FM 3-11.20 (FM 9-20)

Technical Escort Battalion Operations

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Headquarters, Department of the Army

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***FM 3-11.20 (FM 9-20)**

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Headquarters
Department of the Army
Washington, DC, 29 August 2007

Technical Escort Battalion Operations

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Preface

Field Manual (FM) 3-11.20 provides doctrine for planning and conducting technical escort (TE) operations. It describes—

- Mission analysis.
- Hazard and site characterization.
- Sampling.
- Monitoring.
- Mitigation.
- Decontamination.
- Disablement.
- Elimination.
- Munitions assessment.
- Emergency response.
- Sensitive-site exploitation (SSE).

This manual specifically targets TE battalion commanders and staffs and key agencies with the tools and information necessary to plan and execute TE operations. It also provides reference information for chemical, biological, radiological, and nuclear (CBRN) personnel.

FM 3-11.20 is to be used in conjunction with appropriate surety regulations and military and civilian publications that govern the actions taken in dealing with CBRN hazards. Personnel who have not received specialized training should not attempt to conduct the operations outlined in this manual, but should use this manual as a reference for TE battalion capabilities.

This publication applies to the Active Army, the Army National Guard (ARNG), the Army National Guard of the United States, and the United States (U.S.) Army Reserve unless otherwise stated.

The proponent for this publication is the U.S. Army Training and Doctrine Command (TRADOC). Send comments and recommendations on *Department of the Army (DA) Form 2028 (Recommended Changes to Publications and Blank Forms)* directly to Commandant, U.S. Army Chemical School, 464 MANSCEN Loop, Suite 2617, ATTN: ATSN-TD, Fort Leonard Wood, Missouri 65473-8926.

Unless stated otherwise, masculine nouns or pronouns do not refer exclusively to men.

Chapter 1
Employment Fundamentals

During deliberate and crisis action planning, leaders must conduct assessments that analyze the impact of CBRN hazards during full-spectrum operations and various courses of action (COAs). TE battalions support military, civilian, and joint operations across the full range of CBRN hazards—weapons of mass destruction (WMD) and toxic industrial materials (TIM). They integrate the Army's six warfighting functions with CBRN sense, CBRN shape, CBRN shield, and CBRN sustain.

MISSION

1-1. TE battalions—

- Deploy task-organized teams in the continental United States (CONUS) and outside the continental United States (OCONUS) to conduct TE and CBRN hazard characterization, monitoring, disablement, and elimination support operations.
- Provide WMD and CBRN incident emergency response, homeland defense, and contingency support operations to combatant commanders (CCDRs) and lead federal agencies (LFAs).
- Provide site remediation and restoration support operations for the Department of Defense (DOD).

1-2. The five TE battalion mission sets include—

- Emergency response (see *Chapter 4*).
- Remediation and restoration (see *Chapter 5*).
- TE of CBRN material (see *Chapter 6*).
- Technical CBRN support to COCOMs (see *Chapter 7*).
- Homeland security (see *Chapter 8*).

ORGANIZATION

1-3. TE battalions are organized into CBRN teams and remediation and restoration teams (RRTs).

- CBRN teams provide—
  - Support to joint task forces (JTFs) and CCDRs.
  - Forward employment in nonpermissive environments.
  - Complete unit core capabilities to supported elements.
  - Domestic crisis management support for chemical-biological (CB) devices to the Federal Bureau of Investigation (FBI), DOD, and local responders.
  - CBRN advice, secure reach-back, CBRN assessment, and chemical expertise to other emergency response teams worldwide.
- RRTs are stewards of the environment. They provide—
  - Remediation and response for CBRN material to the Army Corps of Engineers (COE), the product manager for nonstockpile chemical material, the Environmental Protection Agency (EPA), and state and local governments.
  - Complete unit core capabilities to supported elements.

CAPABILITIES

1-4. The core capabilities of TE battalions are—

- Technical CBRN advice.
- Sampling.
- Detection.
- Monitoring.
- Limited decontamination.
- Initial hazards mitigation.
- Packaging.
- TE.
- Render-safe procedures (RSPs).
- Elimination.
- Disablement.
- Presumptive analysis.
- Munitions assessment.

Note. See *Chapter 2* for detailed descriptions.

LIMITATIONS

1-5. TE battalions are limited in the following ways:

- They cannot provide operational or thorough decontamination to other units; they can only decontaminate their own equipment and the personnel used to support the assigned mission.
- They cannot support obscuration operations.
- They cannot provide complete explosive ordnance disposal (EOD) support to other units due to the size of the EOD teams; they can only perform simple CBRN EOD render-safe missions.
- There are special maintenance requirements for the commercial, off-the-shelf (COTS) equipment used by TE battalions. See *Chapter 3* for external logistic support considerations.
- Their limited transportation assets require coordination for operational support. See *Chapter 2* for support requirements.

OPERATIONAL ENVIRONMENTS

1-6. CBRN teams function in the following types of operational environments (see *Figure 1-1*).

- **Permissive.** Operations within permissive environments require little or no outside support.
- **Uncertain.** Operations within uncertain environments require area security support.
- **Hostile.** CBRN teams cannot perform missions in a hostile environment; they operate as a support asset to a CCDR or force in such an environment.
- **CBRN hazard.** CBRN teams conduct and support operations nationally and internationally under certain operational environments.
    - CONUS. They provide emergency response and operational support anywhere within CONUS.
    - OCONUS. They deploy overseas to support operations that require their core capabilities.
- **Military-supporting.** CBRN teams support DOD CCDRs and multinational forces under certain operational environments.

- **Civilian-supporting.** CBRN teams support federal, state, local, and host nation (HN) civil authorities, as directed by the Joint Director of Military Support (JDOMS) or according to standing response plans.

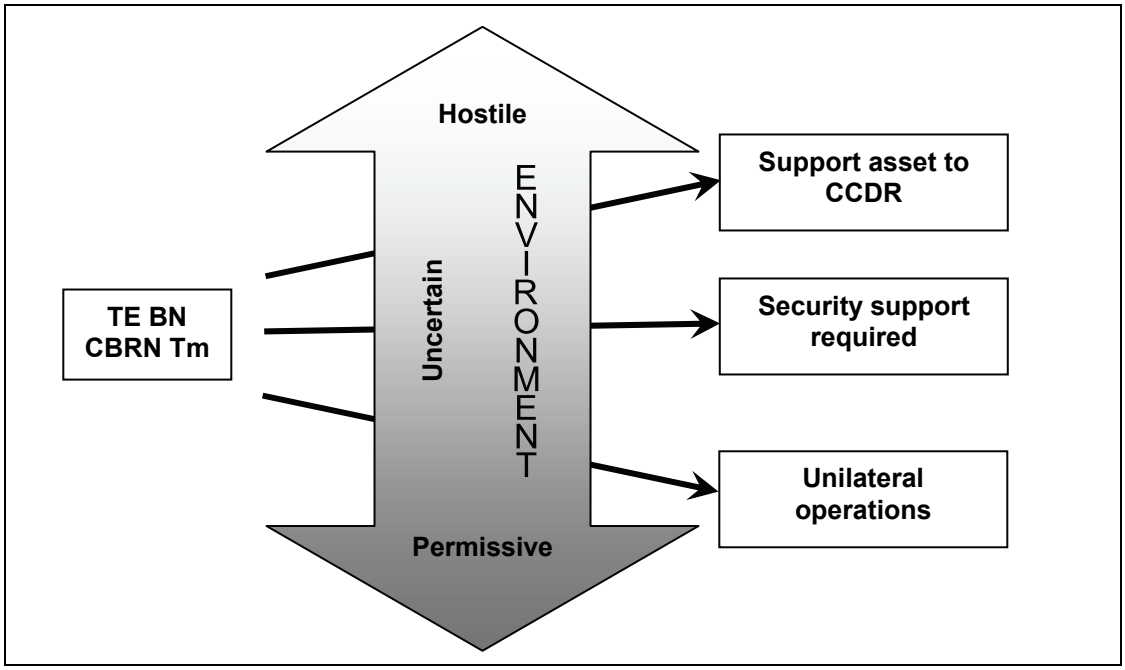

Figure 1-1. Employment Within Operational Environments

ROLES AND RESPONSIBILITIES

1-7. The roles and responsibilities of TE battalions vary with the operation and the agency supported. They are based on the core capabilities listed in *paragraph 1-4*.

1-8. Requests for support from TE battalions must be routed through appropriate approving authorities prior to the support being provided. The approval route is determined by the origin of the request. Common requests for TE battalion support are described below. For more information, see *Joint Publication (JP) 3-26*.

- **DOD.** TE battalions provide core capabilities in support of DOD agencies. Requests for support are routed through JDOMS for validation and authorization. Emergency response situations may require an initial vocal order (VOCO) so that teams may respond while awaiting written authorization.
- **Interagency.** TE battalions provide support to various government agencies for special events, emergency response, remediation and restoration projects, TE, and homeland defense. Requests for support are routed through JDOMS for validation and authorization.
- **Multiservice.** TE battalion teams follow CCDR orders when providing support that involves more than one service. Requests for support are routed through operational channels.
- **Multinational.** Requests for support from North Atlantic Treaty Organization (NATO) or other allied forces are also processed through JDOMS for validation and authorization. Lines of authority are coordinated and established through the validation process. CBRN teams follow CCDR orders when providing support to a multinational operation.

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Chapter 2
Planning and Operations

This chapter implements Standardization Agreement (STANAG) 4359 and STANAG 4590.

This chapter outlines command and support relationships, core capabilities, planning considerations, and operational phases of TE battalions. It also discusses requests for support.

COMMAND RELATIONSHIP

2-1. Due to their mission, TE battalions use task-organized teams to support specific operations within the range of their core capabilities. The teams—

- Will not be assigned to other units for supported operations.
- May be attached to other units for operational support, depending on the time frame that the support is required.
- May be placed under operational control (OPCON) in support of a mission for a specific amount of time.

SUPPORT RELATIONSHIP

2-2. TE battalions may be required to support CONUS and OCONUS civil authorities following the use of CBRN weapons or materials. Commanders must prepare an appropriate response to meet the full spectrum of CBRN incidents (intentional or unintentional) to support civilian, HN, and military installation recovery efforts. Support to civil authorities is to be provided according to applicable federal emergency plans and is likely to require coordination and cooperation with agencies, organizations, and individuals outside the military chain of command or direct control. Responding CBRN teams are normally under the command and control (C2) of the senior DOD official on site.

2-3. TE battalions have unique support requirements for their missions and technical equipment. Much of the equipment used consists of COTS items that have maintenance requirements which cannot usually be provided by military maintenance personnel. Special equipment and maintenance requirements should be identified and agreed upon with the supported agency prior to the support of an operation; failure to do so could delay operational support. See *Chapter 3* for the external logistic support requirements of a technical CBRN unit.

DOMESTIC

2-4. The Department of Homeland Security (DHS) is the LFA for crisis and consequence management. DOD support to DHS includes (1) identifying, assessing, dismantling, transferring, and disposing of a contaminant and (2) conducting decontamination operations. Additionally, incidents involving CBRN environments often require a response according to a specific federal emergency operations plan, such as the *National Response Plan (NRP)*, the *National Oil and Hazardous Substances Pollution Contingency Plan* (commonly referred to as the *National Contingency Plan [NCP]*; *Title 40, Code of Federal Regulations [CFR] 300*), or the *Federal Radiological Emergency Response Plan (FRERP)*. These plans designate an LFA to coordinate the federal response, and the type of emergency determines the LFA. In general, an LFA establishes operational structures and procedures to assemble and work with agencies

providing direct support. (*Appendix A* lists the LFA for each of the emergency support functions [ESFs] designated in the NRP.)

FOREIGN

2-5. The primary responsibility for managing and mitigating the effects of a foreign incident resides with the HN government. When an HN government requests U.S. assistance, the Department of State (DOS) serves as the LFA. DOD support could be a part of the U.S. response, and it is coordinated through the appropriate chief of mission and country team. DOD assets are under the command of the applicable geographic CCDR, and the resident chief of mission and country team coordinate all U.S. Government (USG) support.

CORE CAPABILITIES

2-6. TE battalion core capabilities consist of—

- Technical CBRN advice.
- Sampling.
- Detection.
- Monitoring.
- Limited decontamination.
- Initial hazard mitigation.
- Packaging.
- Technical escort.
- RSPs.
- Elimination.
- Disablement.
- Presumptive analysis.
- Munitions assessment.

TECHNICAL CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR ADVICE

2-7. Team members can provide CBRN technical advice to support CCDRs, incident commanders (ICs), and on-scene commanders by using real-time, reach-back capabilities. Information provided includes—

- Physical characteristics of an agent and locations to which it may spread.
- Packaging and transportation requirements.
- Recommended level of PPE required to enter a contaminated area.
- Appropriate decontaminants.

SAMPLING

2-8. Sampling is the process or technique of selecting, collecting, packaging, and documenting the collection of CBRN material. Sampling team members take samples from munitions (which have been rendered safe by EOD personnel), devices, materials, and the environment for laboratory analysis and further identification. Correct techniques are critical for accuracy in the analysis of environmental samples and medical specimens. The quality of an analytical evaluation is directly related to the quality of the sample or specimen and the degree of postcollection degradation that occurs before testing. Sampling procedures must comply with *STANAG 4359* and *STANAG 4590*.

Sampling Terms of Reference

2-9. Sampling terminology is directly related to the source of the sample or specimen.

Environmental Sample

2-10. Environmental samples contain soil, plants, grass, water, or air. They may be collected by anyone with the appropriate collection training and material.

Biomedical Sample

2-11. Biomedical specimens contain human or animal material (blood, urine, sputum, tissue). Only medically trained individuals collect specimens. Each scenario, geographic region, population base, and suspect agent affect the collection process and the type and amount of specimens required. During all operations, express permission is required before collecting specimens from civilians because of religious or sociological beliefs in many cultures. Some nations and religious groups do not permit the collection of human components except by medical personnel and with the approval of the appropriate authority. Obtaining such specimens without permission could result in unnecessary mission complications.

Toxic Industrial Material Sample

2-12. TIM samples contain hazardous material (HAZMAT) that is used in everyday activities; such as, benzene, acids, chlorine, ammonia, medical waste, and radiological substances used in medical facilities and industrial plants.

Presumptive Identification

2-13. Presumptive identification is the identification of a suspect biological warfare agent by means of devices, materials, or technologies based on detecting biomarkers using a single methodology. The accuracy of biomarkers and methodologies used at this level of testing are significantly limited. Agent identification to species level or differentiation among a family of similar agents may not be possible (see *FM 1-02* and *FM 4-02.7*).

Field Confirmatory Identification

2-14. Field confirmatory identification is the identification of a suspect biological warfare agent by means of devices, materials, or technologies that are based on detecting biomarkers using two or more independent results (see *FM 1-02* and *FM 4-02.7*).

Definitive Confirmatory Identification

2-15. Definitive confirmatory identification is the specific identification of a suspect biological agent as to genus and species, serological type, or toxin. Identification at this level is by means of devices, materials, and technologies that are based on two or more independent biomarker results and using different methodologies. Highly skilled testing personnel with a broader variety of methodologies available perform this level of identification in a reference laboratory, thus providing the highest level of accuracy (see *FM 1-02* and *FM 4-02.7*).

Medium

2-16. Laboratory analytical findings depend on sample material that can produce viable agent presentations. Sample mediums include, but are not limited to—

- **Neat agent.** A neat agent is the best medium for producing desired laboratory results.
- **Air and vapor.** The collection of air and vapor requires specialized equipment.
- **Surface water.** This includes samples of water, along with discolorations, oily films, and floating debris. Samples may also be collected from a few inches below the water surface.
- **Soil.** Most soil samples should be obtained from the top ½ inch, and the depth should be identified on the documentation. The sample should include discolorations and liquids, if present. Several small samples are better than one large sample.
- **Plants.** Plant leaves coated with liquid agent provide the best medium.

- **Grass.** Grass clippings taken from open areas and at the drip line of overhead trees provide the best source.
- **Weapon components.** Weapon components can consist of container fragments or the entire projectile. Authorized personnel must have rendered the projectile safe.
- **Paint scrapings.** Paint scrapings near indentations in a painted surface produce the best samples.
- **Swipes.** Swipe samples are collected from smooth, nonporous surfaces. They should be taken by using a cotton gauze pad to pick up traces of the contaminant.
- **Sediment.** Sediment from containers and small impressions in the ground can produce viable samples.
- **Waste.** Waste such as used syringes, laboratory culture dishes, contaminated clothing, and wastewater are viable sample sources.
- **Medical specimens.** Blood, urine, sputum, nasal swabs, and tissue specimens are viable media.

Methodology

2-17. Sampling methodology is as varied as the type of samples and specimens to be collected. Procedures are as simple as collecting soil or water samples using clean instruments and containers and as diverse as collecting liver biopsies in a medical or forensic facility (see *FM 3-11.19*, *FM 3-11.86*, and *FM 4-02.7*).

Site Sketch

2-18. Sampling teams develop a site sketch (*Figure 2-1)* depicting the locations and types of specific hazards. The sketch contains, at a minimum, the following information:

- Hazard areas (cold zone, warm zone, hot zone, and minimum safe distances).
- Site terrain.
- Ingress and egress routes.
- Site accessibility by vehicle and afoot.
- Off-site populations or environments at risk.
- Pertinent weather information (wind conditions, temperature, forecast).

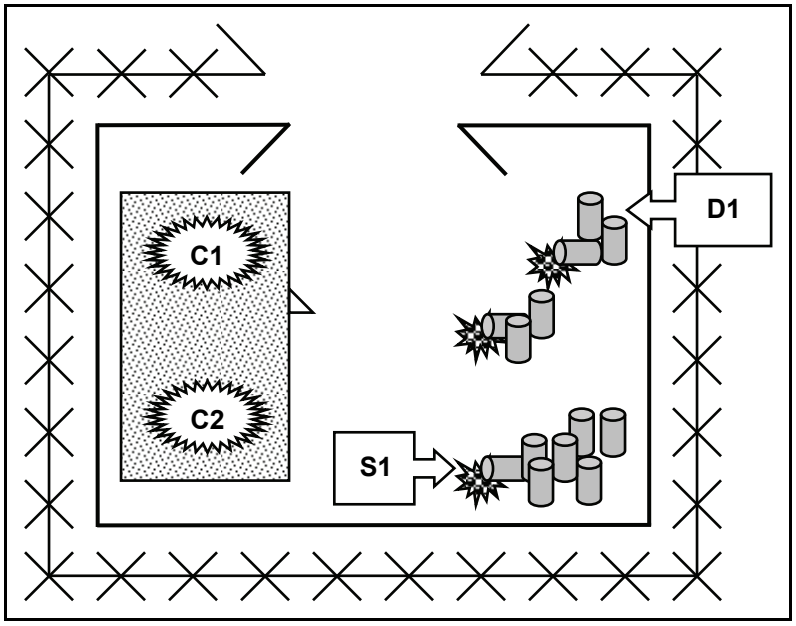

Figure 2-1. Sample Site Sketch

Chain of Custody

2-19. The individual or unit collecting samples must begin the chain-of-custody documentation when the samples are collected. The chain of custody is recorded on *Department of Defense (DD) Form 1911 (Materiel Courier Receipt)* or *DA Form 4137 (Evidence/Property Custody Form)* (see *FM 3-11.86*.)

Transfer Procedures

2-20. When the samples or specimens are transferred from one individual to another, the receiving individual signs the chain-of-custody document. This process continues until the samples are delivered to the final destination laboratory. The final destination laboratory forwards the document with definitive identification of the suspect agent or material to the appropriate authorities for analysis and decision making.

Coordination with Confirmatory Laboratory

2-21. To ensure that samples or specimens are delivered to an appropriate confirmatory laboratory, coordination should occur as the field laboratory mission is being established. An OCONUS confirmatory laboratory may be a U.S. Army area medical laboratory, a Navy environmental and preventive medicine unit, an HN laboratory, or a coalition force laboratory. A CONUS laboratory may be a local, state, or federal laboratory. In CONUS, confirmatory testing of biological threat agents is usually done via the laboratory response network (LRN), including many DOD LRN reference and national laboratories. The confirmatory laboratory should have, at a minimum, Biosafety Level 3 (BSL 3) containment. The appropriate authority (theater commander, area of operation [AO] commander, country team, or FBI) designates the confirmatory laboratory.

DETECTION

2-22. Detection team members can perform presumptive identification for various CBRN materials. Technological advances in detection equipment occur at such a pace that it is not prudent to list the detection equipment currently used by the teams. While CBRN teams use military detection equipment, most of their detection equipment consists of COTS items that detect CBRN material at a lower level than military standard detection equipment. Unit standing operating procedures (SOPs) and equipment user manuals should be used to identify maintenance and operational procedures for the equipment on hand.

MONITORING

2-23. Unit monitoring equipment includes highly sensitive monitors that detect specific CBRN agents in near real time at levels far below that deemed harmful by the Surgeon General. Monitoring technology—like detection technology—changes frequently, so the unit must ensure that equipment is available to provide the best results possible. Unit SOPs and equipment user manuals should be used to identify maintenance and operational procedures for the equipment on hand.

LIMITED DECONTAMINATION

2-24. CBRN teams provide decontamination for their equipment and team members. They do not provide decontamination for other unit equipment, personnel, or terrain.

INITIAL HAZARD MITIGATION

2-25. CBRN teams are trained to mitigate initial CBRN hazards for the purpose of limiting or containing the spread of contamination from the source.

PACKAGING

2-26. CBRN teams are trained to package and seal CBRN material for transportation within the guidelines of *49 CFR* .

TECHNICAL ESCORT

2-27. CBRN units have personnel trained and certified to accompany shipments of surety and nonsurety CBRN material. They can safely transport and secure items while maintaining the chain of custody and integrity of the items.

