handling companion animals brought by evacuees. (Handling of companion animals should not interfere with or delay reception and treatment of human evacuees.) These arrangements should be developed with the involvement of local chapters of humane societies, veterinary associations, and similar organizations and should include identification of

a. local animal care facilities and personnel (e.g., veterinary offices, humane shelters) that agree to provide shelter and shelter services for evacuated animals, including:

(1) treatment of injuries, illness, or other chronic conditions,

(2) administration of antidotal treatment, or

(3) euthanasia of severely injured animals (to be performed only by qualified personnel with a witness present to confirm the necessity of euthanasia);

b. staff responsible for and the procedures to be followed in taking custody of the animals from their owners at reception centers, tagging the animals with the owner's name and address, decontaminating them (if necessary), placing them in a holding area separated from human evacuees, and if necessary, transporting them to a designated sheltering facility;

c. sources of food and water, and any other resources required to sustain the animals while they are sheltered.

K.12 Identify evacuee support issues to be addressed by public education and information materials, including, but not limited to, the following:

a. locations of evacuation routes, reception centers and mass care facilities;

b. procedures to be followed if personal contamination occurs (i.e., what to do, where to go for assistance) (see Appendix L);

c. services that will be provided to evacuees;

d. items that evacuees should take with them during evacuation (e.g., medicines, toilet kits, clothes, etc.);

e. procedures to be used to protect and evacuate day care and school children, including:

(1) where the children will be taken,

(2) who will care for the children, and

(3) the procedures for reunifying parents with their children;

f. methods of communication to be used to locate evacuees, including:

(1) the process to be followed by local non-evacuees to determine the whereabouts of family members,

(2) the process to be followed by evacuees to determine the whereabouts of family members, and

(3) the process to be used by family members outside the emergency area to determine the whereabouts of evacuated family members.

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APPENDIX L

PLANNING GUIDELINES FOR RESPONSE PHASE DECONTAMINATION FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

APPENDIX L

PLANNING GUIDELINES FOR RESPONSE PHASE DECONTAMINATION

Preface

The purpose of this appendix is to provide guidelines on how to plan for decontamination in the event of a significant chemical agent release. As such, it addresses priorities and procedures for decontamination planning. However, these planning guidelines provide neither policy on provision of resources, nor specific identification of the sites or areas that ma require decontamination capability. These policies and guidelines will be determined by the results of ongoing studies regarding liquid agent deposition.

PHASES OF A CHEMICAL RESPONSE

The phases of a chemical event are not distinct. There is no single point in time when all response phase actions terminate and recovery phase actions begin. These actions overlap through much of the event. The following definitions are provided to all planners to assign responsibilities and eliminate duplication in their plans.

Response Phase

The response phase of a chemical agent event covers the initial action in response to an actual or potential chemical agent release. It covers the actions taken to eliminate the source of the release, lifesaving measures for affected personnel, safey measures for potentially affected personnel, and initial security measures taken to preclude the exposure of additional personnel.

The response phase covers the period from the initial recognition of an actual or possible chemical agent event until all of the following actions have been accomplished:

a. The source of the chemical agent event is no longer discharging new chemical agent into the environment. Residual contamination may exist, and the residual contamination may still be a hazard.

b. All personnel requiring medical attention beyond first aid have entered into the medical care system.

c. There is no additional (new) risk to the public. This can be due to the reduction of the hazard, evacuation of the hazard area, or both actions.

d. Security measures are in place to ensure the personnel will not inadvertently enter the hazard area.

Recovery Phase

The recovery phase is the period from the end of the response phase until

a. The affected area can be reoccupied without protective equipment, and there is not present a short- or long-term health risk to humans.

b. Other typical operations, (e.g., agriculture, grazing livestock) can be conducted without any restrictions stemming from the chemical event.

OBJECTIVES

Response Phase Objectives

Lifesaving and minimization of injury to personnel.

Preventing the spread of contamination to key response elements and facilities (e.g., shelters, ambulances and hospitals).

Recovery Phase Objectives

Reduction of hazard to the level where unrestricted use of facilities, lands, and waters are possible without risk to human health.

DECONTAMINATION PRINCIPLES

Decontaminate as soon as possible. This minimizes the effect on personnel and allows for normal operation of equipment/facilities as soon as possible.

Decontaminate only what is necessary. Decontamination requires a significant amount of time and decontamination material. It is essential that limited decontamination assets be focused on high priority operations.

Decontaminate as close to the contaminated area as possible. This will limit the spread of contamination.

DECONTAMINATION PRIORITIES

First priority - People

Second priority - Essential equipment (e.g., ambulances)

Third priority - Other requirements. These will be accomplished during the recovery phase.

The remainder of this standard will focus on decontamination during the response phase. Decontamination during the recovery phase will be addressed in reentry/restoration standards (Appendix M).

DEFINITION AND SCOPE OF DECONTAMINATION

The recommended guidelines in this appendix address two concerns regarding the decontamination of people:

1. **Individuals must be decontaminated as soon as possible.** Available studies (Sidell 1990, Leffingwell 1990; Watson and Munro 1990; Munro et al. 1990; U.S. Dept. of the Army 1989) stress that immediate action to remove or neutralize the agent is necessary to minimize adverse health impacts of exposure. The decontamination of exposed people must begin within a very few minutes after exposure if severe injury or death is to be avoided. The proposed guidelines respond to this requirement by recommending that all people in areas at risk of exposure to agent be provided with information that would enable them to decontaminate themselves and the people around them immediately after an exposure to chemical agent (i.e., self- and buddy-aid).
2. **Individuals must be completely decontaminated.** Thorough decontamination of every potentially contaminated person is necessary both to minimize adverse health effects to that person and to avoid secondary contamination. To assist in ensuring thorough decontamination of all potentially contaminated people, the guidelines call for the establishment of official decontamination stations staffed by trained personnel with ready access to all equipment and materials needed to decontaminate, monitor, and care for exposed individuals.

For the users of these guidelines, "decontamination" is defined in Sect. 10 of this Planning Guidance and in *Chemical Accident or Incident Response and Assistance (CAIRA) Operations* (Dept. of the Army 1991) as "the process of decreasing the amount of chemical agent on any person, object, or area by absorbing, neutalizing, destroying, ventilating, or removing chemical agents" to a safe level. The following guidelines employ this definition to address decontamination for which the primary purpose is to eliminate an immediate threat to human life.

With the exception of decontamination of people, extensive decontamination efforts would not be required for most chemical agent release scenarios. Only liquid forms (including droplet and heavy aerosol forms) of chemical agent pose the risk of significant contamination; vapor is generally not considered a significant source of contamination that poses an immediate threat to human health. Hazardous contamination from a vapor release would likely be limited to materials, such as clothing, which are in contact or very close proximity to the human body and should be best dealth with during personal decontamination. Because agent in liquid form (droplet and aerosol) settles out of the atmosphere relatively quickly, significant contamination would generally be confined to a relatively short distance from the point of release. Off-post contamination presenting a significant risk to the public would most likely occur only in the event of a very large liquid release in the atmosphere-a type of event that is not evident in the planning base.

INTEGRATION OF DECONTAMINATION INTO EMERGENCY PLANNING

Decontamination is closely linked to other aspects of the emergency preparedness program. In particular, a jurisdiction's plans for decontamination must be carefully coordinated with all its other emergency preparedness procedures and especially with the procedures it develops for reentry, monitoring, and medical services. Plans for reentry will prescribe maximum residual agent concentrations that may remain when unrestricted public use of areas and objects can be permitted. The interaction between decontamination and the provision of medical services is particularly important. Medical attention, including decontamination, must be provided to all people who need it; however, procedures must be in place to prevent the spread of contamination to health care providers and facilities (e.g., ambulances and hospitals).

In addition to its interrelationships with other aspects of the CSEPP program, decontamination must respect and integrate the requirements of numerous federal and state laws. These laws could, for example, limit the kinds and quantities of decontamination solutions that could be used in particular area or require containment and treatment of the decontaminant runoff.

The decontamination guidelines presented in this appendix are derived from a variety of sources, including both policy documents and technical studies. Planners involved in CSEPP are encouraged to review some or all of the source documents listed in the references.

Because of the technical nature of some aspects of decontamination planning, a glossary is provided at the end of this appendix. This glossary supplements that found in Sect. 10 of the Planning Guidance.

GUIDELINES

L.1 Each jurisdiction should incorporate a decontamination plan into the hazard-specific appendix of its EOP. The plan should describe the agencies to be responsible, resources to be available, and procedures to be followed to deal with agent-contaminated people and animals that provide critical support to humans. The decontamination plan may be developed separately by the jurisdiction or jointly with the Army installation and other state and local jurisdictions in the IRZ and PAZ.

L.2 The decontamination plan should include a list of priorities for the decontamination or other treatment of people to guide the allocation of resources. The organization(s) responsible for decontamination of each category of people should be identified. The responsible organizations may include departments of the jurisdiction's government, agencies of other levels of government (e.g., the Army or the state government), private contractors, or volunteers. The following list of priorities (in descending order of urgency of decontamination, treatment, or disposal) is offered as a candidate (see Watson, et al. 1992 for detailed guidelines on prioritizing symptomatic people):

a. people who are known or suspected of being contaminated and who require prompt medical attention due to agent exposure or other severe injury,
b. people who are exhibiting signs/symptoms of agent exposure,
c. people who are known to be contaminated but are not exhibiting signs/symptoms and don't urgently require medical attention,
d. people who are suspected of being contaminated but show no signs of agent toxicity,
e. animals that are known or suspected to be contaminated and that provide critical support to humans (e.g., Seeing Eye dogs).

L.3 The decontamination plan should describe the jurisdiction's plans for educating the public on personal **self-decontamination procedures and decontamination of others** (i.e., self- and buddy-decontamination). These plans should apply to all people in areas at risk of exposure to agent. Elements of the program may include

a. a public education program may include (1) instructions on self- and buddy-decontamination. (2) a list of necessary supplies, and (3) guidance on other means of expedient personal decontamination (see L.4).

b. public information releases at the time of the emergency should clearly identify the population segments that should perform self- and boddy-decontamination. These measures should be recommended for all people who are or have been within the chemical agent plume or have come in contact with people, animals, or objects (e.g., vehicles) that have been in plume.

L.4 Self- and buddy-decontamination procedures include

a. removal of eyeglasses and contact lenses. Hands should be decontaminated before removing contacts. Contact lens removers could be used to minimize the risk of cross-contamination. If the wearer cannot evacuate safely without the use of eyeglasses, eyeglasses may be expediently decontaminated by soaking in undiluted household bleach for 5 minutes and rinsing thoroughly with plain water. Eyeglasses suspected of being contaminated and not required for safe evacuation should be placed in a plastic bag and carried to the decontaminated station. All contact lenses suspected of being contaminated should be placed in a plastic bag and carried to the decontamination station,

b. removal of all external extraneous items from contact with the body. Such items include hearing aids, artificial limbs, jewelry, watches, toupees, and wigs,

c. flushing the eyes with large amounts of lukewarm water,

d. gently washing the face and hair with soap and lukewarm water, followed by a thorough rinse with lukewarm water,

e. decontaminating other body surfaces likely to have been contaminated using one of the following measures:

(1) the most desirable decontamination would use undiluted household bleach followed by a clear-water rinse. Procedures include blotting (not swabbing or wiping) with a cloth wetted in undiluted household bleach followed by washing with lukewarm soapy water and rinsing with clear lukewarm water,

(2) in the absence of bleach, a good expedient method would be washing with copious amounts of lukewarm soapy water and rinsing with clear lukewarm water,

f. changing into uncontaminated clothing. Contaminated clothing that would normally be removed over the head (e.g., undershirts) should be cut off.

g. instructions to proceed to the nearest decontamination station.

L.5 The decontamination plan should provide for a personnel **decontamination station** to be established at each reception center and at each host hospital identified in the evacuation plan and at other locations as needed. Personnel at the decontamination station should impound and secure potentially contaminated vehicles brought by evacuees and thoroughly decontaminate potentially contaminated evacuees and injured persons. Each decontamination station should

a. be located where adequate supplies of water and electricity are available or can be made available;

b. be staffed by personnel who are trained, equipped, and clothed to decontaminate potentially contaminated people while incurring minimal risk of self-contamination. Protective clothing and equipment should be approved for use with unitary chemical warfare agent (see Appendix H);

c. be staffed and equipped to decontaminate the maximum number of contaminated individuals expected to arrive at the decontamination station;

d. be capable of being staffed quickly after the public has been alterted and notified of the emergency. The inidial staff should, at a minimum, be sufficient to detain and provide expedient decontamination to potentially contaminated individuals until the decontamination station can achieve full operability;

e. have evaluation procedures for deciding which individuals require decontamination as well as procedures for immediately decontaminating people (including infants and individuals who are injured, handicapped, or elderly) likely to have been contaminated by chemical agent. Persons who should be decontaminated at the station include, in order of priority,

   (1) all people who exhibit any signs or symptoms of exposure to mustard or nerve agent,

   (2) all people who may have been exposed to mustard or nerve agent, regardless of whether they exhibit signs or symptoms of exposure. People designated as possibly exposed will be identified through a brief interview by decontamination station personnel and will include all people who

- evacuated from an area within the plume,
- traveled through any portion of the plume area while evacuating, or
- have come in contact with any people, animals, or objects that had been located in or traveled through the plume and had not been decontaminated;

(3) all people whose contamination status cannot be clearly determined by interview or other available means.

f. have the capability to perform decontamination concurrently with life-saving first aid for people suffering from agent exposure or other injury;

g. be capable of screening people who have been decontaminated as well as other evacuees for symptoms of chemical agent toxicity;

h. have operating procedures for handling the personal property of potentially contaminated persons. Potentially contaminated personal property will be identified as to ownership and impounded (for later disposition) at a secure location separate from uncontaminated property;

i. be designed to contain and collect all used decontamination solutions and rinse water for later disposition.

L.6 Each decontamination station should be designed, equipped, and staffed to provide a sequence of decontamination functions for all potentially contaminated individuals. Most people should be able to proceed through the decontamination sequence on their own with minimal assistance (other than oral instructions) from attendants. However, those who are impaired by agent exposure, injury, poor health, or other handicap may require the assistance of an attendant or special equipment (e.g., mesh stretcher for the injured, boatswain's chair for wheelchair users). One or more mobile decontamination units may be incorporated into the decontaminated station for the purpose of decontaminiating people, provided that the mobile units have been shown to be functionally equivalent to fixed facilities in performing the required decontamination actions within the available time. The decontamination station should provide the following sequence of functions:

a. if sufficient resources are available, potentially contaminated individuals should be separated by gender. Males and females should enter separate decontamination facilities that provide visual screening but do not restrict the flow of fresh air (although young children should be permitted to accompany a parent of either sex). If available resources are not adequate to provide separate facilities for each gender, decontamination should be performed according to the priorities stated in guideline L.5e, without regard to gender;

b. each individual should relinquish personal property (e.g., billfold and external extraneous items) and remove clothing. Any clothing (e.g., undershirts) that would normally be removed over the head should be cut off. Attendants wearing suitable chemical protective clothing should remove the personal property, place it in an agent-impermeable bag, seal the bag, and label it with the individual's name and any other pertinent identification (e.g., social security number), and place the bag in a secure location for later disposition;

c. potentially contaminated eyeglasses and contact lenses should be removed. To reduce unnecessary disposal of corrective lenses that have not been contaminated, the wearer should be interviewed or otherwise evaluated to determine if he/she has been in an agent-contaminated area. Eyeglasses and contact lenses that are determined to be potentially contaminated should be removed and handled according to the following procedures:

(1) hands should be decontaminated by blotting with undiluted household bleach then thoroughly rinsed with water before removing contact lenses. Contact lens removers could be used to minimize the risk of cross-contamination.

(2) contact lenses should be collected for later disposal in an environmentally sound manner (no attempt should be made to decontaminate contact lenses),

(3) eyeglasses in metal frames may be decontaminated by soaking for 5 minutes in undiluted household bleach followed by thorough rinsing, and

(4) eyeglasses in plastic or composite frames should be placed in an agent-impermeable bag labeled with the individual's name and an identification number for later disposition when and if resources can be made available without impeding the decontamination of people. (Suggested disposition: Some eyeglass wearers would be significantly impaired without corrective lenses. Thus, we recommend special treatment for eyeglasses in porous frames such as plastic or plastic composite. We suggest that, if time and resources permit, the lenses be removed from such frames, decontaminated by soaking for 5 minutes in undiluted household bleach rinsing with plain water, remounted in uncontaminated frames, and returned to their owners);

d. the individual should then blot skin areas (excluding the face) that may have been contaminated with decontamination solution (e.g., undiluted household bleach);

e. the individual should then step under a shower (lukewarm water recommended) and, following the instructions of an attendant, first flush the face and eyes with copious amounts of water, then wash the face and remainder of the body with soapy water and rinse;

f. following the shower, attendants should check the individual for any signs or symptoms of agent exposure and follow medical screening guidelines for treatment. Additional decontamination may be necessary. A special effort should be made to decontaminate suspected mustard victims because of the extended latent period between exposure and the appearance of effects. State and local decontamination plans should incorporate personnel monitoring guidelines;

g. following confirmation of successful decontamination, the individual should proceed to an area designated for first aid and re-dress. Attendants should monitor or treat any injuries and provide replacement clothing (e.g., disposable paper garments and booties or clean used clothing obtained from Goodwill, Salvations Army, etc.);

h. the individual should then be directed to a holding area for observation of any agent exposure symptoms. Decontaminated individuals should generally be kept separate from uncontaminated individuals; however, in some cases it may be prudent to allow uncontaminated individuals to join decontaminated dependents;

i. each individual to have undergone decontamination at the station should be marked (e.g., by a casualty tag, hospital bracelet, or by writing directly on the chest or forehead with an indelible marker) with an indication of the specific treatment that was applied to the individual and the time at which decontamination was completed;

j. each individual processed through the station should be provided with a certificate indicating

    (1) a description of the decontamination actions taken,
    (2) the time decontamination was completed,
    (3) the time the individual was released from the observation area, and
    (4) a description of any medical treatment administered in conjunction with decontamination.

Decontamination station personnel should also retain a copy of the certificate.

L.7 Emergency medical personnel should be trained, equipped, and clothed to safely decontaminate any injured person suspected of being contaminated before placing the person in the ambulance for transport to a care facility. Protective clothing and equipment should be approved for use with chemical warfare agents (see Appendix H). Procedures for dealing with injured individuals who are potentially contaminated should incorporate standard medical procedures for the injury involved and should also include

a. removing the outer clothing of the injured person by cutting the clothing and lifting the person free of the clothing onto a wire stretcher or a stretcher with a non-absorbant surface (e.g., a disposable background with drainage holes),

b. removing remaining clothing by cutting it and pulling it from underneath the person,

c. removing any potentially contaminated bandage material, exercising extreme care when removing bandages that are used to control hemorrhage,

d. removing eyeglasses and contact lenses (contact lens removers could be used to minimize the risk of cross-contamination) as well as any other external extraneous items,

e. blotting (not swabbing or wiping) potentially contaminated body surfaces with copious amounts of 5% bleach solution (e.g., undiluted household bleach) or with reagents from the Army's M258A1 or M291 skin decontamination kit and washing the face and eyes with clear water.

f. decontaminating the chemical protective clothing of the care provider, and

g. applying fresh bandages where necessary to control bleeding and placing the injured person in the ambulance.

L.8 Because companion animals accompanying evacuees represent a possible pathway for human exposure to chemical agents, emergency response plans should inlcude provisions for minimizing the cross-contamination hazards presented by companion animals. Planning guidance for decontamination of companion animals will be presented in Appendix M. Additional resource material is available in Watson and Munro (1990).

L.9 The decontamination plan should identify the officials and agencies responsible for establishing and implementing a strict quarantine of all potentially contaminated materials and property that will not be immediately decontaminated. The strict quarantine should prohibit entry by the unprotected public until responsible officials determine through monitoring and sampling that unrestricted reentry and use by the public is safe. Criteria for making this determination and methods to deal with the types of potentially contaminated materials and property listed above are specified in Appendix M.

L.10 The decontamination plan should describe how the jurisdiction will obtain sufficient quantities of non-contaminated water for decontamination activities. Massive amounts of water may be required if the contaminated area or number of contaminated people is sizable. The water may come from any source.

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GLOSSARY

contamination-chemical agent (typically in liquid form; including droplets and/or aerosols) deposited on skin, clothing, or any other material that constitutes a source of potential agent exposure until it is neutralized, removed, or degrades naturally. (Compare to Exposure.)

dose-the quantity of agent absorbed by the body. Often expressed in mass units of agent per body weight or surface area exposed (e.g., mg/kg or mg/m^2). (Compare to Exposure.)

exposure-contact by a person or animal with chemical agent in either liquid or vapor from through inhalation, contact with eyes or the skin, or ingestion of contaminated food or water. Exposure to agent in liquid form (including droplet and/or aerosol form) can result in contamination. (Compare to Contamination.)

household bleach-off-the-shelf chlorine bleach available for domestic purposes. Contains 5% NaOCl (sodium hypochlorite) in water. A strong oxidant with a high (i.e., alkaline) pH.

liquid agent-any chemical agent in undiluted form; includes droplets and heavy aerosols. Only VX or the vesicant agents are likely to be encountered in liquid form.

reentry-entry of persons to an affected following a hazardous materials incident. Reentry can be restricted (entry of monitoring crews) or unrestricted (unlimited public access).

APPENDIX M

PLANNING GUIDELINES FOR RECOVERY PHASE ACTIVITIES FOR THE CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM

The following guidelines are under review by DA and FEMA. Although they have not yet been adopted by CSEPP, they represent the latest thinking regarding planning for recovery phase activities.

APPENDIX M

PLANNING GUIDELINES FOR
RECOVERY PHASE ACTIVITIES

Preface

The potential for off-post agent contamination during any stage of agent storage and disposal is considered remote. Nevertheless, prudence dictates, and the public deserves, thorough contingency planning. Such advance planning is particularly appropriate for the persistent "terrain denial" agents sulfur mustard and VX. These guidelines have been developed to provide experience-based guidance for assisting community and installation planners in developing recovery phase plans specific to local needs.

This appendix provides guidelines on how to plan

(1) for decontamination in the post-acute phase of a chemical warfare agent emergency as well as

(2) for reentry to, and restoration activities within, agent-suspect or agent-confirmed areas in the event of a significant chemical warfare agent release.

This appendix addresses priorities and procedures for planning regarding these issues. Both restricted reentry (caretaker or monitoring teams with specific missions and appropriate protective equipment) and unrestricted reentry (unlimited access by the general public) are included.

This appendix is not concerned with the specification of agent control limits. Separate efforts[1]

1

See Friel 1993; Kerr 1992; Kistner et al. 1992; Opresko et al., in review; Reutter et al. 1994; US DHHS 1990; Watson et al. 1992a, b.

of the CSEPP are underway to define these limits, which will specify the concentrations of chemical agent that may remain in or on various environmental media without presenting a significant risk to human health. Effective planning for recovery phase decontamination and for reentry and restoration can take place while these control limits are being developed. In the absence of agent control limits, emergency plans can be developed to

- describe the actions that will be taken if a chemical warfare agent is confirmed in soil, water, or other media at a control limit (action level concentration),
- describe the actions that will be taken if the field data are unclear on the level of chemical agent contamination or indicate that chemical agent is present at a level marginally below a control limit,
- identify the persons responsible for making decontamination and reentry decisions as well as people and agencies available to provide technical advice to the decision makers,
- identify, by position, the persons responsible for performing decontamination, monitoring, and caretaking tasks in the restricted areas and prescribe the procedures to be followed to accomplish these tasks,
- identify priorities for allocating decontamination resources and for making reentry/restoration decisions,
- prescribe the type of background data that needs to be gathered for use in assessing reentry and restoration issues,
- describe the processes that will be used to estimate the scope and degree of the hazard, and assess public health and environmental impacts,
- lay out a strategy for sampling in the restricted area and define criteria for evaluating the sampling results to make reentry decisions.

The planning standards in this appendix provide guidance for this planning process. As agent-control limits become available, they can be incorporated into the emergency plans that have already been developed.

These guidelines apply to recovery-phase planning for both on-post and off-post areas.

PHASES OF A CHEMICAL RESPONSE

The phases of a chemical event are not distinct. There is no single point in time when all response phase actions terminate and recovery phase actions begin. These phases overlap through much of the event. The following definitions are provided to all planners to assign responsibilities and eliminate duplication in their plans.

Response Phase

The response phase of a chemical agent event covers the initial action in response to an actual or potential chemical agent release. It covers the actions taken to eliminate the source of the release, lifesaving measures for affected personnel, safety measures for potentially affected personnel, and initial security measures taken to preclude the exposure of additional personnel.

The objectives of the response phase are terminating the release of chemical agent, lifesaving and minimization of injury to personnel, and preventing the spread of contamination to key response elements and facilities (e.g., shelters, ambulances and hospitals). All actions aimed at terminating the release will be performed by Army personnel and contractors.

The response phase covers the period from the initial recognition of an actual or possible chemical agent event until all of the following actions have been accomplished:

a. The source of the chemical agent event is no longer discharging new chemical agent into the environment. Residual contamination may exist, and may still be a hazard.

b. All personnel requiring medical attention other than first aid have entered into the medical care system.

c. There is no additional (new) risk to the public. This can be due to the reduction of the hazard, evacuation of the hazard area, or both actions.

d. Security measures are in place to ensure that personnel will not inadvertently enter the hazard area.

Recovery Phase

The recovery phase is the period from the end of the response phase until

a. The affected area has been re-occupied without protective equipment, and there is no short- or long-term health risk to humans.

b. Other typical operations, (e.g., agriculture, grazing livestock) have resumed without any restrictions stemming from the chemical event.

The principal objective of the recovery phase is reduction of hazard to the level where unrestricted access and use of facilities, lands, and waters are possible without risk to human health. Hazard reduction should occur in a phased manner, with restricted access and use preceding unrestricted access and use. Secondary objectives include measures (e.g., social services, claims processing) needed to support the public until resumption of all normal activities in the area.

The planning guidelines of Appendix M primarily apply to activities that take place during the recovery phase. However, decisions made during the response phase (e.g., abandoning companion animals and livestock during evacuation) may create adverse recovery phase situations (e.g., cross-contamination by stray animals moving through and exiting contaminated areas in search of water and food) that could be eliminated with advance planning. Thus, there is overlap between Appendix M and other planning guidance. Figure 1 depicts, in approximate chronological order, the critical actions that may need to be undertaken during the recovery phase. For most of these actions, the figure identifies the corresponding guideline(s) from this appendix.

Integration of Recovery Phase Decontamination, Reentry and Restoration into Emergency Planning

Recovery phase decontamination, as well as reentry and restoration planning are closely linked to other aspects of the emergency preparedness program. In particular, a jurisdiction's plans for decontamination, reentry and restoration should be carefully coordinated with all its other

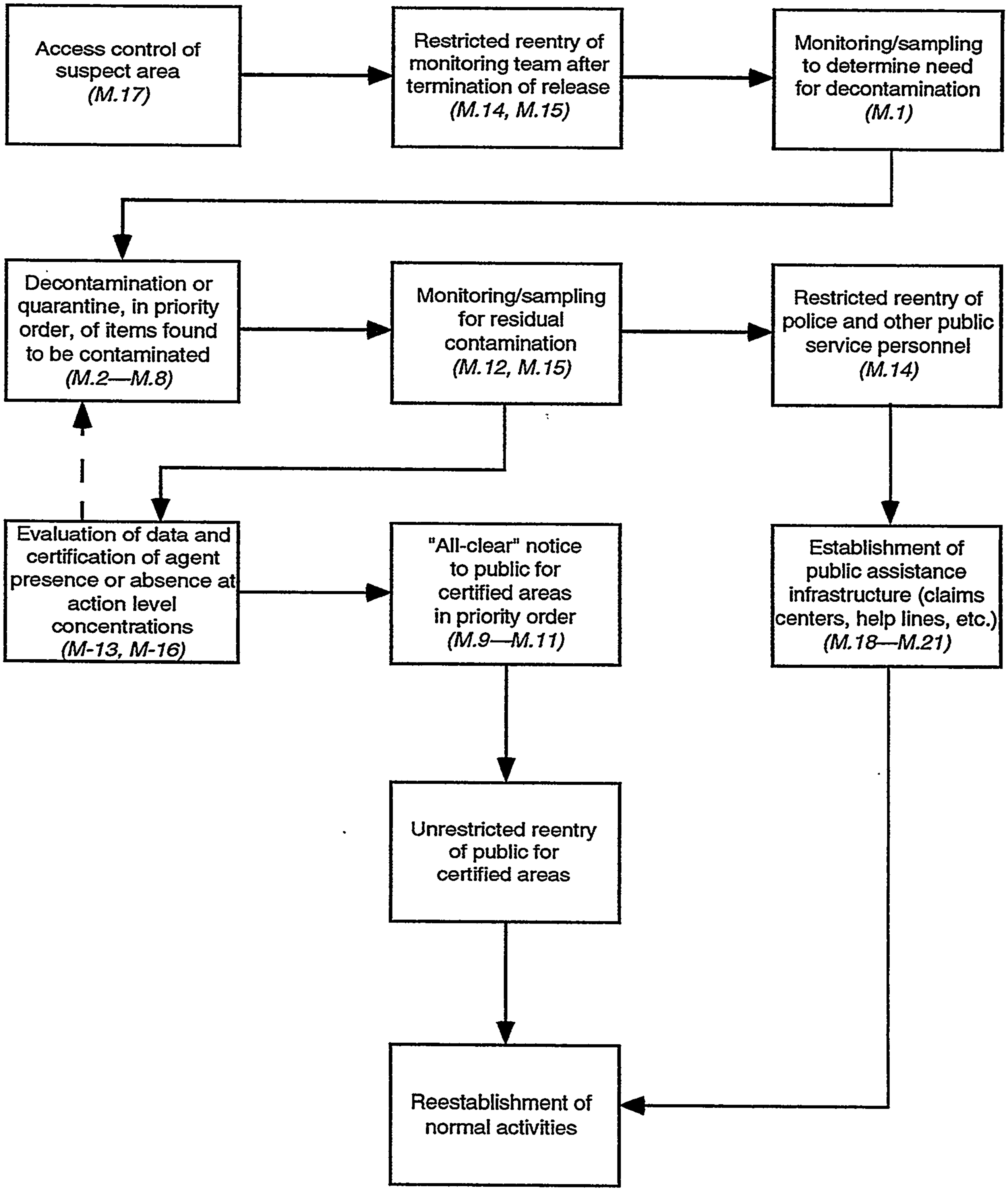

Fig. 1. Suggested flow of recovery-phase activities for CSEPP. (Italicized material refers to pertinent guideline numbers in Appendix M.)

emergency preparedness procedures, especially those for monitoring, medical services, emergency worker operations, and evacuee support.

