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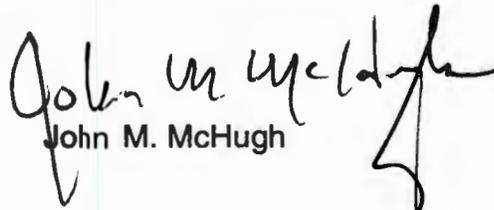
04 APR 2013

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Army Directive 2013-03 (Chemical Accident or Incident Response and Assistance)

1. This directive provides implementing guidance for accident and incident response associated with chemical surety materials as defined by Army Regulation (AR) 50-6 (Chemical Surety). It:
  - a. establishes responsibilities for appropriate Army proponents to incorporate guidance for chemical accident or incident response and assistance (CAIRA) into publication updates;
  - b. rescinds the requirement for U.S. Army Materiel Command to maintain a Service Response Force as identified in AR 50-6; and
  - c. rescinds the requirement for a specifically designated initial response force at chemical surety sites as identified in AR 50-6, although commanders remain responsible for maintaining planning and capabilities consistent with emergency management, safety and security guidance.
2. Detailed guidance for CAIRA planning and exercises, meteorology and medical support is at enclosures 1 through 3, respectively. A list of applicable references is at enclosure 4.
3. This directive supports the rescission of Department of the Army Pamphlet 50-6 (Chemical Accident or Incident Response and Assistance (CAIRA) Operations), 26 March 2003, and is effective immediately. It applies only to Army commands, agencies and organizations with chemical surety missions, including oversight of Army contractor-owned, contractor-operated facilities.
4. The Deputy Chief of Staff, G-3/5/7 is the proponent for this directive. The Deputy Chief of Staff, G-3/5/7; Office of The Surgeon General; and Office of the Director of Army Safety will incorporate the standards in this directive for which they are responsible into their relevant Army publications no later than 2 years from the date of this directive.
5. This directive is rescinded upon publication of the final revised documents.

Encls

  
John M. McHugh

**SUBJECT: Army Directive 2013-03 (Chemical Accident or Incident Response and Assistance)**

**DISTRIBUTION**

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## **CHEMICAL ACCIDENT OR INCIDENT RESPONSE AND ASSISTANCE (CAIRA) PLANNING AND EXERCISES**

1. The Deputy Chief of Staff (DCS), G-3/5/7 will incorporate specific CAIRA planning and exercise guidance into Army Regulation (AR) 50-6. Pending publication of the revised AR, this enclosure provides supplemental guidance for planning and exercises.

2. Commanders and directors of Army Government-owned, Government-operated and Government-owned, contractor-operated facilities with a chemical surety mission will ensure that:

a. the facility has chemical accident and incident response plans and capabilities consistent with requirements in AR 50-6, AR 190-59 (Chemical Agent Security Program), AR 385-10 (The Army Safety Program), and AR 525-27 (Army Emergency Management Program).

b. the facility chemical accident and incident response plans are integrated with installation all-hazards planning, coordinated with stakeholders identified in the plan, and reviewed and approved by the facility's Army Command or direct reporting unit.

c. the facility chemical accident and incident response plans are exercised quarterly. Each year two of these exercises will include external agencies identified in the plan.

d. all applicable requirements of environmental permits that concern CAIRA events will be complied with, including requirements that exceed or are in addition to those specified in this directive. In the event of any inconsistencies between an environmental permit, including its implementing plans, and this directive, the Commander or director will notify the DCS, G-3/5/7 for directions, to be determined in consultation with Army counsel.

3. Contracting officers will ensure that contracts requiring the use of Army-furnished chemical agents at contractor-owned, contractor-operated facilities will require:

a. plans to respond to chemical accidents and incidents consistent with requirements in AR 190-59 and AR 385-10.

b. chemical accident or incident exercises each quarter, which will be documented by written afteraction reports.

c. participation in exercises by external response agencies identified in the chemical accident or incident response plans. The external response organizations must participate in at least one exercise annually.

(1) The intended level of participation is for the external response agency to exercise planned support. The minimum level of participation is as an observer of

an exercise. The level of participation will be documented in the exercise afteraction report.

(2) If the external response agencies are unable or unwilling to participate in exercises, the contractor-owned, contractor-operated laboratory will reevaluate the plan to determine if revisions are appropriate and will give the contracting officer the results of that reevaluation.

4. Contractors are responsible for ensuring their facility and operations are in compliance with all applicable requirements of permits, regulations, and laws, and shall comply with those requirements in addition to the requirements of this directive.

## CAIRA METEOROLOGY GUIDANCE

### General

1. The Office of the Director of Army Safety will incorporate meteorology guidance for CAIRA into Department of the Army (DA) Pamphlet 385-61 (Toxic Chemical Agent Safety Standards).
2. In the interim, this enclosure provides guidance for meteorological support to CAIRA operations. The guidance applies to chemical agent storage facilities, demilitarization and disposal facilities, and facilities for which the maximum credible event (MCE) and supporting risk assessment include an atmospheric chemical hazard after an agent release. DA Pamphlet 385-61 and DA Pamphlet 385-65 (Explosive and Chemical Site Plan Development and Submission) prescribe standards for determining the MCE and using meteorological modeling for the purposes of chemical safety site planning.
3. After a chemical release, chemical agents may appear in the field as vapors, aerosols (droplets), or liquids. To understand the effect of chemical agents in the environment, the commander must also understand how weather and terrain affect those agents. The best way to be prepared for a chemical hazard is to:
  - establish a network of meteorological sensors, and
  - use approved meteorological and hazard assessment models in DA Pamphlet 385-61.

### Factors Affecting CAIRA Operations

1. Meteorological scales that affect CAIRA operations can be classified as synoptic, mesoscale, and microscale. All classifications are important for understanding the development of an atmospheric chemical hazard.
2. It is necessary to quantitatively determine the direction and extent of an atmospheric chemical hazard. To do so, the meteorological variables affecting the travel of such a hazard must be accurately measured and plotted. Horizontal wind velocity, barometric pressure, temperature, humidity, and precipitation must be recorded.
3. A chemical storage or demilitarization facility should have a minimum of one meteorological station and associated meteorological network to provide the necessary data in a timely manner. A meteorologist can help determine how many stations are required to properly characterize the potential area of plume travel. A network can consist of stations or towers of meteorological instruments, data control platforms (computers) that calculate the meteorological data values, and telemetry equipment for remote access. Data can be averaged in different time periods (for example, 5, 10, 15, or 60 minutes).