RENDER-SAFE PROCEDURES

2-28. EOD-trained personnel assigned to CBRN units perform RSPs on CBRN munitions to ensure safe handling prior to mitigation.

ELIMINATION

2-29. CBRN team personnel safely dispose of munitions, devices, and agents with reliable techniques, equipment, and decontaminants. These procedures render the material ineffective, hindering its use by enemy forces.

DISABLEMENT

2-30. CBRN team personnel are trained to perform disablement operations on potential CBRN manufacturing facilities, rendering them inoperable for enemy use. Higher headquarters (HQ) determines the length of time that a facility or process is disabled.

PRESUMPTIVE ANALYSIS

2-31. CBRN teams perform presumptive CBRN analysis based on information gathered from an incident and provide the supported command with information necessary to protect personnel.

MUNITIONS ASSESSMENT

2-32. Chemical and EOD personnel assigned to technical CBRN units assess suspect CBRN munitions and provide information regarding disposition.

PERSONNEL TRAINING REQUIREMENTS

2-33. TE unit personnel receive unique civil and military training in order to perform their individual and unit missions.

QUALIFICATIONS

2-34. Personnel assigned to a TE unit must be qualified in—

- Technical escort.
- Hazardous waste operations.
- HAZMAT.
- HAZMAT transportation.
- Confined-space rescue.

Technical Escort

2-35. Since their duties require close contact with CBRN materials, personnel assigned to a technical CBRN unit must obtain the additional skill identifier (ASI) L3.

Hazardous Waste Operations

2-36. An initial 40 hours of hazardous waste operations training and 8 hours of refresher training each year are required to maintain the hazardous waste operations qualification, which is mandatory for personnel working at remediation sites. The training must be done according to *29 CFR 1910.120(e)*.

Hazardous Material

2-37. HAZMAT training is required for all personnel on emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard. The training must be conducted according to *29 CFR 1910.120(q)*. At a minimum, HAZMAT technicians must receive 24 hours of initial training and have competency in the following areas:

- Emergency response procedures contained in the unit SOP.
- The use of organic field survey instruments and equipment to classify, identify, and verify known and unknown materials.
- Ability to function within an assigned role in the Incident Command System (ICS).
- The selection and use of proper specialized chemical personal protective equipment (PPE).
- Hazard and risk assessment techniques.
- Advance control, containment, and confinement operations, based on the resources and PPE available to the unit.
- Decontamination procedures.
- Termination procedures.
- Basic chemical and toxicological terminology and behavior.

They must also complete refresher training of sufficient content and duration to maintain their competencies or demonstrate competency in these areas at least annually.

Hazardous Material Transportation

2-38. The 2-week Defense Packaging of HAZMAT for Transportation training course focuses on the regulatory requirements for properly transporting HAZMAT using any mode of transportation. The course also qualifies personnel to prepare HAZMAT for shipment. A biannual, 1-week refresher is required to maintain this qualification (*29 CFR 1910.120)*.

Confined-Space Rescue

2-39. Due to the likelihood of operations in confined spaces, as defined in *29 CFR 1910.146(b)*, personnel must receive the training specified in *29 CFR 1910.146* and *National Fire Protection Association (NFPA) 1006*. Rescue teams must be trained according to *29 CFR 1910.146(k)(2)*.

CERTIFICATIONS

2-40. In addition to training requirements, TE personnel are required to complete regulatory certification.

Chemical Personnel Reliability Program

2-41. *Army Regulation (AR) 50-6*, *Chapter 2*, establishes the Chemical Personnel Reliability Program (CPRP). The CPRP ensures that each person who performs duties involving surety chemical agents meets the highest possible standards of reliability. Reliability is determined through initial and continuing evaluations of individuals assigned to CPRP duties.

Equipment Certification

2-42. Any analytical or assessment equipment certification deemed necessary by the manufacturer of the equipment or the unit requiring the training is to be conducted according to manufacturer specifications and the unit SOP.

REQUESTS FOR SUPPORT

2-43. TE support missions must be consistent with policy, regulatory guidance, and unit procedures.

TECHNICAL ESCORT

2-44. All movement of surety material must be conducted according to *AR 50-6*. The Edgewood Chemical and Biological Center (ECBC) Surety Office is the primary contact for requests to move chemical surety material. The Surety Office coordinates with the technical CBRN headquarters for TE team availability. The TE battalion then coordinates the movement with all participating agencies.

2-45. The Chemical Materials Agency (CMA) coordinates with the TE battalion to move stockpile and nonstockpile munitions or agents for analysis. Due to the frequency of movement requirements, the Army Materiel Command (AMC) authorizes direct coordination of movements between the TE battalion and the U.S. Army Research Development and Engineering Command. Requests should be submitted at least 14 days prior to the requested transport date for domestic escorts and 60 days in advance for overseas escorts.

HAZARDOUS MATERIAL ESCORT

2-46. HAZMAT transported by TE battalion personnel must be moved according to all appropriate military and federal regulations, including *49 CFR*.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR RESPONSE

2-47. TE battalions are usually asked to respond anytime chemicals are found. When chemical warfare materiel (CWM) is recovered during a response, TE battalions coordinate with the CMA. When the response is for munitions, EOD personnel respond first. If the EOD team suspects that the munitions are CB, it requests support from a TE battalion through the 20th Support Command (SUPCOM).

2-48. Requests for CBRN teams to respond to locations off an installation are directed through the Joint Forces Command (JFCOM). JFCOM validates the need for response and then, if appropriate, authorizes the TE battalion to respond.

REMEDIATION PROJECTS

2-49. Remediation projects result from recovered CWM (RCWM) and work required by the CMA. RRTs work with the COE and CMA during remediation projects. All recovered CWM found at formerly used defense sites (FUDS) must be transported by TE teams.

COMBATANT COMMANDER SUPPORT

2-50. JFCOM is the approving authority for TE battalion support to CCDRs. Requests should identify which TE battalion core capabilities are required. Support provided to the U.S. Special Operations Command is identified in the standing concept plan with the TE battalion.

MISSION TASKINGS

2-51. DOD organizations request support through JDOMS, who validates the request with the 20th SUPCOM (Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives [CBRNE]) and subordinate TE battalions. JDOMS then authorizes the deployment, if appropriate, with a fund cite and an executive order.

2-52. Other organizations request support through DOD channels. DOD provides assistance upon a validated request from the LFA. The commanders of the U.S. Northern Command (NORTHCOM) and the U.S. Pacific Command (PACOM) serve as supported commanders within their areas of responsibility (AORs) for CBRNE consequence management activities. For large CBRNE consequence management events within CONUS, NORTHCOM may deploy JTF–Civil Support, which exercises OPCON over designated DOD forces. The Defense Coordinating Office is the single point of contact in the Joint Field

Office for requests for DOD assistance, and the requests should be processed according to the NRP *(Figure 2-2)*.

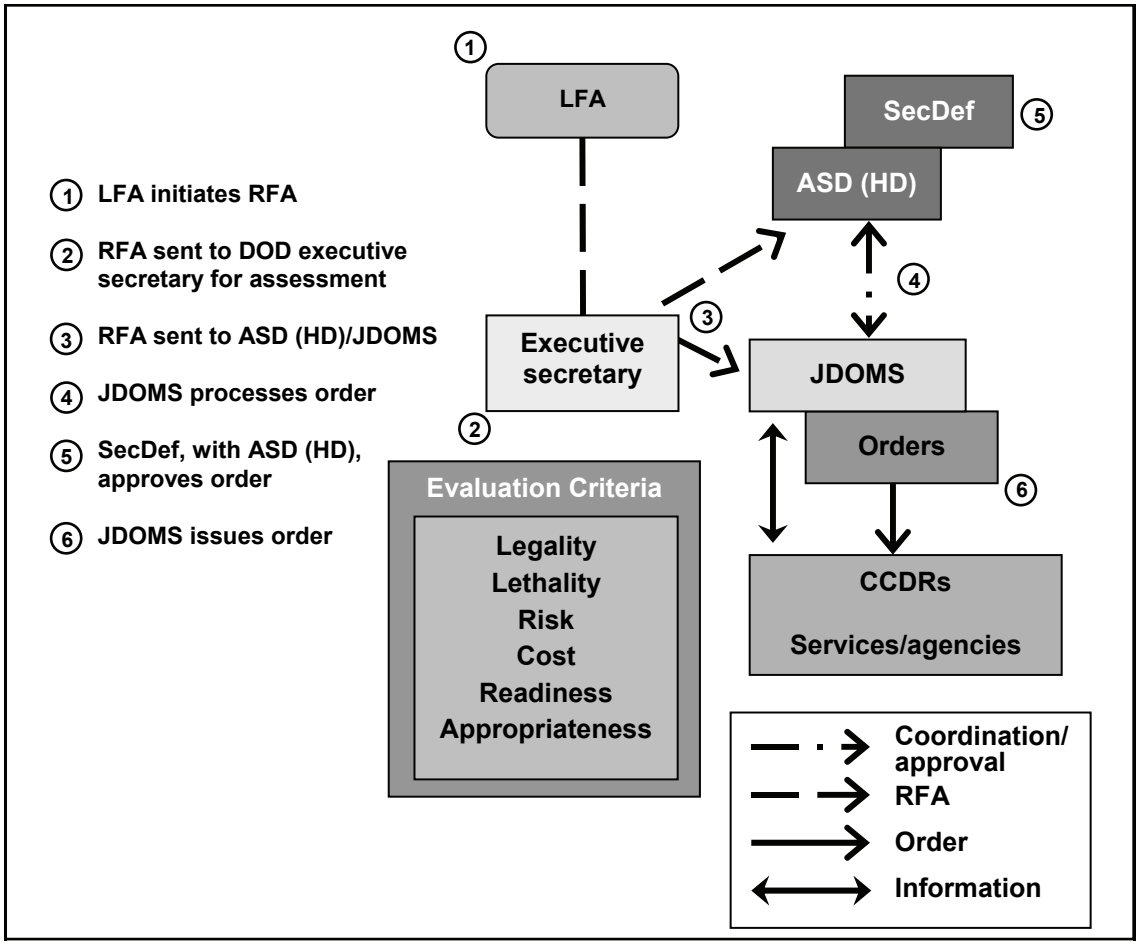

Figure 2-2. Request for Assistance (DOD is not the LFA)

OPERATIONAL PHASES

2-53. There are five operational phases for TE unit missions *(Figure 2-3, page 2-10)*. They are—

- Preincident.
- Alert.
- Deploy.
- Response.
- Postincident.

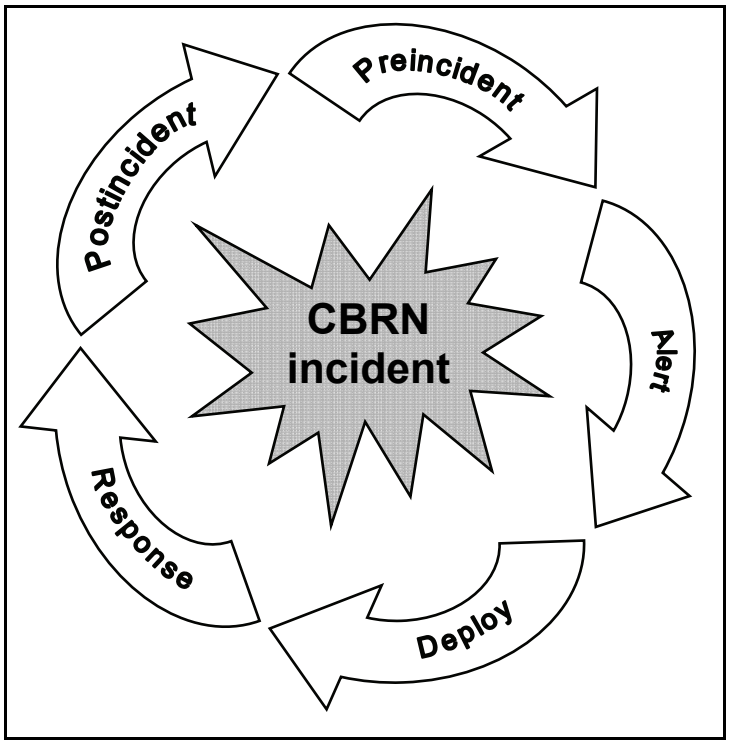

Figure 2-3. Operational Phases

PREINCIDENT

2-54. During the preincident phase, the TE battalion conducts planning, training, maintenance, and exercises to prepare for operations. Commanders ensure that—

- Actions are based on the mission and support the decision-making process.
- Missions, taskings, priorities, and command or support relationships are established and coordinated.
- Personnel are trained, certified, and evaluated for all operations they perform.
- Equipment checks and services are complete and equipment is ready to use.
- All consumables required for missions are stocked to a level that renders equipment serviceable.
- All personnel have a predeployment health threat briefing and a completed *DD Form 2795 (Predeployment Health Assessment)*.

ALERT

2-55. The alert phase includes specific actions needed to notify commanders and the primary staff of a potential deployment, such as—

- Personnel are notified to report to the unit HQ for mission instructions and preparations.
- The accountability of all required personnel and equipment is identified.
- The CBRN or RRT team leader is assigned a mission.
- Equipment and supplies are checked and verified.

DEPLOY

2-56. During the deploy phase, the CBRN or RRT team receives a deployment order and deploys to its designated location. When deploying for an emergency response, the CBRN team reports to the incident site and the team leader coordinates with the IC for support. When deploying for support, the CBRN team

leader reports to the supported commander. Follow-on directives are given by either the TE battalion or the combatant commander to which the team is attached.

RESPONSE

2-57. During the response phase, tasks may range from technical CBRN advice to disablement and elimination operations. The team provides advice, assistance, and assessment support; executes reach-back capabilities; and receives updates on priorities and missions through the supported unit. Follow-on CBRN or RRT team missions may be directed by higher HQ.

POSTINCIDENT

2-58. During the postincident phase—

- Redeployment to the home station is conducted.
- Personnel receive medical treatment as necessary.
- Equipment is recovered and scheduled maintenance procedures are performed.
- After-action reviews (AARs) are conducted to identify lessons learned and improve future operations.

PLANNING CONSIDERATIONS

2-59. Key planning considerations for TE operations include—

- Administrative.
- Equipment acquisition and certification.
- Intelligence.
- Operational.
- Logistics.
- Health requirements and services.
- Communications.
- Supporting technologies.
- Safety.
- Security.
- Public affairs.

ADMINISTRATIVE

2-60. Personnel training, qualification, and certification requirements for operations conducted by the TE unit on a CBRN team or RRT need to be completed before the mission begins. Regulatory and internal training and certifications must be monitored to ensure that unit personnel are qualified to participate in certain missions. The battalion operations section ensures that all required individual training and certifications are properly documented and up to date.

EQUIPMENT ACQUISITION AND CERTIFICATION

2-61. Advancing technology provides more effective equipment for operational use. It takes time to acquire and validate new equipment before it can be used for missions. Once the new equipment is approved for acquisition, training and certification for the user must be completed before implementation in an operational environment.

INTELLIGENCE

2-62. Gathering pertinent and valuable information to conduct an operation is essential for a TE battalion. Information obtained before arriving on the scene better prepares the CBRN or RRT team for its mission. Basic information is required when deploying to a CBRN incident. Weather conditions affect the

contaminated area and the avenues of approach (AAs), so knowing the location of the contamination and the current weather conditions enables the team to safely approach the site and set up in a clean area. Operations in a hostile environment require knowledge of the enemy, friendly forces, security forces, and the surroundings.

OPERATIONAL

2-63. The established command and support relationships must be understood because they impact several factors, such as reporting and logistics. Transportation for technical CBRN teams must be planned well in advance so that operations are not hindered. Environmental considerations for the AO and the type of mission need to be considered to ensure compliance. The cost of consumables must always be deliberately planned.

LOGISTICS

2-64. CBRN and RRT teams must have backup sets of PPE when conducting operations in CBRN environments because the limitations of air supply and filter saturation can prohibit mission accomplishment with one entry. A dry decontamination mixture is not as effective as a wet one, so access to a water source is beneficial.

HEALTH REQUIREMENTS AND SERVICES

2-65. Health requirements and the provisions of force health protection (FHP) for unit personnel must always be included in operational planning. *Table 2-1* provides a sample FHP checklist (see *FM 4-02.7* and *FM 8-55*).

2-66. Individuals responding to events such as CBRN incidents, leaking weapons, and radioactive material must meet strict health requirements. The individual must be able to assume full mission-oriented protective posture (MOPP) and Level A and B protection without causing a major health risk. Individuals suffering respiratory problems, high blood pressure, previous heat stroke, elevated body temperatures, or other physical or medical degrading conditions should not assume Level A or B protection (see *FM 8-500*).

2-67. Individuals responding to a radiological incident must also consider the hazards of the radioactivity. Plans must be made to limit the time an individual is allowed in the radioactive area or is exposed to radiation (see *FM 3-11.4*, *FM 3-11.22*, and *FM 4-02.7*).

2-68. Provisions for FHP must also be planned. Since TE battalions do not have organic FHP and CBRN and RRT teams respond without full support in the response area, FHP must be obtained by area support (see *FM 4-02*, *FM 4-02.1*, *FM 4-02.4*, *FM 4-02.6*, *FM 4-02.7*, *FM 4-02.10*, *FM 4-02.18*, and *FM 4-02.24*).

COMMUNICATIONS

2-69. Communication between the downrange team and the command post is an essential part of an operation. The lack of communication can be a reason to abort the mission for the safety of the team members in the hot zone. Proper maintenance and frequent communications checks ensure that communications equipment is readily available for future missions. Backup communications should be available in the event that one of the mission radios becomes inoperable. When supporting other agencies, the compatibility of communications equipment should be ensured. If the equipment is incompatible, interaction with the supported agency is not possible.

SUPPORTING TECHNOLOGIES

2-70. Technology and technological systems provide supporting capabilities essential to implementing and continuously refining TE battalion operations. Such technologies include voice and data communications, information management, and data display systems. Also included are specialized technologies that facilitate ongoing operations and incident management activities in situations that call for unique technology-based capabilities.

Table 2-1. Sample FHP Checklist

FHP asset	*Required services*	*Available*
Preventive medicine services	Water supply monitoring/sampling Medical surveillance Occupational environmental health/food service facility surveillance	
Veterinary services	Food surveillance and sampling Government-owned animal care and specimen collection	
Combat and operational stress control	Monitoring of response personnel Monitoring of casualties Debriefing of response personnel	
Medical treatment	Care for TE battalion personnel/victims Supervision of patient decontamination Collection of medical specimens Preparation of patients for evacuation	
Medical evacuation	Evacuation of patients from incident sites to supporting MTFs	
Medical logistics	General medical logistic support to FHP personnel Provision of medical supplies for CBRN team sample collection kits	
Hospitalization	Hospitalization support for TE battalion personnel Hospitalization for incident patients	
Medical laboratory support	Medical laboratory support for in-theater/response area confirmatory identification of suspect CBRN samples/specimens	

SAFETY

2-71. The risk management process provides leaders and individuals with a method with which to identify the optimum COA. Risk management must be fully integrated into planning, preparation, and execution.

2-72. The first priority during a CBRN incident is personnel safety. The minimum amount of personnel necessary to accomplish the mission should always be used. A risk assessment provides enhanced awareness and understanding of the situation; therefore, a risk assessment should be conducted for each operation and updated as the situation changes (see *FM 3-100.12*).

2-73. A site safety and health plan must be kept on site. The plan addresses the safety and health hazards of each phase of the operation and includes the requirements and procedures for personnel protection (see *29 CFR 1910.120*).

SECURITY

2-74. Prevention and protection are the two primary concerns of physical security. Both apply to the security of people, equipment, and property. These interests must be supported at all staff and command levels; and this support must be unified in joint, multinational, and interagency operations (see *FM 3-19.30*).

2-75. All personnel (regardless of rank, grade, title, or position) have a personal, individual, and official responsibility to safeguard information. This responsibility cannot be waived, delegated, or in any other respect, excused (see *AR 380-5*).

PUBLIC AFFAIRS

2-76. Public affairs fulfills the Army's obligation to keep the American people and the Army informed and helps establish the conditions that lead to confidence in the Army and its readiness to conduct operations. The primary public affairs functional areas are command information, public information, and community relations.

2-77. Although prompt action is essential in coping with any accident or incident, the importance is magnified with CBRN accidents and incidents. The public is entitled to all unclassified information concerning an accident when regulations, directives, or instructions allow such release. Furnishing information to the public in a positive manner is in the national interest and is a command function (see *AR 360-1*).

Chapter 3

External Logistic Support

This chapter addresses the unique support considerations for units requesting support from a TE battalion.

MAINTENANCE

3-1. TE battalions require maintenance support for—

- Respiratory protection equipment.
- Detection and monitoring equipment.
- Assessment equipment.
- Decontamination equipment.
- Consumables.
- Respiratory protection equipment.

RESPIRATORY PROTECTION EQUIPMENT

3-2. There are specific maintenance requirements for the COTS respiratory protection equipment utilized by technical CBRN teams. The self-contained breathing apparatus (SCBA) is an open-circuit breathing system that uses Grade D or better compressed air as breathing air. SCBA air bottles last 20 to 60 minutes, depending on the bottle capacity, user, weather conditions, and work intensity. The SCBA system requires a means to refill the air bottles to remain operable. While TE battalions are able to refill air bottles on site, this capability may not be available to all teams. In these cases, the supported units must make arrangements for refilling SCBA bottles.

DETECTION AND MONITORING EQUIPMENT

3-3. There are specific maintenance requirements for COTS detection and monitoring equipment to remain operable. Identifying those requirements through manufacturer operations and maintenance manuals is imperative.

ASSESSMENT EQUIPMENT

3-4. There are specific maintenance requirements for COTS assessment equipment. Identifying those requirements through manufacturer operations and maintenance manuals is imperative.