For any **monitoring** for agents or toxic breakdown products conducted during the recovery phase, quality control protocols should be followed to assure a sound basis for declaring areas as suitable or unsuitable for re-occupation. Guidelines for any **medical services** will need to consider sources of cross-contamination in the period after the response phase is terminated, e.g., when human remains are being handled. It will also be important to consider medical service needs such as communicable disease control if population relocation becomes long-term. To assure the safety and health of any recovery-phase workers with specific non-rescue missions, provisions on protective equipment, stay times, etc., from **emergency worker operations** should also apply. Any social, medical and relocation services planning (if the relocation period is relatively long) is an issue common to both reentry and restoration and **evacuee support** planning.

In addition to their interrelationships with other aspects of the CSEPP program, recovery-phase decontamination, reentry and restoration must respect and integrate the requirements of numerous federal and state laws. For example, such laws often require specific procedures to be carried out in the event of a fatality—forensic investigation of remains or death scene, pronouncement of death and signing of death certificates, etc. In addition, different states have different requirements for death-scene investigation that should be identified on a site-specific basis.

The guidelines presented in this appendix are derived from a variety of sources. Planners involved in CSEPP are encouraged to review some or all of the source documents listed in the references.

A glossary and reference section are provided at the end of this appendix. This glossary supplements that found in Sect. 10 of the Planning Guidance.

I. RECOVERY PHASE DECONTAMINATION

Definition and Scope of Recovery Phase Decontamination

For users of these standards, "decontamination" is defined in Sect. 10 of this Planning Guidance and in *Chemical Accident or Incident Response and Assistance (CAIRA) Operations* (DA PAM 50-6; Dept. of the Army 1991) as "the process of decreasing the amount of chemical agent on any person, object, or area by absorbing, neutralizing, destroying, ventilating, or removing chemical agents". Appendix L ("Planning Guidelines for Response Phase Decontamination") employs this definition to address decontamination for which the primary purpose is to eliminate an immediate threat to human life. The following standards employ this definition to eliminate less immediate threats to human life that become significant during the period of time after the acute phase of emergency response is largely completed.

Principles of Recovery Phase Decontamination

Decontaminate as soon as possible. This minimizes the effect on personnel and allows for normal operation of equipment/facilities as soon as possible.

Decontaminate only what is necessary. Decontamination requires a significant amount of time and decontamination material. It is essential that limited decontamination assets be focused on high priority operations and that environmental decontamination be confined to areas where the presence of chemical agent contamination has been confirmed using recognized agent-detection methods (see U.S. Department of the Army Field Manual 3-5 [FM 3-5] *NBC Decontamination;* DA PAM 50-6 *Chemical Accident or Incident Response and Assistance* [CAIRA] *Operations*; Army Regulation 385-61 [AR 385-61] *Army Chemical Agent Safety Program*; DA PAM 385-61, *Toxic Chemical Agent Safety Standards*; and Ember 1994).

Perform recovery phase decontamination within or as close as possible to the contaminated area. This will limit the spread of contamination.

Weathering as a decontamination procedure for vegetation and other non-critical items with large surface areas (structures, roadways, etc.) has much merit in that it is simple and requires no special equipment to implement. However, it is neither precise nor fast, and would require use of rigidly enforced quarantine restraints to prevent the spread of agent contamination.

The issue of how "clean" agent-contaminated material must be before it can be released to the public is under development. Approved methods for decontaminating items for release to the general public are described in DA (1987). Alternative, monitoring, levels for offgas agent air concentrations are documented in Kerr (1992) and DHHS (1987). Additional analyses of these methods are available in AEHA (1994 a, b). Other approaches are currently under consideration by the U.S. Army Environmental Center (Opresko et al., in review).

Recovery Phase Decontamination Priorities

State and local planners should develop priorities to guide the use of decontamination resources during the recovery phase. The following list of decontamination priorities was approved by the (former) CSEPP Reentry/Restoration Subcommittee as a recommendation to assist state and local planners. This list recommends that highest priority be assigned to decontamination activities (e.g., decontamination of living animals) that will prevent the occurrence of additional damage. High priority should also be given to decontaminating human remains because of their cultural and religious importance to the affected families and communities. It is recommended that somewhat lower priority be assigned to decontamination of drinking water because residents of the contaminated area will rely on other sources of drinking water until they are permitted to return to the restricted area, and because of the extremely low probability that drinking water supplies will become contaminated. Decontamination attention should then be focused on other items that are particularly needed by their owners.

First Priority: animals.

Second Priority: human remains.

Third Priority: drinking water.

Fourth Priority: personal property, the absence of which creates hardship for the owner (e.g., automobiles used by evacuees).

After the above priority items have been decontaminated, resources may be allocated to decontaminate real estate and terrain, incidental personal property, foodstuffs, livestock fodder and feed, and crops. Additional background on this priority ranking is available in AEHA (1994 a and 1994 b).

Decontamination during the response phase is addressed in Appendix L, "Planning Guidelines for Response Phase Decontamination."

Planning Guidelines for Recovery Phase Decontamination

M.1 Each jurisdiction will incorporate a **recovery-phase decontamination plan** into the hazard-specific appendix of its EOP. The plan will describe the agencies to be responsible, resources to be available, and procedures to be followed to deal with agent-contaminated animals, human remains, drinking water, personal and real property, terrain, foodstuffs, crops, livestock fodder and feed and any other pertinent issues of local significance. The plan will describe the process that will be followed to employ the results of recognized agent-detection methods (see U.S. Department of the Army Field Manual 3-5 [FM 3-5] *NBC Decontamination*; DA PAM 50-6 *Chemical Accident or Incident Response and Assistance* [CAIRA] *Operations*; Army Regulation 385-61 [AR 385-61] *Army Chemical Agent Safety Program*; DA-PAM 385-61, *Toxic Chemical Agent Safety Standards*; and Ember 1994) to define the area where decontamination actions will have to be taken.

The recovery-phase decontamination plan should be developed jointly with the Army installation and other state and local jurisdictions in the IRZ and PAZ.

M.2 The recovery-phase decontamination plan will include a **list of priorities** for decontamination or other treatment to guide the allocation of resources. The organization(s) responsible for decontamination of each category will be identified. The responsible organizations may include departments of the jurisdiction's government, agencies of other levels of government (e.g., the Army or the state government), private contractors, or volunteers. The following list of priorities (in descending order of urgency of decontamination, treatment, or disposal) is offered as a candidate (see Watson and Munro 1990 for detailed guidelines on prioritizing disposition of symptomatic companion animals and livestock):

a. livestock and companion animals that are known or suspected to be contaminated, are deemed likely to recover as a result of prompt decontamination and veterinary treatment, and are sufficiently valuable to justify the expenditure of resources required for decontamination,

b. human remains,

c. drinking water,

d. personal property, the absence of which creates hardship for the owner (e.g., automobiles used by evacuees),

e. real estate and terrain

f. incidental personal property

g. food, and

h. livestock fodder and feed, and crops.

M.3 The recovery-phase decontamination plan will describe a program for decontaminating **livestock and companion animals**. The program will

a. be developed with the involvement of local stock growers, veterinarians, humane societies, the state department of agriculture, and the USDA Cooperative Extension Service. (These authorities should be requested to assist in developing procedures to prevent or reduce animal exposure as well as post-incident treatment);

b. establish a program to appropriately prepare owners of livestock and companion animals and others who need or wish to learn to decontaminate animals. The program should encompass

(1) identification of individuals who can be members of rapidly mobilized "caretaker teams;"

(2) equipment and procedures to avoid self-contamination while getting to and treating animals (including chemical protective clothing and equipment);

(3) triage decision protocols to decide where to focus decontamination efforts. These protocols should be based on the guidance in the *Recovery Phase Sourcebook* (AEHA 1994b) and *Recovery Phase Workbook* (AEHA 1994a). The plan should recognize that, under some conditions, decontamination of some or all animals may be impractical. The plan should identify the individual(s) authorized to decide whether or not to undertake decontamination, reference any necessary written agreements (MOUs) providing this authority, list protocols to be used in making this determination, and identify resources (e.g., local and state veterinarians, representative of state agriculture department or USDA) that should be contacted to provide advice in the decisionmaking. Animals that should be decontaminated include, in order of priority,

- those exhibiting signs/symptoms of agent exposure,
- those known to be contaminated but exhibiting no signs/symptoms, and
- those suspected of being contaminated but exhibiting no signs of agent toxicity;

(4) procedures for surface decontamination of livestock and companion animals as quickly as possible after exposure, including removing the animal from the source of contamination, washing with bleach solution or other alkaline material (e.g., ammonia, etc.) and thorough rinsing with uncontaminated water. More detailed guidance is available in the *Recovery Phase Sourcebook* (AEHA 1994b) and *Recovery Phase Workbook* (AEHA 1994a).

(5) procedures to be followed in decontaminating livestock and companion animals which have ingested agent. These procedures should be based on guidance in Osweiler et al. 1985 and the *Recovery Phase Sourcebook* (AEHA 1994b) and *Recovery Phase Workbook* (AEHA 1994a);

(6) procedures to ensure that all used decontamination solutions and rinse water runoff are collected for later disposition (e.g., through use of stock tanks or children's plastic wading pools or the like that would be decontaminated or properly disposed of afterwards); and

(7) as a practical matter, procedures to feed, water and otherwise tend to livestock and companion animals.

Additional guidance is provided in an animal relief bulletin prepared by the American Humane Association (1990), Watson and Munro (1990), and AEHA (1994 a,b).

M.4 The recovery-phase decontamination plan will provide for the handling of any **human remains** resulting from the chemical agent release.

a. Plans for the handling and decontamination of human remains must address the following issues:

(1) retrieval of remains and personal effects (all remains and personal effects found in the contaminated area will be assumed to be contaminated);

(2) decontamination of remains by washing (for limited contamination) or soaking (for gross contamination) for at least 15 minutes in a 5% solution of calcium hypochlorite, household bleach, HTH, or super-tropical bleach, followed by thorough rinsing with clear water (all decontamination solutions and runoff must be collected for later disposition);

(3) monitoring of the decontaminated remains and certification that they have no detectable agent greater than the allowable atmospheric exposure limit (eight-hour, time-weighted- average) for workers (see 53 FR 8504). Decontamination should be repeated if residual contamination exceeds the allowable limit;

(4) preparation of the remains for transfer by placing them in an approved human remains pouch containing one gallon of 5% hypochlorite solution (e.g., household bleach). Remains should be refrigerated if transfer will be delayed;

(5) provision of approved chemical protective clothing, equipment, and procedures for retrieval and decontamination personnel; and

(6) availability of crisis intervention teams to provide religious and psychological counseling for any personnel handling human remains. (Consideration should also be given to making these teams available to families of the deceased.)

b. Installation, local and/or state collaboration will be required. Local and state decontamination plans should include provisions and assign personnel and resources to ensure that the removal and decontamination of remains is consistent with all applicable state and local laws, regulations, policies, and procedures (e.g., those regarding pronouncement of death, signing of death certificates, identification of remains, and forensic investigation of the remains or of the site of death) (see Watson and Munro 1990; Elam 1991; Metz et al. 1988, 1990; EAI Corp. 1989; and AEHA 1994 a, b for details and guidance). Note that the USEPA excludes human corpses, remains and personal effects (from corpses) from any medical waste tracking and/or disposal requirements. Local requirements may differ or be more stringent (Lowrence 1990; 40 CFR 259.30 (b)(1)(u) and 40 CFR 261.4 (b)(1)).

M.5 The recovery-phase decontamination plan will include provisions for decontaminating all contaminated **drinking water** supplies. (Planners should note that it is practically impossible for groundwater sources to be contaminated by a chemical agent release. Surface water sources are unlikely to be significantly contaminated because of the amount of dilution provided by reservoirs and rivers normally used as drinking water supplies and because of the relative insolubility of persistent chemical agents.) These provisions will include:

a. procedures to be followed in the field to determine if public or private sources of drinking water are contaminated with chemical agent or with toxic hydrolysis products of agent VX. Field water monitoring procedures and equipment are currently available for determining "battlefield concentrations" of agent. Water supplies will be certified safe for human consumption if the concentration of agent or VX hydrolysate is below agent control limits for public drinking water (See U.S. Dept. of Health and Human Services 1990, Watson et al. 1992a and AEHA 1994 b);

b. procedures to be enacted at the affected water treatment plants to decontaminate affected public drinking water supplies. Special procedures will likely be required for water supplies contaminated with agent VX. For water supplies contaminated with agent GB or mustard agent, the procedures should

   (1) assign responsibility for decontamination of drinking water to trained water purification personnel,

   (2) describe the decontamination protocol to be followed, including treatment of raw water with excess chlorine and charcoal filtration of finish water,

   (3) specify testing protocols to ensure that the treated water is below the agent control limits for drinking water prescribed,

   (4) specify measures, including the provision of approved chemical protective clothing and equipment, to be taken to protect treatment plant personnel from exposure to agent (e.g., from possible off-gassing of agent during aeration); and

   (5) arrangements for providing drinking water from alternative, uncontaminated sources until local treatment plants and supplies have been certified acceptable for use.

c. methods to be used to decontaminate private supplies of drinking water.

M.6 The recovery-phase decontamination plan will identify the officials and agencies responsible for establishing, implementing and maintaining a **strict quarantine** of all **agent-contaminated real and personal property and the general environment** that was not immediately decontaminated during the response phase (see Appendix L). All property within the designated contaminated areas as well as any contaminated property carried out of the area by evacuees or found on fatalities shall be addressed. The strict area quarantine will prohibit entry by the unprotected public until responsible officials determine through monitoring and sampling that unrestricted reentry and use by the public is acceptable. (For discussion of developmental monitoring levels, see Kerr 1992, DHHS 1987, AEHA 1994 a, b, and Opresko et al., in review).

M.7 The recovery-phase decontamination plan will include provisions for the testing and disposition of potentially contaminated **food**. The provisions will include

a. identification of the jurisdiction's areas of responsibility for protection of the public food supply;

b. identification of the jurisdiction's authorities for enforcement of protection action decisions;

c. identification of all resources available to the jurisdiction for implementing decisions and procedures;

d. identification, by positions, of all individuals with decision making authority for the jurisdiction with regard to food safety;

e. description of procedures to be followed by the jurisdiction in carrying out the responsibilities previously identified;

f. identification of all interfaces with other jurisdictions, agencies, and organizations having authority or responsibility for food safety and supply. On the federal level, interfaces should be identified for the Food and Drug Administration (U.S. DHHS) and the U.S. Department of Agriculture (USDA);

g. identification of those positions authorized to provide information to the public on matters of safety;

h. description of how public information will be coordinated with other responsible organizations before issuance or distribution with consideration of how the process will occur when a JIC is operational and when it is not;

i. identification of possible locations for the disposal of contaminated and condemned food;

j. description of safe handling procedures for persons involved in the handling or disposing of contaminated food that is under the authority of the jurisdiction.

k. methods to be used and resources required to expeditiously quarantine all food in private dwellings, grocery stores, or other locations in agent-suspect or -contaminated areas. The food quarantine is intended to restrict public access and allow time for determining the actual extent of contamination;

l. any procedures to be followed and resources required to classify all food within the hazard areas designated by health authorities (i.e., the areas determined by monitoring to have been exposed to liquid agent or to agent vapors in concentrations greater than the 8-hour, time-weighted average permitted for human workers; see 53 FR 8504). Recommended classification schemes for food are presented in AEHA (1994 a, b);

m. any procedures for gathering, destroying, or decontaminating all necessary food. Methods to be used should not contribute to further spread of agent contamination. One destruction method could be controlled incineration at elevated temperatures.

n. Decontamination methods for consideration are:

   (1) weathering (aerating),

   (2) washing in hot, soapy water, rinsing, and aerating (all used water to be collected for later disposition), or

   (3) washing in undiluted household bleach or in a 2% bicarbonate solution and rinsing (all used decontamination solution and rinse water to be collected for later disposition).

   Note that the regulatory definition of hazardous waste differs from state-to-state. Thus, the appropriate disposition of any used decontamination solutions or rinse water should be determined in accordance with state requirements, and coordinated with the U.S. EPA. If a determination has not been made prior to the generation of spent decontamination solutions, the solutions should be collected, and not allowed to enter surface or groundwaters.

M.8 The recovery-phase decontamination plan will address the disposition of **fodder, feed and crops** within the contaminated area. Because adequate supplies of human and animal food can be imported from other areas of the nation or from available food stockpiles, no crops, fodder or feed within the designated contaminated area should be reclaimed for use as food. To attempt to do so would unnecessarily expose additional people to the risk of exposure to chemical agent. The plan's provisions for dealing with crops and forage within the contaminated area will

a. identify methods to be used and assign required resources to enforce an immediate (and possibly sustained) quarantine of all harvested and unharvested crops and forage in the designated contaminated area to prevent the entry of humans and livestock into the area;

b. describe the methods to be used and assign required resources to dispose of the crops and forage within the designated contaminated area. The methods must conform to all state regulations and requirements. (Open burning is unacceptable because of the high probability of vapor inhalation and downwind transport of agent.)

(1) Methods that may be considered to dispose of contaminated crops and forage include

- weathering in-place until residual agent degrades to acceptable levels, then plowing under,
- aerial applications of excess quantities of agricultural lime,
- controlled burning at elevated temperatures, and
- burial in open pits lined with excess lime;

(2) The plan should identify possible locations for the disposal of any contaminated and condemned agricultural resources that are not to be decontaminated in-place;

(3) Procedures for disposing of crops and forage should ensure that the public is not exposed to agent during harvesting, loading, transporting, unloading, and destruction of the contaminated produce. Safe handling procedures should be described for workers involved in handling or disposing of contaminated agricultural resources that are under the authority of the jurisdiction. Necessary chemical protective clothing, equipment, and safety precautions must be provided so that workers are not exposed to agent exceeding workplace inhalation exposure standards (8-hour time-weighted average; see 53 FR 8504).

II. REENTRY AND RESTORATION

Reentry

Reentry is the entry of persons into an affected (i.e., agent-contaminated or -suspect) area following a release. The terms *restricted entry, occupational reentry,* and *emergency reentry* refer to the temporary, short-term re-admission of persons (primarily recovery workers or monitoring teams) into a restricted area for the purpose of performing some essential task. These individuals shall be equipped with appropriate protective clothing and equipment (see Appendix H, "Planning Guidelines for Emergency Worker Operations"). The terms *unrestricted reentry*, and *general reentry* are used in the context of unlimited, permanent re-access, re-occupation, or use by the general public of previously restricted areas and objects after the hazards of chemical agent (or toxic degradation product) exposure have been reduced to acceptable levels.

Restoration

Restoration involves the detection and, when necessary, the removal and decontamination of all chemical warfare agents. The culmination of these activities is re-establishment of major utilities and services and the return of social and economic activities to near-normal levels. The terms *recovery* and *restoration* have been used in combination to refer to the entire group of activities undertaken to prepare a previously contaminated and restricted area for unlimited re-occupation and/or use by the public. There is some overlap of restoration activities with those of "Evacuee Support" (Appendix K).

Principles of Reentry and Restoration

In the event of an unplanned release of chemical agent, a potential exists for agent contamination of structures and their contents, vehicles, livestock and companion animals, grazing land, forage crops, grains, produce, and surface waters. Though remote, it is prudent to plan for this contingency, particularly for persistent agents such as VX or sulfur mustard. Reentry/restoration planning guidelines provided in this appendix are intended to assist installation, state and local authorities to systematically prepare for making rational decisions regarding access to contaminated or suspect areas, whether they occur on-post or off-post. A sound basis for announcing an "all clear" for general population access is critical. Current technical understanding of the reentry issue indicates that at least several days will pass before areas uncontaminated by agent can be identified, confirmed and released for unrestricted reentry. Borderline or contaminated areas and "hot spots" may take longer.

Reentry and restoration planning has been performed by many U.S. communities located in flood- or hurricane-prone areas, in industrial corridors containing a high density of petroleum refineries and processing facilities, or which host transportation hubs such as airports or railroad switchyards. These communities have found that advance reentry and restoration planning contributes to quicker and more efficient recovery after incidents such as storms, derailments, or tank car leaks. Planning for post-incident response in these communities is not a new concept. Communities of the CSEP Program can similarly prepare for post-incident reentry/restoration in the event of a chemical warfare agent incident at a stockpile installation. These agents have unusual, but not unique, properties that can be understood and dealt with in a systematic way.

Chemical warfare agent reentry and restoration planning can also benefit from working concepts of reentry developed by regulatory authorities (primarily U.S. Environmental Protection Agency and state departments of health and agriculture) responsible for safeguarding the health of agricultural workers exposed to toxic concentrations of pesticides in the field or while loading or mixing pesticide formulations for field application. The pesticide formulations responsible for the majority of agricultural poisoning cases have a mode of action similar to that of nerve agents. The existing pesticide reentry regulatory concept and method are pertinent to the basic issue of reentry in the event of off-post chemical warfare agent contamination, particularly for the nerve agents.

Reentry and restoration planning at each stockpile location will require gathering location-specific data which should be maintained and kept current in order to minimize injury to, or loss of, important local resources, such as herds of livestock, should a chemical event occur. Creating or obtaining inventories of valuable resources that must be fed, protected, or otherwise managed should be considered an integral part of the recovery preparedness process. Such preparedness will be valuable not only to CSEPP, but also in responding to other community emergencies (e.g., hazardous materials spills, floods, etc.). Existing documents, such as environmental permits, chemical inventories, maps (topographic, storage areas, locations of fixed monitoring stations and population centers, etc.), spill contingency plans for toxic industrial compounds, zoning requests, site-specific impact statements and other reference materials, will contain much pertinent, location-specific information. They should be included in the local CSEPP reentry planning review. Many state and local planners will find that much of the conceptual thinking and resource evaluation needed for good CSEPP reentry planning has already been considered in developing local plans for other types of toxic releases.

Emergency response and reentry access will be heavily dependent on location-specific features, such as local climate and vegetation. For example, response, reentry and recovery activities in heavily populated, well-watered, and well-vegetated sites will be different than what is appropriate for rural, arid sites. As a result, reentry and restoration plans should be tailored for each installation's environmental and stockpile characteristics. It is the responsibility of state and local planners to collaborate with installations in the preparation of site-specific reentry and restoration plans that meet the particular needs of the communities involved.

Reentry decisions should be made in a phased manner, such that monitoring teams outfitted with appropriate protective equipment are the first to reenter an agent-suspect or -contaminated area (restricted reentry). Areas known to be uncontaminated (identified when early monitoring data defines agent plume boundaries and "hot spots") should be the first to be declared accessible to the general public (unrestricted reentry). Minimally contaminated areas would be declared accessible in the second phase of public reentry, after concentrations of agent and any toxic breakdown products in environmental media are reduced to acceptable levels.

There is a demonstrated need to pre-determine reentry and restoration decision protocols so that only those parameters worthy of examination are monitored. Otherwise, scarce monitoring resources will be expended in an irrational fashion. A recommended ranking of monitoring resource allocation is presented in the "Reentry and Restoration Priorities" section below.

Responsible authorities should keep in mind that there is adequate time to make good reentry decisions; the acute phase of emergency response will have been completed; residents will be, for the moment, safely sheltered or evacuated out of harm's way. Citizens and local officials will probably apply pressure to return to their homes, but the authorities responsible for reentry decision-making must have reliable data on agent and toxic break-down product concentrations (in the suggested priority outlined below) as a sound basis for reentry decision-making. Collection, shipping, analyses, and evaluation of environmental samples can easily require days or weeks. This is another good reason for phased reentry and recovery, with first release of sectors that were never, or minimally, contaminated.

A strict quarantine of agent-suspect or contaminated areas until access decisions can be made is a basic tenet of reentry and restoration planning.

Reentry and Restoration Priorities

Reentry and restoration priorities should be established for each individual stockpile location. It is recommended that reentry monitoring resources be allocated, and mitigative actions implemented, in the following order:

First Priority:

a. livestock and/or companion animals exhibiting signs and/or symptoms of agent effect.

b. If agent concentrations in air attain the general population limit or occupational time-weighted-average (see 53 FR 8504), monitoring resources should be deployed.

Second Priority: vegetation used as food, and surface water sources used as drinking water.

Third Priority: surfaces with which humans are likely to come in contact (e.g., structures, vehicles, etc.)

After the above priorities have been resolved, resources and mitigation may be directed to soil, meat and milk, and non-drinking water supplies such as sources of irrigation water. Additional background on this priority ranking is available in AEHA (1994 a, b).

Planning Guidelines for Reentry and Restoration

In the event of an unplanned release of chemical warfare agent, a potential exists for agent contamination of structures and their contents, vehicles, livestock and companion animals, grazing land, forage crops, grains, produce, and surface waters. Though remote, it is prudent to plan for this contingency, particularly for persistent agents such as VX or sulfur mustard. Reentry/restoration planning standards provided in this appendix are intended to systematically assist installation, state, and local authorities in making rational decisions on access to agent contaminated or-suspect areas.

Responsible authorities need to decide, in advance, what their response will be if a chemical warfare agent is confirmed in soil, water, and other media at a control limit (action level concentration). Advance decisions also need to be made regarding appropriate responses if the field data are uncertain, or below the control limit. At this writing (August 1994), the only agent control limits promulgated for programmatic use in determining access to agent-suspect or -contaminated areas by civilian populations are those developed by the Department of Health and Human Services (DHHS) for atmospheric concentrations (in units of mg agent/m^3 air; 53FR8504, 1988). Additional agent control limits for surfaces and environmental media such as drinking water, milk, meat, other food items and soil are in various stages of development and are intended for eventual use in CSEPP and other related programs (see footnote 1 on page M-2, **Principles of Recovery Phase Decontamination** on p M-8, and Kerr 1992).

The planning guidelines outlined below apply to recovery-phase planning for both **on-post and off-post** areas. Reentry and restoration plans will be needed to guide the recovery process even if the affected area lies completely within the installation boundary. These planning standards are consistent with the identification and prioritization of recovery planning functions as outlined in the *CSEPP Recovery Plan Workbook* (AEHA 1994a).

M.9 Each jurisdiction will incorporate a **reentry and restoration plan** into the hazard-specific appendix of its EOP. The plan will identify, by position, the person(s) with authority for making decisions on both restricted and unrestricted reentry in the jurisdiction. In addition, the plan will describe the agencies to be responsible, resources to be available, and procedures to be followed regarding: access to, and restoration of, livestock and companion animals, drinking water sources, vegetation, surfaces, soil, meat and milk, construction materials and structures, and non-drinking water supplies in an agent-suspect or -contaminated area. <u>The reentry/restoration plan should be developed jointly with the Army installation and other state and local jurisdictions in the IRZ and PAZ.</u> (Specific guidance on reentry and restoration plan development is included in the *CSEPP Recovery*

Plan Workbook and Sourcebook, available from the Army Environmental Hygiene Agency, APG, MD; AEHA 1994 a, b.)