4. At a minimum, an adequately equipped meteorological system would include the following sensors, systems, and maintenance capabilities:

- meteorological network covering areas at potential risk;
- automatic real-time transmission of meteorological information to a hazard assessment system;
- hazard assessment system that uses computers, and meteorological and hazard assessment models; and
- maintenance and quality assurance program.

**Dispersion Meteorological Models.** The plume model provides timely information for real-time assessment of a hazard. Models can be designed to provide accurate or conservative estimates of the hazard.

1. The hazard analyst performs assessments to determine the potential hazard created by releases of chemical warfare agent. The hazard analyst has a basic understanding of the physical and toxicological properties of chemical agents, potential accidents that could occur, the effects of meteorology on chemical plumes, and basic protective actions (sheltering and evacuation) needed to protect workers and the general public. The hazard analyst typically uses chemical plume models and protective action algorithms to project the chemical hazard. Ideally, the hazard analyst has education or experience in dispersion meteorology, but does not need to be a meteorologist to perform the function.

2. The meteorological models must include the effects of the wind, stability, temperature, mixing layer height, terrain, and meteorological trends. The models must be able to resolve those scales of features that are important for that particular location, for all meteorological conditions. Until other models are validated, two models are currently accredited for use:

- WebPuff. The U.S. Army Chemical Materials Agency's WebPuff system is accredited for potential chemical stockpile and non-stockpile accidents. The D2-Puff software algorithm in WebPuff predicts dispersion patterns, travel times, and concentration levels in the atmosphere of possible releases of chemical agents stored at chemical storage sites, chemical demilitarization sites, chemical test laboratories or toxic chemicals at industrial chemical facilities.
- Joint Effects Model. This model is accredited for all other chemical, biological, radiological, and nuclear release scenarios. The model incorporates algorithms from various dispersion models (such as the Hazard Prediction and Assessment Capability; the Vapor, Liquid, and Solid Tracking Model; and D2-Puff) for most types of dispersed agent.

**Forecasting for Hazard Duration.** During a large release exposed to the atmosphere, the direction and speed of the wind will likely change. Therefore, to predict the best option for protective action (sheltering or evacuation), it is important to be able to predict the resulting direction and speed of the toxic cloud's travel.

1. It is critical that personnel are not evacuated to a zone where the toxic cloud will follow. Similarly, the sheltering times must be tracked to avoid unnecessarily prolonged durations within the shelters because low levels of chemicals can become trapped within a shelter. The meteorological and dispersion forecast must account for such planning.
2. When sufficient information is not available, the forecast can be presented in terms of probability of occurrence of the possible outcomes. However, deterministic modeling results and emergency response directions for the general public will be more easily understood and implemented.
3. Forecasts must be made, posted, and communicated to the command and important organizational elements at least daily. Forecasts should include hourly values of winds, atmospheric stability, temperature, precipitation, cloud cover and type, humidity, and severe weather warnings for a minimum 24-hour period.
4. Forecasts must be timely.

### **Operations at a Chemical Accident or Incident Site**

1. Each chemical agent material installation should have the services of a trained hazard analyst familiar with hazardous materials and meteorological modeling. This individual will be responsible for providing operational support, guidance, and advice on the safety of chemical operations. The hazard analyst should also be available to provide assistance in cases of nonroutine operations and chemical accidents or incidents.
2. Meteorological operations and hazard assessment capabilities will be incorporated into exercises at least annually and included in the written afteraction reports for the exercise.
3. Chemical agent storage or demilitarization facilities should be surveyed by an organization with the capability and knowledge of meteorological, transport and diffusion, and hazard assessment systems. Although needs vary depending on climate, terrain, operations, and population proximity, a depot typically needs information provided by towers with wind, temperature, solar radiation, pressure, and humidity sensors, as well as the ability to detect lightning occurrences in the area through a local lightning detection system or access to a national lightning detection database system.

a. Lightning protection systems should be employed to protect data collection instruments and computers, especially on towers. A dedicated computer is required to perform the model calculations. Suitable communications must be available to send the data from the sensors to the model calculation computer.

b. Independent, uninterruptible power sources should be used to enhance the reliability of operations and equipment. Contingency plans should be documented in support of chemical operations to account for the potential loss of the meteorological network or key data.

4. The hazard analyst should establish a standing operating procedure (SOP) that will include daily briefings to the command or command representative. These routine operations will establish familiarity with the type of meteorological influences in the local area. These SOPs will also provide operational support for chemical operations to minimize the potential for accidents or the chemical consequences of an accident. For example, the SOP may prohibit chemical agent operations involving munitions handling during weather periods in which the MCE accident would produce a projected concentration exceeding established protective exposure criterion beyond the boundary of the installation (see DA Pamphlet 385-61).

5. Plans should include provisions for nonroutine operations and chemical accident or incident procedures. The designated hazard analyst should coordinate these actions.

## CAIRA MEDICAL SUPPORT

### General

1. The Office of the Surgeon General will incorporate guidance for CAIRA medical support into DA Pamphlets 40-8 (Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agents GA, GB, GD, and VX) and 40-173 (Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, and HT). Pending publication of the revised DA pamphlets, this enclosure provides guidance for medical support to CAIRA operations associated with chemical surety missions. It is applicable to personnel, organizations, and contractors who could respond to accidents or incidents involving a chemical agent.
2. This guidance is the base document for CAIRA training throughout the U.S. Army. It does not address the requirements for responding to recovered chemical warfare material, or terrorist or other aggressive use of chemical agents in the public domain. However, some of these techniques and procedures may be adapted for use in such situations.