DECONTAMINATION EQUIPMENT

3-5. The resupply of decontaminants must be addressed in the planning stages of an operation. Special transportation documentation and requirements may be necessary.

CONSUMABLES

3-6. Some items are designed for a single use and cannot be used for follow-on missions. Determining the mission load and estimating the maximum consumable products required help increase efficiency.

TRANSPORTATION

3-7. TE battalions may require transportation support as follows:

- **Air.** Air transportation is coordinated through the Air Mobility Command.
- **Ground.** While TE battalions have organic ground transportation, mission requirements may overload their available assets. In addition, coordination with the HN for the movement of International Organization for Standardization or container express containers may be required.

CONTRACTOR LOGISTIC SUPPORT

3-8. TE battalions require contractor logistic support (CLS) as an integrated element of their support and deployment package.

PRINCIPLES

3-9. The use of CLS for military operations must be executable from operational and logistic perspectives. The following principles provide a framework for the use of CLS:

- **Risk assessment.** Commanders must assess risk, evaluate factors (such as the impact of the threat on contractor safety), and determine where CLS can safely operate. The survival training and equipment required during the mission must be identified.
- **Force structure augmentation.** CLS is an integral support requirement for technical CBRN units. It provides a force structure augmentation that may not be part of military core capabilities; for example, a military unit may not be available to perform the required maintenance on COTS equipment.
- **Mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT-TC).** METT-TC factors help determine when and where to use CLS. For example, a commander must consider the time required for CLS to repair a component using a centrally located facility.
- **Integrated planning.** CLS leaders must participate in the logistic planning process, and CLS representatives must be present at planning sessions. CLS representatives can provide useful input on the logistic feasibility of COAs and the preparation of administrative and logistic annexes.
- **Customer support.** Links between the technical CBRN team and CLS must not place additional burdens or requirements on the supported unit. CLS can use whatever internal systems or procedures they choose; however, they must use military systems and procedures when interfacing with the military.
- **International agreements.** International agreements and HN laws that apply to the AO directly affect the use of CLS. The use of CLS may incur legal obligations to the HN (customs, taxes, vehicle registration and licensing, communications, support, passports or restrictions, and inter- or intracountry travel). These agreements must be considered when preparing contracts, operation plans (OPLANs), and operation orders (OPORDs).
- **Habitual relationships.** A habitual relationship is a long-term relationship between CLS and the technical CBRN team. The nature of this relationship is established through the terms and conditions of a contract and extends beyond that of the organization, to include the individual contractor, employee, and supported unit.

PLANNING CONSIDERATIONS

3-10. Planning for CLS support is integral to any operation, and it involves several critical decisions concerning the integration of CLS capabilities. Key CLS planning considerations are as follows:

- **Responsibilities.** Unit planning responsibilities ensure that the right resources are deployed to support a mission.

- **OPLAN.** The combat service support (CSS) section of the OPLAN addresses the use and employment of CLS. The level of detail in the OPLAN varies depending on the level of command.
- **Risk assessment.** Risk assessment evaluates the ability of CLS to support missions during the transition from peace to conflict. As mission requirements increase, CLS must still respond with the same required support.
- **Responsiveness of support.** The nature of the operational environment (for example, operations in multiple AOs and theaters of operation [TOs]) may require CLS to support deployed assets; however, uninterrupted sustainment support is still required. CLS must be prepared to task-organize its assets to meet unanticipated requirements.
- **Transition from peace to war.** The risk of using CLS during peacetime is normally low, increasing as operations transition from peace to war. The supported force must protect CLS personnel in hostile areas, and the CLS contractor and his employees must be trained and ready to operate and survive in a CBRN environment.
- **Communication.** The CLS contract describes the scope of CLS support. The contractor is not legally obligated to meet any requirement that is not in the contract. Without a requirement specified in the contract, the government has no basis for directing or requiring any contractor action. All requirements for CLS are communicated to the contractor through the contract.
- **Coordination.** The supporting and gaining combatant commands, the technical CBRN unit, and the CLS contractor plan in coordination. CLS planning and coordination must address the responsibility of the chain of command to feed, house, and protect contractor employees operating on the battlefield. It must also include predeployment training and integrated, time-phased force deployment planning. Effective coordination and deployment planning ensures that deploying CLS teams receive advance notification of deployment and time to prepare for movement.
- **Task monitor.** Within the scope of the existing contract, the major command contracting office should appoint a CLS task monitor. The appointed task monitor must be familiar with CLS operations and technical CBRN operations. An appointment letter outlines the task monitor's responsibilities.
- **Attachment.** CLS must be attached to a military support element for life support and personnel accountability. For example, a logistic support element coordinates life support services for CLS personnel, but the element may not be within the AOR initially. In its absence, a designated unit or HQ element coordinates the life support effort. An HN, another service, or another Army unit could also furnish actual life support services.

EMPLOYMENT CONSIDERATIONS

3-11. The following are key employment considerations:

- Obtaining information on the safety zone requirements. The safety zone is a force protection control measure for CLS operations. The boundaries are determined by the CCDR based on threat and mission considerations.
- Locating CLS near the technical CBRN C2 element.
- Informing the gaining command of CLS facility requirements and conducting coordination to ensure that required assets are furnished.
- Locating CLS near main supply routes, airfields, or ports of debarkation (air or sea) to facilitate the movement of supplies and equipment.
- Recognizing the requirement for permits or authorizations to move CLS teams across international borders.

RESPONSIBILITIES

3-12. Managing and maintaining visibility over CLS requires the involvement of commanders and their staffs at all levels. In planning and execution, responsibilities or the integration of CLS range from the

strategic to the tactical level. It is necessary to ensure that CLS is integrated into the decision-making process.

Combatant Commander

3-13. The supporting CCDR responsibilities include—

- Providing contracting office support for the CLS effort.
- Validating force requirements to support an OPLAN.
- Ensuring that the OPLAN addresses CLS requirements.
- Preparing forces for commitment in support of OPLAN execution.
- Coordinating movement with and deploying forces as scheduled by the U.S. Transportation Command.
- Coordinating deployment changes with the supported CCDR and the U.S. Transportation Command.
- Coordinating and supporting deployment requirements for technical CBRN units and CLS assets.
- Notifying the CLS contracting office of deployment requirements.

Installation

3-14. Installation responsibilities include supporting personnel, medical, logistic, and deployment operations.

- **Deployment.** An installation may be designated as a mobilization station and aerial port of embarkation. Its primary responsibilities are to receive, house, command, support, share assets with, train, validate, and deploy units and CLS. The installation staff physically processes military units and supporting CLS elements for deployment according to the installation readiness SOP.
- **Other.** Other support includes conducting military and civilian readiness processing verification. This procedure can include medical and dental processing, chemical defense equipment issue, individual equipment issue, and organizational clothing issue. The installation transportation office may—
    - Provide guidance and help units prepare, maintain, and execute movement plans.
    - Coordinate and monitor unit movement.
    - Provide assistance to units within or traversing the installation support area.
    - Coordinate commercial transportation support.
    - Prepare movement reports.
    - Process convoy clearances and special hauling permits.
    - Approve unit movement plans and associated data.

Continental United States Replacement Center

3-15. A CONUS replacement center—

- Receives, processes, trains, equips, validates, and deploys reserve Soldiers and contractor employees and provides theater-specific equipment.
- Coordinates equipping, transporting, training, validating, and staging personnel for movement to a TO.
- Becomes a CONUS demobilization center upon redeployment.
    - Certifies Soldier and civilian contractor readiness processing qualifications.
    - Coordinates installation processing requirements, when needed.
    - Coordinates the equipping of military personnel, government civilians, and contractor employees.

- Coordinates theater-specific briefings and training requirements.
- Coordinates movement around the installation and to the port of embarkation.
- Creates and provides manifests.
- Coordinates outprocessing procedures.

Supported Geographic Combatant Commander

3-16. The supported geographic CCDR—

- Prepares an OPLAN that addresses CLS requirements. It includes time-phased force and deployment data (for technical CBRN and CLS assets), non-unit-related cargo and personnel data, and movement data.
- Provides facilities to support CLS requirements.
- Requests CLS assets.
- Approves time-phased force and deployment list requirements for the technical CBRN unit and supporting CLS assets.
- Ensures the reception, staging, onward movement, and integration of CLS assets.

Service Component Command

3-17. The service component command—

- Develops the time-phased force and deployment data.
- Develops supporting plans for OPLANs.
- Ensures that supporting plans are consistent with the unified command OPLAN.
- Trains and prepares assigned forces for deployment.
- Maintains accurate unit movement data for assigned units.
- Prescribes procedures, requirements, and responsibilities for deployment planning and execution.
- Coordinates deployment activities as scheduled by the U.S. Transportation Command.
- Receives and supports forces deployed to the AO.

Senior Theater Logistics Command

3-18. The senior theater logistics command performs the following functions, which are not related to contract compliance:

- Synchronizes logistic and support operations.
- Integrates CLS into the overall support structure.
- Assumes responsibility for the visibility of CLS elements in the theater.
- Maintains visibility over who is in the theater, what support functions they are performing, when they are providing support, and where they are operating.

United States Transportation Command

3-19. The major transporter of CLS equipment and supplies is the U.S. Transportation Command and its transportation component commands—Military Traffic Management Command, Military Sealift Command, and AMC. The U.S. Transportation Command—

- Provides strategic air, land, and sea transportation.
- Provides centralized global transportation management to ensure in-transit asset visibility.
- Transports CLS personnel and equipment.
- Furnishes transportation assets for the resupply of consumables and replacement personnel.
- Transports CLS assets between AORs.

Contractor Logistic Support Program Manager and Team

3-20. The CLS program manager supervises CLS team activities and ensures that CLS elements are ready to support technical CBRN unit requirements. The CLS team—

- Provides CLS planning.
- Provides CLS load planning data.
- Establishes work priorities.
- Reviews work and supply requests.
- Ensures that CLS team personnel remain ready for deployment (for example, monitors training, medical, and dental requirements).

Contracting Office Representative or Task Monitor

3-21. The contracting office representative (COR) or task monitor assists in the technical monitoring and administration of a contract. He is the supported unit's link to the contractor. The COR or task monitor is designated, in writing, to perform the duties and responsibilities delegated by the contracting office.

3-22. The COR or task monitor and the administrative officer's representative are given specific duties and responsibilities that are delegated, in writing, by the contracting office. Typically, a COR—

- Maintains liaison and direct communication with the contractor and the contracting office.
- Monitors contractor performance and notifies the contracting office of deficiencies.
- Recommends appropriate corrective action.
- Verifies that the contractor has performed the technical and managerial requirements of the contract.
- Performs all necessary inspections.
- Verifies that the contracting office has corrected all deficiencies.
- Accepts supplies and services.

3-23. Although the COR provides a vital link between the military and the contractor, there are limits to his authority. The COR, task monitor, and administrative officer's representative are prohibited from—

- Making an agreement with the contracting office that requires the obligation of public funds.
- Making commitments or changes that affect price, quality, quantity, delivery, or other terms and conditions of the contract.
- Discouraging the contracting office from undertaking new work.
- Extending existing work beyond the contract period by words, actions, or failure to act.
- Authorizing a contractor to obtain property for use under a contract.
- Interfering with the contractor's management by supervising contractor employees or otherwise directing their work efforts.
- Modifying the tour of duty or hours.

3-24. The task monitor—

- Monitors contractor performance.
- Notifies the COR of deficiencies observed.
- Makes recommendations for corrective action.
- Receives feedback from technical CBRN and CLS leaders on sustainment operations.
- Coordinates with the contractor on changes in contract requirements as directed by the contracting office or the COR.

TEAM ASSESSMENT

3-25. CLS teams must be responsive to short-notice deployment requirements. The contracting office or COR may assess the preparedness of CLS to respond.

3-26. Upon notification to deploy, negotiation between the CLS contractor and the contracting office results in an agreement or certification that the contractor fulfill the requisite contractual requirements. Additionally, the COR receives reports or assessments from task monitors on the CLS team's preparation for deployment. The task monitor coordinates with units such as the on-site CLS team, the technical CBRN team, and applicable installation level points of contact (POCs). The following are examples of key information that the task monitor may report during deployment processing:

- Satisfactory completion of readiness processing by CLS personnel, to include required training.
- Results of CLS vehicle technical inspections.
- Receipt of required organizational clothing and equipment.
- Packing of specified line replacement units, consumables, spare parts, and other necessary items.
- Responsiveness of CLS.

CONTROL

3-27. Planning for CLS addresses the military responsibility to feed, house, equip, and protect contractor employees operating on the battlefield. It also includes predeployment training and time-phased, force deployment planning. Overall, the CLS planning effort must address the following:

- **C2.** When coordinating CLS, the contract addresses the relationship between the CLS team and the support of the CLS team as a system contractor to the military. This is a crucial point since commanders cannot order contractors to provide services; they must use the COR to direct work within the scope of the existing contract. Additionally, the government CLS contracting office can appoint, in writing, a military unit commander or his designated representative as a task monitor. The task monitor has the authority to monitor CLS operations. He provides general guidance and furnishes missions and priorities to the supporting CLS team. The appointed task monitor should be familiar with CBRN CLS operations.
- **Deployment.** Deploying CLS teams require early notification of deployment to allow adequate preparation time for movement to become an integral part of the deployment package.
- **Location.** Determining the location of a CLS team on the battlefield requires the consideration of several factors, including—
    - Geographical limits of the contractor safety zone and physical security requirements. The safety zone is a force protection control measure for CLS operations. The boundaries are determined by the CCDR, based on threat and mission considerations.
    - The location of CLS teams near the technical CBRN asset for responsiveness, access to communications and logistic information, and daily coordination.
    - The location of CLS teams near main supply routes or points of debarkation (air or sea) to expedite the receipt or transport of supplies, components, or CLS teams to other locations within or outside the theater.
    - Requirements to move CLS teams across international borders and the corresponding requirements for permits and authorizations.

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Chapter 4
Emergency Response

One of the main missions conducted by a TE battalion is providing emergency response to incidents involving the full spectrum of CBRN. This chapter outlines the unit response capability.

MISSION CHARACTERISTICS

4-1. Each response effort is different based on the type of CBRN incident and the scope of response. TE battalions—

- Isolate the hazard from the general populace.
- Characterize the hazard.
- Confine and contain the hazard.
- Forward samples to the transfer site or laboratory for further analysis.

TYPES OF INCIDENTS

4-2. There are two general types of CBRN incidents that require emergency response from a CBRN team. They are—

- A *nondeliberate act* that requires emergency response to protect life or property. When responding to this type of incident, safety is one of the primary concerns.
- A *deliberate act* (terrorism or a crime) that requires emergency response to protect life or property. When responding to this type of incident, security is one of the primary concerns.

COMMON TERMINOLOGY

4-3. The ICS establishes common organization and structure that allow diverse incident management and support entities to work together across a wide variety of incident management functions and hazard scenarios. ICS is an integral part of the National Incident Management System (NIMS) and the NRP. Some common terminology is as follows:

- **Organizational functions.** Major functions or functional units with domestic incident management responsibilities are named and defined. Terminology for organizational elements involved is standard and consistent.
- **Resource descriptions.** Major resources (including personnel, facilities, and major equipment and supply items) used to support incident management activities are given common names and categorized with respect to their capabilities to help avoid confusion and to enhance interoperability.
- **Incident facilities.** These are facilities in the vicinity of the incident that are to be used in the course of incident management activities.

Note. See *Appendix A* for a comprehensive look at common terminology as outlined in the NRP.

HAZARD CHARACTERIZATION

4-4. Hazard characterization can be conducted as a stand-alone procedure or as a component of risk assessment. It is the process of—

- Detecting and identifying CBRN.
- Obtaining information on the properties of CBRN material in order to predict a likely outcome of an incident.
- Using available information to formulate an initial defensive action plan.

4-5. Characterizing hazards at an emergency response site helps determine the—

- **Initial isolation zone.** The initial isolation zone defines an area surrounding the incident where persons may be exposed to dangerous or life-threatening concentrations of material. Personnel in the initial isolation zone should be considered for evacuation.
- **Protective-action distance.** The protective-action distance determines an area downwind from the incident where personnel may become incapacitated and unable to take protective action or may incur serious or irreversible health effects. The protective-action distance is based on the material in question and the existing weather conditions.
- **Control zones.** The designation of control zones *(Figure 4-1)* is based on safety and the degree of hazard. Common control zones are—
  - **Hot zone.** This is the area immediately surrounding an incident where personnel may experience adverse effects.
  - **Warm zone.** This is the area where personnel and equipment decontamination and hot zone support takes place.
  - **Cold zone.** This area contains the command post and necessary support functions.
- **Access control points.** Access control points are used to deny entry to unauthorized personnel.

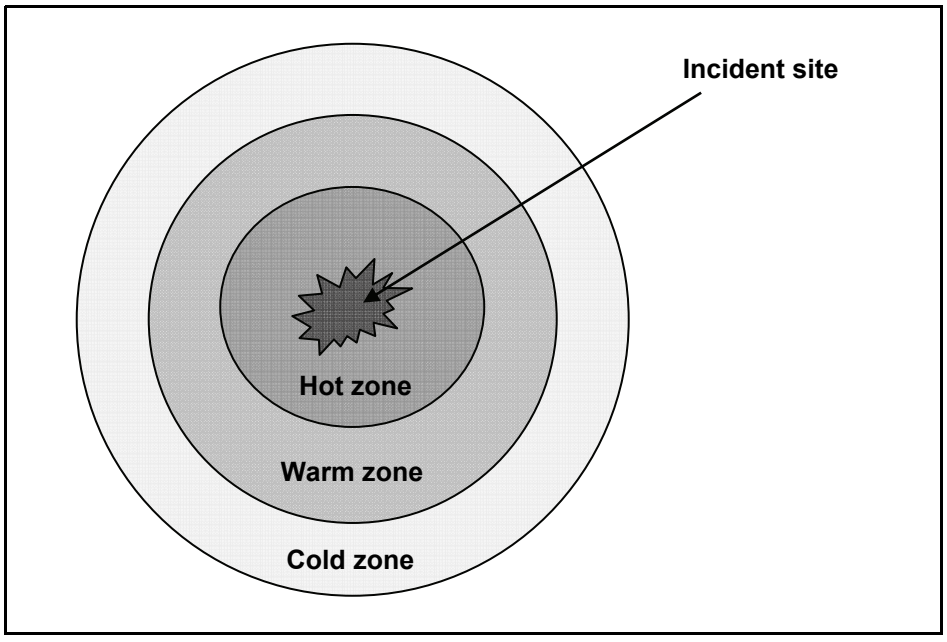

Figure 4-1. Control Zones

REPORTING REQUIREMENTS

4-6. CBRN accidents or incidents within the United States should be reported as soon as possible in order to mitigate the situation.

Note. See *AR 50-6* for further information on reporting procedures.

National Response Center

4-7. The National Response Center (NRC) is operated by the U.S. Coast Guard (USCG). It receives reports when dangerous goods or hazardous substances are spilled. After receiving notification of an incident, the NRC immediately notifies the appropriate federal on-scene coordinator and concerned federal agencies. Federal law requires that anyone who releases into the environment a reportable quantity of a hazardous substance (including oil when water is or may be affected) or a material identified as a marine pollutant must immediately notify the NRC at (800) 424-8802 (toll-free in the United States, Canada, and U.S. Virgin Islands) or (202) 267-2675 in the District of Columbia. When in doubt as to whether the amount released equals the required reporting levels, NRC should be notified.

Military Shipments

4-8. For assistance at incidents involving materials being shipped by, for, or to the DOD, one of the following agencies should be contacted:

- U.S. Army Operations Center, (703) 697-0218 (call collect), for incidents involving explosives or ammunition.
- Defense Logistics Agency, (800) 851-8061 (toll-free in the United States), for incidents involving dangerous goods other than explosives or ammunition.

PREPAREDNESS

4-9. Preparedness involves an integrated combination of planning, training, exercises, personnel qualification and certification standards, equipment acquisition and certification standards, and publication management processes and activities.

PLANNING

4-10. Plans describe how personnel, equipment, and other resources are used to support CBRN incident management and emergency response activities. Plans provide mechanisms and systems for setting priorities, integrating multiple entities and functions, and ensuring that communications and other systems are available and integrated in support of full-spectrum CBRN incident management requirements.

TRAINING

4-11. Training involving standard courses on the ICS, unified command, and operational coordination processes, as well as courses focused on discipline- and agency-specific subject-matter expertise, helps ensure that personnel at all jurisdictional levels and across disciplines can function together effectively during an incident. CBRN awareness training is available for every Soldier, DOD civilian, contractor, appropriate family member, and local national hired by the DOD—regardless of rank. These personnel should be aware of CBRN actions and effects, the need to maintain vigilance for possible CBRN actions, and the methods for employment of CBRN tactics, techniques, and procedures (TTP).

EXERCISES

4-12. Incident management organizations and personnel must participate in realistic exercises (involving multidisciplinary, multijurisdictional, and multisector interaction) to improve integration and interoperability and to optimize the use of resources during incident operations.

PUBLICATIONS MANAGEMENT

4-13. Publications management refers to developing forms, ensuring form standardization, developing publication materials, administering publications (establishing naming and numbering conventions), managing the publication and promulgation of documents, and exercising control over sensitive documents.

RESOURCE MANAGEMENT

4-14. NIMS defines standardized mechanisms and establishes requirements for processes to describe, inventory, mobilize, dispatch, track, and recover resources over the life cycle of an incident.

COMMUNICATIONS AND INFORMATION MANAGEMENT

4-15. NIMS identifies the requirement for a standardized framework of communications, information management (collection, analysis, and dissemination), and information sharing at all levels of incident management.