M.10 The reentry and restoration plan will include a **list of priorities** for determining access to, and restoration of, affected environmental media. This priority list has been developed to safeguard the general public and recovery phase personnel as well as to guide the allocation of personnel and analytical resources in the aftermath of a chemical agent release producing on-post or off-post contamination. The organization(s) responsible for each category will be identified. The responsible organizations may include departments of the jurisdiction's government, agencies of other levels of government (e.g., the Army or the state government), private contractors, or volunteers. The following list of priorities in descending order of urgency is offered as a candidate

a. livestock and companion animals exhibiting signs and/or symptoms of agent effects. If agent concentrations in air attain the general population limit or occupational time-weighted average, then monitoring resources should be deployed to the affected area (see 53 FR 8504).
b. vegetation used as food, and surface water sources used as drinking water.
c. surfaces with which humans are likely to come in contact (e.g., structures, vehicles).
d. soil
e. meat and milk
f. non-drinking water supplies, such as sources of irrigation water

M.11 To minimize injury or loss to important local resources, the reentry and restoration plan will include reference to **<u>existing</u> site-specific background information** characterizing the local agent stockpile (agent type, toxicity, chemical characteristics, etc.) and physical environment (topography, meteorology, locations of buildings and structures, etc.) as well as important local resources that must be fed, watered, protected or otherwise managed in the reentry and restoration phase. Much pertinent information on the physical environment and local resources will have already been compiled in developing other local documents such as local environmental permits, zoning petitions, spill contingency plans, etc. Meeting this guideline is not an effort unique to CSEPP and will not require a major allocation of resources. Such information will be invaluable, for example, if local officials request that the public water supply be tested for agent. If information is on hand indicating that the water supply is groundwater from drilled wells, it could be quickly determined that there would be little need to collect or analyze water samples under most warfare agent release scenarios. Examples of the sources of information that have been shown to be useful in previous agent-specific recovery efforts, are provided below. More detailed lists of candidate information sources are provided under Planning Function 1 of the *Recovery Plan Workbook* (AEHA 1994a) and the "Site Background" Appendix (E) of the *Recovery Plan Sourcebook* (AEHA 1994b).

a. Environmental impact statement(s);

b. Maps or databases containing information on political boundaries, roads, bridges, water wells and reservoirs, etc., property boundaries and grazing leases, land use, schools, parks, recreational areas information on local hunting seasons, game farms, and wild harvesting,etc.

c. Meteorological data.

In addition, if periodic environmental samples are taken in the on-post or off-post areas adjacent to the containment area or installation for routine environmental monitoring, records and knowledge of sampling results would be extremely helpful for post-incident comparison.

M.12 The reentry and restoration plan will describe the process of **evaluating the residual hazard** posed by a chemical agent release to determine the extent, location and severity of residual chemical agent contamination, or toxic agent degradation products, in the areas affected by the chemical warfare agent incident. The plan will

a. Define the process to be followed and authorities who shall determine methods used and resources required to bound areas where residual hazards are likely to occur. These hazards may take the form of excessive, localized air concentrations as well as contamination of buildings, equipment, soil, etc.

Environmental monitoring as well as predictive modeling of plume dispersion and deposition should be addressed.

b. Assign specific responsibilities of state and local jurisdictions, civilian federal agencies, the local installation and the Department of the Army. Clear decision links will be identified and established to achieve coordinated decision-making. The provisions of CSEPP Policy Paper #2 (CSEPP 1993) apply.

Additional specific guidance is provided in DA 1991 and AEHA 1994 a, b.

M.13 The reentry and restoration plan will describe the process of **assessing any hazards to public health and the environment** due to residual agent in the areas affected by the chemical warfare agent release. The assessment process will specify how agent control limits will be used in reentry decision making. (Even though the complete set of agent control limits has not yet been promulgated, the process for using these limits can be developed.) Additional specific guidance is provided in the reference material cited at the end of this appendix and in AEHA 1994b.

a. Potential receptors and critical exposure pathways (ingestion, dermal, inhalation) shall be identified in the plan, as well as the authority and technical bases for mitigative actions and decision making. All pertinent CERCLA and IRP provisions apply.

b. Identification of resources and authority for implementing and maintaining the mitigative actions determined in step a) above is required. An example is that of quarantine measures (patrols, marking of boundaries using mutually agreed protocols, etc.) for agent-suspect or -contaminated areas until reentry decisions can be made.

M.14 If chemical agent residues or toxic degradation products remain after the emergency response phase ends, the **emergency worker protection** function must continue into the recovery phase. The reentry and restoration plan will partly address this function by incorporating appropriate protective clothing and equipment guidelines presented in

Appendix H "Planning Guidelines for Emergency Support Operations."

a. A Site Safety and Health Plan to protect recovery workers from harmful exposures to chemical hazards and to allow performance of monitoring, caretaker and other recovery tasks shall be developed or (if already in existence) cross-referenced. Provisions for both civilian and military recovery personnel shall be addressed.

b. The Site Safety and Health Plan will include identification of personnel, their responsibilities and qualifications; participating organizations and activities (as security/ law enforcement, fire and public works officials, etc.); site control and zoning (maps for identification of hazard areas and monitoring points); hazard assessment; a description of tasks to be performed and standard operating procedures or safe work procedures to be followed; appropriate personal protective clothing and equipment; procedures for decontamination of recovery workers, and provisions for medical surveillance of recovery workers.

c. The personnel protection provisions shall be in place before any monitoring activities occur (see Guideline M.15).

d. Specific responsibilities of state and local jurisdictions, civilian federal agencies, the local installation and the Department of the Army should be identified, along with reference to any necessary written agreements (e.g., MOUs) providing authority. The plan will identify, by position, any person(s) with decision making authority regarding issues (e.g., protective clothing, stay times) related to the protection of recovery phase workers. Clear decision links will be identified and established to achieve coordinated decision-making. The provisions of CSEPP Policy Paper #2 apply (CSEPP 1993).

Additional guidance material is contained in AEHA 1994 a, b.

M.15 The reentry and restoration plan shall include a summary of **data requirements and sample collection design(s)** needed to characterize the boundaries of agent distribution and identify "hot spots" in the environment. Elements include the following:

a. Listing of basic assumptions (e.g., fewer samples to be collected near the point of origin where positive readings are more likely; more samples to be collected in areas remote from the point of origin where positive readings are less likely)

b. Outline concept of operations, including names of civilian personnel trained in all necessary skills needed to accompany Army sampling and monitoring teams (see CSEPP Policy Paper #2 for specifics) (CSEPP 1993), how compliance is to be attained with all applicable public health laws and regulations, and an outline of how decisions on food safety and reentry will be jointly developed with input from federal, state and local officials, and the Department of the Army.

c. Protocols for sample collection, with first emphasis on atmospheric sampling (to "bound the plume area" and characterize the hazard zone(s) for monitoring team or general public reentry), followed by an outline of field sampling protocols and techniques. Note that the determination of dislodgeable residues on home-lawn grass should have a high priority. (Specific guidance is provided in AEHA 1994 a, b; Lombardi et al. in review; USDHHS 1990; Adams 1984; Gunther et al. 1973; Popendorf 1980; Iwata et al. 1977).

d. Protocols for sample handling and analysis to ensure accurate and reliable laboratory results (includes chain of custody, holding temperatures for environmental samples, shipping notification requirements and quality control procedures, etc.). Since there are a limited number of chemical surety laboratories, a list of qualifying analytical laboratories that have been contacted by this jurisdiction and are willing to process local samples should be included in this plan.

Specific guidance for this guideline is provided in AEHA 1994 a, b and US DHHS 1990.

M.16 The reentry and restoration plan will include a description of the process to be followed in **evaluating the findings** resulting from sample and data collection. The decision to reenter areas previously declared off-limits due to measured or suspected agent contamination should be a joint determination by the DA (as represented by the initial response force [IRF] or service response force [SRF] Commander) and appropriate federal, state, and local officials (e.g., a representative of the Regional Response Team, a representative of an agency designated by the host state Governor [usually a Health or Environment Department], and a representative of the local jurisdiction [usually the city and/or county Department of Health or Department of Environment, or equivalent]). It is recommended that, when making any reentry recommendations, greatest weight shall be given to advice from health authorities. These decision links need to be negotiated, identified, and put in place long in advance of a release event, when acute response activities will take precedence. Thus, elements of this planning function should

a. Include rationale for reentry decision making and responsibilities of the various jurisdictions, civilian regulatory authorities, and military authorities. Development of any necessary MOUs shall be included in this planning function.

b. Incorporate the priorities previously listed in guideline M.10.

c. Present alternative decision criteria (such as "reentry intervals") to be employed in the absence of specific environmental monitoring data (see resource material in Watson and Munro 1990; 40 CFR 170.2; 57 FR 38102; 57 FR 38167; Watson, et al. 1992b).

d. Address non-decontamination decision criteria for contaminated food (if produce, packaged goods, foods of animal origin, etc. are not to be decontaminated, what shall be done with them?), livestock (establishing the health of herds and flocks, when and how to mobilize caretaker teams), and ensuring the wholesomeness of the food supply. The plan should recognize that, under some conditions, decontamination of some or all animals and food, may be impractical. The plan should identify the individual(s) authorized to decide whether or not to undertake decontamination, reference any necessary written agreements (e.g., MOUs) providing this authority, list protocols to be used in making this determination, and identify resources (e.g., local and state veterinarians, chairs of local herdsmen's associations, representatives of state agricultural department or USDA, etc.) that should be contacted to provide advice in the decisionmaking.

e. Address decision criteria for non-agricultural, but valuable resources (such as manufacturing facilities, state parks and scenic areas of tourist significance, etc.). The plan should identify the individual(s) authorized to take protective actions (e.g., restrict access), reference any necessary written agreements (MOUs, etc.) providing this authority, list protocols necessary for lifting said protective actions (e.g., sample collection and analysis) and the resources (state and federal departments of health, fish and wildlife, etc.) that should be contacted to provide advice in the decisionmaking.

f. Present a process for making reentry decisions in a phased manner, such that areas ascertained to be uncontaminated will be the first to be declared accessible by the general public. Minimally contaminated areas would be declared accessible in the second phase of reentry, after concentrations of agent and any toxic breakdown products in environmental media were reduced to acceptable levels.

g. Present rationale for how the data will be examined for soundness. Which authorities are responsible for this examination? Certification?

Additional guidance may be obtained from HSUS (1994 a, b), AEHA (1994 a, b), Watson and Munro 1990, and USDHHS 1990.

M.17 The reentry and restoration plan will outline the roles, responsibilities, protocols and committed resources (including MOUs, mutual aid agreements, etc.) needed to implement **access control,** once reentry decisions are made. Access control will have already been initiated during the response phase of the release incident (see Appendix G, "Planning Guidelines for Traffic and Access Control") but will need to be continued through the recovery phase. The primary purpose of access control during the recovery phase is that of managing reentry. A controlled system shall be established for phased access of authorized recovery phase workers and the general public (see guideline M.16 f. above). The reentry access control plan shall address all pertinent provisions of Appendix G in addition to the points identified below:

a. The plan shall establish formal protocols for entry to, and exit from, a restricted area. It shall include

(1) requiring proof of authorization

(2) logging entry and exit times;

(3) issuance, as necessary, of personal protective clothing/equipment and agent antidotes;

(4) monitoring of agent contamination or signs/symptoms of poisoning upon exit;

(5) provisions for decontamination, as needed;

(6) monitoring and logging of articles removed from the restricted area; and

(7) requiring proof of ownership of articles removed from the restricted area.

b. The plan shall outline procedures and coordination that will be completed prior to issuance of reentry information and instructions that will result in traffic flow at access control points.

c. The plan shall outline reentry decision criteria and control procedures for recovery workers, researchers, members of the general public and public information media, and public officials.

d. A recommended priority for allocation of reentry access control resources is as follows:

(1) to protect public health and safety

(2) to secure the hazard areas, and

(3) to allow recovery and cleanup operations to proceed

Additional guidance may be found in AEHA (1994 a, b).

M.18 The reentry and restoration plan will briefly describe advance provisions needed for **long-term relocation** of residents, businesses and government offices. After a chemical agent incident, it may be necessary to prevent reentry to evacuated areas for an extended period, such as to allow sufficient time for agent monitoring and/or degradation (depending primarily on the type and amount of agent released and environmental factors). Appendix K ("Planning Guidelines for Evacuee Support") points out that "planning for long-term support will probably be considerably less detailed [than that for short-term support] because such support is more unlikely to be required, the degree of support needed could vary widely, and adequate time will be available for finalizing long-term support arrangements at the time of the emergency. During the planning phase, the jurisdiction should inventory available long-term support resources for evacuee support." It is further recommended that all necessary interjurisdictional agreements (such as Memoranda of Understanding) governing evacuee/relocatee support, law enforcement, schooling, medical services, etc. for extended periods (weeks) be developed and signed by all responsible civilian and military parties (including installation command) as a precautionary measure and as a means of reducing interjurisdictional confusion in the event of need. These agreements will, of necessity, be somewhat site-specific due to regulatory variations among Program states.

To assist in preparing this inventory, the following list is offered as a candidate:

- Assess the potential need for relocation assistance;
- Identify the available internal and external resources for relocation;
- Assess housing and development options;
- Provide for public input and participation in the decision process;
- Assign priority to areas where community services at temporary or new housing locations already exist;
- Assign priority to areas where road access to relocation sites already exists;
- Review and enact ordinances, regulations, and other legal bases for new development;
- Coordinate with other jurisdictions that serve as host jurisdictions, or relocation jurisdictions when these are not the same;
- Coordinate with other recovery activities such as Public Information, Access Control, Social Services, and Claims and Damage Assessment; and
- Provide special assistance or considerations needed for special populations in the jurisdiction.

Additional guidance may be found in AEHA (1994 a, b).

M.19 The reentry and restoration plan will describe advance provisions to supply **social and medical services** (other than decontamination and medical treatment for agent exposure as outlined in 59 FR 38191 and Appendix I) to the affected (particularly relocated) populations. Provision of adequate social services is intended to expedite return to normalcy by the community. Medical services during the recovery phase will be aimed at preventing communicable disease and assisting community recovery by providing physical and mental health services. Identify roles and responsibilities.

Additional guidance is provided in AEHA (1994 a, b).

M.20 The reentry and restoration plan will describe the **public information activities and community relations program** to be implemented during the recovery (usually post-JIC) phase. Such a program is not included in Appendix J ("Planning Guidelines for Public Education and Information"), which primarily addresses the preparedness and response phases. The principal objectives are to

a. Provide accurate and complete information to the public pertaining to mitigative actions, any health dangers, remediation efforts, available services and other pertinent issues. Specific information needs to be addressed include

    (1) Disseminate accurate and complete information to the public via media briefings, news releases, interviews, outreach programs, and other mechanisms, as appropriate.

    (2) Coordinate dissemination of information with other organizations, as appropriate, including the Army.

    (3) Develop and maintain a rumor control system.

    (4) Coordinate activities associated with deactivation of the JIC and the transition to post-JIC public information, including continuity of telephone access and continued coordination among involved organizations.

(5) Coordinate publicity and logistics associated with public participation in remediation decision making.

b. Provide an avenue for the community to express its interests and preferences regarding the remediation process. Roles and responsibilities of various jurisdictions and authorities will be identified; coordinated communications are stressed. Provisions of the CAIRA Plan (DA 1991), the National Contingency Plan (40 CFR 300.4) and CSEPP Policy Paper #2 (CSEPP 1993) all apply. Additional guidance is provided in AEHA (1994 a, b).

M.21 The reentry and restoration plan will describe the preparations and procedures to be followed in **damage assessment and claims processing** by each jurisdiction affected, as well as the installation and Department of the Army. The resources to be considered should include all those identified in this Appendix (e.g., fodder, feed, crops, livestock and companion animals, etc. [see Guidelines M.3 and M.5-M.8]) that are considered significant on a location-specific basis.

a. The jurisdiction will outline the assistance to be provided affected individuals and the public in filing claims, and will promote prompt access to assistance by making the following preparations:

(1) Ensure procedures are in place to apply for a disaster declaration and assistance as quickly as possible following the agent incident.

(2) Have procedures in place for establishing a Disaster Assistance Center (DAC) in an uncontaminated, accessible area.

(3) Make advance preparations to have current forms available and trained staff to assist the public to file them.

(4) Make advance preparations for public assistance filing.

b. The installation and DA will outline procedures undertaken to expedite damage assessments and claims processing as well as specific information describing how and where to file claims, in coordination with local jurisdictions. All requirements of the U.S. Army Claims Service (in designating a location for claims processing, identifying damage assessment personnel, etc.) and provisions of the CAIRA Plan (Appendix I; DA 1991) apply. Community awareness promotion of these services shall also be addressed.

c. The plan shall identify procedures for deciding when the most prudent course of action is to decide that a given resource is irrecoverable and/or has lost value as a consequence of an agent incident. The plan should identify the individual(s) authorized to determine the value of the resource in question, reference any necessary written agreements providing this authority, list protocols to be used in making this determination, and identify resource persons (e.g., local and state veterinarians, representatives of state agricultural and health departments, USDA, etc.) that should be contacted to provide advice in the decision making. In practice, these procedures are to be implemented on a case-by-case basis.

d. Any involvement by FEMA in providing disaster relief assistance (particularly under provisions of the Stafford Act) will be detailed. Roles and responsibilities will be identified.

Additional guidance is provided in AEHA (1994 a, b) and Herzenberg et al. 1994.

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GLOSSARY

calcium hypochlorite—$CaCl_2O_2$, a strong oxidizing agent. A component of high-test hypochlorite (HTH).

caretaker teams—groups of trained individuals in appropriate protective clothing who could travel through agent-contaminated areas to feed, water, decontaminate and treat untended livestock and companion animals.

CERCLA—Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (PL 96-510).

chemical surety—those controls, procedures and actions that contribute to the safety, security and reliability of chemical agents and their associated weapon systems throughout their life cycle without degrading operational performance.

chemical surety laboratory—laboratory facilities designed for use with chemical warfare agent materials and which incorporate special containment equipment and security features and have certified staff and quality assurance program for analysis of chemical warfare agent materials. Only a few analytical laboratories qualify.

contamination—chemical agent (typically in liquid form; includes droplets and/or aerosols) deposited on skin, clothing, or any other material that constitutes a source of potential agent exposure until it is neutralized, removed, or degrades naturally. (Compare to Exposure.

dermal exposure—contact with, or absorption through, the skin.

dislodgeable residues—USEPA terminology for that portion of total commercial pesticide residue on vegetation that can be readily removed and so serve as a source of dermal exposure, as distinguished from airborne residues.

exposure—contact by a person or animal with chemical agent in either liquid or vapor form through inhalation, contact with eyes or the skin, or ingestion of contaminated food or water. Exposure to agent in liquid form (including droplet and/or aerosol form) can result in contamination. (Compare to Contamination.)

GPL—acronym for a General Population Limit, or threshold inhalation exposure concentration to the general public for a hazardous material in vapor form. For agents GA, GB and VX, the GPL for a 72-hour time weighted average is 3×10^{-6} mg/m^3; for Lewisite, the GPL is 3×10^{-3} mg/m^3 (See 53 FR 8504).

high-test hypochlorite (HTH)—white solid of 70% calcium hypochlorite in granular or tablet form containing approximately 70% available chlorine. HTH decomposes when heated and corrodes metals and fabrics when moist. Dry HTH will make oils, grease, mustard agent, and

DS-2 burn. It is used for surface decontamination in the form of slurry mix (6 gal water to 50 lb HTH), dry mix (2 parts HTH to 3 parts earth or sand), or solution mix (6 gal of water to 5 lb HTH).

household bleach—off-the-shelf chlorine bleach available for domestic purposes. Contains 5% NaOCl (sodium hypochlorite) in water. A strong oxidant with a high (i.e., alkaline) pH.

hydrolysis—chemical reaction of a particular compound (such as a chemical warfare agent) with water to form new chemical compounds ("reaction products")

ingestion exposure—contact with the mouth, throat and gastrointestinal tract by means of food or water consumption, or use of tobacco products (cigarettes, chewing tobacco, etc.).

IRP—Installation Restoration Plan (site specific).

liquid agent—any chemical agent in undiluted form; includes droplets and aerosols. Only VX or the vesicant agents (e.g., H, HD, and HT) are likely to be encountered in liquid form.

monitoring teams—groups of trained individuals in appropriate protective clothing who could travel through agent-contaminated areas to measure agent concentrations in or on various environmental media and collect samples for later analysis.

mustard hydrolysates—reaction products of sulfur mustard agents in water or aqueous media such as milk.

quarantine—a state of enforced isolation or restraint designed to prevent the spread of contamination, disease or pests. Activities of persons, transport of goods or animals and access to affected or suspect properties may all be restricted.

recovery—the period from the end of the response phase (of a chemical agent event) until the affected area can be re-occupied without protective equipment, there are no short- or long-term health risks to humans, and other typical operations such as agriculture can be conducted without any restrictions stemming from the chemical event.

reentry—entry of persons to an affected area following a hazardous materials incident. Reentry can be restricted (entry of monitoring crews) or unrestricted (unlimited public access); derived from the USEPA term describing any human activity in an agricultural area that has previously been treated with pesticides.

reentry interval—defined by the U.S. EPA as "the period of time immediately following the application of a pesticide to a field when unprotected workers should not enter" (40 CFR 170.2). These intervals are the estimated periods of time necessary for an individual formulation to degrade or dissipate to the reentry level, i.e., that concentration of surface residue (in mg or ng/m^2) that would produce no toxic response in exposed individuals. This concept is pertinent to CSEPP reentry/restoration decision-making.

restoration—encompasses the efforts and resources needed to return the agent-affected area to a condition safe for public access and use.

signs—objective, physical evidence of a medical condition or disease (e.g., drooling); readily measured or observed.

Stafford Act—the Robert T. Stafford Disaster Relief and Emergency Assistance Act (PL 100-707 of Nov. 23, 1988; See 42 USCS 121); defines qualifications that must be met for federal declaration of a "disaster," and provision of federal disaster relief.

super-tropical bleach (STB)—a commercial bleaching powder containing approximately 6% CaO and 30-35% available chlorine. STB dust is irritating to eyes, skin, and throat and is corrosive to metal and fabric when damp. STB explodes spontaneously at approximately 300°F. It is used for surface decontamination in the form of slurry mix (6 gal water to 50 lb STB), dry mix (2 parts STB with 3 parts earth or sand), or solution mix (12 gal water to 5 lb STB).

symptoms—subjective evidence of a medical condition, physical disturbance or disease (e.g., headache); usually need to be communicated by patient, and are not readily measured or observed.

TWA—acronym for Time-Weighted Average; the air concentration of a material to which nearly all workers may be repeatedly exposed, day after day (8-hour workday and a 40-hour work week), without adverse effect.

weathering—degradation through the combined actions of sunlight, temperature, moisture, aeration, and microbial activity. As a decontamination procedure for chemical warfare agents, NATO recommends weathering for lawns, gardens, pastures, woods and other similar areas for contaminated areas not in immediate proximity to occupied buildings. It is simple, and requires few personnel and no special equipment to operate; it is neither precise nor fast and is largely temperature dependent.

APPENDIX N

FUNCTIONAL REQUIREMENTS
FOR THE
CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM
AUTOMATED EMERGENCY MANAGEMENT INFORMATION SYSTEM

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ACRONYMS

AC	Alternating current
ACAMS	Automated Continuous Air Monitoring System
AMC	U.S. Army Materiel Command
ANAD	Anniston Army Depot
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
APG	Aberdeen Proving Ground
ChE	Cholinesterase
CAD	Computer-aided design
COTS	Commercial off-the-shelf
CRC	Cyclical redundancy check
CSEPP	Chemical Stockpile Emergency Preparedness Program
D2PC	Military standard dispersion model
DA	Department of the Army
DAAMS	Depot Area Air Monitoring System
DBMS	Database management system
DC	Direct current
DCW-VPF	Digital Chart of the World, Vector Product Exchange Format
DEM	Digital elevation model
DLG-S	Digital line graph-standard
DMA	Defense Mapping Agency
DMF	Demilitarization facility
DMS	Degrees, minutes, seconds
DoD	Department of Defense
DTED	Digital Terrain Elevation Data
DXF	Data Exchange Format
EIP	Electronic implementation procedure
EMIS	Emergency Management Information System
EOC	Emergency operations center
ETA	Estimated time of arrival
ETE	Evacuation time estimate
FEMA	Federal Emergency Management Agency
FEMIS	Federal Emergency Management Information System
FIPS	Federal Information Processing Standard
GA	Chemical nerve agent (Tabun)
GB	Chemical nerve agent (Sarin)
GIS	Geographic information system
GOSIP	Government Open Systems Interconnection Profile
H	Chemical blister agent (mustard)
HD	Chemical blister agent (distilled mustard)
HOTMAC	High Order Turbulence Model for Atmospheric Circulation
HQ	Headquarters
HT	Chemical blister agent (distilled mustard and an inorganic compound)
IBS	Integrated Baseline System
ICD	Interface control document
ID	Identity, identification
IDYNEV	A computer model for estimating evacuation times
IEEE	Institute of Electrical and Electronics Engineers

IEMIS	Emergency management information system developed by FEMA
IP	Implementation procedure
IRZ	Immediate Response Zone
JIC	Joint Information Center
JSC	Joint Steering Committee
kbps	Kilobits per second
km	Kilometer
LANDSAT MSS	Land Satellite, Multispectral Scanner
LBAD	Lexington-Blue Grass Army Depot
LCD	Liquid crystal display
NAAP	Newport Army Ammunition Plant
NAD	North American Datum
NGVD	National Geodetic Vertical Datum
NS	Nanosecond
OREM	Oak Ridge Evacuation Model
ORNL	Oak Ridge National Laboratory
PAECE	Protective Action Evaluator for Chemical Emergencies
PAO	Public Affairs Officer
PAZ	Protective Action Zone
PBA	Pine Bluff Arsenal
PC-DYNEV	Version of IDYNEV that runs under MS-DOS
PL	Public Law
PM	Program Manager for the Chemical Stockpile Disposal Program
POSIX	Portable Operating System Interface for Computing Environments
PUDA	Pueblo Depot Activity
RAM	Random access memory
RAPTAD	Random Particle Transport and Diffusion model
RDBMS	Relational database management system
RF	Radio frequency
RS232	A standard for serial communications interfaces
SCSI	Small Computer System Interface
SIF	Standard Interchange Format
SPOT	*Satellite pour l'Observation de la Terre* (Earth Observation Satellite)
SQL	Structured Query Language
TCP/IP	Transport Control Protocol/Internet Protocol
TEAD	Tooele Army Depot
TIGER	Topologically Integrated Geographic Encoding and Referencing
TM	Thematic Mapper
TRAC	Time-rated concentration
UMDA	Umatilla Depot Activity
UNIX	A computer operating system originally developed at Bell Laboratories
UPS	Uninterruptible power supply
USGS	United States Geological Survey
UTM	Universal transverse mercator (grid)
VX	Chemical nerve agent
WAN	Wide-area network
WS	Wind speed

1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this document is to define the overall functional requirements for an emergency management information system to meet the needs of the Chemical Stockpile Emergency Preparedness Program (CSEPP). This document provides the basis for the development of system requirements documents for both on-post and off-post subsystems. These functional requirements build on the capabilities of existing and previous systems, such as the Integrated Baseline System (IBS).

Several candidate emergency management information systems are available from public and private sources, but each of these systems has significant limitations that reduce its effectiveness for the CSEP.P (Feldman and Dobson 1990). These limitations include incomplete planning modules, inadequate resource-tracking capability, and inability to generate and track standard operating procedures. The desired functions described in this document will be used to evaluate currently available systems and determine what additions to those systems may be necessary, as well as to guide the design of any new system components that are required.

Figures in this document are examples. They are not intended to represent system requirements or constrain local/state officials in the design of their systems.

1.2 BACKGROUND

This document defines functional requirements associated with goals and assumptions outlined in the "Automation Information Management System Development Plan" prepared by the CSEPP Automation Subcommittee (April 1990). The goals and assumptions of the system development plan are as follows:

Goals

- The Congressional mandate of PL 99-145 declared that
  " . . in carrying out the destruction of the lethal chemical agents and munitions, maximum protection for the environment, general public, and

the personnel who are involved in the destruction will be achieved. . . ." Additionally, all applicable state and local environmental laws will be obeyed. The system must allow emergency management planners and responders to estimate locations and occurrence times for lethal and nonlethal areas as well as assess the threat to public safety under protective action options and provide for the needs of handicapped and disabled persons.

- The system needs to support all aspects and phases of planning, exercises, response and recovery operations. The system will be used on a daily basis. As necessary, it will assist the development and evaluation of emergency response plans. It also will assist the development, conduct and evaluation of CSEPP exercises. Further, the system will facilitate real time emergency response actions.

- Life cycle costs must be considered. Included in these costs are system hardware and software acquisition and maintenance, database acquisition, development and maintenance, training, and assorted support. Purchased equipment at the state and local level may be provided by any vendor of choice as long as it meets or exceeds the requirements and specifications approved for CSEPP.

- The system must be able to accommodate novice and expert levels of operators.

Assumptions

- There will be a continuous exchange of information between the installation and affected parties to coordinate planning, exercise, response, and recovery actions. During an event notification, there will be an immediate exchange of information followed by positive "man-in-the-loop" confirmation.

- The system as defined in this document is used for both daily operations and emergencies.