### Terms

1. Chemical accident or incident: An event where a chemical agent is released into the ambient atmosphere and either threatens unprotected personnel or has the potential to threaten unprotected personnel.
  - a. A *chemical accident* results from nondeliberate acts where safety is of primary concern.
  - b. A *chemical incident* results from deliberate acts (terrorism or criminal) where security is of concern.
2. Chemical agent: A chemical substance listed in AR 50-6 (chapter 6) that is intended for use in military operations to kill, seriously injure, or incapacitate a person through its physiological properties. Excluded from consideration are industrial chemicals, riot control agents, chemical herbicides, smoke, and flame.
3. Emergency medical support coordinator: The individual (medical commander, director of health services, contract medical director, or equivalent) who is responsible for coordinating medical support for chemical accidents and incidents.
4. Most probable event (MPE): The worst potential mishap most likely to occur during routine handling, storage, maintenance, or surveillance operations that results in the release of an agent and exposure of personnel.

5. Maximum credible event (MCE): The worst single event that is likely to occur from a given quantity and disposition of ammunition or explosives, accounting for potential accidental explosion, fire, or release of a toxic chemical agent. The event must be realistic with a reasonable probability of occurrence considering the propagation of the explosion, burning rate characteristics, and physical protection given to the items involved. The MCE evaluated on this basis may then be used as a basis to calculate effects and predict casualties.

6. Licensed physician: A person holding a degree of doctor of medicine or doctor of osteopathy who holds a current, valid, active, and unrestricted license to practice medicine from a U.S. jurisdiction, in accordance with AR 40-68 (Clinical Quality Management). Those physicians other than active duty personnel who do not work in medical department activities, medical centers, clinics, and organizations a DoD Component medical department is responsible for (that is, contractor-owned, contractor-operated facilities) must comply with laws regarding licensing in the state where the work is performed.

7. Nerve agent antidote kits: Includes Mark I Antidote Treatment Nerve Agent Autoinjector and the commercial version of the dual-chamber autoinjector marketed as DuoDote®.

## **Guidance for CAIRA Operations at Army Government-Owned, Government-Operated and Government-Owned, Contractor-Operated Facilities**

### **1. CAIRA Medical Support—Readiness Phase**

a. The installation or activity commander should make sure the emergency medical support coordinator receives a general description of each chemical agent operation. These descriptions include the number of personnel involved, location, a summary of work procedures, the duration of the operation, and the potential exposure hazards to chemical agents. The emergency medical support coordinator, in coordination with the surety officer, should develop a list of chemical agents that personnel could be exposed to, a description of potential health effects, and appropriate chemical agent treatment protocols.

b. The installation or activity commander, in coordination with the emergency medical support coordinator, should ensure that nonmedical emergency response personnel receive relevant training in accordance with DA Pamphlet 385-61 before working with chemical agents. The emergency medical support coordinator should review and approve this training in writing on an annual basis.

c. Planning for medical support to CAIRA operations requires an understanding of the MPE and MCE. The MPE and MCE are established by a formal process involving, among others, the installation, the activity owner, and the emergency medical support coordinator. U.S. Army Public Health Command (USAPHC) has developed and will

maintain guidance for installations to use when estimating the chemical agent casualties expected from an MPE.

(1) The MPE determines the medical capability an installation must have to support the chemical mission. The description of the MPE should include the number and type of casualties anticipated (pure chemical, mixed chemical and conventional, or pure conventional casualties); the possible routes of exposure (inhalation, dermal, ocular, or ingestion); the anticipated severity of injuries (mild, moderate, or severe); and the medical capabilities and staffing levels required to treat these casualties.

(2) The MCE, though less likely to occur than the MPE, may generate types and numbers of casualties beyond the capability of the installation or contractor-operated medical treatment facility (MTF). CAIRA medical planning must also encompass a response to the MCE with procedures for mobilizing on-post and off-post medical personnel and emergency medical services, and prescribe medical care for the civilian population under emergency conditions of varying scope.

d. Coordination is required when medical support planning incorporates external support, such as local civilian MTFs and ambulance services.

(1) The emergency medical support coordinator, in coordination with the installation or activity commander, should develop memorandums of agreement (MOAs) with civilian MTFs, Federal MTFs, and ambulance services to ensure that appropriate off-post resources will be available in the event of a chemical accident or incident. (If a contractor provides medical services, the contracting officer or contracting officers representative should ensure that these MOAs are developed.)

(2) Each MOA should detail the level of training healthcare providers will receive; who will provide the training (that is, the emergency medical support coordinator, medical department activity, or Chemical Stockpile Emergency Preparedness Program); and how frequently refresher training will be offered. MOAs should also specify how casualties would be transported to off-post medical facilities and by whom, and any other contingency plans for casualty evacuation.

(3) MOAs with each off-post medical facility should detail the quantities and type of CAIRA-unique medical supplies required to support CAIRA operations and whether these will be prepositioned or provided with the patients as they are transported.

(4) Each off-post medical facility with an MOA should participate in a CAIRA exercise at least annually. Communication links between potential chemical accident or incident sites, the installation or contractor-operated MTF, off-post ground and air ambulances, and off-post medical facilities should be checked for compatibility and tested as part of CAIRA exercises. MOAs should be reviewed and updated in writing annually based on lessons learned during the CAIRA exercise. The intended level of participation is for the external response agency to exercise planned support. The minimum level of participation is for the external agency to observe an exercise.

The extent of external participation will be documented in the exercise afteraction report. If the external response agencies are unable or unwilling to participate in exercises, the annual MOA review will determine if revisions are required to ensure that external partners can provide support in accordance with the MOA.

e. The emergency medical support coordinator, in coordination with the installation or activity commander, should ensure that appropriate medical supplies, equipment, and casualty decontamination solutions are available on the installation's ambulances and at the MTFs. (As previously mentioned, CAIRA-unique medical supplies should also be prepositioned at off-post medical facilities in accordance with the MOA.) The emergency medical support coordinator should determine the medical supply stockage level to meet the casualty requirements associated with the MPE. USAPHC can provide suggested lists of equipment and supplies.

f. The emergency medical support coordinator, in coordination with the supporting leader of the U.S. Army Medical Department Activity or medical center medical augmentation team (MAT), should develop contingency plans for how the MAT may be used in the event of a chemical accident or incident. Plans should factor in MAT response time to the scene of the chemical accident or incident, as well as the MAT's role in providing chemical casualty care, ambulatory care, emergency medical services, preventive medicine support, or casualty evacuation services.