- **Incident management communications.** CBRN teams must ensure that effective, interoperable communications processes, procedures, and systems exist to support a wide variety of incident management activities across agencies and jurisdictions.
- **Information management.** Information management processes, procedures, and systems help ensure that information (including communications and data) flows efficiently through a commonly accepted architecture supporting numerous agencies and jurisdictions responsible for managing or directing domestic incidents, those impacted by the incident, and those contributing resources to the incident management effort. Effective information management enhances incident management and response and helps ensure better decision making during crises.

ONGOING MANAGEMENT AND MAINTENANCE OF THE NATIONAL INCIDENT MANAGEMENT SYSTEM

4-16. The process for managing and maintaining NIMS ensures that all users and stakeholders (including various levels of government, functional disciplines, and private entities) are given the opportunity to participate in NIMS Integration Center activities. The NIMS management and maintenance process relies heavily on lessons learned from actual incidents, domestic incident management training and exercises, and recognized best practices across jurisdictions and functional disciplines.

4-17. The Secretary of Homeland Security is to establish and administer the NIMS Integration Center. Proposed changes to the NIMS are to be submitted to the NIMS Integration Center for consideration, approval, and publication.

INCIDENT PRIORITIES

4-18. Incident priorities include life safety, incident stabilization and mitigation, and environmental and property conservation.

LIFE SAFETY

4-19. The first priority is always the life safety of emergency responders and the public. The lives of emergency responders should not be jeopardized when there is little or no chance of saving a victim. FHP response to a CBRN incident is directed at identifying the health hazards and effects of an incident, including, but not limited to—

- **Preventive medicine.**
  - Monitoring water supplies and collecting water samples in the affected area.
  - Conducting medical surveillance activities.
  - Conducting occupational and environmental health surveillance.

- Providing recommendations on preventive/corrective actions for site health and safety concerns and injury prevention.
- Monitoring food service facilities for possible contamination.
- Monitoring waste disposal procedures to ensure minimal effects of contamination on personnel and the environment.
- Collecting water samples, preparing chain-of-custody documents, packaging samples for shipment, and delivering samples to a courier for transport to the supporting laboratory.

Note. See *FM 4-02.7* and *FM 4-02.17* for detailed information.

- **Veterinary.**
  - Monitoring food supplies and government-owned animals for effects of the CBRN incident.
  - Recommending decontamination procedures and/or disposal of contaminated food.
  - Providing care for affected government-owned animals.
  - Collecting food samples, preparing chain-of-custody documents, packaging samples for shipment, and delivering samples to a courier for transport to the supporting laboratory.
  - Collecting medical specimens from affected animals, preparing chain-of-custody documents, packaging specimens for shipment, and delivering specimens to a courier for transport to the supporting laboratory.
  - Providing guidance on the protection of food supplies and animals at the incident site and downwind of the incident.

Note. See *FM 4-02.7* and *FM 4-02.18* for detailed information.

- **Medical treatment.**
  - Providing medical support and monitoring the health of response personnel.
  - Ensuring that all medical personnel wear the appropriate level of PPE.

Note. Medical personnel operating in the warm zone and receiving casualties from the hot zone must be at a comparable level of protection to ensure their own health and safety.

  - Providing medical treatment at the incident site.
  - Providing guidance to response personnel on the safe removal of injured victims from the hot zone.
  - Receiving victims from the hot zone and providing emergency medical treatment before and during patient decontamination procedures, as required.
  - Supervising patient decontamination procedures, as required.
  - Preparing and evacuating patients to the supporting medical treatment facility (MTF).
  - Collecting medical specimens from affected patients, preparing chain-of-custody documents, packaging specimens for shipment, and delivering specimens to a courier for transport to the supporting laboratory.

Note. See *FM 4-02*, *FM 4-02.4*, *FM 4-02.6*, *FM 4-02.7*, *FM 4-02.10*, and *FM 4-02.24* for detailed information.

- **Medical logistics.**
  - Providing medical logistic support to responding medical units and personnel.
  - Providing medical components of sample and specimen collection kits to responding units and personnel.
  - Providing sample and specimen analysis and identification through laboratory personnel support.

Note. See *FM 4-02.1* and *FM 4-02.7* for detailed information.

INCIDENT STABILIZATION AND MITIGATION

4-20. The second priority is two-fold: minimizing the effect on the surrounding area and maximizing the response effort while using resources efficiently. The size and complexity of the command system that the IC develops should be in keeping with the complexity of the incident (level of difficulty of the response), not the size of the geographic area or the number of resources.

ENVIRONMENTAL AND PROPERTY CONSERVATION

4-21. The third priority is minimizing damage to property while achieving the incident objectives. As incidents become more involved, the IC can activate additional general staff sections (planning, operations, logistics, finance, and administration) as necessary.

SITE SAFETY AND SECURITY

4-22. Site safety and security are essential to response personnel and to those in need of assistance. The so-called "worried well" after an incident can overwhelm care providers and decontamination lines and may cause more harm to response personnel. Therefore, site security personnel at these locations should be trained, certified, and tested routinely.

SAFETY

4-23. According to *29 CFR 1910.120*, employers shall develop and implement a written safety and health program for employees who are involved in hazardous waste operations and emergency response (HAZWOPER). The program shall identify, evaluate, and control safety and health hazards and provide for emergency response to hazardous waste operations. While not always operationally feasible, efforts should be made to medically monitor personnel before, during, and after a HAZMAT incident.

HEALTH

4-24. Workers handling hazardous substances may be exposed to toxic chemicals, safety hazards, biological hazards, or radiation. Therefore, a medical surveillance program is essential to—

- Assess and monitor workers' health and fitness for employment in HAZWOPER and during the course of work.
- Provide emergency medical treatment as needed.
- Keep accurate records for future reference.

Note. See *29 CFR 1910.120* for further information.

4-25. The senior officer or IC must ensure that health and safety measures are established. Medical and safety personnel must ensure that precautions are taken to reduce health risks and prevent injury to response personnel. The on-scene medical staff must monitor the health of personnel for conditions that could cause harm when wearing PPE and for CBRN agent or material effects. The number of personnel

allowed in the hot and warm zones must be restricted to only those required to accomplish the incident response actions.

4-26. Initial health and safety efforts should focus on actions to detect, prevent, or reduce the impact to public health and safety. Such actions can include—

- Environmental analysis.
- Plume modeling.
- Evacuations.
- Emergency sheltering.
- Air monitoring.
- Decontamination.
- Tracking of emerging infectious diseases.
- Emergency broadcasts.
- Public health education.
- Site and public health surveillance and testing procedures.
- Immunizations, prophylaxis, and quarantine.
- Restriction of movement for biological threats.
- Coordination with coalition forces; country teams; HNs; and federal, state, and local public health officials to enhance the safety of victims, responders, and local populations.
- Immediate alerts of downwind hazard areas.

Note. See *AR 385-10*, *FM 4-02.7*, *FM 4-02.17*, *FM 4-02.33*, *FM 8-284*, and the *NRP* for additional information.

4-27. The safety and health of responders is also a priority. Actions essential to limit their risks include the full integration of deployed health and safety assets and expertise, risk assessments based on timely and accurate data, and situational awareness of the safety and health of responder and recovery personnel. A comprehensive description of location and an operational response safety and health plan are key to mitigating the hazards faced by responders. Efforts include—

- Incident hazard identification and characterization.
- Implementation and monitoring of PPE selection, use, and decontamination.
- Exposure sampling and analysis.
- Personnel health and safety risk analysis.
- Health and safety monitoring.
- Development/ongoing evolution of site-specific safety and health plans.

Note. See *FM 3-100.4*; *FM 4-02.7*; *FM 100-14*; and the *Worker Safety and Health Support Annex, NRP*, for additional information.

SECURITY

4-28. The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern to the IC. A site safety and control plan will help ensure the safety and health of personnel on the site. A comprehensive plan should contain or discuss the following:

- Summary analysis of hazards on the site and a risk analysis of those hazards.
- Site map or sketch.
- Site work zones (clean zone, transition or decontamination zone, work or hot zone).
- Buddy system.
- Site communications.

- Command post or center.
- SOPs and safe work practices.
- Medical assistance and triage area.
- Hazard monitoring plan.
- Decontamination procedures and area.
- Other relevant areas.

4-29. Security personnel must establish a boundary around the incident site and ensure that only authorized personnel are allowed entry into the warm and hot zones. Responders in the cold zone must stay upwind and away from the warm zone boundary to protect their health and prevent injury.

Note. See *FM 3-11.21* and *FM 3-11.22* for additional information.

DECONTAMINATION

4-30. The decontamination of personnel and equipment requires established procedures to ensure proper personnel training and the accomplishment of desired results. CBRN teams are trained to utilize different decontamination setups depending on the mission scenario and type of contamination. The type of equipment used and the procedures for processing personnel through decontamination stations can differ with each group of contaminants, the operational environment, and the PPE. CBRN teams follow unit SOPs for decontamination setup and operational procedures.

CONTAMINATION REDUCTION AREA

4-31. The contamination reduction area (CRA) is an uncontaminated area near the exclusion zone, upwind from the hotline. It is usually 50 by 50 meters in size and used to set up a decontamination site to process personnel returning from the hot zone. This area contains several stations and various items of equipment and supplies used to neutralize, eliminate, or reduce personnel contamination to an acceptable level. Although the CRA is established on a clean site, it does become contaminated during operations. For this reason, the area is considered contaminated and personnel not wearing proper protective clothing are not allowed in the CRA after decontamination procedures begin.

CONTAMINATION CONTROL LINE

4-32. The contamination control line is an arbitrary line separating the CRA from the clean redress area. It is used to prevent personnel from entering the CRA without proper protective clothing.

EMERGENCY PERSONNEL DECONTAMINATION STATION

4-33. An emergency personnel decontamination station (EPDS) allows the setup of minimal decontamination equipment to provide immediate decontamination of personnel in the hot zone if an emergency occurs. The EPDS is designed for limited decontamination of a few individuals. When setting up an EPDS, items that provide an immediate capability to decontaminate and evacuate casualties (stretchers, decontaminants, water, scissors) should be used.

PATIENT DECONTAMINATION STATION

4-34. A patient decontamination station (PDS) setup provides for a more thorough decontamination and is essential when the decontamination team is required to decontaminate more than one team returning from the hot zone. After down-range operations at the CBRN event site are complete and all personnel have processed through the PDS, the decontamination team dismantles the PDS and contains all liquid and solid contamination for disposal. *Figure 4-2* shows a sample PDS layout.

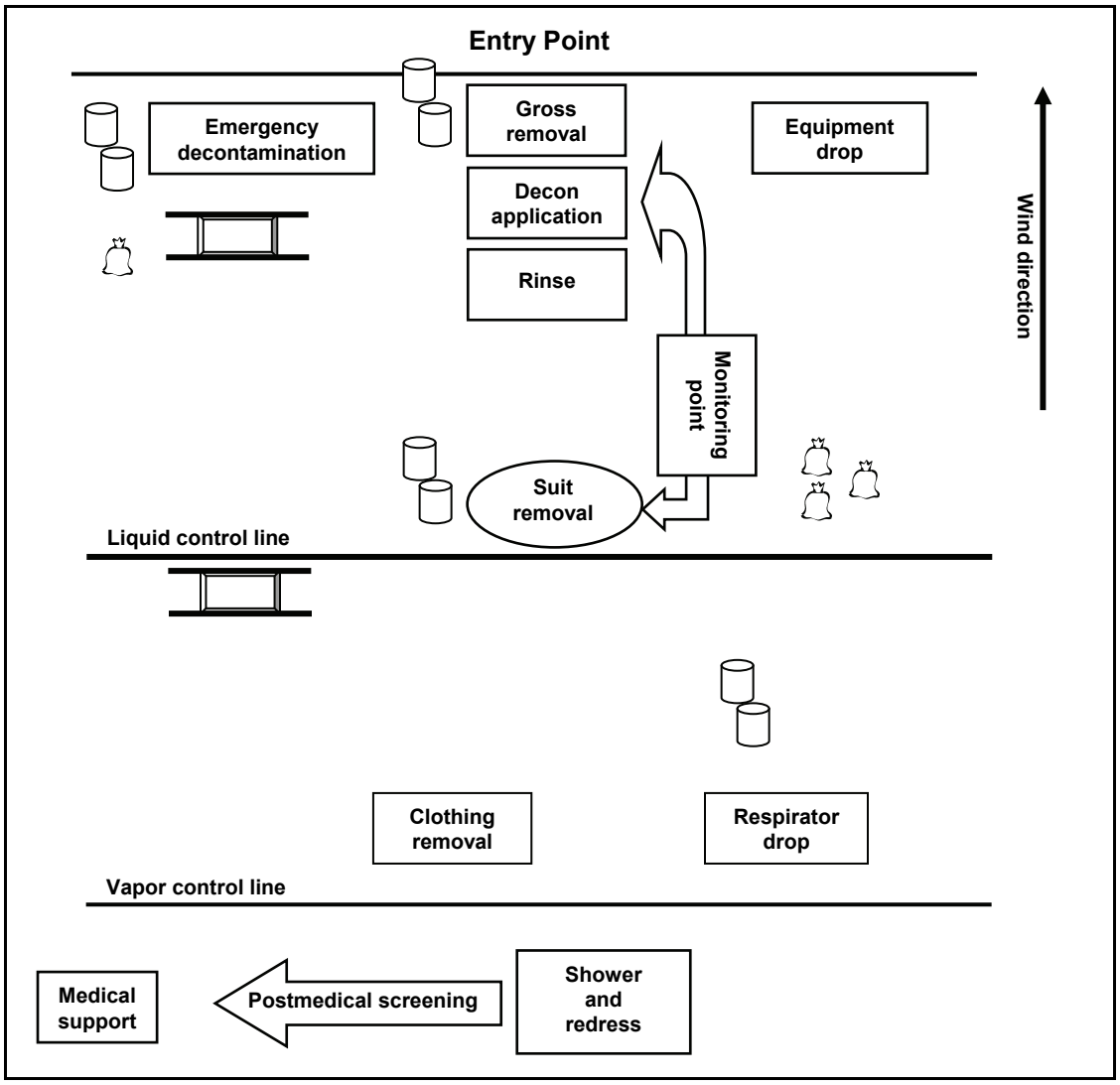

Figure 4-2. Layout of a PDS

CONTAMINATION CONTROL

4-35. Contamination control is a procedure to temporarily or permanently avoid, reduce, or remove CBRN contamination or to render it harmless for the purpose of maintaining or enhancing the efficient conduct of military operations. Controlling the spread of contamination during decontamination operations is

imperative to maintaining personnel safety and limiting the spread of contamination. Contamination control also reduces the size of the area to be cleaned after decontamination is complete.

4-36. The runoff from decontaminant and water used during decontamination operations must be controlled and contained for disposal. The use of liquid containment drums for runoff and solid containment drums for PPE and decontamination equipment helps control the spread of contamination.

ENVIRONMENTAL CONSIDERATIONS

4-37. TE battalions must identify ways to protect the natural environment while executing the full range of their missions. They must—

- Consider the environment in planning and decision making.

- Protect the environment of home stations and training areas as a means of retaining resources for mission purposes.
- Use environmental risk assessments and environmental management principles to integrate environmental considerations into mission performance.
- Instill an environmental ethic in personnel.
- Understand the links between environmental protection issues and their associated impact on safety, force protection, and FHP.

Note. See *FM 3-100.4* for more information.

CONFINED-SPACE OPERATIONS

4-38. Monitoring for CBRN hazards before and during operations in confined spaces is essential to the health and safety of all entrants. Operations are conducted according to unit SOPs and *29 CFR 1910.146*, which contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into confined spaces. There are two different types of confined spaces:

- A *confined space* is an area large enough and configured in such a way that one can bodily enter and work in it, but has a restricted means of access or egress. It is not designed for continuous occupancy. A confined space is not necessarily a subterranean space; it can be aboveground, such as in a supported overhead tank or a railcar.
- A *permit-required confined space* is also not designed for continuous occupancy, and it also has a restricted means of egress or access. In addition, it has other dangerous characteristics that require consideration, such as containing or having the potential to contain a hazardous atmosphere, converging walls, sloping floors, engulfment possibility, or other recognized serious safety or health hazards.

4-39. Since CBRN teams may be required to respond to an incident involving confined spaces, they must have confined-space operations training according to *29 CFR 1910.146*. Furthermore, CBRN teams must be trained at the confined-space rescue operations level to rescue their team members in case an emergency occurs during the mission.

HAZARD CONTROL

4-40. Hazards specific to a confined space are dictated by the—

- Material stored or used in the confined space. (For example, damp, activated carbon in a filtration tank absorb oxygen, thus creating an oxygen-deficient atmosphere.)
- The activity carried out. (For example, the fermentation of molasses creates ethyl alcohol vapors and decreases the oxygen content of the atmosphere.)
- The external environment. (For example, sewer systems may be affected by high tides, gases that are heavier than air, or flash floods.)

PROTECTIVE EQUIPMENT

4-41. Entry into confined spaces may require harnesses and lowering devices to access the space, and proper training on the use of this equipment ensures the safety of entrants. The configuration of confined spaces could also require the use of hardhats, protective footwear, and protective gloves to ensure the health and safety of personnel entering the space. Confined spaces that contain a hazardous environment also require the use of PPE.

EMERGENCY RETRIEVAL

4-42. Each authorized entrant uses a chest or full-body harness with a retrieval line attached at the center of the entrant's back, near shoulder level, above the entrant's head, or at another point which presents a profile small enough for the successful removal of the entrant. The other end of the retrieval line is

attached to a mechanical device or fixed point outside the confined space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical spaces more than 5 feet deep. If entry is required to perform emergency retrieval, entry is conducted by a trained rescue team. All other operations cease until emergency retrieval is complete and the space is evaluated for the cause of the emergency.

TERMINATING THE INCIDENT

4-43. An incident is considered terminated when the IC determines that a state of emergency no longer exists and normal operations may resume, with the exception of structures that may remain closed for an extended period for repair. Termination activities should concentrate on funneling accurate information to the people who need it most. Initially, this group is a small number of emergency responders who may be briefed on the signs and symptoms of a particular product or on special decontamination procedures. In larger incidents, the number of people with a need to know expands and may even include contractors or other agencies. The release of inaccurate information may have many long-reaching effects. Incorrect hazard data could result in illnesses, improper cleanup techniques, and unsafe disposal procedures. Failure to properly manage termination activities may also result in inaccurate assessments from the public and news media.

DEBRIEFING

4-44. Debriefings should begin as soon as the emergency phase of an operation is complete, ideally, before first responders leave the scene. They should include the sector officers and other key players, such as public affairs officers and agency representatives, who the IC determines have a need to know. Debriefings should cover the following subjects:

- **Health information.** The substances that each emergency response person was exposed to should be identified and the signs and symptoms of oncoming illness described. Some signs and symptoms may be delayed, appearing hours to days after exposure. When appropriate, responsibilities for follow-up evaluations should be covered and exposure levels logged for future reference.
- **Equipment and apparatus exposure review.** Equipment and apparatuses that are unfit for service must be clearly marked and arranged for cleaning or disposal, as required. Responsibility for contaminated garments should be delegated and a follow-up date established.
- **Follow-up contact person.** Anyone involved after the release of emergency response personnel from the scene, such as cleanup contractors and investigators, should have access to a single information source who can provide needed data. This contact person is also responsible for collecting and maintaining all incident documents until their delivery to the appropriate investigator.
- **Problems requiring immediate action.** Equipment failures, safety, personnel issues, or potential legal ramifications should be quickly reviewed on scene. If an issue is not crucial, discussion should be saved for the critique.

POSTINCIDENT ANALYSIS

4-45. There are many agencies and individuals who have a legitimate need for information about any significant CBRN incident. They may include manufacturing and shipping company representatives, insurance companies, government agencies, or citizens' groups. Postincident analysis is the reconstruction of the incident to establish a clear picture of the events that took place during the incident. It is conducted to—

- Determine the level of financial responsibility.
- Establish a clear picture of the emergency response for further study.

4-46. The postincident analysis differs from an investigation, which is usually conducted to establish the probable cause of the incident for administrative, civil, or criminal proceedings. It begins with the designation of one person or agency to collect information about the response during the debriefing. They,

in turn, provide all available data to those who need to know. This method guarantees that sensitive or unverified information is not released to the wrong organization or in an untimely manner.

4-47. The IC and the person conducting the postincident analysis should meet as soon as practical to review key events of the incident and to identify subjects for immediate follow-up. A brief chronological review of who did what, when, and where during the incident should be constructed. A simple timeline placing the key players at specific locations at different times is a good start. Cooperation between the postincident analysis team and other official investigators saves time and combines resources to reconstruct the incident completely.

AFTER-ACTION REVIEW

4-48. Many injuries and fatalities have been prevented as a result of AAR sessions. An effective AAR program is supported by leaders as a positive way to outline lessons learned. The more severe the incident, the more important it is to share what was learned. A commitment to AARs for all CBRN responses improves emergency responder performance by improving efficiency and pinpointing weaknesses. Although every organization has a tendency to develop its own AAR style, an AAR should never be used to assign blame—it should be used as a valuable learning experience. When practical, each individual should keep notes of important points and sum up their lessons learned. A good critique mentality promotes the following:

- Trust in a self-correcting response system.
- Willingness to cooperate through teamwork.
- Continued training of skills and techniques.
- Preplanning for significant incidents.
- Sharing of information between response agencies.

4-49. The crucial player in this scenario is the AAR leader, who acts as a director of the entire performance. The AAR leader should—

- Monitor the AAR by introducing the players and procedures, keep it moving, and end it on schedule.
- Ensure that direct questions receive direct answers.
- Ensure that all participants utilize the AAR guidelines.
- Ensure that each operational group presents observations.