- The initial response shall be based on precomputed action elements.

- All essential resources are identified, preassigned and, if necessary, contracted for in advance.

- In addition to the system, there will be an alternate means of communication between the on-post emergency operating center (EOC) and a local point of contact that can be used to alert the local EOC of an imminent notification. (CSEPP communications equipment and capabilities are described in the *Planning Guidance for the CSEPP*, particularly in Appendix A, "Planning Standards for Command and Control," and Appendix C, "Communications Support Network.")

The following additional sets of objectives have been established for the automation system:

Preparedness/Mitigation Objectives

- Store, manage, and access databases to support planning efforts.

- Interface databases with analytical planning tools and models.

- Provide automation support for daily, weekly, monthly, and yearly planning tasks (e.g., reporting, scenario development, training, exercise planning).

- Organize emergency plan concepts and standard operating procedures.

Response Objectives

- Provide rapid access to information and preauthorized implementation procedures to support command and control and protective action decisions.

- Facilitate effective communication and alert/notification.

- Track and log events.

- Provide a means of effectively managing emergency response resources.

Recovery Objectives

- Support collection, storage, retrieval, and analysis of data.

- Track and log events.

1.3 CONCEPT OF OPERATIONS

On-post and off-post subsystems of the automation system will support emergency management activities in the mitigation, preparedness, response, and recovery phases and facilitate the transition from one phase to another. In the context of the automation system, the mitigation and preparedness phases are inextricably linked. Analyses conducted as part of the preparedness phase will identify needed mitigation measures that, when implemented, will lead to refinements of emergency operations plans and implementation procedures.

1.3.1 Preparedness/Mitigation Phase

The preparedness/mitigation phase is dominated by planning activities. Planning using automation includes modeling dispersion, protective action, and evacuation for a wide variety of source terms and encapsulating the results in a series of implementation procedures (IPs) keyed to a given event. Dispersion modeling consists of calculating assumed chemical releases as toxic time-rated concentrations (TRACs) over time for pertinent locations, meteorological conditions, chemical agents, and amounts. Protective action modeling consists of identifying subpopulations and determining whether they will be evacuated or protected in place. Evacuation modeling consists of determining destinations for and optimal routes to be taken by populations selected for evacuation. Protective action modeling and evacuation modeling should be performed iteratively to identify the need for mitigation measures to ensure adequate public protection, to evaluate alternative measures, and to incorporate adopted measures into plans and procedures. Mitigation measures could include such actions as enhancing structures to be used as shelters or using reverse traffic flow to provide additional lanes to expedite evacuation.

In addition to modeling, plans for resource management are developed during the preparedness/mitigation phase. The automation system should support the identification of resources required for effective emergency response, the execution of arrangements to ensure the timely availability of the resources during an emergency, and the design of IPs for mobilizing and employing the resources.

Finally, the automation system should support routine operations that are necessary to ensure adequate preparedness. Such operations include chemical agent monitoring and meteorological monitoring.

1.3.2 Response Phase

The initial stage of the response phase is a period of reaction as officials quickly execute procedures and plans developed in the preparedness phase. Decision makers assess the severity of the accident, select an appropriate set of protective actions, warn the public, establish command and control, deploy emergency response resources, and provide support to the affected public. Automated assistance in these activities consists primarily of calling up and guiding the execution of predeveloped decision processes and IPs. The execution of decision processes, such as accident assessment and protective action selection, requires that decision makers be reminded of the information required to make the decisions and be assisted in obtaining that information. The execution of IPs requires that appropriate managers be prompted to ensure the performance of certain actions at given times.

As the response phase progresses, the emphasis shifts to the gathering and processing of information from a variety of sources. The automation system retrieves data from chemical agent monitors and meteorological monitors and employs these data in dispersion models to refine estimates of the extent of the hazardous area. The system assists in displaying changing conditions in the extent of the hazard, the status of response resources, and other factors on status boards in the EOCs and in summarizing these changes in situation reports. The automation system logs messages received and sent by the EOC. Evacuees are registered and the information is input into the automation system. Any contaminated property which is confiscated will be logged in the system.

1.3.3 Recovery Phase

The recovery phase concentrates on assessing the damage caused by the emergency and returning the community to normal. The automation system assists these efforts by recalling predetermined procedures for obtaining samples from the suspected contaminated area and tracking the management of samples taken.

1.3.4 System Definition

To ensure timely and adequate automation support for the emergency management activities described in the preceding paragraphs, the following objectives will guide the design and development of the automation system:

- The automation system will consist of on-post and off-post subsystems.
- Where appropriate, the system architecture should use commercial off-the-shelf (COTS) products to reduce the time required for development.
- Individual government-developed and COTS products must work together as a system with a homogeneous user interface rather than as stand-alone products. User controls for similar functions in different packages will work in the same manner.
- The system shall support multiple users at local and remote sites.
- The user interface shall make it easy for the user to access the data described in this document.
- Data integrity shall be controlled so that users may be assured that the central server is supplying the workstation with the most current information.
- On-line, context-sensitive help shall be available within the system.
- The system shall incorporate a geographic information system (GIS) that integrates mapping functions, relational database operations, and model output.
- Geographic information in the system shall include location-specific digital data as follows: (1) Army installation site plan and maps in digital form, (2) Bureau of the Census TIGER line and demographic data for the counties of interest, (3) United States Geological Survey (USGS) digital line graph-standard (DLG-S) and digital elevation model (DEM) data at scales of 1:24,000 AND 1:100,000 as available, (4) Defense Mapping Agency (DMA) data for the Army installation and

surrounding areas as available, and (5) additional digital maps of political boundaries, major transportation routes, and major hydrologic features within a location-specific radius, and acquired from existing sources as available (e.g., state department of transportation).

- Nonspatial data requirements should be based on IPs.

- The system shall be designed with an open architecture to be able to take advantage of advances in computer and communications technology.

- The system shall be designed for easy maintenance.

- The system shall incorporate a backup-and-restoration mechanism for all system and user data. Backups shall be performed automatically and shall be transparent to the user during normal operations.

- System vulnerability shall be reduced by an architecture designed for high reliability, availability, and rapid restoration of operations after a system failure.

- System documentation shall be written at levels appropriate for both system administrators and users operating the various modules of the system.

1.4 DOCUMENT OVERVIEW

This document is organized on the basis of emergency management phases. Information management requirements change depending on whether one is preparing for an emergency, responding to an emergency, or recovering from an emergency. Chapter 2 discusses the functionality required of the CSEPP automation system in the preparedness/mitigation phase. Chapter 3 describes automation functions needed in the response phase. And Chapter 4 discusses required automation functions to support recovery phase activities.

Chapter 5 defines, in general terms, the types of data needed by the various nodes of the CSEPP automation system and the expected flow of data and information among the nodes.

Chapter 6 outlines provisions associated with development of the automation system. This chapter describes the expected hardware and software architecture of the system, identifies interface control aspects to be addressed during future system development, and discusses the role of the Configuration Control Board in overseeing quality control for the overall system.

The functions of an automated emergency management system are to an extent parallel to but not identical to emergency management functions as they are traditionally conceived by emergency managers. Appendix A attempts to bridge between these two viewpoints by listing the automation functions associated with each traditional emergency management function.

1.5 RELATED DOCUMENTS

1.5.1 Standards for System Development

Development of on-post applications of the automation system will proceed according to the requirements of DOD-STD-2167A, "Military Standard; Defense System Software Development," and MIL-STD-490A, "Military Standard; Specification Practices." Off-post applications will be developed according to the requirements of Institute of Electrical and Electronics Engineers (IEEE), "Software Engineering Standards," 3rd edition, SH12534 and its updates.

1.5.2 References

References are listed following the body of this document.

2.0 PREPAREDNESS/MITIGATION PHASE—FUNCTIONAL REQUIREMENTS

Automation support is associated with two components of the preparedness/mitigation phase: (1) planning, analysis, and enhancement of emergency response capabilities, and (2) routine operations of the emergency management system.

2.1 PLANNING AND ANALYSIS

The potential for rapid onset of an emergency requires a significant amount of planning by on-post and off-post communities. Key components of planning are the identification of the protective action strategies required to protect the public from the full range of possible credible accident conditions and the design of a process to be used during an emergency to decide which strategy to implement. In addition, contacts, resources, procedures, and assignments of responsibilities must be planned and developed.

2.1.1 Protective Action

Deciding what combination of protective actions to recommend in response to a release of chemical agent is among the most important and difficult decisions facing emergency managers. At none of the eight chemical agent stockpile locations can local decision makers count on having enough time in an emergency to complete a full analysis and decision-making process with respect to appropriate protective actions. Therefore, local officials must examine the protective action decision during the emergency planning phase to determine which protective actions are appropriate for which population groups under various conditions, and to develop a decision process to be used during an emergency to select the appropriate set of protective actions. The results of this process should be incorporated into electronic implementation procedures (EIPs) that can be accessed immediately during an emergency to initiate the appropriate protective actions.

The process of analyzing protective action options, developing alternative protective action strategies, and designing a process for selecting the appropriate strategy during an emergency is described in the *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program* (Sect. 8.5 and Appendix B, "Planning Standards for Protective Action Decision Making"). The planning guidance states that evacuation is the preferred protective action whenever it can be accomplished before arrival of the chemical agent plume (see also Rogers et al. 1990).

To support the protective action decision making process, the automation system should provide the following functional capabilities in the preparedness phase.

- The system should support the selection of protective actions for all population groups under all credible release scenarios. This requires thorough analysis of the interaction of accident characteristics, meteorological conditions, and population characteristics as they relate to the selection of protective actions.

- The system should support the analysis of protective actions at the sub-zone level. The system should allow the user to digitize or draw and to label affected geographic areas in an interactive manner on the screen. The GIS module should allow the user to link each drawn area and its label name to data in the relational database management system (RDBMS).

- The system should incorporate a modeling capability for analyzing protective action options under various conditions and for identifying the most effective option for each population group for each set of conditions. Figure 2.1 illustrates one possible method for analyzing and selecting protective actions for the general public. This method could be adapted for special populations and institutions.

- The protective action analysis model should incorporate agent source term (i.e., type and amount of agent released), wind speed, and atmospheric stability. Other factors, such as rate and duration of release, may also be included. The system should allow more than 600 combinations of these factors to be modeled and saved by the user for immediate recall.

- The model should employ data describing source terms for the credible range of potential accidents. These data are published in the appendices of location-specific emergency response concept plans (Carnes et al. 1989a–1989h).

- At least one year's worth (preferably 3–5 years) of local historical hourly data for wind direction, wind speed, and stability class should be available for use by the

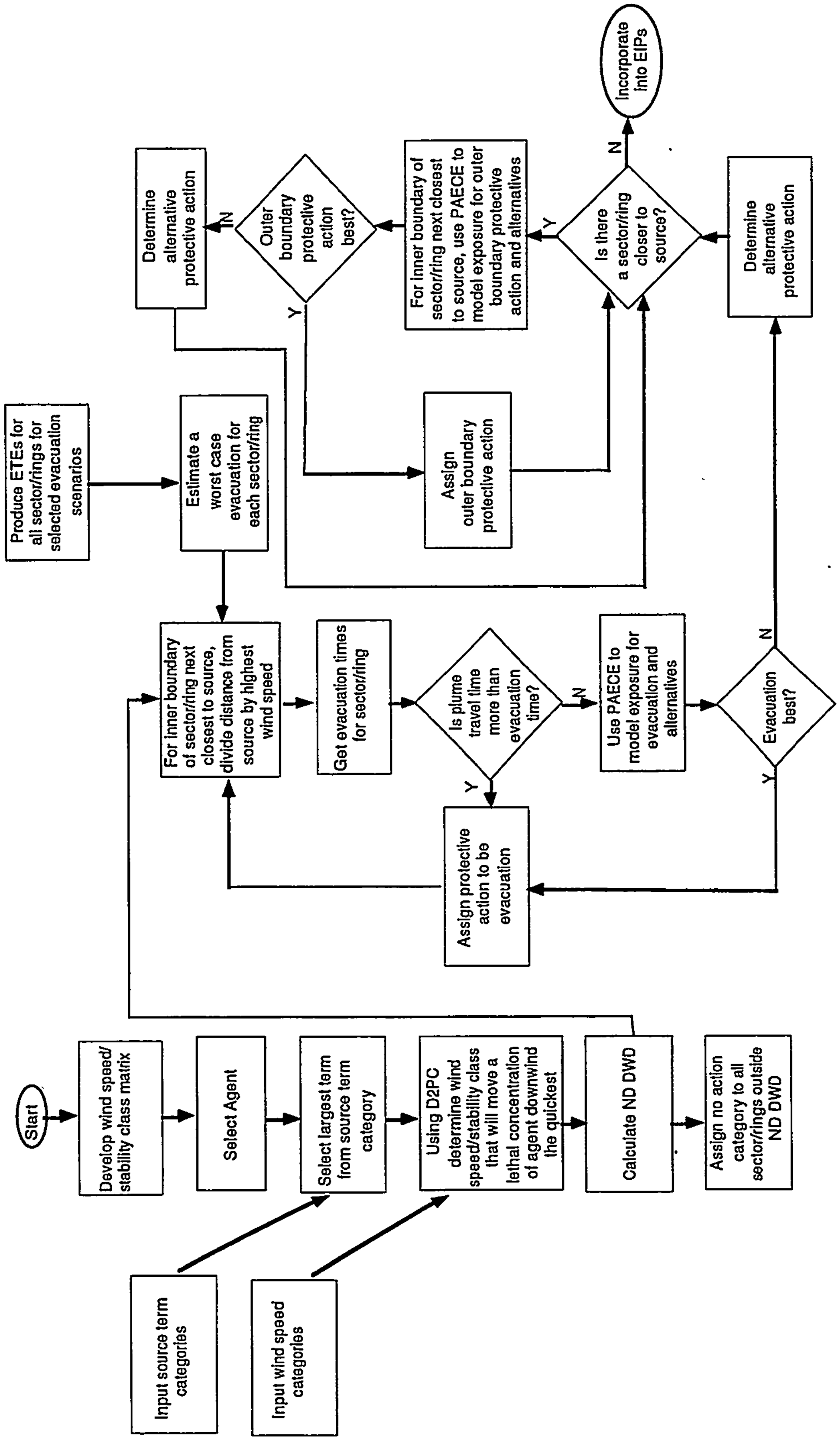

Fig. 2.1 Example flow diagram for analyzing protective action decisions for the general public

model. The model should also be able to use meteorological data that will be collected continuously once the automation system is operational (see Sect. 2.2.1.2).

- The model for analyzing and selecting protective actions should account for decision-making times for both decision makers and the affected populations, and the amount of time required to warn the public.

- The protective action analysis model will employ the current Army-approved dispersion model to evaluate the dispersion of chemical agent for the purposes of identifying the area that would be affected by a release and estimating the times required for agent to reach various downwind distances.

- The protective action analysis model should employ evacuation time estimates (ETEs) for any user-defined area up to the entire IRZ and PAZ.

- The system should include and integrate the current approved evacuation model within the bounds of the evacuation planning and display modules. The model should be operable from batch or interactive input. When run in batch mode, the model should run in the background and should allow full use of the workstation for other tasks. A message should be flashed to the screen when the model run has been completed.

- The system should be capable of easily integrating and/or replacing evacuation models and of running at least two different models sequentially, keeping their data outputs separate.

- The evacuation models should be fully integrated with the map display. The user should be able to toggle quickly and easily between batch and interactive executions of the model. In the interactive mode the screen should highlight and display routes, showing congested areas in a contrasting color or line width.

- The user should be able to step forward or backward in time to display the evacuation model results. The displays should automatically color-code evacuation routes in green, amber, or red to reflect traffic density per unit of time in relationship to the designed route capacity.

- The system should be capable of accepting a digitized evacuation route network that is generated external to the system. The system should link the digitized network with geographic-based data required for evacuation modeling. (See Table 2.1 for examples of data needed for evacuation modeling.)

- The evacuation model should be capable of providing ETEs for the general public as well as for all institutions and special needs individuals (e.g., the mobility-impaired and people without access to private automobiles).

- The evacuation model should be capable of producing ETEs for the variety of conditions that reasonably may occur in the area. Separate ETEs should be produced for daytime, nighttime, weekend, and weekday population distributions, for a reasonable range of weather conditions, and for foreseeable situations (e.g., road construction and public events) that would affect evacuation times.

- The evacuation model should facilitate the identification of locations in the road network that act as constraints on the flow of evacuation traffic.

- The system should be capable of storing and displaying the results of the analysis in the form of protective action strategies. Each strategy should list the protective action to be recommended for each population group in each geographic area under a given set of release and meteorological conditions. Figure 2.2 illustrates one possible method of organizing and displaying protective action strategies.

- The system should enable the user to construct a decision matrix designed to organize protective action strategies using such factors as the release characteristics, meteorological conditions, population characteristics, and affected geographic areas. Figure 2.3 illustrates one form that the decision matrix could take. This example depicts a decision table that could be used to select a protective action strategy if a release of agent GB resulted in the declaration of a community emergency. This example assumes that the analysis of protective actions determined that the critical factors for deciding among the alternative strategies for this agent type and notification level are (1) amount of agent released, (2) wind speed, and (3) duration of the release.

Table 2.1 Example data requirements for evacuation modeling

Variables	Description
	Highway network data
Section lengths	Length of highway sections
Number of lanes	Number of lanes in highway section
Capacities	
Directions	
Channelization	
Shoulders	
Conditions	
Intersection traffic controls and signal timings	
Speed limits	Speed limit on the highway section
Typical daily traffic volume	Daily traffic volume
	Population data
Population in residences	Population by area
Number of households	Number of households by area
Employed populations	Number of persons employed by workplace location
School populations	The number of students, employees, faculty, and the precise location of the population
Day care facilities	The number of students, employees, faculty, the precise location of the day care center
College and university populations	The number of students, employees, faculty, the precise location of the institution
Hospital and nursing home populations	The number of patients, employees (by shift), and visitors; and the precise location of the population
Airport passengers visitors and employees	The airport passengers, visitors and employees, and the precise location of the airport.
Correctional facilities	The number of inmates and employees and the precise location of the facility
Military and other government employees	The number of military and civilian personnel (daytime and nighttime) and the precise location of the facilities.
Shoppers and employees at major shopping centers	The precise location of the shopping area and either the average number of shoppers and employees or the average number of vehicles in the shopping area
County populations by age	
Inter and Intra county commuting patterns	Daily movements of commuters within and between counties
Mobility-impaired population	People who have physical disabilities that would hinder their ability to evacuate or who do not have access to private vehicles.
	Vehicle utilization data
Vehicle utilization by trip purpose	Vehicle occupancy rates for commuting, shopping, personal business, and other purposes
Household vehicle utilization rates	Number of operational vehicles available per household within an area
Special facility vehicle utilization rates	Vehicle utilization rates for schools, hospitals, day-care facilities, correctional facilities, military installations, and other facilities

PROTECTIVE ACTION STRATEGY 1 Sector C

PROTECTIVE ACTION STRATEGY 1 Sector B

PROTECTIVE ACTION STRATEGY 1 Sector A

Distance from Agent Source	Protective action to be recommended for			
	General Public	Disabled Public	Hospitals	Schools
0-2 km	Pressurized Shelter	Pressurized Shelter	NA	NA
2-4 km	Pressurized Shelter	Pressurized Shelter	NA	NA
4-6 km	Enhanced Shelter	Pressurized Shelter	NA	Pressurized Shelter
6-8 km	Evacuate	Pressurized Shelter	NA	NA
8-10 km	Evacuate	Pressurized Shelter	Pressurized Shelter	Pressurized Shelter
10-14 km	Evacuate	Evacuate	NA	NA
14-20 km	Evacuate	Evacuate	Pressurized Shelter	Evacuate

Fig. 2.2 Example of a protective action strategy table

Decision Process for
Community Emergency
Involving **Agent GB**

IF **Amount** of Release Is:	AND **Windspeed** Is:	AND **Duration** Is:	THEN **Implement** :
<1,000 lbs	<2 m/s	NA*	Strategy 3
	>2 m/s	NA*	Strategy 2
1,000 - 10,000 lbs	<2 m/s	NA*	Strategy 3
	2-6 m/s	<30 min	Strategy 2
		>30 min	Strategy 1
	>6 m/s	NA*	Strategy 2
>10,000 lbs	<2 m/s	NA*	Strategy 3
	>2 m/s	<15 min	Strategy 2
		>15 min	Strategy 1

*Duration is not applicable to the selection of a strategy under this combination of amount and windspeed conditions.

Fig. 2.3 Example of a protective action decision table

2.1.2 Procedures

Procedures are a major driver of emergency response activity. Historically, IPs have been developed on paper with each IP focusing on a single task and describing who was to do what, when and to whom or what in order to accomplish the task. Under CSEPP, IPs will be automated as electronic implementation procedures (EIPs) and will be designed to reflect a comprehensive approach to emergency response. A set of EIPs will be developed, with each EIP listing all emergency functions that must be addressed for a given, reasonably foreseeable chemical agency emergency situation. The tasks required to fulfill each emergency function will be identified, and the actions and resources necessary to accomplish each task will be specified. Among the advantages of this approach are rapid access to procedures, ease of updating procedures, standardization of formats, the possibility of systematically analyzing resource requirements at various stages in the plan, the ability to identify all actions to be taken by a specific individual, and automated tracking of the completion of procedures during an emergency.

The tasks to be incorporated into EIPs must be defined locally based on the structure of the organization for emergency response, the availability of resources, and other factors. Table 2.2 depicts an example of a range of functions and tasks that could be addressed in EIPs developed for CSEPP. Many jurisdictions have already developed many of these tasks, although they may need to be automated and organized into comprehensive EIPs for CSEPP.

The procedures module for the automation system will consist of two parts. The first part is a planning module that is used to develop EIPs. The second part is an operations module that can display and execute EIPs during an emergency. The latter module is discussed in the Sect. 3.4.

The procedures planning module (which is part of the off-post subsystem only, but is to be coordinated with the on-post subsystem) should build upon EIPs such as those being designed into the IBS. The module should allow EIPs to be developed, tested, and easily revised. EIPs should address the sequence and time requirements to complete emergency actions and should identify the individuals responsible for performing the actions, the action to be taken, and the resources to be employed. The module should attempt to validate that the designed procedures will accomplish their purposes within the time available.

The procedures planning module for the automation system should provide the following capabilities:

- Allow the development, storage, and rapid recall of up to 1,000 EIPs. The module should provide a display that guides user input of EIPs. This display should require the user to enter a name for each EIP and to identify the emergency functions to be incorporated into the EIP.

- Allow the definition of up to 36 emergency functions which can be incorporated into any EIP. The module should provide a display that guides user input of each emergency function. The display should require the user to enter a name for each emergency function and to list the tasks that must be performed to fulfill that function.

Table 2.2 Functions for which automated tasks could be developed (example)

<u>Facility considerations</u>
- shutting down the chemical processing facility and related activities in an orderly and safe fashion

<u>Command and control</u>
- activating the emergency operating center(s) on- and off-post
- mobilizing emergency management personnel

<u>Emergency workers</u>
- mobilizing first response personnel
- assuring that emergency personnel are adequately protected
- mobilizing medical workers and medical facilities
- mobilizing other emergency personnel
- worker protection

<u>Communications</u>
- notifying base officials
- notifying off-post officials
- notifying medical facilities and other institutions

<u>Accident assessment</u>
- detecting or reporting an accident
- accident classification
- assessing accident impacts

<u>Protective action decision making</u>
- deciding upon the best protective action(s)

<u>Public alert and notification</u>
- alerting the public
- providing protective action information to the public
- keeping the public informed
- establishing information channels with the media

<u>Security</u>
- establishing access controls and security
- controlling traffic

<u>Implementing public protection</u>
- providing transportation
- supporting evacuees
- medical care
- detection/monitoring by Army personnel
- decontaminating personnel by both military and civilian personnel
- decontaminating the environment by military personnel
- establishing reentry criteria

- Allow the development of up to 99 tasks per emergency function. The module should provide a display that guides user input of each task. The display should require the user to enter a name and priority for the task and to list up to 99 actions that make up the task. Each action should consist of (1) an action number, (2) a subject stating who or what is responsible for performing the action, (3) a verb describing the action to be taken, (4) an object stating to whom or what the action is applied, (5) a statement of the time or conditions under which the action is to be taken, and (6) criteria to be used to ascertain that the action has been completed.

- Provide an automatic display of the resources required to accomplish each defined task.

- Provide syntax checking to ensure that each procedural step is complete and reasonable.

- Permit the association of tasks with lists, messages, and other tasks.

- Permit the identification of specialized words (e.g., "ring" and "activate") that would cause the system to initiate defined processes.

2.1.3 Contact Lists

Lists of people and institutions who may need to be contacted are essential to emergency operations. The automation system should provide for the development, maintenance, and management of such lists through the following capabilities.

- The system should employ relational database capabilities to minimize problems of redundancy and discrepancies among lists of contacts. The system should support the construction of two master lists: one for individuals and one for institutions. The system should permit the creation of additional master lists if others are found to be necessary in the future. Each record on a master list should include an indication of all special purpose sublists with which the individual or institution is associated.

- The system should be capable of generating special contact lists that are subsets of one or more master lists.

- The system should allow creation of special contact lists when needed by searching the fields of one or more master list and entering the name of the special contact list.

- The system should permit entry of all pertinent information for all individuals and institutions included on the master lists. Special contact lists should be able to display all or any part of the information on the master lists.

- The system should enable the user to add, delete, and edit items on master lists.

- Changes made in an item on a master list should produce an automatic update of all special contact lists with which the item is associated.

- The system should provide rapid search algorithms for finding listed items quickly.

2.1.4 Resource Management

Resources are people or things that have special characteristics or skills that can be used in emergency situations. Examples of resources are protective clothing, protective equipment, trucks, cranes, hand-held radios, helicopters, decontamination teams, police cars, and sheriff's deputies. Most resources have multiple uses and, in some instances, the uses are limited only by the imagination. For example, a sheriff's vehicle with a deputy can be used for establishing authority at a road block, transporting protective clothing, or providing reconnaissance and communication to report on an unknown situation, as well as for a variety of other purposes.

The management of resources is a critical function of the response phase of an emergency. To support this function, data regarding resources should be collected and structured during the preparedness phase. The automation system should provide for entering resources data into a relational database and provide an interface between the database and the GIS system. The system should be capable of storing and processing the following types of resource data:

- a unique identifier for each type of resource,
- sufficient descriptors to adequately describe the characteristics of each resource (e.g., descriptors for a cistern truck might include the capacity of the reservoir, its pumping capacity, the make of the truck and reservoir, and the type of radio installed in the truck),
- the item and quantity of the resource (e.g., 25 protective suits, where suit is the item and 25 is the quantity),
- the name of the owner of the resource,
- the name of the person or institution which currently controls the resource,
- an indication of the existence of a valid contract permitting use of the resource during an emergency,
- the location of the resource,
- the status of the resource,
- the current assignment of the resource,
- procedures for obtaining or contacting the resource,
- the start time of the resource's current assignment,
- the projected availability and assignment of the resource,
- any special circumstances associated with the resource,
- any other resources associated with the resource (e.g., a cistern truck might include a folding reservoir, ladders, a floodlight, and a generator which could, if necessary, be used independently of the truck).

2.1.5 Organizational Responsibilities

Planning will likely reveal that response to a chemical emergency would involve a very large number of people with a wide variety of responsibilities. Effective management requires that organizational and individual roles be clearly stated; managers will need to know who is responsible for what and who reports to whom. To facilitate this command and control function, the automation system should contain organizational charts linked to lists of functional responsibilities.

The system should contain outlining tools that can be used to enter and organize data easily. Capabilities are needed to allow the emergency manager to move among lists of responsibilities, organizational charts, and contact lists.

2.2 ROUTINE OPERATIONS

In addition to planning and analysis functions, the preparedness phase activities include monitoring the chemical agent storage and demilitarization facilities to detect releases, regular testing of key components of the emergency response system, and participating in exercises. The requirements these activities impose on the automation system are discussed in this section.

2.2.1 Monitoring

Chemical agent and meteorological monitoring are important components of emergency preparedness. Under some chemical agent release scenarios, on-post and off-post populations could be affected within a few minutes. Thus, it is critical that any release be detected as quickly as possible and that information be immediately available regarding meteorological conditions that would influence the transport of the released agent.

The Army shall have primary responsibility for supplying, staffing, and maintaining all monitoring equipment and for providing information from these monitors to the off-post subsystem.

2.2.1.1 Chemical Agent Monitoring

The state of the art in chemical agent monitoring places some constraints on the timeliness and quality of information that can be provided through an automated system. Release of agent is likely to be detected in one of the following ways.

- Alarms from agent monitors will indicate detectable releases in confined areas within the DMF and storage yard. The alarms are activated within 2–5 minutes after release in the presence of detectable quantities of agent.

- Leaks in the storage area are likely to be detected and reported to the command post by work teams during protected first entry. Agent may be detected by hand-held monitors when workers enter the storage area or by visual inspection. Most leaks in the storage area will be too small to be quickly detected by storage area perimeter monitoring because the amount of agent present is too small to activate the alarm and poses no off-post hazard.