## **2. CAIRA Medical Support—Response Phase**

a. CAIRA medical support encompasses actions to save lives and preserve health and safety. This support involves triage and treatment of casualties at the site of the chemical accident or incident, the personnel decontamination station, continuing treatment at the appropriate MTF, and ongoing communication with supporting medical facilities.

b. Medical treatment will be carried out through the following four medical response levels:

(1) Level I. Support is provided by nonmedical personnel, who may include firefighters, security forces, supervisors, toxic materiel handlers, explosive ordnance disposal crews, and/or fellow workers as part of the emergency response. The support consists of self-aid and buddy-aid, individual protection, casualty decontamination, and evacuation procedures.

(2) Level II. Care, including advanced life support, is provided by trained medical professionals on the medical response team (MRT). This support includes emergency medical triage, advanced airway management, treatment of chemical and conventional injuries, decontamination, stabilization, and transport of casualties from the site of the chemical accident or incident to the appropriate supporting MTF. The emergency medical support coordinator will designate, in writing, the leader and members of the MRT.

(a) An appropriately staffed, trained, and equipped MRT will be on duty during all shifts where chemical operations or maintenance activities are ongoing at storage, disposal, laboratory, or training facilities, and workers carrying out their normal duties face the potential for exposure to chemical agents.

(b) The MRT leader is a licensed physician (Government or contractor) responsible for the tasks listed in table 1 beginning on page 6 of this enclosure. The MRT leader is not required to be onsite during chemical operations, but must be able to respond to the installation within 60 minutes and be immediately available by cell phone and/or radio so that he or she can be notified and given directions to the MRT while en route. If the MRT leader is not on the installation, a suitably trained and privileged physician assistant or nurse practitioner must be on the installation to act on behalf of the MRT leader while he or she is en route. The MRT leader's response time and communications connectivity must be demonstrated at least annually during a CAIRA exercise.

(c) Other MRT members are responsible for the tasks shown in table 2 on page 7.

(3) Level III. Support is provided by MATs from the supporting medical activity or medical center, including definitive treatment of chemical agent casualties, ambulatory care, emergency medical services, preventive medicine support, and casualty evacuation. The medical activity/medical center commander will designate in writing the MAT leader and members. The MAT leader will accomplish the tasks shown in table 3 on page 7.

(a) Each medical activity/medical center with a geographic responsibility for medical support to chemical surety sites should maintain the ability to deploy a MAT. The MAT leader should develop contingency plans to show how the team may be used to augment the installation MRT in the event of a chemical accident or incident. Plans should factor in MAT response time to the scene or the chemical accident or incident, as well as the MAT's role in providing chemical casualty care services.

(b) In addition to medical specialty training, all members of the MAT should have training equivalent to the MRT members.

(c) MAT activation for support of installations without chemical surety missions is at the discretion of Headquarters, U.S. Army Medical Command (MEDCOM).

(4) Level IV. Support is provided by the Medical Chemical Advisory Team, clinical consultants, and subject matter experts from U.S. Army Medical Research Institute of Chemical Defense (USAMRICD). The Medical Chemical Advisory Team provides clinical advice and consultation in matters related to the initial or long-term management of chemical casualties at the chemical accident or incident site. For consultation, contact the Commander, USAMRICD, commercial 410-436-3276 or DSN 584-3276.

c. Additional medical support is available:

(1) The appointed Consultant to The Surgeon General for Chemical Casualty Care is available for clinical consultation. Contact information is at <https://ke.army.mil/tsgconsultants> (select medical corps consultants). (Access to Army Knowledge Online (AKO) is required.)

(2) The appointed Consultant to The Surgeon General for Surety Medicine is available for clinical consultation. Contact information is at <https://ke.army.mil/tsgconsultants> (select medical corps consultants). (Access to AKO is required.)

(3) The USAPHC Surety Medicine Program has subject matter experts available for clinical and other consultation. The point of contact may be reached at 410-436-4312 or DSN 584-4312.

(4) The National Response Center at 1-800-424-8802 is available for technical and clinical consultation.

(5) Upon receipt of a validated tasking from MEDCOM, subordinate commands will deploy requested Specialized MEDCOM Response Capabilities in the Continental United States and outside the Continental United States to provide medical augmentation to local, State, Federal, and defense agencies or medical teams responding to disasters; civil military cooperative actions; incidents involving weapons of mass destruction or chemical, biological, radiological, nuclear, and high-yield explosives; and emergencies or providing humanitarian assistance. For incidents and emergencies occurring on a military installation, the MTF commander may request Specialized MEDCOM Response Capabilities support directly from the regional medical command. The commander of the regional medical command can immediately deploy Specialized MEDCOM Response Capabilities in support of the MTF and notify the Office of the Surgeon General Emergency Operations Center (Operations Center 21 or OPSCENTER21) at 703-681-8052/5095 (DSN 761) as soon as possible.

**Table 1: MRT Leader Tasks**

<b>Task 1</b>	Completes the Medical Management of Chemical and Biological Casualties Course conducted jointly by USAMRICD and the U.S. Army Medical Research Institute of Infectious Diseases, or another MEDCOM-approved biological/chemical casualty course.
<b>Task 2</b>	Maintains licensure and clinical privileges to provide advanced life support and chemical casualty care. (This includes, but may not be limited to, procedures such as endotracheal intubation, methods of ventilating apneic patients, management of cardiac arrhythmias, and fluid resuscitation using peripheral and central intravenous techniques.)

**Table 1: MRT Leader Tasks (Cont)**

<b>Task 3</b>	Completes the Toxic Chemical Training Course for Medical Support Personnel, conducted by U.S. Army Chemical Materials Agency and/or the Army Medical Department Center and School and USAPHC, or another MEDCOM-approved chemical surety medicine course.
<b>Task 4</b>	Attends other military or civilian courses (particularly in the areas of occupational health, emergency medicine, or ambulatory care) that may benefit the team by increasing professional and technical capabilities.
<b>Task 5</b>	Ensures, reviews, and documents the technical proficiency of all MRT members.
<b>Task 6</b>	Directs properly trained and equipped MRT personnel to cross the hotline.
<b>Task 7</b>	Ensures timely patient movement across the hotline and to definitive medical care.
<b>Task 8</b>	Certifies patients as free of contamination before evacuation of patients to off-post MTFs.