Chapter 5
Remediation and Restoration

When CWM or biological warfare materiel (BWM) is discovered on active DOD installations, on installations awaiting realignment or closure under the base realignment and closure (BRAC) program, or at FUDS, remediation and restoration operations must be conducted. As the DOD executive agent for CWM and BWM, the Army is responsible for the safe, timely, and effective response to discoveries of this type of materiel.

RECOVERED CHEMICAL WARFARE MATERIEL

5-1. RCWM refers to CWM that was previously discarded, fired, or buried and discovered either unexpectedly or during planned environmental restoration operations. RCWM is classified based on the requirements of *40 CFR 266, Subpart M (EPA Military Munitions Rule)*.

5-2. Upon discovery of munitions, the initial EOD or TE battalion responders conduct a preliminary assessment. As soon as possible thereafter, the CBRN team conducts a detailed assessment by documenting the circumstances of discovery, performing visual examinations, recording physical characteristics, performing gross and low-level monitoring, and conducting other testing as appropriate. For example, CBRN teams are capable of determining the explosive configuration and fill characteristics of unknown recovered munitions through the use of such nonintrusive means as—

- **Portable X-rays.** X-rays may be used to determine whether munitions contain liquid and, consequently, whether they should be treated as conventional or chemical.
- **Portable isotopic neutron spectroscopy (PINS) systems.** The PINS chemical assay system *(Figure 5-1, page 5-2)* is a nonintrusive, nondestructive evaluation tool used to identify the contents of munitions and chemical storage containers. Suspect items may be evaluated without being opened, drilled, or even touched during the assessment process. The PINS system employs neutron radiation as a probe, resulting in the production of gamma rays unique to each chemical element encountered. A high-resolution, gamma-ray spectrometer is then used to identify the chemical elements within the item undergoing testing. The actual fill of the item is inferred from the list of chemical elements contained within. For example, the presence of phosphorus indicates that the item contains organophosphorus nerve agents while the presence of nitrogen is indicative of military high explosives.

The results of the detailed CBRN team assessment are presented in a written report which includes test results and photographs.

5-3. An important goal of the detailed assessment is the identification of recovered munitions. Munitions that are chemical in nature must not be prematurely dismissed as conventional munitions, but instead must be handled with special care as required by public law. It is also important that conventional munitions not be misidentified as chemical in nature, or they may be unnecessarily afforded the same special care. Additionally, the proper identification of recovered munitions potentially reduces the likelihood of incompatible storage. In the event that the contents of the unknown RCWM cannot be positively identified, the items must be managed in accordance with procedures applicable to the most hazardous of potential fills as determined by the circumstances associated with the discovery.

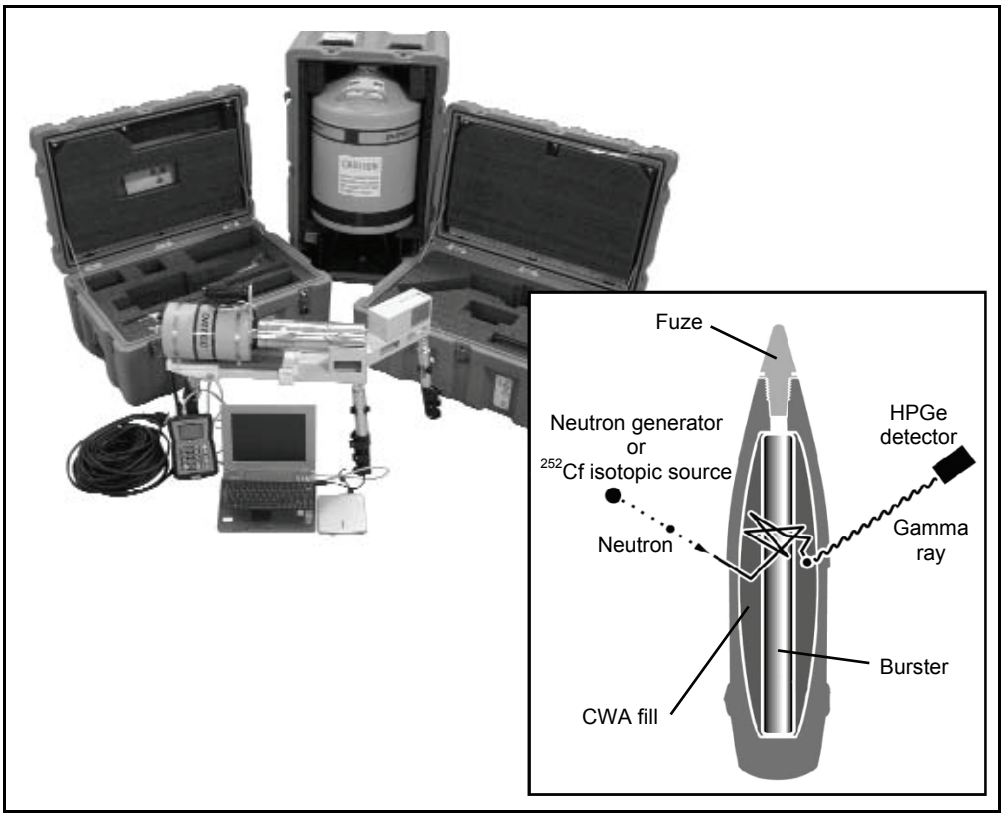

Figure 5-1. PINS

5-4. CWM found buried must be managed in compliance with the following environmental laws and regulations, as applicable: the *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Public Law [PL] 96-510)*, the *Superfund Amendments and Reauthorization Act (SARA) (PL 99-499)*, and the *Resource Conservation and Recovery Act (RCRA) (PL 94-580)*. If the recovery organization does not believe that the buried CWM is subject to management under the provisions of *CERLA*, *SARA*, or *RCRA*, no off-site removal action is to be taken until the Office of the Assistant Secretary of the Army (ASA) (Installations and Environment [I&E]) has reviewed the circumstances and made a final determination. CWM discovered on firing ranges must be classified, transported, and disposed of in accordance with *40 CFR 266, Subpart M*.

5-5. The Materiel Assessment Review Board (MARB) was established to assist with the safe management of suspect RCWM. The board may be convened at the request of the 22d Chemical Battalion (TE); the Product Manager for Nonstockpile Chemical Materiel (PMNSCM); the CMA; a Level II certified radiographer; the Research, Development, and Engineering Command (RDECOM); the Edgewood Chemical and Biological Center (ECBC); or the Idaho National Laboratory (INL). The MARB is composed of 10 voting members (appointed by the AMC, Director of the Chemical Materials Agency) and several permanent nonvoting members who are chosen based on their expertise in the fields of chemical history; nonintrusive assessment; radiography; handling, storage, transport, and treatment of chemical munitions; EOD; and risk management. Ad hoc members and guests may also be appointed and invited to specific MARB meetings as deemed necessary. Because MARB decisions are based on the detailed assessments of the CBRN teams, proper assessment of the data is a critical step in the RCWM management process.

5-6. Chemical munitions may be rendered safe by rendering the fuze safe without releasing the agent. Alternatively, the agent and explosive components may be destroyed simultaneously, eliminating the need for RSPs. The option chosen depends on factors such as munition type, fuzing, agent fill, and the specific

situation in which the munition is found. In no case are bursters to be removed from damaged or leaking munitions.

5-7. In an accident or incident involving visible leakage of liquid chemical agents, items that have not leaked should be moved away from those that have. Every attempt should then be made to stop or reduce leakage from the remaining containers. Although sealing techniques vary depending on the type of chemical agents present and the size of the holes in the containers, procedures should be carried out in accordance with *Technical Manual (TM) 60A-1-1-11*. Additional information regarding leak-sealing procedures may also be found in *TM 3-250, Chapter 10*.

5-8. The possibility of spreading contamination can be reduced by packing munitions at the incident site in accordance with procedures outlined in *TM 60A-1-1-11*. Possible leak-sealing and packaging procedures are illustrated in *Figure 5-2*.

Note. Final packaging should not involve filling containers with liquid (water or detergent), as doing so could unnecessarily complicate handling and disposal.

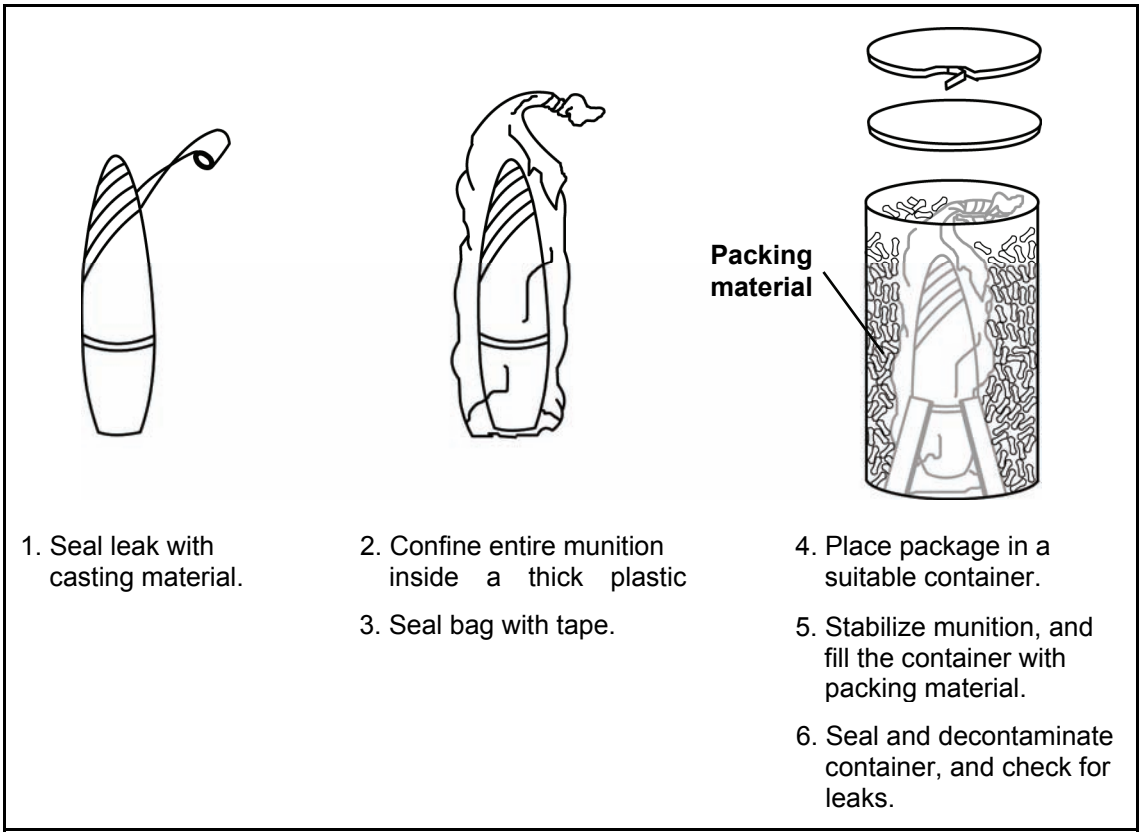

Figure 5-2. Sample Leak-Sealing and Packaging Procedures

5-9. If on-site treatment or disposal cannot be accomplished, TE teams must transport the RCWM to an approved location in accordance with *50 U.S. Code (USC) 1512–1517*; *AR 75-15*, *paragraph 3-7*; and environmental and transportation laws and regulations, as applicable. The CMA is responsible for coordinating the relocation of recovered munitions with federal and state regulatory agencies, as required. RCWM, therefore, may not be removed from the site until the TE battalion receives verification from the CMA that the storage destination has been approved and that the appropriate notifications have been made. The TE battalion commander is responsible for deciding whether escort personnel should be armed during transportation. RCWM that presents an emergency threat to public health or safety must be transported under the emergency provisions of *50 USC 1517* and in accordance with applicable environmental and transportation laws and regulations. RCWM that does not constitute an emergency threat to public health

or safety is transported under the general provisions of *50 USC 1512* and in accordance with applicable environmental and transportation laws and regulations.

5-10. Once the RCWM has been transported to an installation with an active surety mission, it is afforded the same safety and security measures that are in place for chemical surety material. The intent, though, is not to reclassify RCWM as surety material.

5-11. Recovered chemicals that do not meet the definition of RCWM are considered and treated as industrial chemicals or hazardous waste—not as RCWM. Standards for the recovery and disposition of such substances are specified in *29 CFR 1910.120*, *40 CFR 260–279*, *40 CFR 300*, and where applicable, equivalent state regulations.

RECOVERED BIOLOGICAL WARFARE MATERIEL

5-12. Recovered BWM refers to items configured as munitions but which contain etiological agents intended to seriously injure, incapacitate, or kill through physiological effects. BWM also includes etiological agents designed to damage or destroy crops intended for human consumption.

5-13. The Army does not maintain a BWM stockpile, and there are no plans for any BWM remediation. Although the likelihood of accidental discovery is extremely remote, BWM could potentially be encountered during Army remediation or restoration activities at active installations, BRAC sites, and FUDS. The unplanned discovery of actual or suspected BWM must be reported by the site custodian in accordance with chemical event reporting procedures as specified in *AR 50-6*.

5-14. Any BWM that is recovered is assessed by TE battalion personnel to determine the biological composition of the material and ascertain whether it is explosively configured; whether it is fuzed; and whether it can be safely moved, stored, treated, and disposed of. Assessments are based on the circumstances of the discovery, visual examination, physical characteristics, gross and low-level monitoring, X-ray imagery, and other tests as appropriate.

5-15. The primary objective of BWM response activities is the safe, effective, and timely mitigation of public and environmental health and safety hazards posed by the materiel. Response activities are conducted in compliance with statutory and regulatory requirements and in coordination with federal, state, and local authorities. All recovered BWM is to be handled and managed at the appropriate biosafety level as determined by a risk assessment (conducted in accordance with *32 CFR 626-627*, *AR 385-69*, and *DA Pam 385-69*) until it has been fully characterized or assigned to another risk group by the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID). In the event that the contents of the unknown recovered BWM cannot be positively identified, the items must be managed in accordance with procedures applicable to the most hazardous of potential biological agent fills as determined by the circumstances associated with the discovery.

5-16. Recovered BWM must be packaged, labeled, marked, prepared for transport, and transported in accordance with applicable federal, state, and local laws and regulations, including *42 CFR 72*, *49 CFR 172 and 173*, *9 CFR 122*, *DA Pam 385-69*, and the requirements of the International Air Transport Association (IATA). All Risk Group 4 (RG-4) or U.S. Department of Agriculture (USDA)-restricted animal pathogens are transported and accompanied by a designated courier who monitors aspects of the shipment and ensures that required transfers are completed and documented and that final delivery is accomplished and acknowledged. Audit trails and receipts of all BWM transport activities must be established and maintained.

Chapter 6
Technical Escorts

Federal agencies regulate the transportation of hazardous chemicals and related items within the limits of CONUS and in some areas overseas. There are procedures that must be followed before, during, and after the shipment of materiel requiring TEs. Personnel performing these procedures must meet certain criteria.

MISSION PLANNING

6-1. The TE battalion operations staff officer (S-3) is responsible for planning and coordinating all off-post escort missions. A locally generated worksheet is used as a format guide for off-post escort mission planning. At least seven days prior to the planned shipment date of the chemical agent, the TE battalion S-3 ensures that the shipper has sent out the proper report of shipment. Immediately prior to departure of the shipment, the TE battalion S-3 briefs the technical escort officer (TEO) according to unit SOPs. The TEO then checks all team members for proper equipment and government credit cards and thoroughly briefs personnel on the duties they are required to perform.

6-2. In accordance with unit SOPs, the TE battalion S-3 notifies all concerned agencies prior to the commencement of off-post escorts. The TEO notifies the TE battalion S-3 about any and all delays as soon as possible. The S-3 immediately notifies the consignee and all other elements involved in the escort about the delay by telephone or alternative means. Addressees involved with classified shipments are also notified of any delays or changes during the escort as well as at the completion of the mission. Emergency telephone numbers are listed on the shipping papers.

6-3. Prior to the execution of any off-post escort, the TEO conducts premission checks in accordance with unit SOPs. Sample procedures, checklists, and other documents are available in *Appendix E*. The number of vehicles used during an escort is dependent on the mission; however, a minimum of three vehicles—one sweep vehicle, one cargo vehicle, and one guard vehicle—are used for off-post chemical surety agent movements. Although rental vehicles may be used as the sweep and guard vehicles, the cargo vehicle (which must have a cargo compartment separate from the passenger section of the vehicle) must be a General Services Administration (GSA), military, or contractor-owned vehicle.

PROCEDURES

6-4. TE battalion commanders establish procedures for all chemical-agent operations. The requirements and procedures to be followed are determined by factors such as the origination, destination, type, and quantity of materiel to be transported.

GENERAL

6-5. The TEO is responsible for all escort operations conducted throughout the mission. Operations are conducted in accordance with the guidelines established in unit SOPs. Specifically, the TEO—

- Follows security requirements outlined in the unit SOP.
- Briefs TE members on their special orders and ensures that they sign the orders prior to performing the escort mission.
- Maintains a daily log *(DA Form 1594 [Daily Staff Journal or Duty Officer's Log])* from the start of each mission.
- Notifies the TE battalion S-3 before departure and upon arrival at each location.

- Provides a verbal duress code to the TE battalion S-3 and the escort team. The TEO must not provide the duress code to any other entity. Furthermore, the TEO must not write or otherwise record the duress code.

6-6. TE teams follow and strictly enforce a "two-person rule," the intent of which is to help ensure the safety of the individuals directly involved in chemical-agent handling and security. One of these two personnel is designated as the team leader.

Receipt of Cargo

6-7. When receiving cargo from the shipper, the escort team—

- Establishes and continuously mans a temporary exclusion area around the cargo. The size and shape of the exclusion area is determined by the TEO or team leader.
- Strictly controls entry into the exclusion area. To enter the area, visitors must be authorized by the TEO or team leader and they must also be accompanied by an appointed escort.
- Positively identifies the authorized recipient of the cargo by comparing information provided by the TE battalion S-3 with the recipient's picture identification card or security badge.
- Obtains shipping documents and a *DD Form 1911* thoroughly describing each container and its contents.
- Accounts for each container listed on the *DD Form 1149 (Requisition and Invoice/Shipping Document)*.
- Ensures that the shipper has certified the material to be properly described, classified, marked, packaged, labeled, and in the proper condition for transportation.
- Verifies that the shipper has properly packaged and labeled the cargo in accordance with *49 CFR* and *TM 38-250*.
- Visually inspects cargo for signs of damage that could cause leakage during transportation. If damage is discovered, the escort team monitors the cargo with appropriate air monitoring equipment and follows emergency actions outlined in unit SOPs.
- Obtains a *DD Form 2890 (DOD Multimodal Dangerous Goods Declaration)* from the shipper. (Cargo drivers must sign this form and carry it with them at all times.)

6-8. The TEO signs for the cargo on a *DD Form 1911* and retains the original. He then directs the escort team to insert magazines into their weapons, search all transport vehicles (verifying that there are no unauthorized personnel onboard or any evidence of sabotage present), and load the cargo onto the transport vehicle. The TEO inspects the loading operation, ensuring that the cargo is properly secured to prevent movement during transport.

Transportation of Cargo

6-9. Whenever the vehicle is loaded with cargo, placards must be displayed in accordance with *49 CFR*. In addition, when the driver is in the vehicle, the shipping papers must be within arm's reach. If the driver leaves the vehicle, the shipping papers must be placed on the driver's seat or stored in a pouch on the driver's side door.

6-10. If the visual inspection conducted during receipt of the cargo indicated possible damage, the cargo is also to be inspected—

- After loading and securing the cargo in each transport vehicle.
- After loading the cargo from one mode of transportation to another (ground to air or air to ground).
- After the occurrence of an unplanned incident (a road accident or heavy turbulence during air movement).

6-11. Except in an emergency or when otherwise specified, convoys must not travel farther than 400 miles or longer than 8 hours per day—whichever occurs first. Rest and meal periods are not considered driving time. Overnight stops are not normally made; however, they may be arranged by the TEO or the TE battalion S-3 on a case-by-case basis.

Delivery of Cargo

6-12. Upon arrival at the destination, the escort team—

- Establishes and continuously mans a temporary exclusion area around the cargo. The size and shape of the exclusion area is determined by the TEO or team leader.
- Strictly controls entry into the exclusion area. To enter the area, visitors must be authorized by the TEO or team leader, and they must also be accompanied by an appointed escort.
- Positively identifies the authorized recipient of the cargo by comparing information provided by the TE battalion S-3 with the recipient's picture identification card or security badge.
- Provides one copy of the shipping documents to the receiver and retains the remaining copies.
- Visually inspects cargo for signs of damage that may have occurred during transportation. If damage is discovered, the escort team must follow guidelines contained in the receiver's SOPs.
- Assists the receiver in unpacking and taking inventory of the cargo, if required.
- Signs the cargo over to the custodian on a *DD Form 1911* and retains a copy of the receipt.
- Removes the magazines from the weapons.
- Conducts a safety inspection of each vehicle and then removes all placards.
- Provides the time of mission completion to the TE battalion S-3.

Postmission

6-13. Following the completion of the mission and the return to home station, the TEO ensures that—

- The equipment is cleaned and postmission preventive maintenance checks and services (PMCS) are performed.
- All sensitive items are accounted for.
- All equipment and supplies are returned to the TE battalion logistics staff officer (S-4).
- The TE battalion S-3 receives an operational back-brief.

GROUND ESCORT

6-14. In addition to the general TE procedures, the following procedures also apply specifically to ground transport:

- The ground team leader contacts the TE battalion S-3 the afternoon prior to departure.
- The ground team notifies local activities.
- The ground team prepares primary and alternate strip maps for each vehicle in the convoy.
- Following completion of the mission, the TEO ensures that a trip report for air escort (see *Appendix E*) is prepared and submitted to the TE battalion S-3.