- Leaks or releases occurring during transportation and handling related to storage or demilitarization would be detected visually or within a few minutes by real-time monitors at the work site and reported to the command post by the work teams.

- Field reports from members of work teams or other individuals will indicate that there has been an unusual occurrence such as a vehicle accident, a pallet drop involving agent, or some natural occurrence causing a release.

The important point is that the release of agent in the DMF may be detected by monitoring but that most other releases will be identified by human observers. The initial indication of trouble from work teams may be a radio report or an alarm activated by an emergency button on a hand-held radio if hand-held radios are equipped with the feature. More detailed reports would come after initial protective measures had been taken.

Thus, the requirements for the on-post automation system are as follows:

- it should be linked to the DMF;

- it should provide for entry and processing of data from the non-automated perimeter monitoring system;

- it should accept and process manually or automatically an alarm received from a radio or through another communication channel;

- it should provide for a report of agent release whether from an automated system or from verbal reports received from other communication channels; and

- it should alert system users to a detection or report of a release through on-screen messages as well as by triggering audible or visible alarms in the on-post EOC.

The on-post system should maintain three databases to support agent monitoring: (1) a monitor database, (2) a monitor reading's database, and (3) an agent alarm database. The system should also provide screens for entering data into these databases.

The monitor database (see Table 2.3 for example) should contain needed information for each monitoring location.

Readings from agent monitors should be stored in the monitor reading's database for a period of time to be determined by local procedures. After that time the readings should be archived.

Table 2.4 provides an example of the data that could be needed in the monitor reading's database.

As readings are entered into the monitor reading's database, they should be compared to alarm threshold contained in the agent alarm database (see Table 2.5 for example). If the comparison indicates that the concentration of agent exceeds the alarm limits, then the operator is notified.

The on-post system should be able to display data in several ways. Because samples are not taken concurrently, it is not possible to display the concurrent values at all monitoring locations. However, levels of agent at all monitoring points can be displayed for the most recent samples or for all samples taken within a specified time frame. Such a display might

Table 2.3 Example monitor database

Name	Description
Agent monitor ID	Character ID used to describe a particular monitor
Agent device code	Code identifying a particular monitoring device
Agent device name	Name of monitoring device
Map object ID	Character ID designating monitor on map displays
Storage site ID	Character ID designating the monitored storage location
Monitor comments	
In-service flag	Binary indicator of the status of the monitor
Reading interval	Time interval between readings
Agent code	GB, VX, H
Maximum agent concentration	Highest allowable reading for the agent
Minimum agent concentration	Lowest allowable reading for the agent

Table 2.4 Example monitor readings database

Name	Description
Agent monitor ID	Character ID used to describe a particular monitor
Date/time begin	Time monitoring of agent began
Date/time end	Time monitoring of agent ended
Agent code	GB, VX, H
Agent concentration	Monitored concentration of agent
Data quality code	Set to good if there is no indication of problem

Table 2.5 Example agent alarm database

Name	Description
Agent code	GB, VX, H
Alarm threshold	Minimum concentration of agent that triggers alarm
Boiling point	
Dew point	
Agent type	
Vapor pressure	Vapor pressure of agent at 25°C

be a map with graduated circles at the monitoring locations indicating the concentration. A second display option could show bar graphs of agent concentrations over time by monitoring location.

2.2.1.2 Meteorological Monitoring

Figure 2.4 shows a high-level conceptual drawing for an automated meteorological monitoring capability that would interface with the automation system. On-post meteorological stations are polled by a receiver controller (e.g., a Handar unit) through an RF radio link. The receiver controller determines how often the monitors are polled and handles data transfer between the monitors and the receiver controller using an error checking protocol. Data are passed from the receiver controller to the on-post EOC computer.

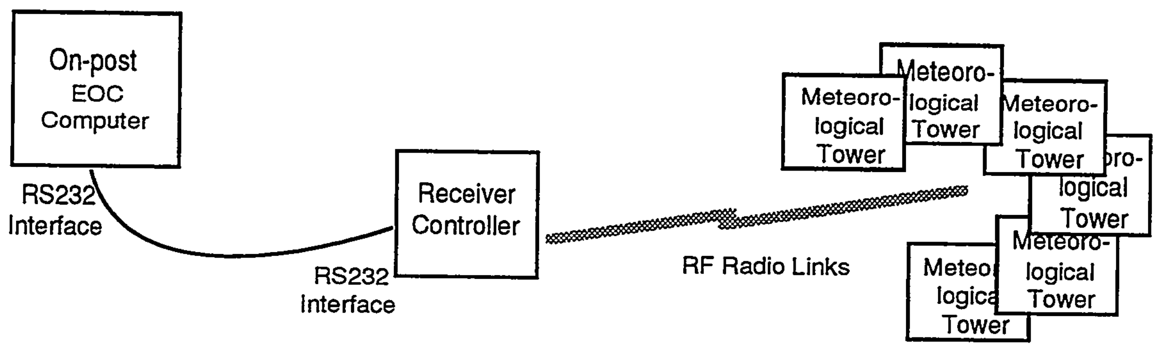

Fig. 2.4 Example meteorological data collection system

Figure 2.5 depicts a possible scheme for obtaining meteorological data. It is important that error checking be built into the system. Communications errors can be detected using a standard cyclical redundancy check (CRC) error checking protocol. Data should be validated with interval checks before being entered into a database.

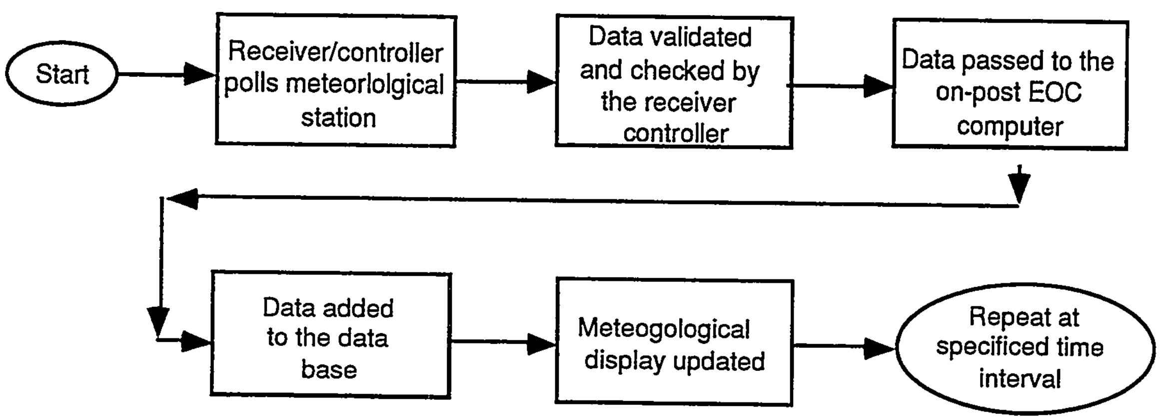

Fig. 2.5 Conceptual flow diagram for meteorological data (example)

The system should support multiple meteorological monitoring towers. Tables 2.6 and 2.7 show examples of the types of meteorological and monitor data.

Table 2.6 Example meteorological monitor record

Name	Description
Meteorological tower ID	Character ID for meteorological tower
Map Object ID	Character ID designating tower on map displays
Battery voltage	
Meteorological device code	Code identifying a particular monitoring device
Meteorological device name	Name of monitoring device
Property measured	Wind speed, wind direction, standard deviation of wind direction, temperature, humidity
Units of measure	Meters per second, degrees C, etc.

Table 2.7 Example meteorological data record

Name	Description
Meteorological sensor ID	Character ID for monitoring sensor
Meteorological device code	Code identifying particular monitoring device
Meteorological tower ID	Character ID for meteorological tower
Sensor height	
Reading interval	Time interval between readings
Date/time reading	Time of reading
Meteorological sensor value	Monitored value of variable

The Army installation subsystem of the automation system should operate a subsystem to collect and process data from meteorological stations. Meteorological data collected by the on-post system should be updated to off-post systems automatically and on demand. The specific meteorological data used for a given model projection should be identified by the on-post system to other systems.

Meteorological stations typically provide integrated values. That is, they make instantaneous measurements that are then averaged over some period of time. For the CSEPP automation system, the data will be averaged periodically and reported to the on-post EOC computer. The on-post EOC computer should then periodically distribute data to other nodes. The cycle for distribution could be once every 10 to 15 minutes.

Meteorological towers should be polled on a schedule. Because of the design of the system, readings will not be concurrent. However, assuming a polling time of 20 seconds per station, 10 stations can be interrogated in approximately 3–4 minutes. Thus, it should be possible to display readings from all stations that are within 5 minutes of being concurrent with one another.

The automation system (both on-post and off-post components) should be able to display meteorological data in all of the following ways:

- The values for all parameters for one or more meteorological stations for one sample or time period. This might involve a map display showing the location of the meteorological station with text reporting the parameters (at each location).

- The value of a one or more parameters for several samples or time periods (i.e., longitudinal data). This is likely to be a line or bar graph with time on the horizontal axis and appropriate scales such as wind speed on the vertical axis.

- The values of wind speed and wind direction from several monitors for a single time period that should be in the form of a map display with the length of the arrows indicating wind speed, the orientation of arrows indicating the direction, and text indicating the exact values. The system should have the capability of rapidly
(15–30 frames per second) showing a sequence of time periods thereby permitting the user to see how wind speed and wind direction are changing.

- The values of a single parameter for several stations presented in spreadsheet form.

The dispersion models should be run at periodic intervals and whenever significant meteorological changes have occurred. The system should be capable of storing "threshold" meteorological values; that is, meteorological conditions that would result in significant changes in protective action recommendations or emergency response activities. When these threshold values are exceeded, the system should produce a message to rerun the dispersion models. Both the on-post and off-post subsystems of the automation system should provide operators with the options of running these models using data from a single meteorological tower, averaged data from multiple towers or groups of towers, or manually entered data.

Both subsystems should retain the meteorological data for later reference and for the purpose of improving prediction methods. Weather data should be periodically archived. A set of historical data should be available.

2.2.1.3 Monitoring the Demilitarization Facility

The DMF will provide three types of automated alarms that will be connected to the on-post EOC automation subsystem. These alarms include fire alarms, a general site alarm, and a combined stack alarm. The general site alarm will notify the on-post EOC when DMF personnel have masked or evacuated. The combined stack alarm will indicate the occurrence of a release and will indicate the appropriate chemical event emergency notification system level. The alarms will provide notification only; all other information from the DMF will be provided to the on-post EOC via telephone. The activation of an automated alarm will require human verification before notification of the off-post EOC.

The on-post EOC automation subsystem should be capable of receiving a notification from any of the three types of DMF alarms. Upon receipt of such an alarm the automation subsystem should activate a visual and/or audible alarm within the on-post EOC and should display the information available regarding the suspected incident (e.g., type of alarm, chemical event emergency notification system level). The subsystem should facilitate the input of information received via telephone from the DMF by automatically presenting screen displays for input of information pertinent to accident assessment (see Sect. 3.1).

2.2.2 Testing

Routine CSEPP operations include testing of communications and public alert and notification systems. The automation system should support these testing programs.

2.2.2.1 Communications System Testing

The *Planning Guidance for the CSEPP* (Sect. 8.3 and Appendix C, "Communications Support Network: System Design Criteria and Evaluation Guide") calls for regular testing of major communications capabilities. The automation system should support this testing by automatically activating data communications links and displaying and recording the results of the testing. This requires that the automation system contain a database of all nodes of the data communication network and the procedures for contacting each and that the system has the capability to activate the contact procedures. Tests will be conducted in accordance with "Communications Support Network: System Decision Criteria and Evaluation Guide." The automation system should record the results of these tests. Results of the monthly tests should be maintained for twelve months before being archived.

2.2.2.2 Public Alert and Notification System Testing

Like the communications system, the public alert and notification system will be tested regularly (*Planning Guidance for the CSEPP*, Sect. 8.7, and Appendix F, "Public Alert and Notification Systems: System Design Criteria and Evaluation Guide"). The automation system should support this testing by initiating appropriate testing protocols and displaying and recording the results of the testing. To provide this support, the system should contain a database of warning devices and the procedures for activating them and should be able to execute the activation procedures.

Silent tests of the outdoor siren/voice units will be conducted in accordance with the CSEPP Planning Guidance and Appendix F, "Public Alert and Notification Systems." During these tests, the automation system should activate the silent test feature of the siren/voice units, receive status information provided by the units in response, evaluate the adequacy of the received information, produce an on-screen display indicating any units that failed to respond properly to the test, and record the results of the testing to a data file. Results of the silent tests should be maintained by the system for one week before being archived. The automation system should be capable of receiving, evaluating, and storing the following status information from the siren/voice units:

- siren/voice unit address code,
- AC site power (on/off),
- AC line voltage,
- DC voltage (unit battery voltage),
- ambient temperature (2-digit representation),
- unit receiver link signal/noise ratio (2-digit representation), and
- activation count.

Full-scale tests of the outdoor siren/voice units and indoor tone-alert radio units will be conducted at least once per month. These tests will employ the warning system activation procedures that would be used during an emergency. Regarding the outdoor siren/voice units, these tests require the same capabilities from the automation system as the silent tests. To support the testing of indoor warning systems, the system should also provide for the manual entry of reports of malfunctions of tone-alert radio units.

The system should be capable of summarizing and displaying data on failures of warning system components. For indoor tone-alert radios, the system should compile and report data on the date, location, and type of failure experienced for receivers reported as inoperative. For outdoor siren/voice unit networks, the system should calculate summary data for each test indicating the percentage of units that responded successfully to the test.

2.2.3 Exercises

The automation system should assist Army installations and state and local governments in designing and conducting exercises. The system should be able to load scenarios for use in table top, direction and control, and full-scale exercises. During CSEPP exercises, the system should facilitate the monitoring and control of play by exercise controllers through the use of monitors that provide access to all information entered into the system by exercise players. The system's RDBMS capability could also assist in tracking the resolution of issues raised during exercises.

3.0 RESPONSE PHASE—FUNCTIONAL REQUIREMENTS

Response phase activities are primarily geared toward minimizing impacts of the chemical agent release on the public. Initial response activities will consist largely of implementing plans and procedures developed during the preparedness phase. Accident assessment protocols will be implemented, the protective action decision process will be executed, and procedures for warning the public will be activated. As the response phase progresses more flexible methods of managing resources will come into play. Throughout the phase, information on the emergency must be managed to guide response activities. Assistance could be provided to affected populations, requiring the registration of evacuees, exposed and treated persons, fatalities, and confiscated property. Mass care shelters will be managed to care for evacuees.

3.1 ACCIDENT ASSESSMENT

Efforts to assess the nature and consequences of a chemical agent accident will continue throughout the response phase and into the recovery phase. In regard to their automation requirements, these efforts fall into two distinct phases: initial assessment and ongoing assessment.

3.1.1 Initial Accident Assessment

Because of the short time that may be available for recommending and implementing appropriate protective actions, accident characteristics that affect the choice of protective actions must be determined quickly. The primary accident characteristic of concern is the source term, that is, the type and quantity of chemical agent released. It is unlikely that the source term can be measured with precision or back-calculated, especially in the first few minutes following an accident. Therefore, the source term must be estimated.

Estimates of the source term may be calculated based on types and numbers of containers involved (Chester 1990). The quantity of agent is specific to the type of container, and the types and number of containers are location-specific. Estimates of source terms are also available from the accident analysis (see U.S. Dept. of the Army 1987 or the appendices of Carnes et al., 1989a – 1989h).

The on-post automation system should be able to take available information regarding the release and interrogate appropriate databases to quickly report an estimate of the maximum credible source term associated with that information. To produce this initial estimate, the system should incorporate the logic depicted in Fig. 3.1. The precision of the estimate that can be produced by the system depends on the amount of information available. The logic diagram maybe verbally described as follows.

- If no information is available regarding the type of operation involved in producing the release, the system should use the location of the release to identify the type of agent and the maximum credible amount of agent that could be released from that location. (For releases resulting from external causes, such as earthquakes, meteorite strikes, aircraft crashes, and lightning, both the cause and the location will be used to produce an estimate of the type of agent and the maximum credible release.)

- If it is known that the accident occurred in the DMF, then the system should report the type of agent being processed in the DMF at that time and the maximum credible release amount. Information on the particular area of the DMF where the accident occurred will permit a more refined estimate of the maximum credible release.

- If the type of non-DMF operation in progress when the accident occurred is known, then the system should identify the type of agent and maximum credible release based on the work team involved. On a given day there may be several work teams. Each work team will deal with only one agent and perform one set of tasks. Thus, a report of a release by a work team necessarily identifies the work team, agent, and set of tasks involved as well as the approximate location of the release. This information can be used to define the maximum credible release associated with the set of tasks being performed by the team. The automation system should be capable of receiving and decoding an emergency alarm signal from hand-held radios equipped with an alarm button, although not all teams will have radios with this capability.

The initial estimate of the source term will be stored for automatic retrieval when the protective action decision making process is activated.

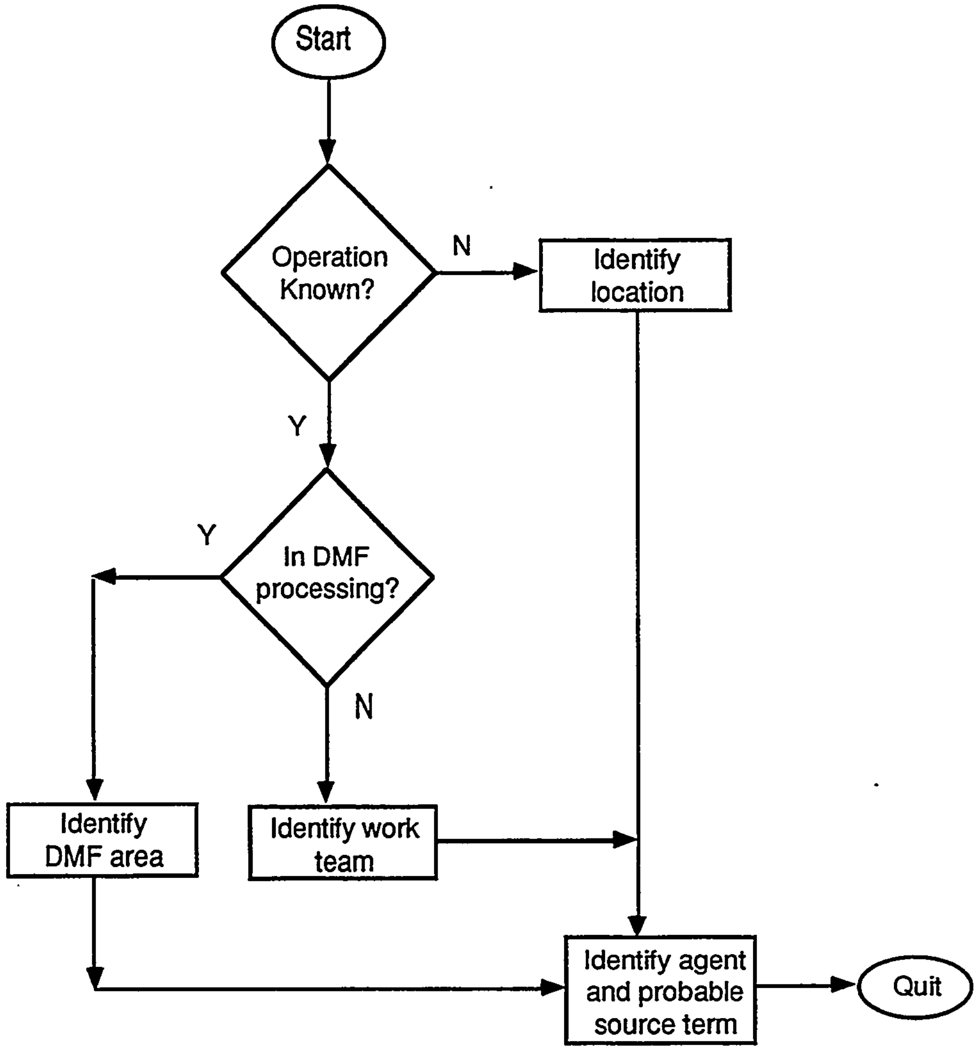

Fig. 3.1 Logic for source term determination

To support the initial source term determination, several related databases will be included in the automation system:

- An operations database will be needed that lists all operations (e.g., inventory, transport, loading, unloading) and pertinent characteristics of each. Pertinent characteristics include, but are not necessarily limited to, the type of agent, type of munition/container, and names of team members involved in the operation; the location of the operation; current status of the operation; and the maximum credible release associated with the operation.

- A database of locations where chemical agents are stored will be needed. It should include the name and location of each storage area along with the type of agent stored there, the type and number of munitions stored there, the configuration of the munitions/containers (e.g., number of munitions per pallet and number of pallets), and the total quantity of agent at the location. This data will not be included in the system until it is declassified by the Department of Defense.

- A database of maximum credible releases from each area of the DMF will be needed. This database should contain the name of each area of the DMF, the name of the activity performed there, and the maximum credible release from the area for each type of chemical agent. (Coordination between on-post and off-post officials is required to ensure agreement on the definition of all terms related to maximum credible events.)

- A database of risk analysis data will be needed to include pertinent data for each accident included in the accident analysis (U.S. Dept. of the Army 1987, reported in Carnes et al., 1989a - 1989h). Pertinent data include the type of agent, activity ID, scenario ID, total amount of agent released, amount of agent detonated, amount of agent emitted, amount of agent evaporated, amount of agent unreleased, mode of release, duration of the release, and cause of the release.

3.1.2 Monitoring

As the chemical event progresses, the accident assessment will be refined as more information becomes available. Much of the additional information will be provided through monitoring. All monitoring activities described in Sect. 2.2.1 will continue during the response phase. The focus of monitoring during the response phase will be on defining the extent of the liquid or vapor hazard around the accident site.

To provide automation support for mobile monitoring, the on-post automation system should include computer in the monitoring vehicle (see Fig. 3.2). The computer should maintain a simple database and a database entry screen that will permit members of the mobile team to record a sample identification number, affix a date and time stamp, and upload the information through a radio link to the on-post EOC subsystem of the automation system. Interval checks should be performed on the data before uploading to ensure that it is within

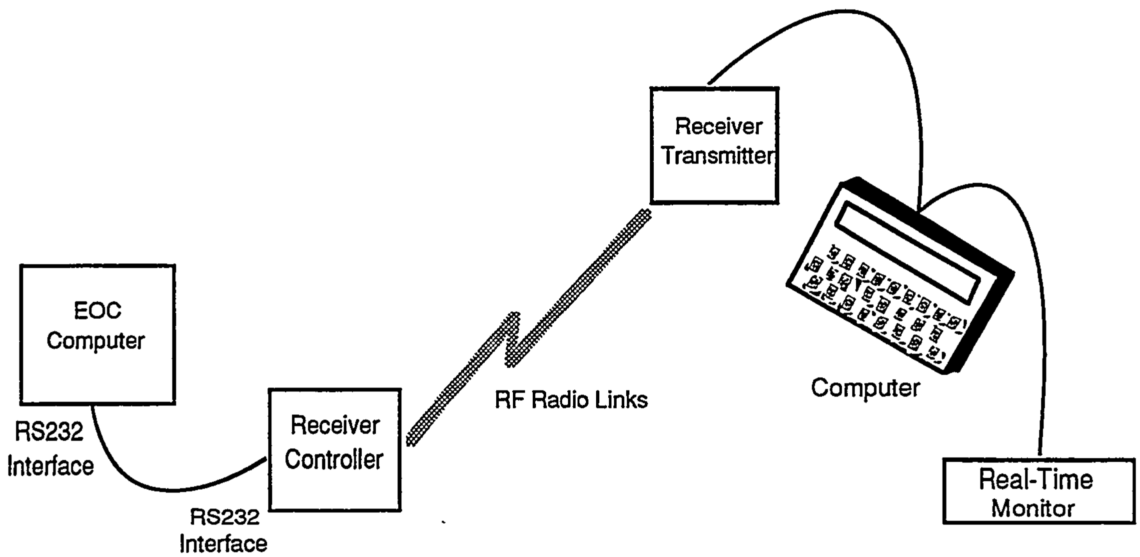

Fig. 3.2 Example mobile sampling unit

range. CRC-type error checking should be performed on all transmissions. The system should also permit entry of other pertinent information, such as descriptive text about the nature of the sample and its precise location, identification numbers of related photographs, orientation information, identification numbers of markers placed to indicate specific sample locations, and team identification fields.

Because existing mobile sampling units appear to have very high rates of false positives, all data received from the mobile unit should be entered into a temporary data file in the on-post EOC subsystem of the automation system. The data should then be subjected to appropriate quality checks before being transferred to the main database.

3.2 CHEMICAL EVENT NOTIFICATION AND PROTECTIVE ACTION RECOMMENDATIONS

3.2.1 Chemical Event Notification

The on-post automation system should have the capability to automatically make a determination of an accident's classification on the chemical event notification system based on an automated hazard analysis of the event (see *Planning Guidance for CSEPP*, Sect. 6.2). The system will make this determination employing a geographically-based analysis of the hazard prediction TRAC in relation to the limited area and installation boundaries. The accident classification will be automatically carried forward to the current incident status board screen (see Sect. 3.6.1).

3.2.2 Protective Action Recommendations

Both the on-post and off-post subsystems should support timely execution of the protective action decision making process. This will entail selecting one or more of the EIPs developed during the preparation/mitigation phase (see Sect. 2.1.1) for execution. This requires that, on command, the system extract current appropriate data (e.g., wind direction, wind speed, atmospheric stability) from the meteorological records database and source term data from the initial accident assessment database and input these data into the protective action decision making process. The on-post subsystem will support providing a protective action recommendation to the off-post decision makers.

Once the system has completed the protective action decision making process, it should display both the names and detailed descriptions of the recommended protective action strategies. These strategies will identify the recommended protective action for each population category in each area potentially affected by the release. The system should automatically forward this information to a status board screen (see Sect. 3.6.1).

3.3 PUBLIC ALERT AND NOTIFICATION

Public warning systems and processes are described in the *Planning Guidance for the CSEPP* (Sect. 8.7 and Appendix F, "Public Alert and Notification Systems: System Design Criteria and Evaluation Guide"). The automation system should be capable of controlling and/or monitoring all warning devices. The public alert and notification system is not a subsystem of the automation system; however, the automation system should be capable of activating all or some of the alert and notification devices. The automation system interface control document will describe the interface between the automation system and the A&N system.

The automation planning requirements for warning systems are straightforward. The automation system should be interfaced with the public warning system's central control points which control the sirens and tone-alert radios. When the automation system operator activates particular sirens and/or groups of tone-alert radios, the EOC database should be updated causing a message to be sent from the computer to the warning system central control points. The automation system should evaluate return signals from the central control points to see if each unit has responded correctly. (Tone-alert radios are one-way systems and do not broadcast return signals.) Error checking should occur on all communications links. When the operator activates a siren system, a message should be sent to the log indicating that a siren has been activated. The system should permit the operator to cancel an ongoing activation of the alert and notification system.

The public alert and notification capability of the automation system should be linked to the system's protective action decision making support capability. The selection of a protective action strategy determines the appropriate set of emergency messages. In an emergency or emergency test, the system should display, in either textual or graphic form, the warning devices that should be activated and the message appropriate for each device. The system operator should be able to edit or approve the selection of devices and the content of messages before the system activates the alert and notification system. When the activation command is given, the system should transmit codes for the sirens or tone-alert radios to be activated along with message content to the warning system central control points. The system should automatically log this event on the system log.

The automation system will include two sets of data to support the above functions. The first set is data regarding warning system messages. These data will include an identifying number for each message and the message content. The second set is data regarding individual warning devices (siren/voice units and tone-alert radios). These data will include an address code for the device along with its street address, status, and location in geographic coordinates. These data will be available to the system's GIS capability.

The primary warning system of siren/voice units and tone-alert radios may be supplement by telephone ringdowns or pagers for persons or institutions requiring special notification. The automation system should support activation of these supplemental devices through procedures developed and implemented according to Sects. 2.1.2 and 3.4.

3.4 EXECUTION OF IMPLEMENTATION PROCEDURES

An important part of emergency response is the execution of procedures developed during the preparedness phase. The automation system should support this activity by displaying applicable EIPs developed as described in Sect. 2.1.2, providing for the activation of the appropriate EIP, and monitoring its completion. The system should not allow EIPs to be activated independently of each other, concurrently with one another by different operators, or by other procedures.

The automation system should provide the following capabilities for executing EIPs.

- The system should be able to display a list of all EIPs.

- The system should be able to execute an EIP upon operator command.

- The system should be able to provide an on-screen display of any selected EIP. The display should

  - show all tasks of the EIP, including, for each task, the task number, actions to be taken, who is responsible for taking the actions, to whom or what the actions should be performed, a measure of completion for the task, and the time the task was completed;
  - an indicator of whether or not the EIP is currently active, including who is responsible for the activation and the date and time of activation; and
  - an indication of whether the EIP has been completed.