**Table 2: MRT Member Tasks**

<b>Task 1</b>	Receives annual training in the medical treatment of chemical casualties from the MRT leader or through courses mentioned in table 1. Topics should include, but are not limited to, airway management techniques, patient assessment skills, use of nerve agent antidotes and anticonvulsants (if appropriate), patient decontamination, and START (Simple Triage and Rapid Treatment) triage.
<b>Task 2</b>	Maintains licensure or certification as a physician, emergency medical technician, registered nurse, nurse practitioner, or physician assistant. At least two members of the MRT will have demonstrated proficiency in advanced airway management techniques.
<b>Task 3</b>	Attends regularly scheduled training provided by the MRT leader pertaining to treatment of chemical casualties or emergency medical procedures to maintain technical proficiency.
<b>Task 4</b>	Participates in local CAIRA training.
<b>Task 5</b>	Maintains current certification in basic life support/cardiopulmonary resuscitation.

**Table 3: MAT Leader Tasks**

<b>Task 1</b>	Directs MAT response to regional installations without chemical surety missions, upon the direction of Headquarters, MEDCOM.
<b>Task 2</b>	Directs overall backup medical support to installations with chemical surety operations within the MAT leader's assigned area of regional responsibility.
<b>Task 3</b>	Ensures that all support agreements concerning MAT functions are current.
<b>Task 4</b>	Completes the Toxic Chemical Training Course for Medical Support Personnel conducted by the Chemical Materials Agency and/or the Army Medical Department Center and School and USAPHC, or another MEDCOM-approved chemical surety medicine course (see task 3 of table 1).
<b>Task 5</b>	Maintains licensure and clinical privileges to provide advanced life support care (see task 2 of table 1).

### **3. CAIRA Medical Support—Recovery Phase**

a. As long as required, on-location medical expertise, to include preventive medicine expertise, must be provided to support the recovery effort. Depending on the magnitude of the chemical accident or incident, long-term public health problems may need to be addressed, including performing disease control activities related to sanitation and assessing contamination of water and food supplies.

b. Consultation with the U.S. Centers for Disease Control and Prevention may be appropriate to address public health concerns related to the recovery effort. The Agency for Toxic Substances and Disease Registry may be used to assess health effects associated with a chemical accident or incident.

### **4. Medical Treatment of Chemical Agent Casualties**

#### *a. Priority of emergency medical treatment procedures*

(1) Do not delay emergency treatment to save life or limb solely for the purpose of decontamination, provided that rescuers/medical personnel remain protected against the chemical agent. Airway management and/or control of hemorrhage may be as important as treatment of chemical agent poisoning.

(2) In general, when contamination results in respiratory difficulty, loss of consciousness, hemorrhage, or shock, the following steps are suggested, in order of priority:

(a) Protect self by donning protective mask and equipment.

(b) Move injured person upwind and away from the immediate area of any liquid contamination.

(c) Perform cardiopulmonary resuscitation in conjunction with paragraphs 4a(2)(d) and 4a(2)(e).

(d) Administer nerve agent antidote kits

(e) Decontaminate the injured person.

(f) Administer additional emergency medical care for shock, wounds, and illnesses that may endanger life or limb.

(g) Administer supportive care for less urgent injuries.

(h) Evacuate the individual as soon as resuscitation and stabilization have occurred.

(3) The priority of emergency medical treatment procedures may vary, depending on the agent, circumstances of exposure, and clinical condition of the individual.

(a) H-Type and L-Type Blister Agents. Quick decontamination of the individual's eyes is absolutely essential after exposure to liquid blister agent. To prevent subsequent skin redness or vesication, decontaminate any skin exposed to liquid mustard or lewisite as rapidly as possible (within 1 to 2 minutes) with whatever decontaminant is available.

(b) G-Type Nerve Agents. Most G-type (such as Sarin (GB)) injury scenarios involve respiratory exposure to vapor. Vapor-exposed personnel should be immediately removed upwind and away from the agent source. Decontamination of skin exposed to liquid G-type agents should be performed as rapidly as possible (within 1 to 2 minutes), with whatever decontaminant is available, to prevent subsequent local and systemic effects of nerve agent poisoning.

(c) V-Type Nerve Agents. V-type agents (such as VX) present more of a percutaneous liquid hazard than a vapor hazard. In the event of skin exposure to liquid V-type agent, immediately decontaminate the individual (see paragraph 4d on page 10) before evacuating the individual to an uncontaminated area. The need for nerve agent antidote may be assessed while the injured person is being decontaminated. If the injured person is severely intoxicated, three of the appropriate nerve agent antidote kits should be given immediately—before performing cardiopulmonary resuscitation and decontaminating the individual.

b. *Treatment in the field*

(1) Self-aid consists of first-aid measures that the chemically contaminated person can apply as self-help. These measures include decontaminating the chemically contaminated area and administering nerve agent antidote, if appropriate.

(2) Buddy-aid consists of emergency actions given by a trained nonmedical individual to a chemical agent casualty who is unable to perform self-aid. These actions include masking the injured person, administering antidote, decontaminating, giving assisted ventilation, and evacuating the casualty. It is essential that buddy-aid providers recognize the importance of quickly providing an adequate airway, assuring an adequate breathing effort, controlling blood loss, and administering antidote rapidly and properly. If more than one employee or buddy is available to provide assistance, one can perform cardiopulmonary resuscitation and the other can administer the antidote.