AIR ESCORT

6-15. In addition to the general TE procedures, the following procedures also apply specifically to air transport:

- A rotation order is established for the TE team members to ensure consistent compliance with the two-person rule.
- The TEO briefs the aircraft commander in accordance with unit SOPs. See the sample aircraft commander's/ship captain's briefing in *Appendix E*.
- The cargo and the escort kit, which is used to clean up spills in the event of an emergency, must be stored in such a way that they are easily accessible in flight without moving other cargo. Furthermore, compatibility requirements for cargo must also be observed *(49 CFR)*. The escort team is to advise the loadmaster or crew chief of these requirements.

SURETY MATERIEL

6-16. In addition to the general technical escort procedures, movement involving surety chemical agents must comply with local, state, and federal laws, including *50 USC 1512*; *49 CFR, Parts 171 through 180*; *AR 50-6*; *AR 200-2*; and *DOD 4500.9-R* and with the notification requirements of the *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction* (the "Chemical Weapons Convention"). Guidance and instruction for handling radiological, nuclear, and improvised nuclear materiel is presented in *DOD Directive DODD 3150.5*, *DODD 3150.8*, *DOD 3150.8-M*, and *AR 50-5*. Other surety-specific procedures include the following:

- Movement of surety chemical agents exceeding the amounts specified in *Table 6-1* and *Table 6-2* must be accompanied by at least two TE battalion CPRP personnel. Each of these personnel must be capable of recognizing unsafe acts and performing self aid or buddy aid in the event of exposure to a chemical agent. The TE teams must comply with DOD, AMC, RDECOM, and DOT regulations.
- In the event that the surety material is transported by ground, a minimum of three vehicles—one sweep vehicle, one cargo vehicle, and one guard vehicle—are used for off-post movement. Although rental vehicles may be used as the sweep and guard vehicles, the cargo vehicle (which must have a cargo compartment separate from the passenger section of the vehicle) must be a GSA, military, or contractor-owned vehicle.
- In the event that the surety materiel is transported by air, the materiel must be accompanied by at least four armed TE team personnel onboard the fixed/rotary wing aircraft. That number may be increased at the discretion of the TE battalion commander. Additional personnel may also be employed in a trainee capacity. While trainees do not serve as full-fledged team members, they are armed and they are equipped with air-purifying protective masks for escape purposes.

Table 6-1. Surety Threshold Levels for Research, Development, Test, and Evaluation Dilute Solutions

Agent	*Maximum total quantity (mg)*	*Maximum concentration (mg/ml)*
GA, GB, GD, GF	20	2.0
VX	10	1.0
H, HD, HQ, HT, Q, T	100	10.0
L, HL	50	5.0

Table 6-2. Surety Threshold Levels for Neat Research Chemical Agents

HD (ml)	*L (ml)*	*VX (ml)*	*GA, GB, GD, GF (ml)*
25	25	1	10.0[1]
[1]Aggregate total for G series agents in 1-ml primary containers.			

NONSURETY MATERIEL

6-17. In addition to the general TE procedures, the following procedures apply specifically to the transportation of RCWM, viable biological agents, or other nonsurety materiel:

- The TE battalion commander decides whether escort personnel should be armed during transport of RCWM. If escort personnel are to be armed, the TE battalion S-3 ensures that escort team members meet the appropriate security and weapons qualification requirements.
- Only one escort vehicle is used if the nonsurety materiel is transported by ground, unless additional vehicles are required due to the number of containers being shipped. If an item is suspected of containing CWM, the cargo vehicle must be placarded for inhalation hazard.
- Approval for movement of RCWM to a temporary storage facility, if necessary, is obtained by the PMNSCM.

Note. Intermediate serial dilutions produced when converting nonsurety levels of neat research chemical agent *(Table 6-2)* to nonsurety levels of research, development, test, and evaluation (RDTE) dilute solution *(Table 6-1)* are considered nonsurety work, providing the intermediate dilutions are not stored overnight.

SECURITY

6-18. The size and composition of the security force accompanying a shipment is determined by the type of cargo, the mode of transportation, the area to be traversed, and security considerations. The number of TE battalion guards to be used must be sufficient to ensure protection of the chemical agents during movement.

6-19. The premission briefing presented to the TE team members by the TEO may include use-of-force instructions and special instructions involving the use of weapons. A sample of this type of briefing is included in *Appendix E*.

6-20. In the event that a TE team comes under attack, team members take appropriate response action, continue to the next delivery location, and notify the TE battalion S-3 to provide information concerning the location and situation. In doing this, the TE team follows the use-of-force guidelines established in unit SOPs. The TE battalion S-3 then initiates security assistance.

6-21. The following actions can be conducted prior to departure to reduce the risk of an attack during the mission:

- Obtain intelligence information from the TE battalion intelligence staff officer (S-2) for all locations in which the TE team is to travel.
- Ensure that the chain of command for the TE operation has been designated.
- Ensure that all escort equipment needed for the mission is available and operational.
- Conduct a security survey of the shipping location and delivery point.
- Conduct a reconnaissance of the primary and alternate travel routes.
- Ensure that the TE team is briefed on the primary and alternate travel routes.
- Ensure that the TE team is briefed on establishing a security perimeter, as necessary, throughout the escort mission.
- Ensure that the TE team is briefed on all emergency procedures.
- Ensure that the TE battalion S-3 and the TE team are provided a duress code.

In addition, informing the TE battalion S-3 of any delays encountered during the mission and the reasons for those delays can also reduce the risk of attack.

EMERGENCIES

6-22. In the event of an incident involving the agent container, it is assumed that an agent spill has occurred until it is proven otherwise. Emergency procedures vary depending on the mode of transportation.

GROUND TRANSPORT

6-23. During an emergency involving ground transport, the following actions are to be performed:

- Personnel within the emergency action zone are immediately evacuated by rescue personnel wearing PPE. Victims are evacuated upwind, and first aid is rendered when necessary.
- A control point is established.
- Local authorities and the TE battalion S-3 are notified of the situation and location by telephone. If there is a military installation nearby, installation assistance is requested.
- The security of the cargo and affected area is maintained in accordance with unit SOPs.
- Communication is established with the HAZMAT team upon their arrival at the scene.

- The accident site is surveyed to determine the status of the cargo and assess areas of possible contamination.
- The escort kit and other available material are used for decontamination, as necessary, in accordance with unit SOPs.

6-24. During an emergency involving ground transport, the following actions are to be performed:

- All personnel onboard the aircraft don the appropriate PPE as quickly as possible.
- Smoke and fumes are eliminated from the aircraft, as determined by the pilot in charge (PIC). Plastic bags are used in an attempt to contain liquid or vapor leaks. Attempts to open cargo packages with only vapor leaks should not be made while in flight.
- The PIC attempts to land at the nearest suitable "safe haven" airfield—preferably a military airfield. The PIC notifies the airfield of the emergency and relays all necessary information. Given a choice between communications security and flight safety, flight safety takes precedence.
- Because TE teams do not normally carry sufficient quantities of decontaminants to decontaminate the entire aircraft, the TEO furnishes the PIC with the following information to be relayed to the landing airfield command post (CP):
  - The type and quantity of equipment and decontaminant required.
  - The number of personnel required to support cargo off-loading and to provide assistance with emergency decontamination.
- The TEO contacts the TE battalion S-3 immediately after landing, reports the location, and provides all pertinent information regarding the emergency—including whether or not security was compromised.

TRAINING

6-25. TE personnel must receive annual training on the provisions of *AR 50-6*, *AR 190-14*, *AR 190-56* , *AR 190-59*, *DA Pam 385-61,* and appropriate unit SOPs.

6-26. TE battalion personnel responsible for conducting TE operations must meet all the qualifications for CPRP certification prior to conducting those operations.

6-27. Trainees receiving on-the-job training (OJT) must also meet all TE training requirements and be in the CPRP program.

Chapter 7
Support to Combatant Commanders

This chapter implements STANAG 2195.

TE battalions generally support CCDRs at theater level and above. The CBRN teams make use of several unique capabilities to provide full-spectrum CBRN technical assistance to CCDRs and their AOs. This chapter focuses on the main types of support missions conducted by CBRN teams.

TECHNICAL CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR ADVICE

7-1. Team members support combatant, incident, and on-scene commanders by providing technical CBRN advice on issues such as—

- Establishing isolation and safe zones. Based on the physical characteristics of the chemical agent and the existing weather conditions, the team determines where the agent is likely to spread and, therefore, which areas should be cordoned.
- Selecting the necessary PPE. The team uses permissible exposure limit (PEL) information to determine the level of PPE required for entry into the contaminated area.
- Identifying appropriate decontaminants. The team determines the decontaminants appropriate for the specific agent and situation.
- Packaging and transporting agents. The team determines packaging and transportation requirements based on the physical characteristics of the agent.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR MUNITIONS ASSESSMENT

7-2. CBRN teams use nonintrusive technologies to identify discovered CBRN munitions by the external and internal characteristics of the munitions. This important capability allows for the safety of the assets in the vicinity of the munition.

7-3. During an initial assessment, the team visually inspects the munitions for markings, fuze condition, and any leaks. Chemical munitions may be identified through visual inspection and the use of gross- or low-level monitoring equipment. If the munition cannot be identified by visual inspection or initial monitoring, an X-ray may be used to determine the fuze condition and fill type (liquid or solid).

7-4. If the presence of a liquid in the CBRN munition is verified, the team uses a PINS system to analyze its chemical makeup. Once the chemical composition of the liquid has been determined, the team can make recommendations regarding disposition of the munition. In general, the EOD members of the team perform RSPs in preparation for movement of the munition to a safe storage location. After mitigating any initial hazards and performing any necessary leak-seal procedures, the team members properly package the munition for transportation. These procedures ensure that the munition is moved safely and without the spread of contamination.

7-5. Once the munition has been packaged for transportation, the team escorts the munition to a transfer point or to an authorized storage location.

ELIMINATION OPERATIONS

7-6. Elimination operations involve eliminating or degrading the hazardous properties of a hazardous substance. Elimination is conducted to protect the force from the enemy who is using hazardous materials and also to prevent the lingering effects of the hazardous material from resulting in illness or death to follow-on forces. There are two general methods that may be used to conduct elimination operations:

- **Neutralization.** The process of neutralization involves introducing a substance to the hazardous substance so that the hazardous substance is degraded and rendered nonhazardous. Monitoring and detection equipment is used to obtain information about the physical properties of the hazardous substance. This type of information is essential for the assessment of proper neutralization methods. An adverse chemical reaction may occur when a neutralization substance is introduced to a substance with unknown properties.
- **Incineration.** The incineration of hazardous substances is currently conducted at only a few locations. If the quantity of the substance is too great for on-site neutralization, the team may request that the material be transported to an incineration facility. In situations involving only a few chemical munitions, EOD personnel may conduct emergency disposals by thermally treating the munitions in place with an appropriate amount of high explosives to incinerate any liquids that may be present.

Note. Specific elimination operation procedures are described in TE battalion SOPs and training plans.

DISABLEMENT OPERATIONS

7-7. Disablement operations are intended to render the process or machinery used to produce hazardous substances—from small, clandestine laboratories used to make crude CBRN material to state-of-the-art facilities producing larger amounts of CBRN material—inoperable for a period of time. CBRN teams conduct disablement operations to protect the force and deny the enemy; they use whatever means are available and authorized to ensure that the facility is not usable for the length of time ordered by the supported command. This results in maintenance and financial burdens for the enemy attempting to reuse the disabled facility.

Note. Disablement operation procedures are identified in TE battalion SOPs and training plans.

SENSITIVE-SITE EXPLOITATION SUPPORT

7-8. SSE is defined as "a related series of activities inside a captured sensitive site to exploit personnel documents, electronic data, and material captured at the site, while neutralizing any threat posed by the site or it contents" *(JP 1-02)*. Although the physical process of exploiting the sensitive site begins at the site itself, full exploitation may involve teams of experts located around the world. SSE is a combined arms operation requiring extensive planning, coordination, and execution oversight by commanders and their staffs. CBRN teams support the CBRN aspects of SSE operations.

PREPARATION

7-9. Operations involving CBRN SSE support are simply variations of normal tactical operations; all planning steps and considerations pertinent to full-spectrum operations apply. Knowledge of the following aspects of planning may assist planners and commanders in anticipating the effects of CBRN operations on normal TTP:

- **Size of the AO.** Commanders are assigned an AO that includes the sensitive site and enough terrain around the site to accomplish the designated mission. The size of the area necessary for CBRN response operations impacts the resources required.

- **Intelligence.** Information about known and suspected CBRN sites in the AO must be incorporated into the intelligence preparation of the battlefield (IPB). Because extensive coordination may be required to obtain the necessary information, it should be requested and developed well in advance of anticipated operations. Comprehensive intelligence and analysis of potential sensitive sites should be collaboratively developed across the command and disseminated as part of the IPB. *Technical intelligence* refers to intelligence derived from the collection and analysis of the threat and foreign military equipment (and associated materiel) for the purpose of preventing technological surprises, assessing foreign scientific and technical capabilities, and developing countermeasures designed to neutralize an adversary's technological advantages. *Weapons technical intelligence*, a subcomponent of technical intelligence, is focused on improvised explosive device (IED) exploitation. Weapons intelligence teams collect forensic evidence and device components that have been rendered safe or acquired through postblast analysis from IED incident locations by EOD personnel. Units involved in CBRN response must plan how to seize and dispose of intelligence material, supplies, evidence, contraband, and other minor items collected during this mission; search teams require detailed instructions for handling controlled items. All captured equipment and documents must be processed in accordance with *FM 34-54* and *STANAG 2195*.
- **Communications.** TE battalion communications capabilities may need to be augmented to provide linkages to subject matter experts (SMEs) or from SME teams to the supporting HQ. For example, it may be necessary to establish a secure video linkup between unit teams on site and SMEs located elsewhere in the AO.
- **Site preservation.** CBRN response operations at sensitive sites are fragile and highly dynamic. There is usually only one chance to properly search a sensitive site. Therefore, a good preliminary survey should be conducted to use that chance to the best advantage. The evidence value of CBRN items discovered at the site can easily be lost; however, a CBRN site survey helps identify items and materiel that have potential evidence value. The CBRN survey team performs a preliminary examination (preferably without entering the more critical areas of the site), noting the conditions, items, and locations that seem to be of greatest importance. The primary functions of the survey team are to observe and record. All material taken from the site should be tagged with information indicating where it was found, the circumstances under which it was found, and the names of the individual(s) handling it. Field-expedient tags may be used in lieu of evidence tags.

7-10. There are many tools that may be taken into account during the planning process which can be used to effectively conduct CBRN defense operations. Examples of these tools include OPORDs, warning orders (WARNORDs), fragmentary orders (FRAGORDs), and METT-TC analysis and vulnerability assessments (including vulnerability analyses, threat analyses [IPB], and vulnerability reduction measures).

EXECUTION

7-11. The primary purpose of the CBRN SSE is to identify, characterize, secure, and render safe the adversary's CBRN materiel, equipment, weapons, infrastructure, and personnel. A secondary purpose is to collect appropriate intelligence and forensic evidence.

7-12. After the sensitive site has been secured and safe access had been established, actual exploitation of the site begins. Examples of units that support SSE operations are—

- **TE battalion CBRN teams.** In a hostile environment, a CBRN team operates as a support asset to a CCDR or force (see *Figure 7-1, page 7-4*). CBRN teams are capable of operating in permissive environments with little or no outside support requirements. Because TE battalions do not have organic security assets, operations in uncertain environments require area security support.
- **EOD units.** EOD units are trained to recognize and test for CBRN hazards. The units use portable X-ray capabilities to determine ordnance type and function. For more information on EOD, see *Field Manual Interim (FMI) 4-30.50*.

- **Special Forces chemical reconnaissance detachments (CRDs).** A CRD provides support for a deployed Special Forces operational detachment (SFOD) in all environments (hostile, permissive, and uncertain) in support of strategic, operational, and tactical objectives during SSE operations. It is employed in one of two modes:
  - Unilaterally (in a permissive environment).
  - As augmentation or training support to an SFOD (in a nonpermissive or semipermissive environment).

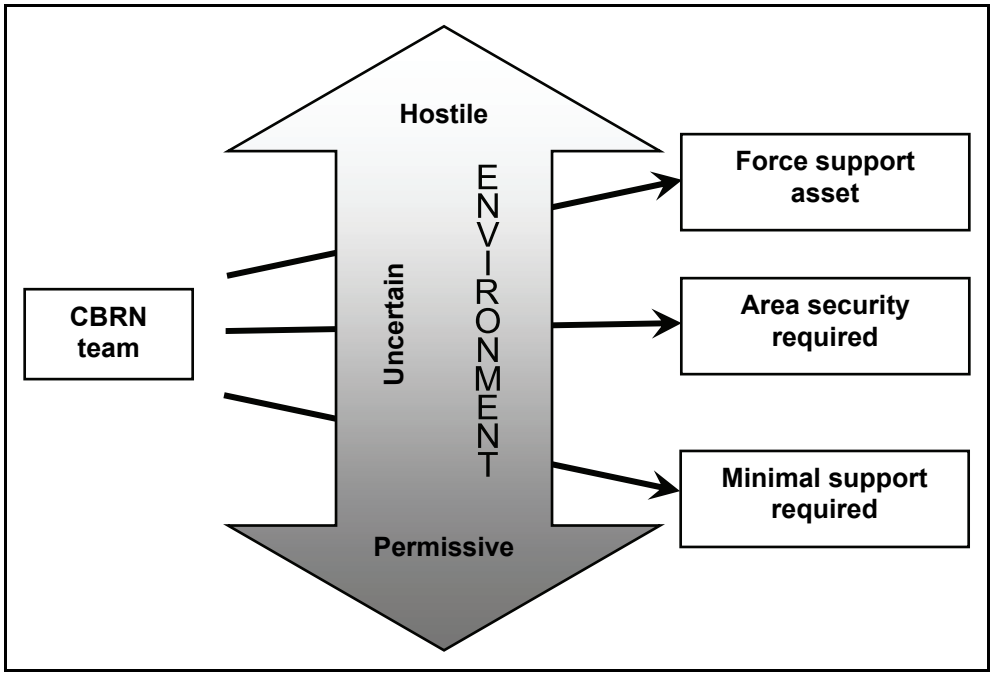

Figure 7-1. CBRN Team SSE Support

7-13. SSE operations may be conducted in either a hasty or deliberate manner. In both cases, operations tend to follow a tactical sequence similar to that used for other combat missions. In general, the sequence consists of—

- Performing reconnaissance, assessing the site, and completing an initial report.
- Performing tactical movement and isolating and securing the site.
- Assessing and then accessing and exploiting the site. (Team members and subject matter experts carefully enter and exploit every structure, facility, and vehicle on the site and determine their value and hazard to the force.)
- Neutralizing or destroying the site.

7-14. During each step of the sequence, all incoming and outgoing data (including any questions asked and the responses provided) should be captured and archived in the most complete and accurate manner possible. Throughout the duration of the SSE operation, the assault or support element provides support to the exploitation team, and the security force maintains security of the site.

7-15. Although hasty and deliberate sensitive-site operations may follow similar tactical sequences, their execution often varies drastically. Deliberate operations generally involve a greater degree of planning, preparation, and organization than used for hasty operations. In addition, for deliberate operations, the unit conducting the operation is normally task-organized into a company team or battalion task force (TF) and key capabilities needed for conducting SSE are integrated into the organization. Units involved in deliberate operations prepare to perform a wide variety of tactical tasks under differing scenarios by rehearsing actions such as site searches, seizures, and exploitation.

7-16. The value of a CBRN sensitive site to friendly forces is a function of the ability of the force to exploit its contents. Sensitive sites normally contain vast amounts of data. If possible, the unit securing the site should attempt to prevent the enemy or adversary from destroying sensitive material, equipment, or documents and purging computers of sensitive information. However, the primary challenge facing the unit is the containment of lethal material until it can be removed or destroyed.

POSTMISSION OPERATIONS

7-17. Depending on the situation, the sensitive site may be destroyed to prevent any potential utilization by the enemy or it may be preserved as evidence. The destruction of a site is normally carried out when the site is a military, weapons storage, or research and production facility. Experts, working in specially organized teams or supervising tactical elements, destroy the site. The tactical unit continues to provide security, and on order, expands the secure area to the minimum safe radius required for demolition. If the site is to be preserved, site exploitation teams remove all sensitive material and manually destroy selected enemy equipment. In addition, remediation of preserved sites may also be necessary.

7-18. Following the SSE response mission, the command reviews the data collected (incident event logs, medical records for response personnel, costs and expenditures for personnel and equipment) and addresses two key areas—documentation of lessons learned and identification of any necessary after-operation follow-up.

NORTH ATLANTIC TREATY ORGANIZATION CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR BATTALION SUPPORT

7-19. TE battalions have the capability to support the NATO CBRN Battalion; the TE battalions provide that support as authorized and required. Support to the NATO CBRN Battalion must be requested and approved through the JDOMS.

REACH-BACK

7-20. Reach-back is a process that employs communications assets to identify and make use of resources not present at the site. When technical CBRN issues exceed the capabilities of on-scene CBRN personnel, the CBRN team may consult with, or "reach back" to, off-site SMEs. Reach-back should be conducted in accordance with established unit protocols and local SOPs.