- The system should automatically call up any data files required by the EIP.

- The system should automatically prompt the activation of devices (e.g., pagers, telephones) as called for in the EIP.

- The system should automatically call up other related actions as directed by the task being executed. The related actions should be automatically executed or displayed for operator approval as appropriate.

3.5 RESOURCE MANAGEMENT

As initial emergency conditions are met, the conditions that define initial response will give way to the need for a more creative and flexible management of resources. Previously undefined and ill-defined situations for which there are no procedures will arise constantly. Resource management will become an important issue. The idea behind resource management is to be able to locate, assign, or reassign resources to make the most effective use of them.

Different things happen to resources during an emergency. Resources may

- need to be located;
- be assigned and reassigned to different jurisdictions or controllers;
- be partially or wholly depleted;
- be split, that is, two resources may be made from one (25 protective suits may be divided into two resources with 10 suits in one resource and 15 in the other); or
- be disassociated from each other (e.g., a portable generator on a fire truck may be placed in locations in need of power).

The automation system should support resource management by providing screens displaying relevant information regarding each resource (see Sect. 2.1.4). The system should allow operators to enter and edit data on the screen display and to create displays for new resources. Figure 3.3 depicts one possible version of a resource management screen that displays the information needed for effective management of most resources. (This figure is for illustrative purposes; screens developed for the system may have a different appearance.)

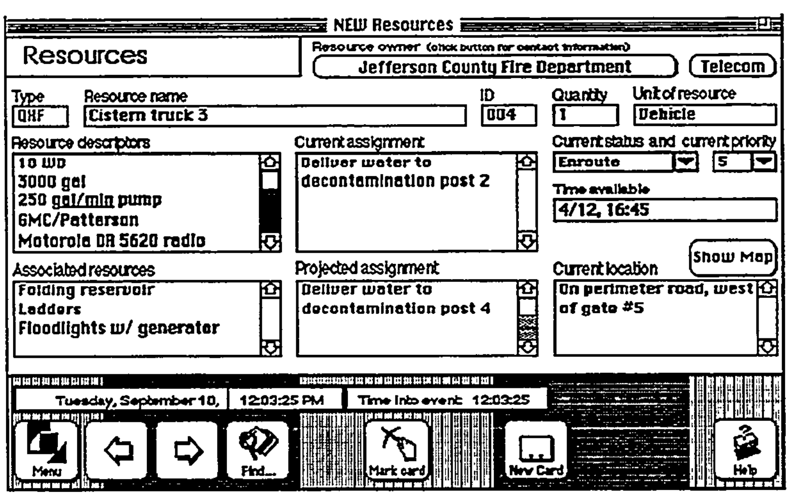

Fig. 3.3 Example of resources screen

The resource management data displayed on the screen should be available to the system's GIS capability. The system should be able to display the location of a resource on a map and should allow the operator to assign a location to a resource by "pinning" it on the map.

The user should be easily able to enter the resource's current location by either moving the resource's map icon or inputting address, street intersections, or coordinates as well as its current status. Such changes should immediately update the database, and the update should be time stamped. In addition, the icon for each resource should reflect its location and availability. The user should be able to click on the icon to display attribute information, including the resource's name, owner, quantity, current assignment, projected assignment, current status and priority, current location, expected time available, resource descriptors, and associated resources.

Some resources can be described only by special types of information and will require resource management screen displays significantly different from those for typical resources. The automation system should support the development and display of these special screens. Figure 3.4 depicts a screen that might be used for managing a specialized resource such as a roadblock. (This figure is for illustrative purposes; screens developed for the system may have a different appearance.)

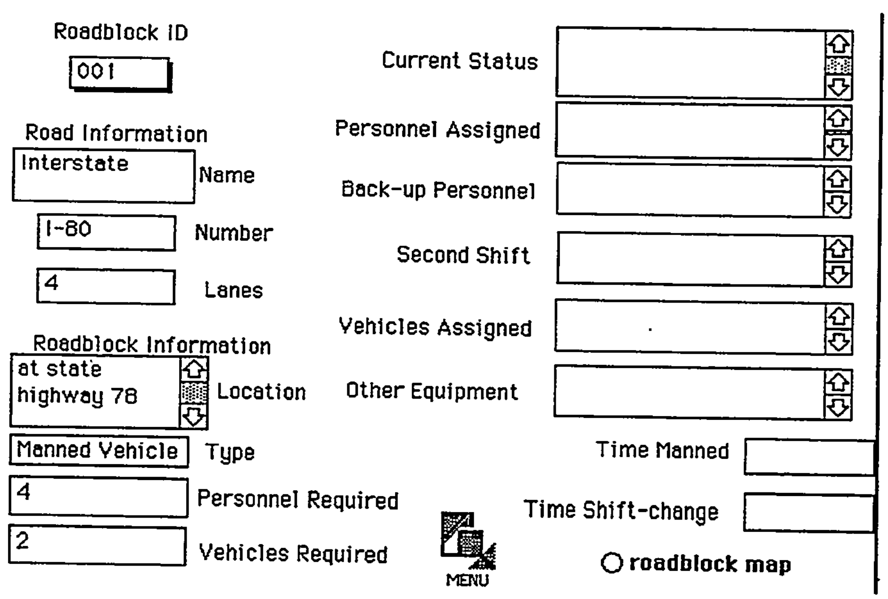

Fig. 3.4 Example of a resource screen for a road block

3.6 MANAGING EMERGENCY INFORMATION

It is important to be able to track all events in an emergency. This requirement is usually referred to as event logging. However, there often is confusion when event logging is discussed because people do not share a common understanding of the term. When the term "event logging" is used it usually includes one or more of the following functions:

- status boards;
- a message traffic/action log;
- a database journal of changes to the automated management system database;
- the status of emergency plans or procedures;
- situation reports; and,
- reports from the Joint Information Center (JIC).

In this document an attempt has been made to limit the use of the term "event log" to those occasions when more than one of the preceding functions is being referenced. Otherwise, explicit reference is made to the exact function.

The system should be able to restrict computer access and functions available to each individual user during an event, or to downgrade the permissions of an individual, up to and including the automatic disconnection of non-essential user sessions and background processes. Generation of resource-intensive routine reports during an emergency should not be allowed if those reports are not vital to the response.

The automation system should be capable of maintaining and displaying status boards that contain information about the current state of the incident(s). The information should be stored as a record in the database(s) associated with a particular status board. The system should maintain a series of records for a particular status board to provide a "history" of an incident for the information contained on that status board.

The automation system should maintain a message traffic log to track messages received by the EOC and/or message traffic initiated by action officers dealing with the emergency. The message traffic/action log should also provide the means of tracking who is responsible for responding to message traffic and tracking whether an appropriate response has been completed. The EOC manager and assistant manager(s) should be able to review the message traffic/action log to stay current and should be able to interrogate the message traffic/action log for key pieces of information.

The automation system should include an automated database journal that tracks all changes to the database management system (DBMS). This log should be transparent to the users and should contain information about who (which client in a client/server architecture) initiated a change to the database, a record of the change to the database, and the time at which the change occurred. (Most sophisticated DBMSs on the market have a journal capability, although almost all have a very limited ability to extract specific information from the journal database without external programming.)

The automation system should provide an emergency plan tracking capability to track the status of emergency procedures. Part of this capability could be included in the message tracking capability and part could be included in the operational capabilities for managing procedures. (See Sects. 2.1.2 and 3.4.)

The automation system should include an automated situation report utility that provides a record of the material that was reviewed during status updates. As such, it may be no more than a record of the various status boards that were used in filing a situation report and any additional information that was conveyed that might not have been captured in the status screens. This is an important capability because it provides a record of what was conveyed to the people managing the incident(s).

3.6.1 Status Boards

Status boards refer to screens containing current information about the salient features of an incident and the response to that incident. Status boards are a summary report of the known information about an incident. The system shall provide a series of status boards (screens) containing the following types of information:

- Description of the incident;

- Current meteorological conditions;
- TRAC location and travel;
- Protective action recommendations;
- Current status of weapons or containers from which agent has been released;
- Casualty information;
- Status information on notifications;
- Status of requests for resources; and,
- Status of traffic control points;

The automation system should store the information in records in associated databases. The information may be entered manually or may be automatically provided by other components of the system. Manual entry of information should be limited to the EOC manager or his/her designated action officer(s) through the use of appropriate security mechanisms such as passwords. When information is automatically forwarded to a status screen data file, the status screen should automatically be displayed and the operator should have two minutes (default) to edit or confirm the information. If no confirmation is received, the status board should automatically be updated with the received information.

Approved users of the system should be able to view information contained on the status boards. Status boards function to

- display, for approved users, the current or historical conditions associated with the accident; and
- provide a place to update key information and to approve updates to key information throughout the emergency.

When a user requests a particular set of information, the current information should be retrieved from the database and displayed on a status screen. A user should be able to view the history of a particular type of status information by scrolling backwards through the records containing that information, by searching for a particular piece of information in the appropriate record, or by searching for records associated with a selected period of time. When a data element is changed, that element and all associated data in the record should be written to a new record that should become the current status board for that type of information. Table 3.1 provides examples of the types of information that may be displayed on status screens.

Where appropriate, the information on status board screens should be available to the system's GIS capability. For these screens the system should be capable of displaying the information on a map. The system should be capable of displaying the status board and its associated map either sequentially or side by side. Drawing tools should be associated with all map screens to allow the operator to add or remove drawing elements. Maps should have a zoom capability to permit changes in scale and in the level of detail.

Figure 3.5 is an example of how one status board, the "current incident screen," might look. (This figure is provided for illustrative purposes only; screens developed for the system may differ in appearance.) Information on this example screen would either be inserted automatically based on information from other screens entered through the accident assessment module or be inserted manually by the manager of the EOC. The information contained on the incident information screen labeled "current" represents the emergency manager's current understanding of an incident in progress. By using the arrows at the top right of the screen, the manager is able to "scroll" through prior reports for the same event. For the prior reports, the word "current" on the screen is replaced with the time at which one or more data elements on that screen were changed.

Because it is conceivable that more than one "incident" may occur at the same time, this example allows the operator to label data associated with two or more incidents. Each incident will have its own "name" and a set of related incident screens. The incident "name" is an assigned number.

Table 3.1 Example information for status screens

Incident	
Incident identifier number	
Description	
Incident description data	
Estimated time incident began	
Time reported	
Agent involved	
Incident location (description)	
X-coordinate	X-coordinate in user units
Y-coordinate	Y-coordinate in user units
Type of incident	
Estimated source term	
Munition container type involved	
Number of containers /munitions	
Signature of incident	spill, fire, explosion, complex
Meteorological conditions	
Wind speed (current)	
Stability class (current)	
Wind direction (current)	
Wind speed (projected 1 hr)	
Stability class (projected 1 hr)	
Wind direction (projected 1 hr)	
Table showing meteorological values at 15 minute intervals from the accident	
TRAC data	
TRAC orientation	
Time posted	
1% lethality	
0% lethality	
No effects distance	
Leading edge arrival times	
Following edge arrival times	
Area traversed by the TRAC	
Protective-action data	
Protective-action recommendations	
On-post protective-action recommendations time posted	
Off-post protective-action recommendations Group I	
Off-post protective action implemented Group I	
Off-post protective-action recommendations Group II	
Off-post protective action implemented Group II	
Protective-action recommendations Group III . . . N	

Table 3.1 Example information for status screens (continued)

Weapons/container data	
Weapon/container 1	Status of weapon/container
Weapon/container 2	Status of weapon/container
Weapon/container 3	Status of weapon/ container
Weapon/container	Status of weapon/container
Weapon/container n	Status of weapon/container
Casualty Information	
Name	
Other identifying information	
Location of incident where casualty occurred	
Contaminated	
Current contamination status	
Description of casualty incident	
Medical description of the casualty	
Current medical description of the casualty	
Current location of the casualty	
Current transportation status of the casualty	
Other remarks	
Notification Information	
Persons to be notified	
Status of notification	
Next update	
External resource requests	
Nature of the resource	
From whom requested	
Time of request	
ETA	
Current status	
Remarks	

This example screen (Fig. 3.5) contains information (accident classification and meteorological data) that was automatically forwarded from other components of the automation system. As discussed above, when this screen is activated at the onset of a new incident, the operator will have two minutes to edit or confirm this received data. If there is no confirmation, then these recommendations will automatically become the default emergency conditions. Editing of the information could be accomplished via "point and shoot" operations.

Figure 3.6 depicts an example of the incident map screen that might be associated with the status board screen shown on Fig. 3.5. (This figure is provided for illustrative purposes only; actual screens developed for the system may differ in appearance.) In this example, the map display would be activated by selecting the map icon on the status board screen. The

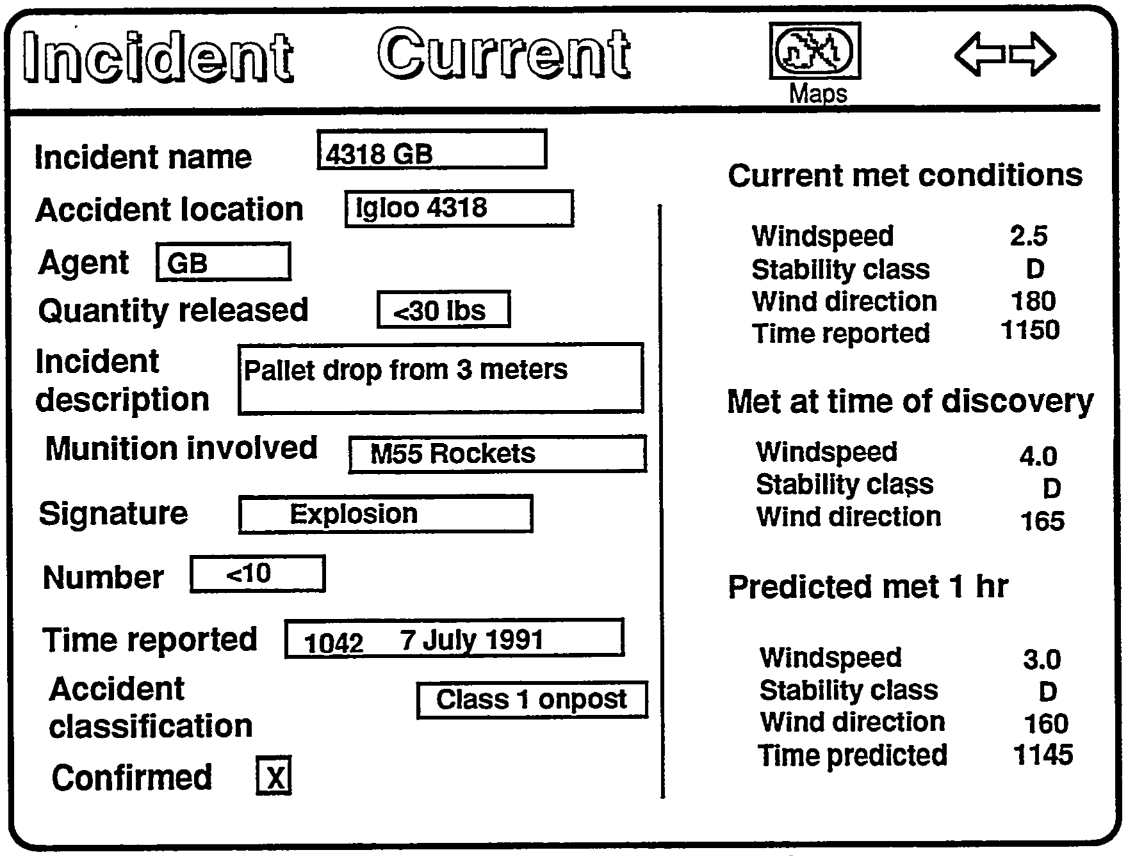

Fig. 3.5 An example of a status board screen

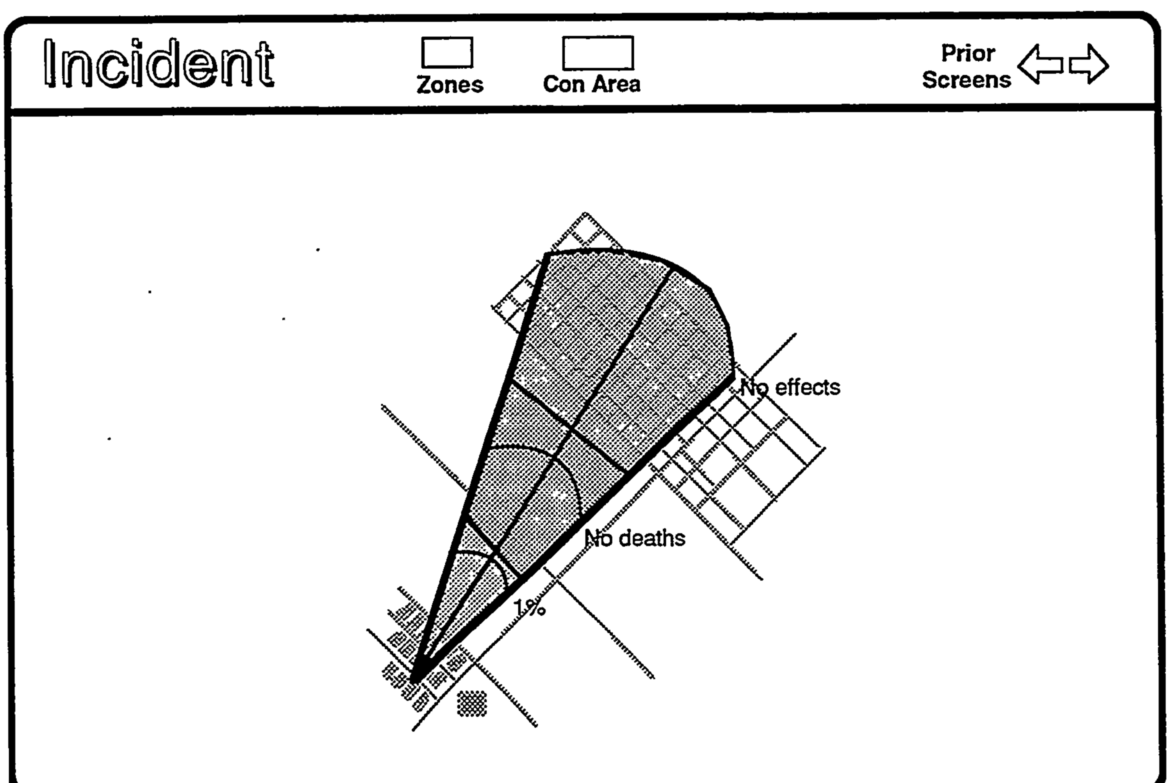

Fig. 3.6 Example of contamination area overlaid on map with protective action layer turned off

incident map screen displays the location of the incident(s); the rays of an arc defining the edges of the potential contamination zone; and the arc for the 1% lethality, the no deaths and no effects distances. Because an incident evolves over time, there is a need to distinguish between the area that may be being approached by the vapor cloud, the area over which the vapor cloud is likely to be, and the area where the vapor cloud has passed but where there may be deposition. The

area between the projected leading and following edges of the TRAC at the time of the most recent projection could be highlighted in red or some shade of gray. The area between the source and the trailing edge of the TRAC could be highlighted in another color such as yellow or shade of gray. The area between the leading edge of the cloud and the no-effects distance could be highlighted in yet another color (blue) or shade of gray. If the vapor cloud should no longer be airborne, then the entire area could be shaded yellow. A band between the colors might be a checkerboard pattern to indicate the uncertainty about the exact boundaries between the areas. This scheme, or something approximating it, will help to define where the vapor cloud resides and the potential area for contamination. Since managers may need to know the estimated arrival time of a cloud, pointing at the center line of the arc in a particular location could cause a display of the time of arrival of the leading and trailing edges of the cloud. The protective action zones may also be drawn on the map. The elements describing the contamination zone and the protective action zone may be toggled on and off. The user should also be able to retrieve overlays from earlier maps and place them on the map to compare with the "current" map.

3.6.2 Message Traffic/Action Log

There are three basic types of message traffic: messages generated external to the EOC and conveyed to the EOC by telephone, radio, or data fax; messages generated internal to the EOC by action officers; and messages generated on-post for off-post use. Each off-post EOC will establish its own procedures. The message system should be flexible enough to accommodate a range of procedures.

The automation system should enable emergency managers to review message traffic, find selected messages, and obtain reports of all actions to be completed or actions to be completed by a specific action officer. To provide these functions, the design of the message control form, the e-mail system, and the DBMS must be closely linked.

Upon request, the automation system should display a message form to an operator. A sample message form is shown in Fig. 3.7. When the operator has filled appropriate fields, the form is sent by e-mail to appropriate receiving parties and, transparently, to the DBMS.

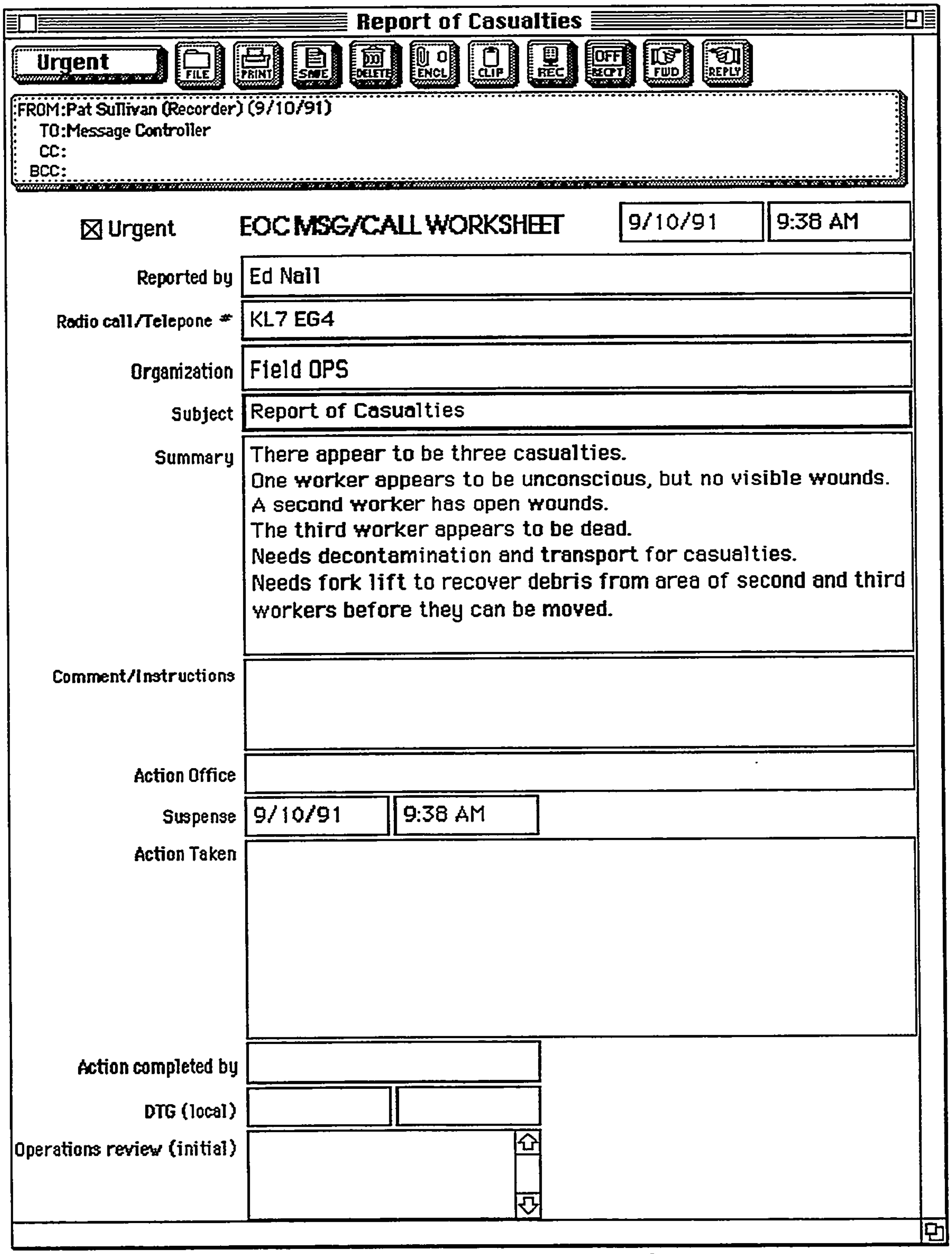

Fig. 3.7 An example of a message form

If one or more designated receiving parties is not connected to the system, the message should be redirected or the sender should be notified.

Figure 3.8 is an example of a mail form and distribution method for a more advanced mail system. In this example, receiving parties review and initiate by filling appropriate fields and then reply or forward to other action officers through the e-mail system. The new information on these forms is updated transparently to the database.

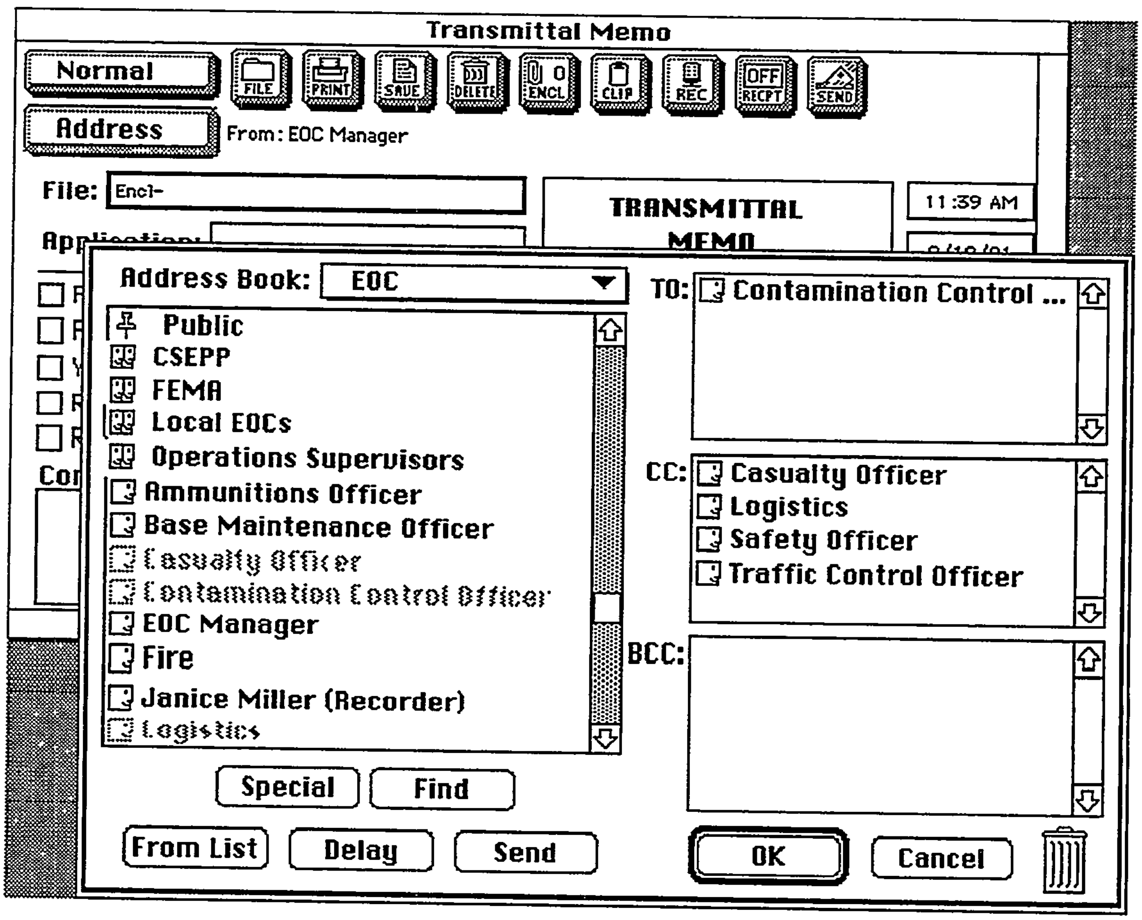

Fig. 3.8 An example of mail form to send EOC message

3.6.3 Message Traffic/Action Reports

Reviewing message traffic: The automation system should enable all persons receiving message traffic to sort the message traffic in the e-mail system by urgency, time, subject, suspense, and originator. Urgency, time, subject, suspense, and originator should be indicated on the listing of messages so that the user can scan the entire list of messages at once. Once a message is read, it should be removed from the mail list, although it will be retained in the message traffic database.

Finding selected messages: The system should allow users to search any field or group of fields in the message traffic database for any word, phrase, or set of noncontiguous words. ("Word," as defined here, means a word or part of a word.) Searches for a word or phrase should return all partial or exact matches. Noncontiguous word searches should search specified fields for the selected words and return any records containing the words regardless of order. Search operators such as “and,” “or,” “=,” “<,” and “>“ are required. These operators allow search conditions to be defined so that one can find, for example, any suspense between 0900 and 1000 with “AMC” or “HQ” in the organization or summary field. The system should support graphical construction of searches. Error checking should be conducted to permit only valid searches.