(3) Medical personnel from the MRT should provide required medical care after receiving the chemical agent casualty at the hotline. After stabilization, the injured person should be transported to a military or civilian MTF for further care. The MRT leader should direct properly trained and equipped medical personnel to cross the

hotline to provide lifesaving care as required, recognizing the limited emergency lifesaving capability of the nonmedical members of the emergency response. The MRT leader should take such action only when crossing the hotline will not compromise the medical capabilities that are necessary outside the contaminated area.

c. *Administration of the nerve agent antidote*

(1) An individual who has been exposed to a nerve agent and exhibits definite signs or symptoms of exposure should receive immediate treatment with the appropriate antidote kit. The exposure routes of individual nerve agents differ and are related to the physical and chemical properties of the agent. Inhalation is the most common exposure route for volatile (nonpersistent) agents, while cutaneous (skin) exposure is more common for persistent agents. Significant exposures also may occur through ocular absorption. Inhalation exposures may be associated with runny nose (rhinorrhea), blurred vision, pinpoint pupils (miosis), and chest tightness with shortness of breath. Cutaneous exposures may be associated with localized sweating or muscular twitching followed by systemic effects such as nausea or abdominal cramps. After significant exposure to nerve agent, the patient may or may not exhibit local effects but may rapidly progress from anxiety to unconsciousness. Regardless of the exposure route, symptoms and signs may progress from local to systemic effects and result in generalized convulsions, respiratory arrest, and death.

(2) The nerve agent antidote kit is injected into the outer (lateral) thigh muscle or upper outer quarter of the buttocks. Injections may be repeated at 5-minute (or less) intervals if signs and symptoms are progressing until three injections are given. Unless directed by medical personnel, do not give more than three auto-injectors. If the individual has severe signs of agent exposure (that is, respiratory failure, severe muscular twitching, unconsciousness, or convulsions), all three nerve agent auto-injectors should be given in rapid succession. For any severely intoxicated nerve agent casualty, the MRT should administer diazepam (10 milligrams via auto-injector or 5 milligrams intravenously) immediately after the three kit injectors are given to prevent possible nerve agent-induced brain injury or to control seizures in actively convulsing patients.

(3) *Note:* Treatment of actively convulsing patients with diazepam may require cumulative dosages in excess of 20 milligrams intravenously. Anticonvulsants that are routinely used for the treatment of status epilepticus, such as phenytoin, phenobarbital, or valproic acid, are NOT effective in the treatment of nerve agent-induced seizures.

d. *Patient decontamination*

(1) Decontamination of a vapor-exposed casualty consists of removing the victim's clothing in a clean air environment and subsequently shampooing or rinsing the hair to prevent vapor off-gassing.

(2) Decontamination of a liquid-exposed casualty requires these same steps, along with the application of soap and water (preferred) or 0.5 percent sodium hypochlorite to physically remove liquid agent from exposed skin. Use only sterile saline or water to decontaminate the victim's eyes, mucous membranes, or open wounds. Reactive Skin Decontamination Lotion (RSDL) (NSN 6505-01-507-5074) may be used under locally established procedures and in accordance with Technical Manual (TM) 3-6505-001-10 for spot decontamination, but must be followed by soap and water wash/shower. The U.S. Federal Drug Administration has approved RSDL only for initial spot decontamination, not full body decontamination. In the event of liquid VX exposure to the skin, immediately decontaminate the individual in accordance with references 2, 5, 6, and 7 in enclosure 4.

(3) Medical and/or site personnel should ensure that patients have been adequately decontaminated to reduce continued dermal absorption of the agent and prevent the secondary exposure of subsequent healthcare providers. Before transporting patients from the contamination control line, the MRT leader (or designee) should confirm that the casualties have been decontaminated and are free of residual agent contamination at the level of the established short-term exposure limit. This may be done by using a low-level monitoring device (such as Automatic Continuous Air Monitoring Systems or Miniature Continuous Air Monitoring Systems) in an enclosed environment to detect any evidence of vapor off-gassing above the device detection or measurement level. Patients should be prominently tagged as decontaminated before being transported to definitive care facilities off-post. In cases where immediate, life-saving care is required and delays in obtaining near real-time monitoring would compromise patient survival, the MRT leader may certify the patient free from contamination without air monitoring results based on the verified observation of patient decontamination procedures.

### **Guidance for CAIRA Operations at Contractor-Owned, Contractor-Operated Facilities**

Contracting officers will ensure that the following guidance is incorporated into contracts requiring the use of Army-furnished chemical agents at contractor-owned, contractor-operated facilities.

#### **1. CAIRA Medical Support—Readiness Phase**

a. The contractor-owned, contractor-operated facility will ensure that the emergency medical support coordinator is given a general description of each chemical agent operation. These descriptions include the number of personnel involved, location, a summary of work procedures, the duration of the operation, and the potential exposure hazards to a chemical agent. The emergency medical support coordinator, in coordination with the facility chemical agent manager, should develop a list of chemical agents personnel may be exposed to, a description of potential health effects, and appropriate chemical agent treatment protocols.

b. The chemical agency manager, in coordination with the emergency medical support coordinator, should ensure that emergency response nonmedical personnel receive relevant training before working with chemical agents. Training will include topics outlined in Occupational Safety and Health Administration regulations, 29 Code of Federal Regulations (CFR) 1910.1450(f)(4) and applicable paragraphs under 29 CFR 1910.120(q)(6), chemical agent self/buddy aid, casualty decontamination, and evacuation procedures. The emergency medical support coordinator should review and approve this training in writing on an annual basis.

c. Planning for medical support to CAIRA operations requires an understanding of the MPE and MCE. The MPE and MCE are established by a formal process involving, among others, the contracting officer/contracting officer representative and the facility chemical agent manager, safety manager, and emergency medical support coordinator. USAPHC has developed and will maintain guidance for use by contractor-owned, contractor-operated facilities in estimating the chemical agent casualties that may be expected from an MPE.

(1) The MPE determines the medical capability the contractor-owned, contractor-operated facility must have to support chemical agent operations. The description of the MPE should include the number and type of casualties anticipated (pure chemical, mixed chemical and conventional, or pure conventional casualties); the possible routes of exposure (inhalation, dermal, ocular, or ingestion); the anticipated severity of injuries (mild, moderate, or severe); and the medical capabilities and staffing levels required to treat these casualties.