7-21. Many of the organizations commonly used as CBRN reach-back resources have other primary missions and are, therefore, not specifically resourced to provide reach-back capability. Technical reach-back points of contact include the—

- **NRC hotline (telephone: 1-800-424-8802).** The NRC hotline serves as an emergency resource that first responders may use to request technical assistance during an incident. Intended users include trained emergency personnel, such as firefighters, emergency medical technicians (EMTs), and police who arrive at the scene of a CB terrorist incident. Other potential users may include state emergency operations centers (EOCs) and hospitals that may need to treat victims of agent exposure. Hotline operators have extensive reference materials and databases, and they have immediate access to the nation's top SMEs in the field of CB agents. NRC duty officers take reports of actual or potential domestic terrorism and, if necessary, link emergency calls with applicable SMEs (such as those at RDECOM and the U.S. Army Medical Research Institute for Chemical Defense [USAMRICD] for technical assistance and the FBI for federal response

actions.) The NRC also provides reports and notifications to other federal agencies as necessary. The USCG mans the NRC hotline 24 hours a day, 7 days a week. Specialty areas include—

- Federal response assets.
- Applicable laws and regulations.
- Physical properties of CB agents.
- Toxicology information.
- Hazard prediction models.
- Detection equipment.
- PPE.
- Decontamination systems and methods.
- Medical symptoms from exposure to CB agents.
- Treatment of exposure to CB agents.

- **20th SUPCOM (CBRNE) Operations Center (telephone: 1-410-436-4484).** The U.S. Army 20th SUPCOM Operations Center provides an avenue through which to request assistance from USA TE battalion and EOD units. The hotline is manned and operated 7 days a week, 24 hours a day.
- **Defense Threat Reduction Agency (DTRA) (telephone: 1-877-240-1187).** DTRA can provide technical reach-back information and services to on-scene personnel. Requests for support should be directed to the DTRA EOC.
- **Armed Forces Radiobiology Research Institute (AFRRI) (telephone: 1-301-295-0316/0530).** The AFRRI can provide DOD technical support for nuclear/radiological incidents or accidents.
- **USAMRIID (telephone: 1-888-872-7443).** The USAMRIID is a DOD medical research facility which is nationally recognized for its identification of biological agents from clinical specimens and other sources. Medical and scientific SMEs on staff at the USAMRIID can provide technical guidance to commanders and senior leaders regarding the prevention and treatment of hazardous diseases and the prevention and medical management of biological casualties. USAMRIID personnel can also provide technical guidance for assessing and evaluating biological terrorist incidents from the initial communication of the threat through incident resolution.
- **USAMRICD (telephone: 1-410-436-3277).** The USAMRICD is a DOD medical research facility which is nationally recognized for its identification of chemical agents from clinical specimens. Medical and scientific SMEs on staff at the USAMRICD can provide technical guidance to commanders and senior leaders regarding the prevention and treatment of chemical casualties. USAMRICD personnel can also provide technical guidance for assessing and evaluating chemical terrorist incidents from the initial communication of the threat through incident resolution.
- **U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) (telephone: 1-800-222-9698).** USACHPPM provides worldwide preventive medicine support on a day-to-day basis. USACHPPM technical support teams perform detailed laboratory analyses of environmental (air, soil, water) samples. Expertise is also provided for the analysis of threats posed by TIM and arthropod-borne diseases, as well as for occupational hazards.

TOXIC INDUSTRIAL MATERIAL REFERENCE DATA WEB SITES

7-22. In addition to CBRN reach-back resources, there is a substantial amount of TIM information available on the internet. The following Web sites contain TIM information that may be used to support the military decision-making process (MDMP):

- ***Agency for Toxic Substances and Disease Registry (ATSDR),* uniform resource locator (URL): *<http://www.atsdr.cdc.gov/hazdat.html>*.** ATSDR produces "toxicological profiles" for hazardous substances from a priority list of 275 substances found at *National Priorities List*

(NPL) sites. The hazardous substances are ranked based on their toxicity, potential for human exposure, and frequency of occurrence at *NPL* sites.

- ***North American Emergency Response Guidebook (NAERG),* URL: *<http://hazmat.dot.gov/pubs/erg/gydebook.htm>*.** The U.S. DOT, Transport Canada, and the Secretariat of Communications and Transportation of Mexico (SCT) jointly developed the *NAERG*—or *Emergency Response Guidebook (ERG)*—for use by firefighters, police, and other emergency services personnel who may be the first to arrive at the scene of a transportation incident involving HAZMAT. The *NAERG* is intended to aid first responders in quickly identifying the generic or specific classification of the materials involved in the incident and in determining how to protect themselves and the public during the initial response phase. The *NAERG* incorporates dangerous goods lists from national and international regulations and the most recent United Nations (UN) recommendations. To incorporate new products and technology, the *NAERG* is updated every 3 years.
- ***National Institute for Occupational Safety and Health (NIOSH) Pocket Guide (NPG) to Chemical Hazards,* URL: *<http://www.cdc.gov/niosh/npg/pgintrod.html>*.** The *NPG (U.S. Department of Health and Human Services [DHHS] [NIOSH] Publication Number [No.] 2005-149)* serves as a source of general industrial hygiene information for workers, employers, and occupational health professionals. The *Pocket Guide* presents key data and information (in abbreviated tabular form) for 677 chemicals or substance groupings that are found in the work environment (for example, manganese compounds, tellurium compounds, and inorganic tin compounds). The chemicals or substances listed in the *NPG* include all of those for which the NIOSH has established recommended exposure limits (RELs) as well as those which have been assigned PELs, as documented in *29 CFR 1910.1000* (the Occupational Safety and Health Administration [OSHA] *General Industry Air Contaminants Standard*). The information contained in the *NPG* includes identification codes, synonyms, chemical formulas and structures, measurement methods, chemical and physical properties, incompatibilities, reactivities, exposure limits, respirator selections, signs and symptoms of exposure, and procedures for emergency treatment. The industrial hygiene information found in the *NPG* should help users recognize and control occupational chemical hazards.
- ***Registry of Toxic Effects of Chemical Substances (RTECS®)*, URL: *<http://www.cdc.gov/niosh/rtecs/default.html>*.** The *RTECS* provides toxicological information for more than 140,000 chemical substances. The detailed profiles contained in the *RTECS* include toxicological data and reviews, analytical methods, references to U.S. standards and regulations, international workplace exposure limits, and exposure and hazard survey data. For ease of use, the information is compiled into individual records for each substance. Updated information is fully integrated.
- **Chemical Hazards Response Information System (CHRIS), URL: *<http://www.chrismanual.com>*.** The CHRIS database is a comprehensive source of emergency response information for those involved in the transportation of hazardous materials. The database contains records for more than 1,300 hazardous materials. Each record contains key identification data such as chemical abstract service (CAS) numbers, synonyms, observable characteristics, and hazard labels. In addition, information useful for emergency response situations (physical and chemical properties; shipping and hazard classifications; water pollution; health, fire, and reactivity hazards; first aid) is also included in the CHRIS database.
- **Hazardous Substances Data Bank (HSDB), URL: *<http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html>*.** The HSDB is a factual, nonbibliographic data bank created and maintained by the National Library of Medicine. The data bank, which contains records for more than 4,500 chemical substances, includes extensive information on the identification, manufacturing, use, regulations, chemical and physical properties, analytical determinations, safety, handling, exposure, human and nonhuman toxicity, pharmacology, and environmental fate of chemical substances.
- **Integrated Risk Information System (IRIS), URL**: ***<http://www.epa.gov/iris/index.html>*.** The IRIS is a fully indexed, searchable, electronic database containing regulatory and health risk

information for nearly 700 specific substances. The database, which is maintained by the U.S. EPA, contains numerical and descriptive information regarding—

- Oral reference doses and inhalation reference concentrations for chronic, noncarcinogenic health effects.
- Hazard identification, oral slope factors, and oral and inhalation unit risks for carcinogenic effects.
- Background documents and references that describe the rationale and methods used to develop the values and associated information in the chemical files.
- A glossary of scientific terms used in the chemical files and background documents and definitions of acronyms and abbreviations used.
- Supplementary data on acute health hazards and physical/chemical properties.
- Bibliographic citations.

- **Regional methods (RM) programs, URL: <*http://epa.gov/osp/regions/rm.htm*>.** When Congress passed the *Clean Air Act (CAA) Amendments of 1990 (PL 101-549)*, EPA was required to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. As a result, EPA now requires companies of all sizes that use certain toxic and flammable substances to develop an RM program, with the goal of reducing chemical risks at the local level. RM programs contain summaries of information about each of the facilities, including an accident history for the last 5 years, a hazard assessment detailing the potential effects of an accidental release, and an evaluation of worst-case and alternative accidental releases. This information is useful to local fire, police, and emergency response personnel who must prepare for and respond to chemical accidents and to citizens interested in the chemical hazards of the community. Making the RM programs available to the public is intended to stimulate communications between industry and the public to improve accident prevention and emergency response practices at the local level.
- **High Production Volume (HPV) Challenge, URL: <*http://www.epa.gov/opptintr/chemrtk/index.htm*>**. HPV chemicals are those chemicals which are manufactured in or imported into the United States in amounts greater than or equal to 1 million pounds per year. The HPV Challenge Program is a collaborative partnership with a goal of ensuring that the public has access to the type of information that allows them to actively participate in environmental decision making at federal, state, and local levels. The *HPV Voluntary Challenge Chemical List* is available on the HPV Challenge Web site.
- ***Extremely Hazardous Substance (EHS) Chemical Profiles and Emergency First Aid Guides*, URL: <*http://www.epa.gov/swercepp/ehs/ehslist.html*>.** The *EHS Chemical Profiles and Emergency First Aid Guides* contain information on more than 300 EHS currently listed as part of the *Emergency Planning and Community Right-to-Know Act (EPCRA) (PL 99-499)*. Each chemical profile includes physical/chemical properties, fire and explosion hazards, reactivity data, health hazards, precautions for safe handling and use, and protective equipment necessary for emergencies. The first aid guides list signs and symptoms of poisoning and describe emergency treatment for first responders. The information in the chemical profiles and first aid guides are accessed through either the CAS number or the alphabetical list of EHS.
- **Immediately Dangerous to Life or Health (IDLH) concentrations, URL: <*http://www.cdc.gov/niosh/idlh/idlhintr.html*>.** The original list of 387 chemicals considered IDLH was developed in the mid-1970s, when only limited toxicological data was available for many of the substances. In the 1990s, NIOSH requested information on the current use of IDLH concentrations in the workplace. The information obtained is in the process of being evaluated and will eventually be used to establish future actions concerning IDLH levels. In the interim, however, NIOSH has reviewed and revised the original IDLH levels, to include an additional 85 substances.
- **General Dennis J. Reimer Training and Doctrine Digital Library, URL: <*http://www.train.army.mil/*>.** The General Dennis J. Reimer Training and Doctrine Digital Library is a repository

of approved Army training and doctrine information; as such, it contains several references appropriate for use by CBRN teams.

- **National Oceanic and Atmospheric Administration (NOAA), URL: *<http://www.noaa.gov/>*.** NOAA, a Department of Commerce agency, gathers data and conducts research on the atmosphere, space, sun, and global oceans and applies this knowledge to everyday life. NOAA charts the seas and skies, conducts research to improve understanding and stewardship of the environment, guides the use and protection of ocean and coastal resources, and issues warnings of impending dangerous weather. These services are provided through the National Environmental Satellite, Data, and Information Service (NESDIS), the National Ocean Service (NOS), the National Marine Fisheries Service, the National Weather Service (NWS), and NOAA research and special programs units. NOAA research and operational activities are supported by the seventh U.S. uniformed service, the NOAA Corps—a commissioned officer corps of men and women who operate NOAA ships and aircraft and serve in scientific and administrative posts.

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Chapter 8
Homeland Security

Task-organized teams support homeland security by providing defense support to civil authorities. They apply the same principles when employed OCONUS in support of foreign consequence management operations.

OVERVIEW

8-1. *The National Strategy for Homeland Security* complements *The National Security Strategy of the United States of America* by providing a comprehensive framework that organizes the efforts of federal, state, local, and private organizations whose primary functions are often unrelated to national security. Critical to understanding the overall relationship is an understanding of the role that DOD plays in national and homeland security and the policy in the *National Strategy for Homeland Security* that identifies the DHS as the LFA.

8-2. Homeland security at the national level focuses on terrorist threats; the DOD focus in supporting homeland security is much broader. Military response to threats and aggression aimed at the homeland includes—

- Preparation.
- Detection.
- Deterrence.
- Prevention.
- Defense.
- Mitigation.

8-3. DOD also provides military assistance (including consequence management) to civil authorities. The armed forces of the United States support the *National Strategy for Homeland Security* through two distinct but interrelated missions—homeland defense and civil support *(Figure 8-1, page 8-2*).

HOMELAND DEFENSE

8-4. Homeland security is the protection of U.S. sovereignties, territories, domestic populations, and critical infrastructures against external threats and aggression or other threats as directed by the President of the United States. DOD is responsible for homeland defense and recognizes that threats planned or inspired by external actors may materialize internally. The reference to external threats does not limit where or how attacks are planned and executed. DOD is prepared to conduct homeland defense missions when the President exercises his constitutional authority as Commander in Chief and authorizes military action.

8-5. DOD is the LFA for homeland defense and is supported by other agencies as directed by the President or the Secretary of Defense. However, DOD may be in support of DHS when defending against internal asymmetric, nontraditional threats (such as terrorism).

8-6. When ordered to conduct homeland defense operations within U.S territories, DOD coordinates closely with other federal agencies and departments. Consistent with laws and policy, the armed forces of the United States provide support to combatant commands for a variety of air, land, maritime, space, and cyber incursions that can threaten national security. These include invasion, IED CBRN attacks, computer network attacks, and air and missile attacks. Upon DOD order, TE battalions provide task-organized CBRN teams in support of homeland defense.

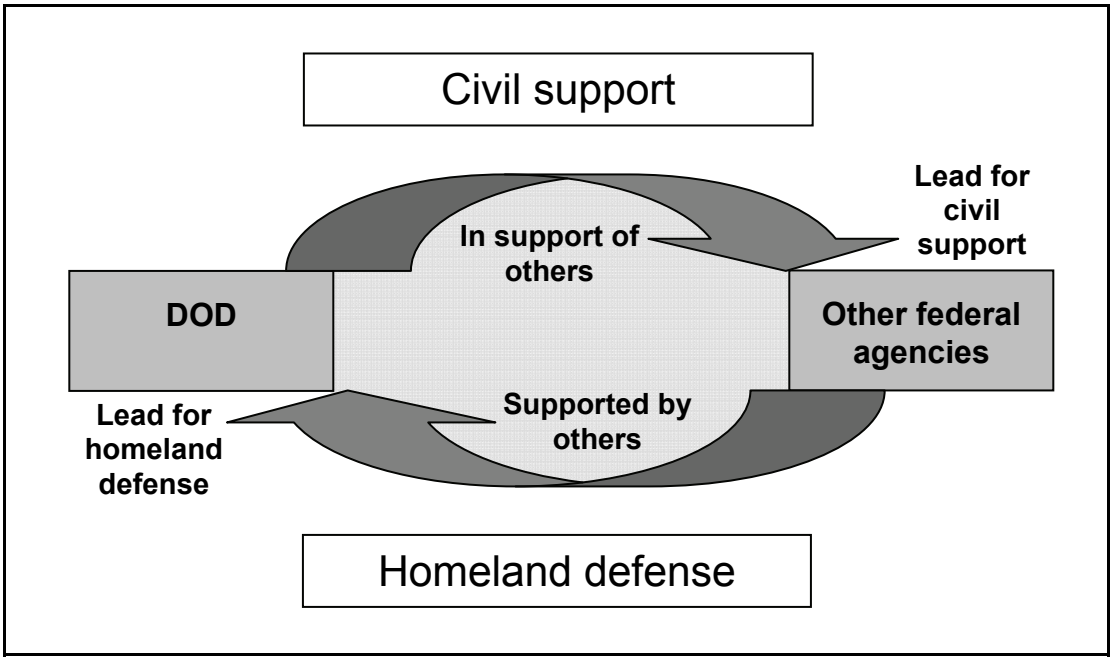

Figure 8-1. DOD Support Relationships

CIVIL SUPPORT

8-7. Civil support includes assistance to U.S. civic authorities for—

- Domestic emergencies.
- Designated law enforcement within the scope of restrictions required by *18 USC 1385* (the *Posse Comitatus Act*).
- Other incidents approved by the Secretary of Defense.

8-8. Support must be consistent with military readiness, DOD directives, and the law. The employment of military forces within the United States and its territories and possessions under the auspices of civil support typically falls under the broad mission of military assistance to civil authorities. This mission consists of three mission subsets:

- Military support to civil authorities.
- Military support to civilian law enforcement agencies.
- Military assistance for civil disturbances.

8-9. As directed in *Homeland Security Presidential Directive (HSPD) 5,* DHS is the LFA for CBRN crisis management and consequence management. DOD supports DHS by identifying, assessing, dismantling, transferring, and disposing of contaminants and by conducting decontamination operations. Additionally, an incident involving CBRN contamination is likely to require a response according to a specific federal emergency OPLAN (such as the *NRP*, *NCP*, or *Federal Radiological Emergency Response Plan*). These plans designate an LFA to coordinate the federal response depending on the type of emergency. In general, an LFA establishes operational structures and procedures to assemble and work with agencies providing direct support to the LFA.

Note. *Appendix A* shows the designated LFA for each emergency support function as outlined in the NRP.

8-10. TE battalions provide domestic civil support to local and federal agencies through task-organized teams. Depending on the situation, these teams provide—

- Support to the FBI, DOD, DHS, and local responders.
- Domestic crisis management for CB devices.
- WMD support.
    - Suspect CB IED support.
    - Limited decontamination (see *paragraph 2-24*).
    - Packaging and transport of CBRN dispersal device remnants.
- Support for national special security events.

OUTSIDE THE CONTINENTAL UNITED STATES

8-11. The primary responsibility for managing and mitigating the effects of a foreign incident resides with the HN. If the HN requests U.S. assistance, the DOS serves as the LFA. DOD support is coordinated through the appropriate chief of mission and country team, and DOD assets are under the command of the geographic CCDR.

8-12. TE battalion CBRN teams support JTFs and combatant commands and are capable of forward employment in nonpermissive environments, but not in hostile environments. They can provide operational support to emergency response teams worldwide, including CBRN advice and assessment, secure reach-back, and chemical and EOD expertise.

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Chapter 9

Improvised Explosive Devices

The threat of IEDs has become increasingly probable when responding to an emergency, and there has been a dramatic increase in the number of IEDs encountered in the United States and worldwide. Information describing materials and techniques for constructing and employing IEDs are readily available on the Internet and in published material. An increasing number of civil law enforcement agencies have IED disposal-trained personnel and the equipment needed to respond to IEDs; however, many do not have IED response capability.

GENERAL

9-1. Each IED is unique in nature because its builder improvised with available materials. IEDs may include explosives only, or they may include CBRN or other hazardous material. IEDs are constructed from any available material, and they may range in size from a cigarette pack to a large vehicle. Though they can vary widely in shape and form, IEDs share a common set of components that make them lethal:

- Initiation system or fuze.
- Explosive fill (may not be a component of CB devices).
- Detonator (may not be a component of CB devices).
- Power supply for the detonator.
- Container.

TYPES OF DEVICES

9-2. There are many types of devices, including modified conventional munitions; vehicle-borne bombs; suicide bombs; improvised nuclear, biological, and chemical devices; and radiological dispersal devices.

PACKAGE

9-3. A package device can vary from modified conventional munitions to common objects (*Figure 9-1, page 9-2,* through *Figure 9-3, page 9-3*). The addition of CBRN material to an IED increases its impact, and the lethality can last longer and affect more people than an IED that possesses only explosive and fragmentation capabilities. *Table 9-1*, *page 9-4*, provides the amount of explosives contained in different packages and the area affected when they are detonated.

Figure 9-1. Soda Can Used as an IED

Figure 9-2. Conventional Projectiles Rigged With Explosives and Triggered by Electronic Devices

Figure 9-3. Sophisticated Briefcase IED

Modified Conventional Munitions

9-4. Enemies have used IEDs that contain mortar and artillery projectiles as explosive devices. Military munitions are the most commonly used—usually 122-millimeter or greater mortar, tank, or artillery munitions. IEDs have been—

- Thrown from overpasses or roadsides in front of approaching vehicles.
- Emplaced in potholes and covered with dirt.
- Emplaced along main and alternate supply routes to target vehicles.
- Employed along unimproved roads to target patrols.
- Placed in front of cinder blocks or piles of sand to direct the blast into a kill zone.
- Command-detonated by wire or remote devices.
- Time delay-triggered.
- Detonated by cordless phones (which provides a mobile firing platform and prevents tracing or triangulation).

Vehicle-Borne

9-5. Vehicle-borne IEDs use vehicles as packages and containers. They come in all shapes, colors, and sizes that vary by the type of vehicle used—from small sedans to large cargo trucks. Generators, donkey-drawn carts, and ambulances have also been used to attack coalition forces and the new Iraqi government.

9-6. Large vehicles house large amounts of explosives, which results in a greater effect. The explosive charge normally ranges from 100 pounds to well over 1,000 pounds and includes items such as mortar rounds, rocket motors, rocket warheads, composition 4 (C4), and artillery rounds.

9-7. A growing technique has involved the use of multiple vehicles. In such instances, the lead vehicle is used as a decoy or barrier buster. Once the decoy is stopped or neutralized and forces are moving to inspect or detain it, the main vehicle-borne IED comes crashing through the crowd and detonates, resulting in increased casualties.