Producing action reports: The automation system should enable action officers to search the message database and produce simple reports. For example, an action officer may need to produce a report showing all incomplete actions listed by time of suspense. Alternatively, an action officer may wish to print a selected set of messages that meet a set of search criteria. The system should contain a set of predefined action reports and a simple method for defining the format of new reports, for example, a utility permitting graphical placement of report elements. The system should be capable of producing reports that include listings of all actions sorted by action office, completed/open status, subject, or user-selected criteria. Users should be able to select the file in which each report is stored and the printer where it is printed.

3.6.4 Situation Reports

Situation reports should be constructed from the status boards and other pertinent information. The system should construct these reports as predefined report forms in the DBMS that are automatically filled with information from current status boards. In addition, word-processing-like capability should be provided for adding information to the report. The system should allow users to incorporate images into the report either in the form of scanned pictures or images that are copied and pasted from screens.

3.7 POPULATION ASSISTANCE

System design should accommodate the development of the following databases:

- an evacuee register and evacuee locator register,
- a human exposure and treatment register, and
- management assistance at mass care sheltering facilities.

3.7.1 Evacuee Register

There are a variety of reasons for establishing an evacuee register. Such a register provides one way of establishing that an individual was part of the evacuation and is entitled to compensation. An evacuation register also provides a way to locate people who may become separated from each other.

There are two major difficulties in establishing an evacuee locator register. The first is the logistics of getting the register into operation quickly. Reception centers could be established at locations where automated information equipment already exists (e.g., schools that have computer facilities). However, the possibility that the affected buildings could become contaminated argues strongly against this approach. The possible need, in the initial stages of an emergency, for battery-powered computer operations or a manual evacuee registration process should also be considered. It is important to design the system so that large numbers of people can be handled quickly with a minimum of input errors.

Thus, the automation requirements are to

- rapidly establish a PC capability at reception centers to process evacuees;
- have trained volunteers who can assemble the hardware, load software, enter data, conduct searches, and operate communications equipment;
- require minimal input so that processing can be handled rapidly;
- give priority to evacuees who are searching for other family members;

- upload information from the reception center to a central computer;
- design a query queue so that matches can be made and reported without having to requery the system; and
- design the query system to minimize the traditional "literalness" of information systems which often obstructs matching.

3.7.2 Human Exposure and Treatment Register

It is vital to know who has been exposed, where exposed persons are located, and, if it can be determined, the circumstances and place of their exposure (Watson, et al. 1989; Watson and Munro 1990; Munro, et al. 1990). It is important to maintain a record of decontamination and treatment and to obtain exposure information from symptomatic individuals. As complete a description of the signs or symptoms as possible should be obtained from medical personnel or the casualty or his/her companions. Any other pertinent medical data should be recorded. In addition to the standard reception information, it would be useful to show the individual a map and determine where the individual was located following notification of the emergency as well as the path that the individual followed in leaving the contaminated zone. Narrative information that the individual can provide should be recorded. At a minimum, summary information about the number of exposed persons and information about where exposures occurred needs to be presented to the EOC. The remaining data could be maintained separately.

3.7.3 Human Fatalities Register

There may be deaths during a chemical emergency either because of exposure to agent or from other circumstances such as heart attacks. A fatalities register is needed for several reasons including

- notification of next of kin;
- identification of missing persons to minimize demand on search resources;
- accurate reporting of effects of the accident to the public;

- establishing the boundaries of contaminated zones;
- disposition of remains;
- assuring public health and safety; and
- establishing a basis for compensation or other benefits following the chemical emergency.

A protocol should be developed for obtaining fatality information. At least summary information for fatalities should be reported to the on-site EOC. At a minimum, the following types of information are needed for each fatality:

- name,
- social security number (if known),
- home address (if known),
- method of discovery of remains,
- probable cause of death,
- location of remains at death (address and geographic coordinates),
- current location of remains,
- contamination status of remains, and
- information regarding autopsy, forensic investigation, etc.

3.7.4 Confiscated Property Register

As part of the decontamination process, people may be asked to surrender personal property. It is important to secure and track that property in order to return it to its rightful owner once it has been determined safe or to compensate the owner for the property's value. Information needed for the confiscated property register includes

- date of report,
- name of person making report,
- name and address of confiscated property owner,
- number of items confiscated property,
- descriptions of each item confiscated,
- ID number(s) assigned to confiscated property,
- estimated value of each item,
- location of items confiscated, and
- ID number(s) of associated property inventory photographs.

3.7.5 Shelter Management

In addition to being able to track evacuees, emergency managers must also be able to manage shelters effectively. Thus, they must be able to track the number of persons in a shelter and track the resources associated with the shelter. There must be sufficient food, water, cots, clothing, and sanitary equipment to support the sheltered population. There appear to be three basic functions:

- the shelter manager must be able to track and report the number of sheltered persons by age group;
- the shelter manager must be able to keep an inventory of the resources that are available at the shelter; and
- the shelter manager must be able to request additional resources.

The first of these functions can be accomplished by developing a specialized report from the evacuee registration form. The main problem will be to ensure that those who are not staying in the center indicate that they are leaving. The computer-generated numbers should be supplemented with estimated counts.

The inventory problem can be addressed by the specialized use of the resources forms described in Sect. 3.5.

The ability to generate computer requests for additional resources will require specialized forms and the ability to dial into a central facility.

4.0 RECOVERY PHASE—FUNCTIONAL REQUIREMENTS

The goal of the recovery phase is to return the affected area and population as nearly as possible to pre-accident conditions. Many efforts that were initiated during the response phase will continue during recovery, although the focus of the efforts may change. Automated support for these efforts will also need to continue. Support for population assistance, for example, will continue to be necessary as long as people are unable to return to their homes. In addition, much of the data collected during the response phase regarding exposures and fatalities will be analyzed to refine estimates of the area affected by the accident. Resource management tasks will continue, using the same automation capabilities as before, although different types of resources (e.g., monitoring and decontamination teams and equipment) will likely be involved.

Information flow management during the recovery phase will be defined in user's manuals with the amount and type of equipment required. In addition, methods for ensuring that data are current shall be established based on the system design. The process for ensuring that only qualified personnel are allowed to change critical information shall be specified.

One recovery function will require automation support significantly different from that provided in earlier phases. This function is the drawing and tracking of samples to determine the extent and degree of contamination of the affected area. The automation requirements associated with sampling are discussed in the remainder of this chapter.

A major effort during the recovery phase will be sampling to certify that concentrations of agent in potentially contaminated zones are within acceptable levels. Figure 4.1 shows the tasks involved in the sampling program. To support this effort the automation system should

- provide support for designing environmental sampling plans;
- provide support for managing the field teams who are actually collecting the samples;
- track (i.e., chain of custody) the samples from the time they are taken until the results are entered into the automated system;

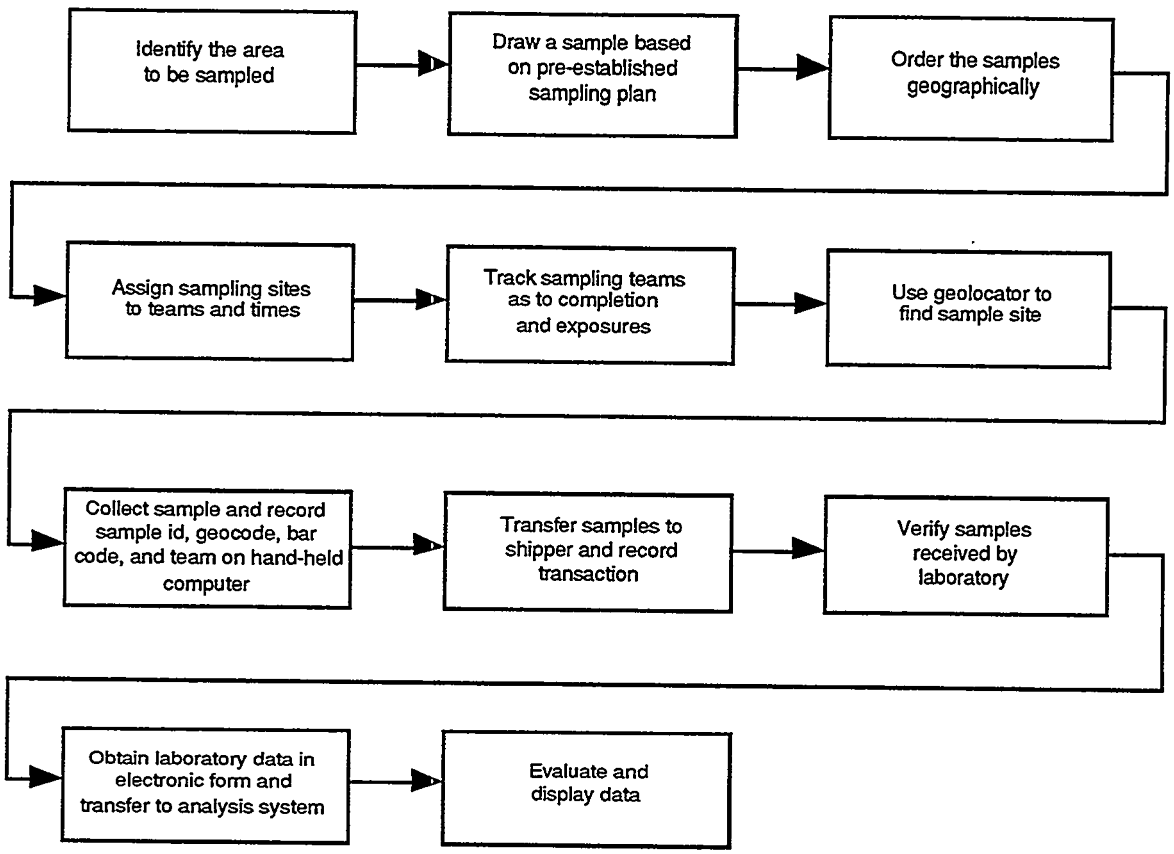

Fig. 4.1 Flow diagram of sampling and sample tracking procedures (example)

- support the analysis and display of data from the samples.

4.1 DEVELOPING A SAMPLING PLAN

The initial step in the sampling effort is to identify the area over which the agent concentration is assumed to have traveled. The automation system should support this step through the use of dispersion modeling capabilities.

The system should support the use of empirical data to confirm and refine the modeling results. The system should be able to analyze summary data from the human exposure and fatalities registers. In addition, the system should permit manual entry of other evidentiary data (e.g., location of downed domestic animals or wildlife from aerial photographs or other sources).

Once the affected area is identified, the system should support the application of a density function to the sampling area. Because agent will probably not disperse uniformly over an area, more samples will need to be taken in areas which received smaller concentrations than in areas receiving higher concentrations. The system should be able to design a sampling scheme weighted to areas receiving lower concentrations. The system should provide coordinates for locations to be sampled and supply a unique identifier to be used for each sample location.

4.2 SAMPLING MANAGEMENT

To support sampling management the automation system should help to do the following:

- order the samples geographically;
- track team membership and track estimated dose, baseline medical data, and blood ChE activity of team members;
- track which teams are assigned to which sites; and
- keep track of teams in the field including team arrivals and departures from sample locations as well as other unique information that might be conveyed to the EOC.

Each sampling team could be equipped with a hand-held computer and a bar code reader (see Fig. 4.2). The hand-held computer could use a simple database entry form that permits the team to record sample identification numbers and bar codes affixed to the sample containers. The system should permit entry of other pertinent information, such as descriptive text about the nature of the sample and its precise location, identification numbers of related photographs taken while the samples were being gathered, orientation information, the identification numbers of markers placed to identify specific sample locations, and team identification fields. The database should identify replicate samples taken at the same location. Data could be transmitted from the sample site (using cellular phones) to the on-post or off-post automation subsystem, which should confirm that the data have been received and verified before the team leaves the site.

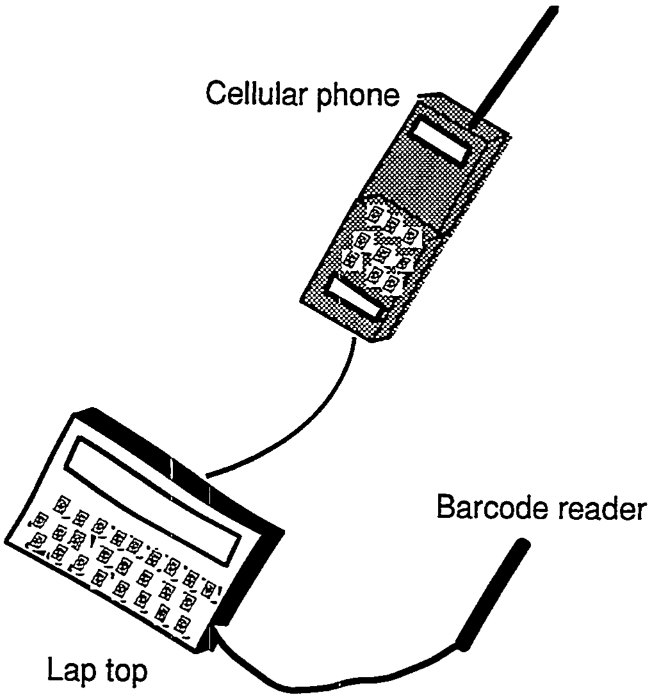

Fig. 4.2 Example field sample tracking unit

The system should support development of a transshipment database to indicate which samples are in which containers being shipped to which laboratories and for which analyses. The system should provide for uploading and downloading of data between field teams and a central source.

The automation system should support the electronic receipt of analysis results from laboratories. Once the data are returned to the EOC, the system should support the evaluation of the data, including comparison to environmental background concentrations determined prior to the release. Data may be graphically displayed by location or contoured.

5.0 SUMMARY OF DATA/INFORMATION FLOWS

It is envisioned that the databases for the on-post and off-post automation subsystems would be identically structured. Some of the data tables would contain identical information while others would contain location-specific information. Perhaps the easiest way to think about this is to think about where data will be generated and used. Some data and information are mostly local in application and are generated locally. Other information is generated externally but has local application. Some locally generated information has external use or application. And some information has both local and external application.

Accident data and the data required to evaluate the accident are generated at the on-post EOC. Most of these data flow off post to local and state systems where they are used to develop an understanding of the accident and to guide local decision making. These data may be stored locally for later reference.

Resource data are generated both locally and at other nodes and may be used in both places. The post will generate its own resource data as will local and state entities. The post and the local jurisdictions will use their own resource data, but the post is also likely to send resource data and information to the locals. Local entities are likely to receive resource data from the state. Both the post and the state are likely to receive resource data from the Army and other entities. Precontracted resources are also likely to be used. The resource data may be prepared ahead of time and entered into the system.

Procedures and contacts are largely local and will be generated and used locally, although there may be some exchange in this area. The formulation of procedures in the planning stage will require substantial exchange of data.

Data related to the assessment of accident impacts will be generated locally both on post and off post. These data will be used locally, but the off-post entities will send assessment data or summaries of assessment data to the on-post EOC and to the state. At least initially, these data will probably be handled through the CSEPP automation system. Later, these data may be transferred to other systems in order to free the CSEPP automation system for emergencies. Similar data flows are expected for post-accident management activities.

The automation system at Army headquarters should be capable of networking into the wide-area network (WAN). Personnel at headquarters should be able to monitor the situation. External systems, such as the headquarters system, can be used to support the on-post system, for example, by preparing data for resources (such as protective clothing) being transferred to the location of the event and then electronically passing the data associated with these resources to the on-post automation subsystem. For a variety of reasons, it is probably not practical to use the remote system as a back-up to the primary system.

6.0 SYSTEM DEVELOPMENT PROVISIONS

6.1 SYSTEM SPECIFICATIONS

6.1.1 Hardware Requirements

6.1.1.1 System Hardware Architecture

Figure 6.1 is a high-level conceptual drawing showing the minimal wiring diagram of an emergency management information system. The drawing depicts functional connections and may not indicate all required physical connections. Nodes of the system are located at the on-post EOC, the DMF, local governments, state governments, and the JIC. Temporary reception centers will be able to upload and download information but will not necessarily be full fledged nodes on the system. The higher commands of the Army will be able to view data and to upload and download data. The JIC will have available to it all of the information available on the system that is authorized to JIC operators.

Other components such as weather stations, chemical sensors, and the warning/alerting system(s) are attached to the system. The monitoring systems are connected directly to the on-post subsystem of the automation system. All automated chemical monitoring equipment is likely to be located at the DMF. Agent monitoring data (out-of-limits alerts) from the DMF will be passed to the on-post EOC. During a chemical event, the monitoring data could be made available to off-post entities, but it would not normally be available in real time.

The installation will maintain a subsystem that will collect and process data from meteorological stations. Data from local jurisdictions that have their own meteorological stations will be available locally and may be sent to the on-post EOC to be used in obtaining a more comprehensive view of meteorological conditions. Meteorological data collected by the on-post system will be updated to off-post systems automatically.

Both on-post and off-post automation subsystems are connected to the warning systems. The on-post systems must be able to activate part or all local systems in order to provide a timely warning in all circumstances. Local entities will be able to activate their own warning and alerting systems but not those of other communities.

Data links between nodes of the system should be hard-wired, nonpublic telephone links with appropriate high speed modems at each end. This system should parallel the hard-wired audio communications system. The dedicated communications link between the on-post and

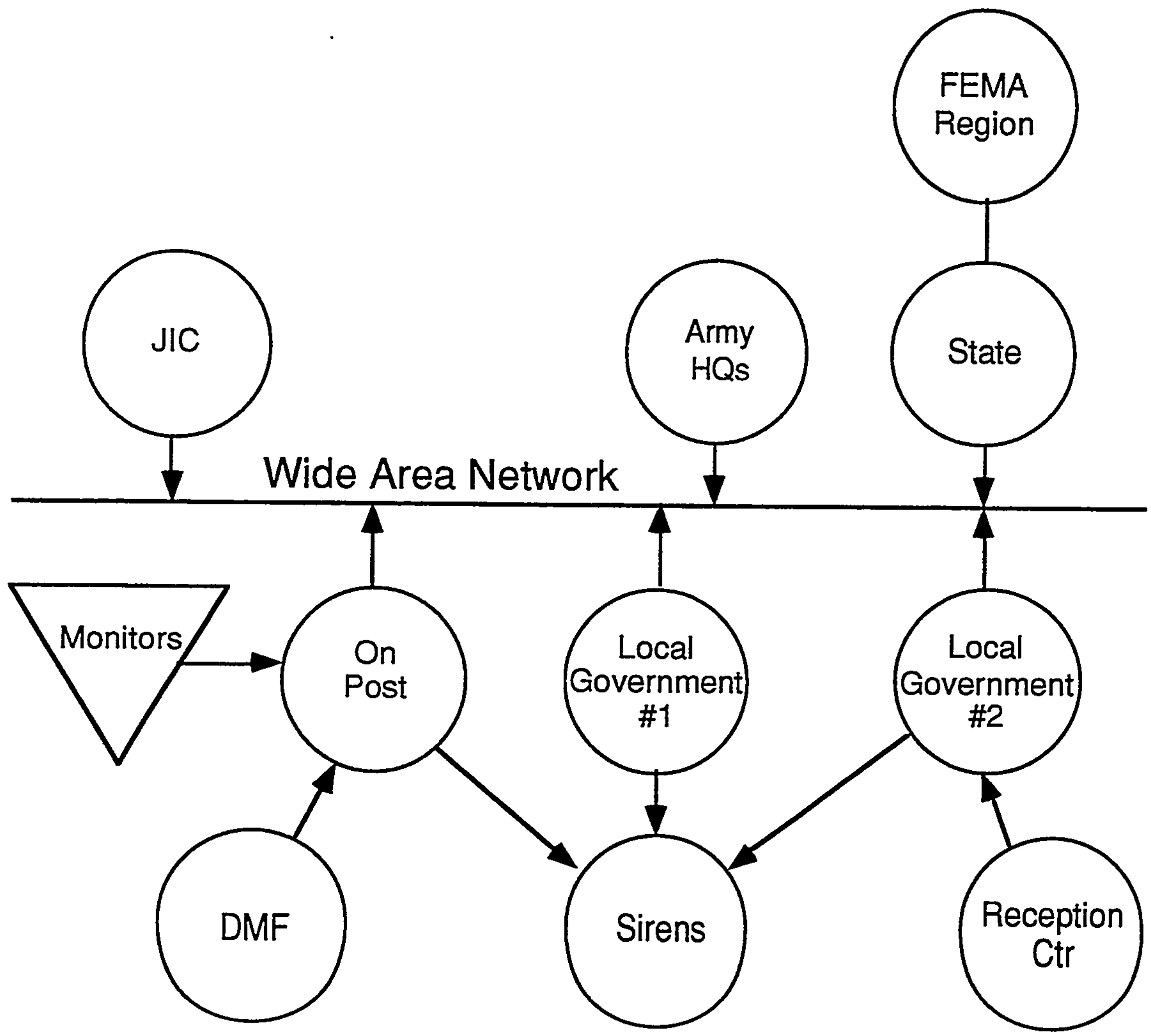

Fig. 6.1 Example minimal wiring diagram for the automation system (high level)

off-post systems should support an actual throughput rate of at least 56 kbps communication to support rapid transfer of graphics between nodes. A back-up link via dial-up modems supporting V.32bis and V.42bis protocols is required.

Sufficient redundancy shall be built into the dedicated communications network to minimize interruption of data communications.

The system architecture will be GOSIP layer 4 compliant in accordance with FIPS 146 (IEEE 802.2, IEEE 802.3, IEEE 802.4, and IEEE 802.5)

6.1.1.2 Architecture of the On-post Automation Subsystem

Figure 6.2 is a conceptual diagram showing the architecture of an on-post system. The terms "workstation" and "server" are intended to be understood as representing a distributed network client/server architecture. Multi-user systems are not adequate.

The data server is the backbone of the system. It must be a machine equipped with a true multi-tasking operating system. It needs to be sufficiently fast to handle traffic from multiple jurisdictions, traffic from the monitoring systems, and database transactions.

A back-up server must be present and the software needs to support rapid switching to the back-up server. The client workstations within the EOC shall be linked to the server via 10 Base T or thin wire Ethernet. The client workstations must be capable of running POSIX compliant software. Decision maker workstations must support dual monitors with a resolution of at least 1152 x 870 pixels and a minimum pixel depth of 8 (256 colors).

Sufficient Ethernet bridges and modems will be needed to connect all local sites, the JIC, and other nodes, such as Army headquarters, over leased lines.

6.1.1.3 Architecture of the Link to the DMF

With the approval of the local DMF commander, a node of the automation system can be provided off of the on-post EOC subsystem. The node will be tied to the EOC through an Ethernet link composed of bridges and modems. The physical link between the DMF and the EOC should be a hard wire or a fiber link with an appropriate back-up link.

6.1.1.4 Architecture for the Local Off-post Automation Subsystem

The architecture for the off-post subsystems in IRZ and PAZ counties (see Fig. 6.3) is similar to that of the on-post central server option. The off-post subsystem will require a central server and 3-10 additional workstations. The exact number of workstations will need to be determined based on county and state level task analyses.

6.1.1.5 State Level Architecture

The state level system should have the same architecture as the on-post system but without the sensor inputs or the capabilities to activate the alarm systems.

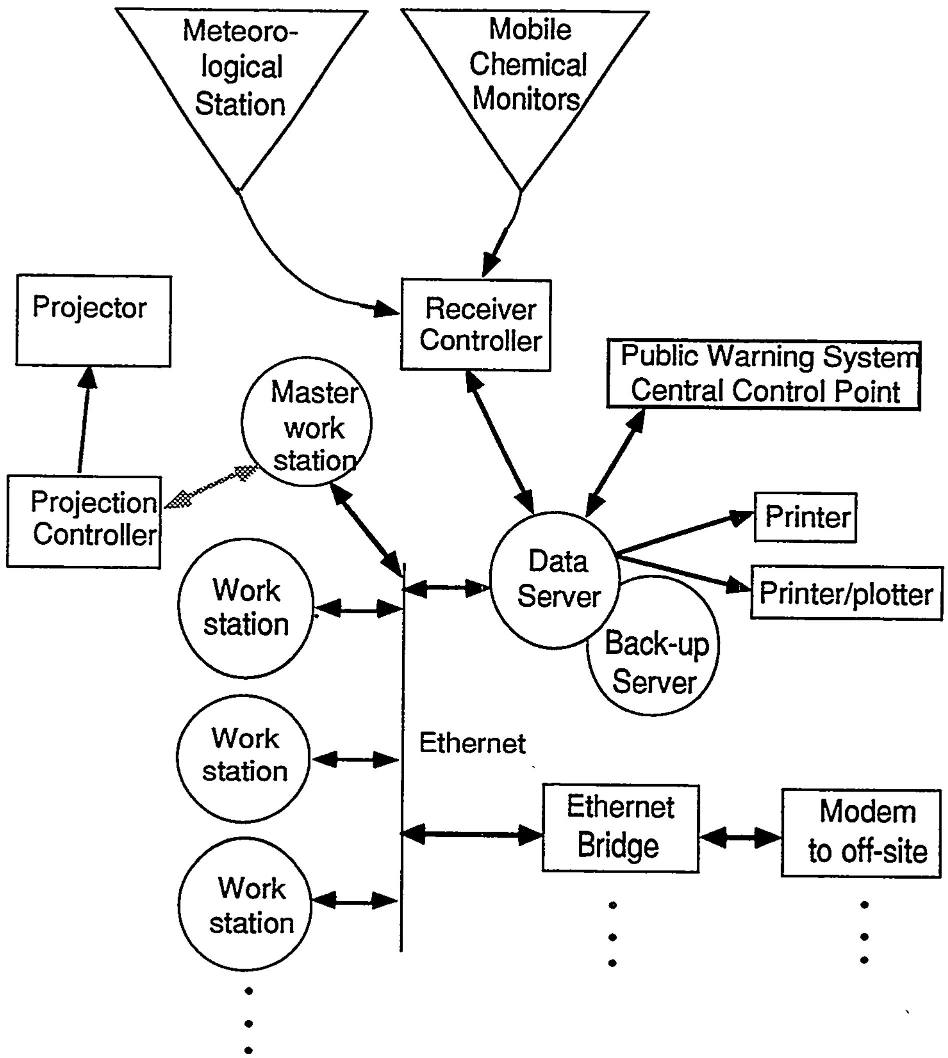

Fig. 6.2 Example minimum on-post EOC system architecture

6.1.1.6 Power Requirements

Equipment should be isolated from disturbances or faults that may occur on the power line. This may be accomplished by the use of devices such as uninterruptible power supplies (UPS). Either a central UPS for the entire EOC automation system or an individual UPS for each server, workstation, and important peripheral is acceptable. The UPS should be capable of maintaining the automation system for a period of 30 minutes.

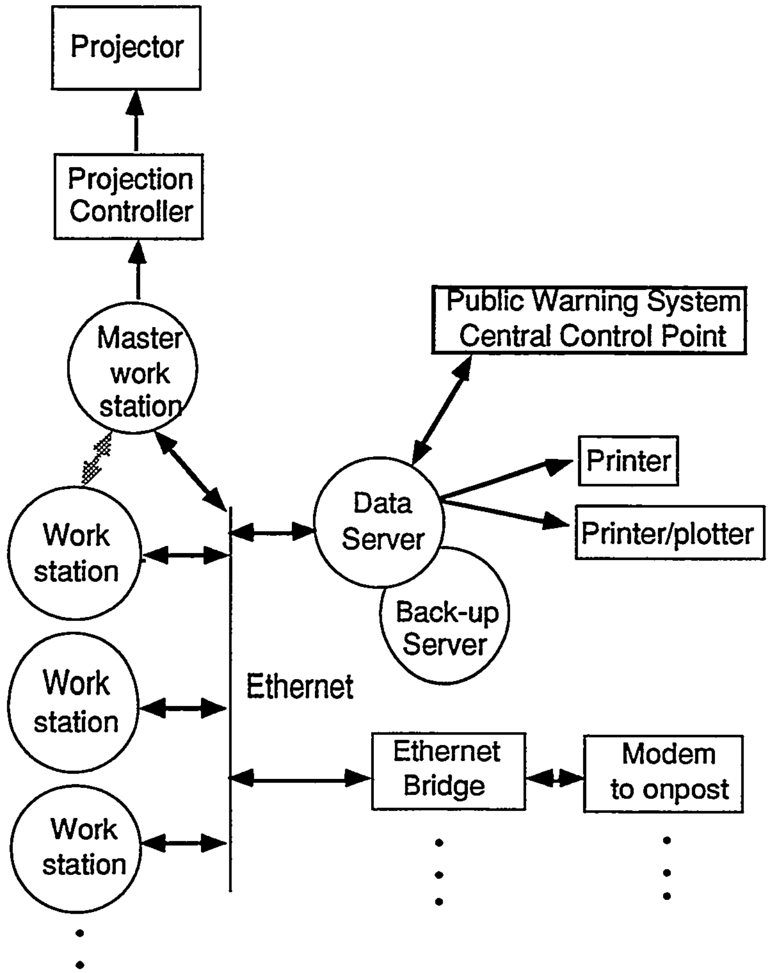

Fig. 6.3 Example minimum off-post system architecture

6.1.1.7 Sharing Computer Images: Video or Overhead Projection

The use of video or overhead projection must be planned carefully. Without careful planning and control, projecting computer images on a screen can cause confusion and add distractions in the EOC, detracting from the ability of decision makers to focus on their mission to control an incident. Projecting images on a screen can be useful for briefings and for group decision making. While standards for screen projection must be locally determined, the following considerations are offered as suggestions.