(2) The MCE, though less likely to occur than the MPE, may generate types and numbers of casualties beyond the capabilities of a normal medical response. CAIRA medical planning must also encompass a response to the MCE. MOAs with local emergency medical providers will identify additional MCE-related medical care and services that may be required.

d. Coordination is required when medical support planning incorporates local MTFs and ambulance services.

(1) The emergency medical support coordinator, in coordination with the chemical agent manager and contracting officer/contracting officer representative, will develop MOAs with local medical treatment and ambulance services to ensure that appropriate resources are available in the event of a chemical accident or incident.

(2) Each MOA should detail the level of training healthcare providers will receive, who will provide this training, and how frequently refresher training will be offered or required. MOAs should describe how casualty care will be coordinated before, during, and after transport to the MTF(s) and any other contingency plans for casualty evacuation.

(3) The emergency medical support coordinator will give the supporting medical facility(ies) information on the critical elements of care for chemically injured or exposed workers, training objectives and resources, and minimal requisite medical supplies and equipment for such care (based on the MPE).

(4) Each MTF with an MOA should participate in a CAIRA exercise at least annually. Communication links between potential chemical accident or incident sites, the facility response center, ambulances, and MTFs should be checked for compatibility and tested as part of CAIRA exercises. MOAs should be reviewed and updated in writing annually based on lessons learned during the CAIRA exercise.

e. The emergency medical support coordinator, in coordination with the contracting officer/contracting officer representative, should ensure that appropriate medical supplies, equipment, and casualty decontamination solutions are available within contractor-owned, contractor-operated facilities. (As mentioned previously, medical supplies for chemical agent casualties should also be prepositioned at medical facilities in accordance with the MOA). The on-hand medical supply should be determined by the casualty requirements associated with the MPE. USAPHC can provide suggested lists of equipment and supplies.

## **2. CAIRA Medical Support—Response Phase**

a. CAIRA medical support encompasses actions to save lives and preserve health and safety. This support involves triage and treatment of casualties at the chemical accident or incident site, continuing treatment at the appropriate MTF, and ongoing communication with supporting medical facilities. Appropriately trained staff and/or medical personnel will be in place or on duty when chemical operation activities are ongoing and when the potential exists for exposure to a chemical agent.

b. Trained personnel will be available for the following response levels:

(1) Level I. Support is provided by nonmedical personnel, who may include firefighters, security forces, supervisors, laboratory technicians, and/or fellow workers as part of the emergency response. It consists of self-aid and buddy-aid.

(2) Level II. Care, including advanced life support, is provided by trained medical professionals/first responders identified in the MOA. This support includes emergency medical triage, advanced airway management, treatment of chemical and conventional injuries, stabilization, and transport of casualties from the chemical accident or incident site to the appropriate supporting MTF. A physician will be available to provide and/or coordinate advanced life support and chemical casualty care. (The physician is not required to be onsite during chemical operations, but must be able to respond in accordance with the approved facility emergency response plan and immediately establish and maintain communication with the contractor-owned, contractor-operated facility to receive updates and provide oral direction to first responders within the boundaries of applicable State law while en route to the facility

or MTF.) The physician's response time and communications connectivity must be demonstrated at least annually during a CAIRA exercise.

c. Additional medical support is available:

(1) The Chemical Materials Agency Surgeon can provide technical and medical consultation. The contact number is 410-436-3787 (DSN 584-3787).

(2) USAMRICD can provide technical and medical consultation. The contact number is 410-436-3276 (DSN 584-3276).

(3) The USAPHC Surety Medicine Program has subject matter experts available for clinical and other consultation. The contact number is 410-436-4312.

(4) The National Response Center at 1-800-424-8802 is available for technical and clinical consultation.

### **3. CAIRA Medical Support—Recovery Phase**

As long as required, on-location medical expertise, including preventive medicine expertise, must be provided to support the recovery effort.

### **4. Medical Treatment of Chemical Agent Casualties**

a. *Priority of emergency medical treatment procedures*

(1) Do not delay emergency treatment to save life or limb solely for the purpose of decontamination, provided that rescuers/medical personnel remain protected against the chemical agent. Airway management and/or control of hemorrhage may be as important as treatment of chemical agent poisoning.

(2) In general, when contamination results in respiratory difficulty, loss of consciousness, hemorrhage, or shock, the following steps are suggested, in order of priority:

(a) Protect self by donning protective mask and equipment.

(b) Move injured person upwind and away from the immediate area of any liquid contamination.

(c) Perform cardiopulmonary resuscitation in conjunction with paragraphs 4a(2)(d) and 4a(2)(e).

(d) Administer nerve agent antidote.

(e) Decontaminate the injured person.

(f) Administer additional emergency medical care for shock, wounds, and illnesses that may endanger life or limb.

(g) Administer supportive care for less urgent injuries.

(h) Evacuate the individual as soon as resuscitation and stabilization have occurred.

(3) The priority of emergency medical treatment procedures may vary, depending on the agent, circumstances of exposure, and clinical condition of the individual.

(a) H-Type and L-Type Blister Agents. Quick decontamination of the individual's eyes is absolutely essential after exposure to liquid blister agent. To prevent subsequent skin redness or vesication, decontaminate any skin exposed to liquid mustard or lewisite as rapidly as possible (within 1 to 2 minutes) with whatever decontaminant is available. (See paragraph 4d.)

(b) G-Type Nerve Agents. Most G-type (for example, Sarin (GB)) injury scenarios involve respiratory exposure to vapor. Vapor-exposed personnel should be immediately removed upwind and away from the agent source. Decontamination of skin exposed to liquid G-type agents should be performed as rapidly as possible (within 1 to 2 minutes), with whatever decontaminant is available, to prevent subsequent local and systemic effects of nerve agent poisoning. The decontaminant of choice at this time is soap and/or water, based on the most recent information from USAMRICD. RSDL may also be used, but must be followed by soap and water wash/shower. (The Federal Drug Administration has approved RSDL only for initial spot decontamination, not full body decontamination.) (See paragraph 4d.)

(c) V-Type Nerve Agents. V-type agents (for example, VX) present more of a percutaneous liquid than a vapor hazard. In the event of skin exposure to a liquid V-type agent, immediately decontaminate the individual (see paragraph 4d on page 17) before evacuating the individual to an uncontaminated area. The need for nerve agent antidote may be assessed while the injured person is being decontaminated. If the injured person is severely intoxicated, three of the appropriate nerve agent antidote kits should be given immediately—before performing cardiopulmonary resuscitation and decontaminating the individual.

b. *Treatment in the field*

(1) Self-aid consists of first-aid measures the chemically contaminated person can apply as self-help. These measures include decontaminating the chemically contaminated area and administering the chemical agent antidote.

(2) Buddy-aid consists of emergency actions given by a trained, nonmedical individual to a chemical agent casualty who is unable to perform self-aid. These actions

include masking the injured person, administering antidote, decontaminating, giving assisted ventilation, and evacuating the chemical agent casualty. It is essential that buddy-aid providers recognize the importance of quickly providing an adequate airway, assuring an adequate breathing effort, controlling blood loss, and administering antidote rapidly and properly. If more than one employee or buddy is available to provide assistance, one can perform cardiopulmonary resuscitation and the other can administer the antidote.

(3) First responders should provide required medical care after receiving the chemical agent casualty at the hotline. After stabilization, the injured person should be transported to a medical treatment facility for further care.

*c. Administration of the nerve agent antidote kit*

(1) An individual who has been exposed to a nerve agent and exhibits definite signs or symptoms of exposure should receive immediate treatment with the nerve agent antidote kit. Individual exposure routes to nerve agents differ and are related to the physical and chemical properties of the agent. Inhalation is the most common exposure route for volatile (nonpersistent) agents, while cutaneous exposure is more common for persistent agents. Significant exposures also may occur through ocular absorption. Inhalation exposures may be associated with runny nose (rhinorrhea), blurred vision, pinpoint pupils (miosis), and chest tightness with shortness of breath. Cutaneous exposures may be associated with localized sweating or muscular twitching followed by systemic effects such as nausea or abdominal cramps. After significant exposure to nerve agent, the patient may or may not exhibit local effects but may rapidly progress from anxiety to unconsciousness. Regardless of exposure route, symptoms and signs may progress from local to systemic effects and result in generalized convulsions, respiratory arrest, and death.

(2) The nerve agent antidote kit injectors are injected into the outer (lateral) thigh muscle or upper outer quarter of the buttocks. Injections may be repeated at 5-minute (or less) intervals if signs and symptoms are progressing until three injections are given. Unless directed by medical personnel, give no more than three injections. If the individual has severe signs of agent exposure (that is, respiratory failure, unconsciousness, convulsions, or severe muscular twitching), give all three kit injectors in rapid succession. For any severely intoxicated nerve agent casualty, the MRT should administer diazepam (10 milligrams via auto-injector or 5 milligrams intravenously) immediately after the three nerve agent antidote kits to prevent possible nerve agent-induced brain injury or to control seizures in actively convulsing patients.

(3) *Note:* Treatment of actively convulsing patients with diazepam may require cumulative dosages in excess of 20 milligrams intravenously. Anticonvulsants that are routinely used for the treatment of status epilepticus, such as phenytoin, phenobarbital, or valproic acid, are NOT effective in the treatment of nerve agent-induced seizures.

d. *Patient decontamination*

(1) Decontamination of a vapor-exposed casualty consists of removing the victim's clothing in a clean air environment and subsequently shampooing or rinsing the hair to prevent vapor off-gassing.

(2) Decontamination of a liquid-exposed casualty requires these same steps, along with the application of soap and water (preferred) or 0.5 percent sodium hypochlorite to physically remove liquid agent from exposed skin. Use only sterile saline or water to decontaminate the victim's eyes, mucous membranes, or open wounds. RSDL (NSN 6505-01-507-5074) may be used under locally established procedures and in accordance with TM 3-6505-001-10 for spot decontamination, but must be followed by soap and water wash/shower. The FDA has approved RSDL only for initial spot decontamination, not full body decontamination.

(3) Medical and/or site personnel should ensure that patients have been adequately decontaminated to reduce continued dermal absorption of the agent and prevent the secondary exposure of subsequent healthcare providers. Before transporting patients from the contamination control line, confirmation should be made that the casualties have been decontaminated and are free of residual agent contamination at the level of the established short-term exposure limit. This may be done by using a low-level monitoring device (such as Automatic Continuous Air Monitoring Systems or Miniature Continuous Air Monitoring Systems) in an enclosed environment to detect any evidence of vapor off-gassing above the device detection or measurement level. Patients should be prominently tagged as decontaminated before being transported to definitive care facilities off-post. In cases where immediate, life-saving care is required and delays in obtaining near real-time monitoring would compromise patient survival, the MRT leader may certify the patient free from contamination without air monitoring results based on the verified observation of patient decontamination procedures.

## REFERENCES

1. 29 CFR 1910.120, Hazardous waste operations and emergency response.
2. 29 CFR 1910.1450, Occupational exposure to hazardous chemicals in laboratories.
3. AR 40-68 (Clinical Quality Management), Rapid Action Revision Issue Date 22 May 09.
4. AR 50-6 (Chemical Surety), 28 Jul 08.
5. AR 190-59 (Chemical Agent Security Program), 10 Apr 12.
6. AR 385-10 (The Army Safety Program), Rapid Action Revision Issue Date 4 Oct 11.
7. AR 525-27 (Army Emergency Management Program), 13 Mar 09.
8. DA Pamphlet 40-8 (Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agents GA, GB, GD, and VX), 4 Dec 90.
9. DA Pamphlet 40-173 (Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, and HT), 3 Jun 03.
10. DA Pamphlet 385-61 (Toxic Chemical Agent Safety Standards), 17 Dec 08.
11. DA Pamphlet 385-65 (Explosive and Chemical Site Plan Development and Submission), Rapid Action Revision Issue Date 20 Jul 09.
12. Technical Manual 3-6505-001-10 (Operator's Manual for Reactive Skin Decontamination Lotion (RSDL) (NSN 6505-01-507-5074) Training Packet, Reactive Skin Decontamination Lotion (RSDL) (NSN 6910-01-507-5141).