- A projection system should be controlled from a single dedicated computer.

- The computer controlling the projection system should not be used for any purpose other than providing a video output to the projector. This prohibition includes the running of any scenarios or what-if projections on the machine controlling the projector.

- Images and output for the projector should be fed to the computer controlling the video projector by other computers.

- There should be a single person responsible for controlling what is on the projection screen.

- There should be a protocol establishing what can be shown and who can request images to be projected. The protocol should include a set of minimum standards for information that must be displayed as part of the image.

- Images should be projected only when there is need for group viewing. At other times, the screen should be left blank or display a message stating that no images are available.

- An image that is acceptable at screen size will often project poorly because there is too much detail and text and features are too small. Special maps and text displays should be developed for use with projection equipment. It is unlikely that projection equipment will displace entirely the detail maps that are often found on the walls of EOCs.

- Many types of projection equipment work poorly in large rooms because the displays are not sufficiently bright. This means that the use of overhead equipment requires very low lighting levels. This in turn becomes dysfunctional for other operations within the EOC where adequate lighting is essential. Great care should be taken to design lighting for use with projection systems and task lighting so that EOC operations are not disrupted.

The availability of suitable projection equipment is changing rapidly. There is a variety of video projectors on the market. Users should investigate these based on the above identified considerations. There are also flat-plate color liquid crystal display (LCD) panels that will work with high-quality overhead projectors and which will display images at a rate of 30 frames per second. While the latter cost more than video projectors, they are more flexible and their price will likely decline rapidly as competition intensifies.

The system should include software that allows some or all users to see images appearing on other computers. A user should be able to make available the image on his/her screen to other users, and the EOC manager should have the capability to view an image displayed on any machine and should be able to cause an image displayed on any machine to be displayed at some or all other terminals. The use of this type of software may reduce or eliminate the need for projection. As with overhead projection, this form of image sharing has limitations. The primary limitation is that it may disrupt activities at a local workstation. The user needs to be able to control the display of images on his screen at all times.

6.1.2 Software Requirements

6.1.2.1 Requirements

The functional requirements discussed in this document lead to the following minimum software requirements. These requirements are based on generally accepted federal standards and on lessons learned from previous CSEPP exercises.

- The operating system for the servers should be POSIX compliant UNIX.
- The system should have an RDBMS that can handle textual, numeric, or image data at a pace consistent with events.
- The RDBMS should be able to function in a decentralized networked environment.
- The underlying RDBMS should be capable of running across a variety of platforms.
- Any database should be capable of triggering the immediate updating of other databases.
- The RDBMS should comply with the structured query language (FIPS SQL 2 Standard and Extensions).

- There should be appropriate levels of field- or record-locking to maintain the integrity of the database.

- The functions normally associated with GISs, most notably the ability to retrieve information identified through overlays or by banding displays of geographical information, should be present. These functions do not necessarily have to be a part of the RDBMS per se, but they should be able to retrieve data from the RDBMS for geographical processing. A GIS should be provided with the following capabilities as a minimum:

  - the ability to overlay spatial data layers and combine them logically and/or physically;
  - the ability to retrieve database information from a graphical query, and the ability to graphically display the results of a database query;
  - support for both vector and raster data types and the ability to convert from one to the other;
  - support for spatial data formats as follows: DLG-option; degrees/minutes/seconds (DMS); TIGER; DEM; Digital Terrain Elevation Model (DTED); Digital Exchange Format (DXF); Arc/Info; Standard Interchange Format (SIF); Thematic Mapper (TM); *Satellite pour l'Observation de la Terre* (SPOT); Land Satellite Multispectral Scanner (LANDSAT MSS); and Digital Chart of the World-Vector Product Exchange Format (DCW-VPF);
  - support for the Spatial Data Transfer Standard;
  - double precision coordinates;
  - map projection support, including UTM, Transverse Mercator, and Lambert Conformal Conic;
  - support for geoids, including North American Data, 1927 (NAD27), NAD83, National Geodetic Vertical Datum, 1929 (NGVD29), and NGVD88; and
  - a macro or scripting language.

- The display of information on maps is a central feature of the system. The display of maps at various scales and levels of detail is important. The software should have a zoom feature capable of shrinking or enlarging maps and providing decreasing or increasing levels of detail, and it should support display and overlaying of series of raster or vector maps or both at different scales with different levels of detail.

- Information with a geographical component should be maintained and displayed in a user coordinate system. At a minimum, the system should be capable of storing coordinates in the universal transverse mercator (UTM) format or as latitude and longitude with the ability to move between the two systems in real time. The system may use other coordinate systems as long as the basic requirement is met.

- The graphical user interface should support icons. Pictures, drawings, detailed maps, and tabular or textual information may be stored behind icons and may be activated for display by pointing at the icon.

- The user interface should include a point and shoot (click) interface, maximize the use of pull-down menus, and minimize command line entries.

- The network should meet IEEE standards. The protocol will be Transport Control Protocol/Internet Protocol (TCP/IP).

The main objective of this program is to develop an automated system application rather than building a database management system. The DBMS should be one of the several commercially available standard database packages that will work on a variety of platforms. This is important because this system or its successor systems will be in place at least through 1998 and quite possibly past the turn of the century. It is quite likely that the hardware will be replaced at least once and possibly twice during this time. The vendors of DBMSs will see to it that their systems evolve to take advantage of new hardware. They are likely to provide migration paths so that existing applications built around their DBMS can be moved to more advanced platforms and can also be modified to make use of new features.

The CSEPP automation application will require extensive support and modification. There will undoubtedly be a demand for additional features. The choice of databases, languages, and operating system should be such that programmers and database experts will be readily available to modify the applications.

6.1.2.2 Electronic Messaging Capability

Emergency managers need the capability to pass messages to each other. This capability must be functionally equivalent to a note written on a piece of colored paper indicating the priority of the note and carried by a runner. The following requirements are essential for senders of messages.

- The user must be able to type and edit messages on the screen.
- The user should have the capability to address mail by choosing one or more persons or functional names from a list of names and functionaries.
- The user should be able to send messages to more than one recipient.
- A user should be able to identify a function in an organization chart and cause mail to be sent to the person responsible for that function.
- The user should be able to see the names or icons for files in directories and attach those files to the body of the message.
- The user should be able to assign at least two types of priorities to messages, one indicating a time before which the message should be viewed and a second indicating the message precedence.
- Each message should have a subject field that should contain a terse description of the message content before it is accepted by the system.
- The user should be able to check if the message has been received and opened.

The system shall include

- The ability to cut materials from other screens and paste them to mail messages, and
- The ability to record, send, and receive voice messages.

Receivers of messages shall have the following capabilities:

- A mechanism for viewing a directory of the waiting messages that will show the two types of priority levels, the sender's identification, and the subject of the message;
- The ability to acknowledge a message;
- The ability to structure replies so that the original message is contained within the reply;
- The ability to acknowledge a message but retain it in the queue for further action;
- The ability to forward a message that has been received; and
- The ability to have messages that are within 5 minutes of the expiration of their time priority trigger an alarm.

6.1.2.3 Security

Three approaches will be used to ensure system security: (1) physical access control, (2) password protection, and (3) role-based access privileges. Role-based access privileges should incorporate a minimum of four security levels. These levels should include one for the system manager, one for top level emergency managers, one for remaining emergency coordinators, and one for data that can be generally available. All data elements and applications shall have an access level associated with them. Each user shall be assigned a user access level. Users will have access to all data and/or applications with access levels up to and/or including their access level. For example, only users with system level access would be able to write data to the protective action libraries. All other users might have read access only.

The system manager at each site will be responsible for maintaining the passwords for users on the system. The system managers for the various nodes will work together to define security levels so that they are consistent across nodes.

The system will include no classified data or National Defense Area information. Therefore, no encryption will be required.

6.2 INTERFACE CONTROL

The System Specifications document for any specific CSEPP automation system to be implemented according to the present Functional Requirements needs to include Interface Control Documents (ICDs) for each data system with which the CSEPP system must exchange data automatically.

Each ICD must discuss the concepts and the specifics of the interface implementation and provide complete detail about the following:

- Primary and back-up physical links between the CSEPP automation system and the external system;
- Telecommunications protocols used over primary and back-up links;
- Location and naming of directories and files involved in the data exchange on both systems;
- Procedures used in establishing, reestablishing, or switching of communications between primary and back-up links and vice versa;
- Procedures used to trigger the actual exchange of data;
- List of error conditions and error messages;
- Procedures followed to recover from errors;
- Methods and procedures used to ensure data integrity and prevent loss of data;
- List and data formats of all file and data types exchanged;
- List of all data elements exchanged; and
- Data dictionary information for every data element exchanged.

6.3 IMPLEMENTATION AND CONFIGURATION MANAGEMENT

In addition to a System Specifications document, an Implementation Plan and a Configuration Management Plan must be prepared and approved for each system developed to meet the Functional Requirements for a CSEPP automation system. The latter two documents should be written in cooperation with the developer during the development phase and well before system deployment.

The purpose of the Implementation Plan is to provide guidance for timely and efficient deployment of a system. It should detail and assign responsibilities for all site preparation, installation, training, and support and maintenance tasks.

The purpose of the Configuration Management Plan is to provide guidance throughout the life cycle of the system for all activities necessary to ensure system integrity and maintain a high level of system readiness and responsiveness. The Configuration Management Plan must address procedures for the following issues: quality assurance and quality control, handling of software problem reports, database auditing, revisions to the functional requirements (system specifications) that become necessary during the lifetime of the system, and software version control.

The Configuration Management Plan will be enforced by a Configuration Control Board (CCB), consisting of appointees who are collectively authorized to decide about proposed changes to the system software and to the standard system configurations. For federally developed systems, the CCB will be established at the federal level and will include federal, state, and local representatives. Within state jurisdictions, a CCB should consist of state and local representatives.

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GLOSSARY

accident assessment—the evaluation of the nature, severity, and impact of an accident. In the Chemical Stockpile Disposal Program, the Army will be primarily responsible for accident assessment.

chemical agent (lethal)—a chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate a person through its physiological effects. Excluded from consideration are riot control agents, chemical herbicides, smoke, and flame.

chemical event—a term used by the military that includes (1) chemical accidents resulting from nondeliberate events where safety is of primary concern or (2) chemical incidents resulting from deliberate acts or criminal acts where security is a concern.

Chemical Event Emergency Notification System—a tiered system whereby the Army classifies chemical surety emergencies and provides appropriate notification to off-post public officials.

Chemical Stockpile Disposal Program (CSDP)—the Congressionally mandated program that requires the Army to dispose of all its unitary chemical agents. The preferred mode of disposition is on-post incineration.

Chemical Stockpile Emergency Preparedness Program (CSEPP)—a joint DA/FEMA program to oversee and assist in the development of adequate emergency response plans and capabilities for all jurisdictions that might be affected by a chemical release associated with CSDP activities. The CSEPP is administered by the Joint Steering Committee.

configuration—the arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. May refer to a hardware configuration or a software configuration.

configuration control—the process of evaluating, approving or disapproving, and coordinating changes to configuration items after they have been formally identified.

D2PC—a dispersion model developed by the Army to estimate downwind hazard distances from releases of chemical agents.

decision matrix—a matrix of all contingencies that are to be considered in the description of a problem together with the actions to be taken for each set of contingencies.

emergency operating center (EOC)—the location or facility where responsible officials gather during an emergency to direct and coordinate emergency operations, to communicate with other jurisdictions and with field emergency forces, and to formulate protective action decisions.

emergency planning zone—the geographical area delineated around a potential hazard generator that defines the potential area of impact. Zones facilitate planning for the protection of people during an emergency.

evacuation—a protective action that involves leaving an area of risk until the hazard has passed and the area is declared safe for return.

GA—see nerve agent.

GB—see nerve agent.

H—see mustard agent.

HD—see mustard agent.

HT—see mustard agent.

immediate response zone (IRZ)—the planning zone immediately surrounding each Army installation. Generally, it extends to about 6 miles from the installation's chemical storage area. At some installations, it extends to about 9 miles.

institutional populations—people in schools, hospitals, nursing homes, prisons, or other facilities that require special care or consideration by virtue of their dependency on others for appropriate protection.

Joint Information Center (JIC)—a single location where public information officials gather to collaborate on and coordinate the release of emergency public information.

Joint Steering Committee (JSC)—the body of federal officials that was created by the Army and FEMA Memorandum of Understanding to serve as a focal point for project oversight of the Chemical Stockpile Disposal Program emergency planning efforts.

maximum credible event—the worst case single event likely to occur from the release of chemical agent as a result of an unintended, unplanned, or accidental event. It has a reasonable probability of happening.

mustard agent—the vesicant agents (H, HD, and HT) that cause blistering. In sufficient amounts they can be fatal if not quickly removed from exposed skin or if inhaled.

nerve agent—the nerve agents (GA, GB, and VX) are lethal colorless, odorless, and tasteless agents that can be fatal upon skin contact or when inhaled. These agents attack the central nervous system by inhibiting the production of acetylcholinesterase, which is essential for proper operation of the nervous system.

no effects distance—a calculated distance downwind from a chemical agent release beyond which a toxicity level is not expected to have short-term adverse effects on humans, based on laboratory animal studies.

off-post—those areas outside of the limits of an Army installation.

on-post—a military installation or facility.

open architecture—for the purposes of CSEPP, an open system refers to a computer system organized and operated so that its components can be easily connected to other independently organized and operated computer system components through communications links to exchange data and other computing services on an as needed basis. Open system standards enable distributed systems composed of components from multiple hardware and software vendors (i.e., COTS). An open systems architecture is modular.

protective action—an action or measure taken to avoid or reduce exposure to a hazard.

protective action decision making—the process whereby off-post public officials make a selection of one or more actions to protect the threatened population. The Army will make recommendations as part of its accident assessment and off-post notification processes.

protective action zone (PAZ)—the planning zone beyond the immediate response zone. Generally, it extends to about 21 miles from the installation's chemical storage area, and at some installations it extends further.

public alert and notification system—the system for obtaining the attention of the public and providing appropriate emergency information. Sirens are the most commonly used public alert devices but frequently are supplemented by tone alert radios, visual warning devices for the hearing impaired, and telephone-based alert/notification systems.

public affairs officer (PAO)—the Army installation person responsible for public affairs. The PAO is the installation counterpart to the off-post public information officer (PIO).

public information officer (PIO)—the person on the emergency management team who is in charge of public information affairs. The PIO is the counterpart to the on-post public affairs officer (PAO).

real time—pertaining to the processing of data by a computer in connection with another process outside the computer according to the time requirements imposed by the outside process.

redundancy—the inclusion of duplicate or alternate system elements to improve operational reliability by ensuring continued operation in the event that a primary element fails.

reliability—the ability of an item to perform a required function under stated conditions for a stated period of time.

sheltering—a protective action that involves taking cover in a building that can be made relatively airtight. Generally, any building suitable for winter habitation will provide some protection with windows and doors closed and heating, ventilation, and air conditioning systems turned off. Effectiveness can be increased by methods such as using an interior room or basement, taping doors and windows, and employing other systems to limit natural ventilation.

source term—characteristics of the chemical agent release, including the type, amount, and physical state (e.g., vapor, aerosol, liquid) of chemical agent released, along with the location, mode (e.g., fire, explosion, spill), and expected duration of the release.

system reliability—the probability that a system, including all hardware and software subsystems, will perform a required task or mission for a specified time in a specified environment.

traffic control point (TCP)—a location that is staffed to ensure the continued movement of traffic inside or outside an area of risk. Traffic control is a temporary function to be implemented at points where normal traffic controls are inadequate or where redirection of traffic becomes necessary due to emergency conditions.

VX—see nerve agent.

ATTACHMENT

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
I. Direction and Control				
Command and Control	• Notify key officials and personnel -chain-of-command (C-of-C) -emergency personnel (EP) -institutions (I) -public officials (PO) • Track personnel status changes • Log personnel status changes • Track command authority changes • Log command authority changes	• Ring-down application (C-of-C, EP, I, PO) • Reporting (event log) • Relational database (personnel tracking) • Relational database (command authority) • Mapping (personnel/command)	1 The system shall be capable of holding and presenting to official parties, the specific delegations of authority for both on- and off-post officials including names and calling protocol for all assigned daily standby officials.	2.1.3, 2.1.5
			2 The system shall be capable of monitoring command and control actions by all appropriate parties including automatic flagging of incomplete/overdue actions.	3.4
			3 The information shall be presented in a manner which minimizes potential confusion over the spatial location or designated position of command and control elements, off-site response parties or other support elements, formal or informal.	2.1.5

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
			4 The system shall be capable of formatting real time or summary reports appropriate to the requirements of each jurisdiction from a distributed but fully coordinated database accessible to all appropriate parties.	3.6.1, 3.6.4, 3.6.5
			5 Each local system will automatically generate a permanent journal of all entries during a chemical event. Journal entries may be retrieved for review by the operator.	3.6.2, 3.6.3
			6 The installation system will automatically record the video image of the EOC main console display. This capability will be optional to the local jurisdictions.	3.6.1
			7 The system will contain an E-mail system.	3.6.2, 3.6.3

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
Resource Coordination	• Monitor duty rosters of emergency response personnel • Recommend initial assignments of available resources and personnel resources • Track emergency personnel and resources • Locate personnel and resources • Link personnel and resources with critical data (e.g., owner, skills, projected availability, status) • Optimize personnel and resource assignment by priority • Alarm emergency officials as resources or personnel capacities are approached • Identify pool of available personnel and resources as they become available	• Mapping (response resources) • Relational database (personnel resources) • Relational database (personnel-critical data) • Reporting (alarms) • Reporting (assignment accepted) • Reporting (event log)	1 The system shall hold, edit and process the listings and availability of functional resources both on and off post and the expected positioning of that resource for various accident types and categories.	2.1.4, 3.5
Drills and Exercises	• Maintain schedule • Assist in scenario development • Monitor exercises and drills	• Accept data from monitors and surveys • Mapping (actual plume) • Relational database • Allow manual data input	(NA)	2.2.3

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
II. Communications				
	• Store and retrieve communication protocols • Assist communication procedures • Display communication links • Control access to secure data • Communicate with other CSDP installations and locations for analysis assistance • Distribute written notification and reports to various locations	• Relational database (access appropriate protocols) • Procedures application (checklist) • Mapping (communication links) • Relational database (data access control) • Communications Applications • FAX or other equivalent written message.	1 Engineering design criteria must conform to standard communications protocol.	6.2
			2 The installation system must communicate with each of the other CSEPP installations	5.0, 6.1.1, 6.2
			3 The installation system must communicate with local jurisdictions	6.1.1.1
			4 The installation system must communicate with state agencies	6.1.1.1
			5 The installation system must communicate with Army headquarters	6.1.1.1
			6 The local system must communicate with other local jurisdictions	6.1.1.1
			7 The local system must communicate with the state agencies	6.1.1.1

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
			8 The local system must communicate with the field command post	6.1.1.1
			9 The system shall incorporate a reasonable amount of redundancy	1.3.4, 5.0
III. Warning				
Public Alert and Notification	• Identify warning system devices associated with plume emergency response area. • Partition affected area by protective action recommendation • Relate warning devices with selected protective action alternatives • Activate warning system alert	• Relational database (plume/emergency response-protective action • Relational database (protective action warning devices) • Auto activate public warning devices • Reporting (event log)	1 The system must contain sufficient data to allow public alert and notification from an alternative location.	3.3, 6.1.1.1
			2 The system will activate indoor and outdoor warning systems. It may select from a pre-programmed list or the operator may perform selective activation.	3.3
			3 As provided by local agreements, a users' system may activate another users' alerting system. It may select from a pre-programmed list or the operator may perform selective activation.	3.3

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
Chemical Event Notification	• Plume dispersion/estimation • Locate plume on map • Estimate plume trajectory • Link event location with plume origin • Link event classification with off-site officials requiring notification • Log event classification changes	• Modeling application (dispersion) • Near-Real-Time Data (meteorological monitoring) • Relational database (plume location) • Relational database (GIS-related data) • Mapping (site/area/community level) • Reporting (event log)	1 Upon receipt of information indicating that a chemical event has occurred, the system will display the preplanned notification list associated with the event class.	3.2.1, 3.6.1
			2 Upon receipt of notification authentication, the system will execute the pre-planned notification.	3.2.1, 3.4
			3 The spatial display will be high resolution graphics with zoom capability, capable of showing related attributes of an event as necessary.	1.3.4, 3.6.1
			4 The system must provide timely and accurate spatial information which will aid in determining appropriate actions.	1.3.4, 3.1.2, 3.6.1

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
			5 For the installation system, if no authentication is received within 2 minutes, the system will automatically proceed with the notification plan. As requested by specific local jurisdictions, such a fail-safe mechanism may be installed.	3.6.1
			6 The system must provide predicted hazard zones and recommended courses of action within 5 minutes of notification.	3.2.2
			7 The system must contain sufficient data to allow public alert and notification from an alternative location.	3.3

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
Special Populations	• Identify institutional populations associated with plume/emergency response area • Notify institutions • Identify distributed special populations associated with plume emergency • Notify distributed populations • Notify assisting agencies/people/resource owners (e.g., buses, ambulances, etc.) • Track protective action implementation of institutional populations • Monitor protective actions and alarm as capacities are approached	• Relational database (plume/emergency response institutions) • Relational database (institutions-protective actions) • Ring-down application (institutions) • Ring-down application (response assistance) • Auto-activate warning devices for distributed special populations • Manual data input (protective action) • Analytic application (monitor protective action capacity) • Reporting (event log) • Reporting (alarm)	(NA)	2.1.1, 3.2.2, 3.3, 3.4
IV. Chemical Agent Defense				
Hazard Detection and Monitoring	• Manually Enter Reports of event • Identify event location • Accept Data from event Monitor -Agent detection -Pressurization of Facility • Report Event Log	• Near-Real Time data inputs • Manual data inputs • Mapping (site level) • Reporting (event log)	1 The system will be capable of receiving data from remote detectors and monitors either through hardwire or radio transmission.	2.2.1, 3.1.2

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
			2 Input from mobile detectors and monitors will include position location accurate to within 15 meters.	3.1.2
			3 The system shall automatically access data from one or more fixed or mobile meteorological sensing systems and direct the information to the appropriate module.	2.2.1.2
			4 The system (Army only) shall automatically access predefined data from the demil plant and direct it to the appropriate module.	2.2.1.1
			5 The system (Army only) shall automatically access intrusion detection system data and direct it to the appropriate module.	
			6 The system shall automatically access input from remote chemical agent monitors and direct it to the appropriate modules.	2.2.1.1

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
Hazard Assessment and Classification	• Routine inventory tracking • Accept manual estimates of source term • Integrate data from various sources for best estimate of source term • Alarm events with potential to transcend key boundaries • Link to credible accidents at location • Log hazard assessment/classification changes.	• Relational database (location-inventory) • Analytic application (estimate source from qualitative release information, e.g., puddle size, munitions) • Modeling application (dispersion) • Near-Real-Time data inputs (plume tracking via agent monitors) • Reporting (alarms) • Mapping (site and area) • Reporting (event log) • Modeling application (hazard assessment)	1 All system users must run the same dispersion model(s).	2.1.1, 2.2.1.2, 4.1
			2 All systems must use the same parameters and coefficients when running a given model for a specific event. Only agent source data supplied by the Army will be used.	3.1.1
			3 The system must be capable of easily changing or updating modules when new or improved editions are available.	1.3.4
			4 The system must display results graphically in 2 or 3 dimensions as appropriate.	1.3.4
			5 The system will use current weather to predict dispersion patterns for 24 hours in the future.	2.2.1.2

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
			6 The system will accept user specified future synoptic winds, either from the National Weather Service or EOC director, in order to predict changes in areas requiring population protection.	2.2.1.2
			7 The model will incorporate and use topographic features which affect the cloud movement. Such features include hills, valleys, rivers, lakes, forested terrain, etc.	
			8 The model will incorporate changing sun angle and cloud cover as an aid in predicting micro meteorology.	
			9 Output will include a dynamic tracking of contours which specify: a) 1% lethality; b) .005% lethality (Labeled "No Lethality); c) .005% Threshold	

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
Protective Action Decision Making	• Evaluate Protective Action Alternatives • Use real-time meteorology, plume dispersion, and viable emergency response scenarios • Link Protective action decisions with most likely human health consequences • Track available time for key decisions • Alarm emergency officials when critical decisions jeopardize protective action effectiveness. • Make protective action recommendations • Log protective action recommendations	• Modeling application (protective action) • Reporting (alarm) • Time monitoring • Reporting (event log)	1 The system will assist planning by exercising population protection model(s) that include protection in place and evacuation options.	2.1.1
			2 The model(s) will provide information to indicate areas and conditions under which sheltering in place and evacuation are appropriate response actions.	2.1.1, 3.2.2
Decontamination	• Track who is decontaminated • Locate optimal locations for decon stations • Identify decontamination resources and personnel • Track decontamination personnel and resources	• Mapping (response resources) • Relational database • Reporting (assignment accepted) • Modeling application (assignment)	1 The system will have the ability to maintain records of exposed personnel.	3.7.2

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
Reentry	• Monitor plume's actual location • Display plume data • Monitor for potential health effects among people entering cleared areas	• Accept data from monitors and survey teams • Mapping (actual plumes) • Relational database (health effects)	1 The system will have the ability to record and display measurements of air, ground, and water contaminations after the event and draw contours of level of concern. It will use the same levels as specified for dynamic tracking.	4.1.1, 4.1.2
			2 The system will maintain a database of resources to support recovery operations.	3.5, 4.0
			3 The system will incorporate means to estimate the cost of recovery operations based on field and simulation data.	

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
V. Emergency Support Services (ESS)				
Emergency Worker protection	• Link protective equipment with emergency workers • Monitor equipment and personnel capacity • Alarm emergency officials as resources or personnel capacities are approached • Monitor emergency response sequence to assure safety • Monitor decontamination procedures	• Analytic application (monitor protective equipment capacity) • Procedures application (sequence) • Procedures application (decontamination)	(NA)	2.1.2, 2.1.4, 3.4, 3.5
Emergency Medical Services	• Identify available emergency medical personnel and resources • Recommend initial assignments • Track medical personnel and resources • Locate medical personnel and resources • Optimize medical personnel and resources • Alarm emergency officials as personnel resources approach capacity	• Mapping (response resources) • Relational database (personnel resources) • Relational database (personnel-critical data) • Reporting (alarms) • Reporting (assignment accepted) • Reporting (event log)	1 The system will maintain a database on agent properties and health effects.	

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
VI. Emergency Public Information				
	• Notify public information specialist • Make information available to JIC • Link pre-existing protocols with current emergency situations • Assist in prep. of text and graphics	• Procedures application (release) • Communication with EOC • Relational database (information protocols-current emergency) • Word processing application • Graphics application • Reporting (media releases)	(NA)	3.6.5
VII. Evacuation				
Access and Traffic Control	• Recommend evacuation routes • Monitor evacuation routes • Alarm emergency officials when congestion jeopardizes evacuation effectiveness • Evaluate impact of events (e.g., construction, weather) on transportation system capacity	• Modeling application (traffic flow) • Modeling application (traffic loading) • Mapping (road network) • Relational database (nodes-population) • Relational database (nodes-exposure estimates) • Relational database (nodes-location) • Near-Real-Time data (traffic monitors)	1 For potentially hazardous areas with transient population, the model(s) will identify options for controlling entry.	2.1.1

Analysis of emergency management functions, information functions and system capabilities

Emergency management and response functions	Automation system functions	System capabilities	System specifications	Related chapter and section
		• Manual data inputs (traffic reports) • Reporting (alarm) • Reporting (event log)		
Evacuee Support	• Track location of evacuees • Identify care center resources • Monitor care center capacities • Reassign evacuees to care center resources • Monitor care center resource needs	• Mapping (evacuee support) • Relational database (evacuee location) • Relational database (resources) • Reporting (event log)	1 For those areas of recommended evacuation, the model (s) will support selection of routes, assigned shelters and sequencing.	2.1.1
			2 The system will maintain shelter management information.	3.7.5
Transportation	• Recommend initial assignments of available transportation resources and operators • Track transport resources • Locate transport resources • Link transport resources with critical data (e.g., projected availability status) • Optimize transport resource assignment by priority • Alarm emergency officials as transport resources are approached • Identify pool of available transport resources as they become available.	• Mapping (response resources) • Relational database (personnel resources) • Relational database (personnel-critical data) • Reporting (alarms) • Reporting (assignment accepted) • Reporting (event log)	(NA)	2.1.4, 3.5

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