Table 9-1. Initial Exclusion Areas

High Explosives			
Threat Description	***Explosives Mass (TNT Equivalent)***	***Building Evacuation Distance***	***Outdoor Evacuation Distance***
Pipe bomb	5 lb (2.3 kg)	70 ft (21 m)	850 ft (259 m)
Suicide belt	10 lb (4.5 kg)	90 ft (27 m)	1,080 ft (330 m)
Suicide vest	20 lb (9 kg)	110 ft (34 m)	1,360 ft (415 m)
Briefcase/ suitcase bomb	50 lb (23 kg)	150 ft (46 m)	1,850 ft (564 m)
Compact sedan	500 lb (227 kg)	320 ft (98 m)	1,500 ft (457 m)
Sedan	1,000 lb (454 kg)	400 ft (122 m)	1,750 ft (534 m)
Passenger/ cargo van	4,000 lb (1,814 kg)	640 ft (195 m)	2,750 ft (838 m)
Small moving van/ delivery truck	10,000 lb (4,536 kg)	860 ft (263 m)	3,750 ft (1,143 m)
Moving van/ water truck	30,000 lb (13,608 kg)	1,240 ft (375 m)	6,500 ft (1,982 m)
Semitrailer	60,000 lb (27,216 kg)	1,570 ft (475 m)	7,000 ft (2,134 m)
LPG			
Threat Description	***Mass/Volume***	***Fireball Diameter***	***Safe Distance***
Small LPG tank	20 lb/5 gal (9 kg/19 l)	40 ft (12 m)	160 ft (48 m)
Large LPG tank	100 lb/25 gal (4.5 kg/95 l)	69 ft (21 m)	276 ft (84 m)
Commercial/ residential LPG tank	2,000 lb/500 gal (907 kg/1,893 l)	184 ft (56 m)	736 ft (224 m)
Small LPG truck	8,000 lb/2,000 gal (3,630 kg/7,570 l)	292 ft (89 m)	1,168 ft (356 m)
Semitanker LPG	40,000 lb/10,000 gal (18,144 kg/37,850 l)	499 ft (152 m)	1,006 ft (608 m)

SUICIDE BOMBER

9-8. A suicide bomber represents a hard-to-recognize threat for Soldiers. The aim of the terrorist is not to commit suicide, but to kill or injure as many people as possible. A suicide bomber usually opts for a high-explosive/fragmentary effect and uses a command-detonated firing system, such as a switch or button activated by hand. Explosives with fragmentation can be contained in a vest, belt, or clothing that is

specifically modified to carry the material. Vehicle-borne suicide bombs use a command-detonated firing system and employ the same methods and characteristics of other package or vehicle bombs.

9-9. If a suspect is determined to be a suicide bomber, deadly force is normally the only response option. In such cases, Soldiers should be prepared for and expect a detonation. Soldiers responding to such events should shoot from a protected position as far away as possible.

IMPROVISED CHEMICAL DEVICE

9-10. Improvised chemical devices disperse toxic chemicals, including chemical surety material. They may be fabricated in a completely improvised manner or may be an unauthorized modification to a U.S. or foreign chemical weapon.

IMPROVISED BIOLOGICAL DEVICE

9-11. Improvised biological devices disperse toxic biological organisms and associated toxins or agents of biological origin.

RADIOLOGICAL DISPERSAL DEVICE

9-12. Radiological dispersal devices disperse radioactive material to cause contamination. They can be almost any size, defined only by the amount of radioactive material and explosives contained within.

IMPROVISED NUCLEAR DEVICE

9-13. An improvised nuclear device (IND) causes a yield-producing nuclear explosion. It consists of diverted nuclear weapon components, a modified nuclear weapon, or an indigenous-designed device. An IND is designed to scatter radioactive material over an area to inhibit the use of the area. While identifying the location of the radioactive contamination is time-consuming, removing the radiation from the affected area can be even more time-consuming. Depending on the radioactive material used in the device, the decay rate is from days to thousands of years—this means that if the radiation cannot be removed, it will take that long for it to decrease to a lower, safer level.

9-14. The FBI is the LFA for IND incidents in the United States and its territories and possessions, and it is DOD policy to assist the FBI during these incidents. When the U.S. Government responds to an IND incident in a foreign country, the U.S. Ambassador coordinates response operations with the HN.

9-15. The DOD response team shall be prepared to deploy within 4 hours of notification of an IND incident. The team shall be under the C2 of the senior DOD official, provided by the responsible service or commander-in-chief (CINC), who shall establish coordination with the LFA. When DOD responds to an IND incident, the DOD senior representative exercises OPCON over DOD assets.

SUPPORT

9-16. Teams responding to a suspect CBRN IED incident normally conduct operations in a support role under the LFA. The senior DOD official on site coordinates the authorized team support operations with the LFA.

9-17. CBRN teams, with assigned EOD personnel, support CBRN IED operations when requested and authorized. When requested as the initial response team, CBRN team EOD personnel conduct RSP before the CBRN team conducts leak-sealing and packaging procedures to prepare the IED for movement to an authorized location. Further disposition of IEDs is determined by higher HQ. When an organic EOD team has responded first and then requested support from a TE battalion, the CBRN team receives a back-brief from the EOD team to establish what actions have been taken before they proceed downrange.

9-18. Each IED is evaluated with available nonintrusive assessment equipment to determine its potential destructiveness. Evaluation data is forwarded to the IC for review and assistance in preparing for further

actions. The CBRN team's support role is terminated when the IED is safely mitigated and no other hazards requiring their assistance are present at the incident.

SAFETY AND SECURITY

9-19. The safety of personnel is the number one concern when encountering a suspected IED. The area around the IED must be secured until trained EOD personnel arrive. After initial evaluation, the EOD team may seek assistance from a TE battalion if it is deemed that the IED may contain CBRN material. When encountering a suspected IED, personnel should—

- Stop all movement toward the suspected IED and immediately evaluate the surrounding area for secondary IEDs.
- Not approach the suspected IED.
- Not attempt to move the suspected IED.
- Avoid using any communication or electronic equipment within 300 meters of the suspected IED.
- Establish a secure area around the suspected IED.
- Adjust the initial exclusion area based on—
    - METT-TC.
    - Local command policy and guidance.
    - TTP.
    - SOPs.
- Search the initial secure area for possible secondary explosive devices or hazards. Following an initial attack, terrorists often plant a secondary device designed to detonate minutes or hours after the primary device. The purpose is to wipe out the emergency responders who are at the scene, thereby crippling the community's ability to respond to the attack.
- Identify potential enemy force observation or vantage points. All available man-made and natural frontal and overhead cover should be searched. The establishment of a "reaction" pattern should be avoided.
- Forward all known information to higher HQ using the standard 9-line Explosive Hazard (EH) Spot Report (see *Figure 9-4* and *Figure 9-5*). At a minimum, the report must contain—
    - Who discovered the item (POC).
    - What the item is (type/subgroup).
    - Where the item is located (using an 8-digit grid).
    - When the item was discovered (date-time group).
    - Recommended priority (immediate, indirect, minor, or no threat).

Line 1: Date-time group (date-time discovered; command policy dictates local or Zulu time).

Line 2: Reporting unit/EH location (unit identification code or unit designation/8- or 10-digit grid [include landmarks, reference points, and street addresses]).

Line 3: Contact method (radio frequency and call sign or telephone number and name).

Line 4: Type of ordnance (dropped, projected, placed, or thrown).

Line 5: CBRN contamination (yes or no, known or suspected; if yes, type of agent if known or identified).

Line 6: Resources threatened (identification of resource and determination of criticality).

Line 7: Impact on mission (description of how the UXO affects the mission).

Line 8: Protective measures (description of measures taken).

Line 9: Recommended priority (immediate, indirect, minor, or no threat).

Figure 9-4. Standard 9-Line EH Spot Report Format

Line 1: 121300LMAR07.

Line 2: 1-75th Infantry Battalion, C Company, EP2134567891, 150 meters south of the grid-referenced road junction.

Line 3: 49.7000 (Tripwire 60) or 1-800-555-6789 (SFC Smith).

Line 4: Placed; possible IED with chemical fill.

Line 5: Yes; suspected GB nerve agent.

Line 6: MSR Speedway; critical.

Line 7: Unit cannot conduct resupply operations; main supply route is impassable.

Line 8: Constructed sandbag barricade and evacuated nonessential personnel 300 meters. Mission-essential personnel are in protective gear and are utilizing frontal and overhead cover.

Line 9: Immediate.

Figure 9-5. Sample IED Report

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Appendix A

National Response Plan

This appendix provides an overview of the *NRP*, the ICS, and the unified command (UC) and outlines the strategies that can be used to reduce hazards associated with a traditional or nontraditional CBRN incident.

GENERAL

A-1. The *NRP* is an all-discipline, all-hazard plan that establishes a single, comprehensive framework for the management of domestic incidents. It provides the structure and mechanisms for coordinating federal support with state, local, and tribal incident managers and for exercising direct federal authorities and responsibilities. The *NRP* assists in the important homeland security mission of preventing terrorist attacks within the United States, reducing the vulnerability to all natural and man-made hazards, minimizing the damage, and assisting in the recovery from any type of incident that occurs.

ORGANIZATION

A-2. The *NRP* consists of the following components:

- Base plan.
- Appendices.
- ESF annexes.

Base Plan

A-3. The base plan describes the structure and processes involved in a national approach to domestic incident management. It is designed to integrate the efforts and resources of federal, state, local, tribal, private-sector, and nongovernmental organizations. The base plan includes planning assumptions, roles and responsibilities, operations concepts, incident management actions, and plan maintenance instructions.

Appendices

A-4. The appendices provide relevant, detailed supporting information, including terms, definitions, acronyms, authorities, and a compendium of national interagency plans.

Emergency Support Function Annexes

A-5. The ESF annexes detail the missions, policies, structures, and responsibilities of federal agencies for coordinating resource and programmatic support to states, tribes, and other federal agencies or jurisdictions during incidents of national significance. The introduction to the ESF annexes summarizes the functions of ESF coordinators and primary and support agencies.

- ESF 1 covers transportation operations.
    - Federal and civil transportation support.
    - Transportation safety.
    - Restoration and recovery of transportation infrastructure.
    - Movement restrictions.
    - Damage and impact assessment.

- ESF 2 covers communications operations.
    - Coordination with telecommunications industry.
    - Restoration and repair of telecommunications infrastructure.
    - Protection, restoration, and sustainment of national cyber and information technology resources.
- ESF 3 covers public works and engineering operations.
    - Infrastructure protection and emergency repairs.
    - Infrastructure restoration.
    - Engineering services and construction management.
    - Critical infrastructure liaison operations.
- ESF 4 covers firefighting operations.
    - Incidents on federal land.
    - Resource support to rural and urban firefighting efforts.
- ESF 5 covers emergency management operations.
    - Coordination of incident management efforts.
    - Issuance of mission assignments.
    - Resource and human capital.
    - Incident action planning.
    - Financial management.
- ESF 6 covers mass care, housing, and human services.
    - Mass care.
    - Disaster housing.
    - Human services.
- ESF 7 covers resource support.
    - Facility space.
    - Office equipment and supplies.
    - Contracting services.
- ESF 8 covers public health and medical services.
    - Public health.
    - Medical treatment.
    - Mental health services.
    - Mortuary services.
- ESF 9 covers urban search-and-rescue operations.
    - Lifesaving assistance.
    - Urban search and rescue.
- ESF 10 covers oil and HAZMAT response operations.
    - Chemical, biological, and radiological releases.
    - Environmental safety and short- and long-term cleanup response.
- ESF 11 covers agriculture and natural resources.
    - Nutrition assistance.
    - Animal and plant diseases and pest response.
    - Food safety and security.
    - Natural and cultural resources and historic properties protection and restoration.

- ESF 12 covers energy.
    - Infrastructure assessment, repairs, and restoration.
    - Coordination with industry utilities.
    - Energy forecasts.
- ESF 13 covers public safety and security operations.
    - Facility and resource security.
    - Security planning and technical and resource assistance.
    - Safety and security support.
    - Access, traffic, and crowd control.
- ESF 14 covers long-term community recovery and mitigation operations.
    - Social and economic community impact assessment.
    - Long-term community recovery assistance to states, local governments, and the private sector.
    - Mitigation analysis and program implementation.
- ESF 15 covers external affairs.
    - Emergency public-information and protective-action guidance.
    - Media and community relations.
    - Congressional and international affairs.
    - Relations with tribal and insular residents.

Support Annexes

A-6. The support annexes provide guidance and describe the functional processes and administrative requirements necessary to ensure efficient and effective implementation of *NRP* incident management objectives. The support annexes include the following:

- The financial-management annex provides guidance for *NRP* implementation to ensure that incident-related funds are provided expeditiously and that financial-management activities are conducted according to established law, policies, regulations, and standards.
- The international coordination annex provides guidance for carrying out responsibilities regarding coordination in support of the federal response to domestic incidents of national significance.
- The logistic management annex describes the framework for the overall *NRP* logistic management function. It also outlines logistic management responsibilities and mechanisms for integrating federal, state, local, and tribal resource providers.
- The private-sector coordination annex outlines the processes used to conduct effective incident management coordination and integration with private-sector representatives, including representatives from critical infrastructure (CI) and key resource (KR) sectors and other industries.
- The public affairs annex describes the procedures used to conduct interagency incident communications designed to enable the coordination and dissemination of timely public information during incidents of national significance.
- The science and technology annex provides the guidance and mechanisms to ensure that all levels of government use the nation's science and technology resources efficiently and effectively during incidents of national significance.
- The tribal-relations annex describes the policies, responsibilities, and concept of operations (CONOPS) for effective coordination and interaction with tribal governments and communities during incidents of national significance.

- The volunteer and donations management annex provides guidance on volunteer and donations functions related to incidents of national significance.
- The worker safety and health annex details the processes for identifying responder safety and health risks and outlines the procedures necessary to minimize or eliminate illnesses or injuries during incident management and emergency response activities.

PURPOSE

A-7. The purpose of the *NRP* is to establish a comprehensive, national, all-hazards approach to domestic incident management across a spectrum of activities, including prevention, preparedness, response, and recovery operations. The *NRP*, using the NIMS, establishes mechanisms to—

- Maximize the integration of incident-related prevention, preparedness, response, and recovery activities.
- Improve the coordination and integration among federal, state, local, tribal, regional, private-sector, and nongovernmental organization partners.
- Maximize the efficient use of resources needed for effective incident management and CI and KR protection and restoration.
- Improve incident management communications and increase situational awareness across jurisdictions and between the public and private sectors.
- Facilitate emergency mutual aid and federal emergency support to state, local, and tribal governments.
- Facilitate federal-to-federal interaction and emergency support.
- Provide a proactive and integrated federal response to catastrophic events.
- Access links to other federal incident management and emergency response plans developed for specific types of incidents or hazards.

CONCEPT OF OPERATIONS

A-8. A basic premise of the *NRP* dictates that incidents be handled at the lowest jurisdictional level possible. Police, fire, public health, medical, emergency management, and other personnel are responsible for incident management at the local level. In some instances, a federal agency in the local area may act as a first responder and provide direction or assistance consistent with its specific statutory authorities and responsibilities. In the vast majority of incidents, state and local resources and interstate mutual aid provide first-line emergency response and incident management support.

A-9. When an incident or potential incident is of such severity, magnitude, and/or complexity that it is considered an incident of national significance according to the criteria established in this plan, the Secretary of Homeland Security, in coordination with other federal departments and agencies, initiates actions to prevent, prepare for, respond to, and recover from the incident. These actions are taken in conjunction with state, local, tribal, nongovernmental, and private-sector entities (as appropriate to the threat or incident). When an emergency or disaster incident exceeds state, local, or tribal capabilities, the DHS will coordinate supplemental federal assistance for incidents covered under the *Robert T. Stafford Disaster Relief and Emergency Assistance Act (PL 93-288)*.

ORGANIZATIONAL STRUCTURE

A-10. The national structure for incident management establishes a clear progression of coordination and communication from the local level to the regional and national HQ levels. This structure is diagramed in *Figure A-1*.

A-11. According to the NIMS process, resource and policy issues are addressed at the lowest organizational level practicable. If the issues cannot be resolved at that level, they are forwarded to the next level for

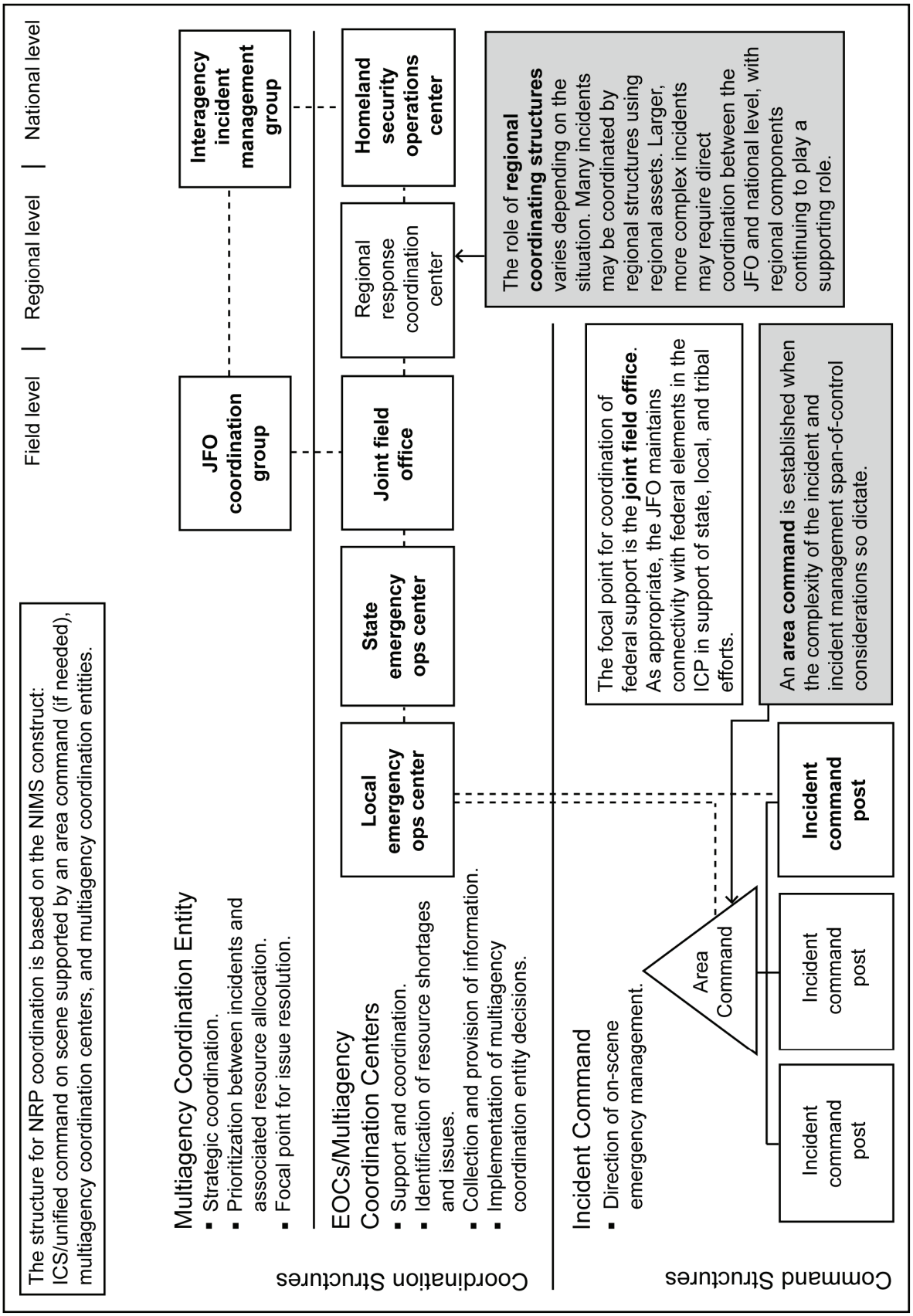

Figure A-1. Possible NIMS Framework

resolution. Keeping with the NIMS construct, the *NRP* includes the following command and coordination structures:

- Incident command posts (ICPs) on scene using ICS and UC.
- Area commands (if needed).
- State, local, tribal, and private-sector EOCs.
- The joint forces operations (JFO) coordination group, which is responsible for coordinating federal assistance and supporting incident management activities locally.
- A regional response coordination center (RRCC) and a homeland security operations center (HSOC), which serve as multiagency situational awareness and operational coordination centers at the regional and national levels.
- An interagency incident management group (IIMG), which serves as the national HQ multiagency coordination entity for domestic incident management.
- The Homeland Security Council (HSC) and other White House organizations, which serve as the national-level multiagency coordination entities to advise and assist the President on homeland security and other policy issues.

A-12. The *NRP* organizational structure addresses site-specific incident management activities and broader regional or national issues related to the incident (such as the possible implications on other areas of the country), the immediate regional or national actions required to avert or prepare for potential subsequent events, and the management of multiple threats or incidents (particularly those that are not site-specific, geographically dispersed, or could evolve over a long period of time).

A-13. *Figure A-2* depicts initial incident management actions. In situations where it is apparent that an incident of national significance may be imminent or has already occurred, the assessment and preincident interagency coordination phase is compressed. In these instances, DHS moves quickly to coordinate multiple federal activities, to include information sharing, interagency COAs, alert and deployment of resources, operational coordination, and other assistance as required, in consultation and coordination with other federal departments and agencies and the affected jurisdictions.

RESPONSE GUIDANCE

A-14. CBRN teams should plan and prepare to respond to a terrorist CBRN emergency. This response capability could be organic or established through reach-back capabilities (as discussed in *Chapter 2*). Strategic guidance for CBRN response to terrorist CBRN incidents and attacks is given in presidential and federal directives, joint doctrinal publications, and CONOPSs.

A-15. The presidential directive that covers responses to a CBRN incident is found in *HSPD-5*. It indicates that there is a single federal response to domestic incidents based on DHS guidance. *HSPD-5* directs the DHS to publish an *NRP* and requires federal departments and agencies to adopt the NIMS to manage domestic incidents. The *Initial National Response Plan (INRP)* was released in September 2003. On 1 March 2004, DHS published the NIMS as the underlying architecture to govern the full range of U.S. incident management efforts. The NIMS employs incident response directives using the operational structure of the ICS and UC system. Joint guidance is governed by the Chairman, Joint Chiefs of Staff (CJCS) CBRN protection policy and a number of standards that include CBRN protection, response capabilities, prioritization criteria, management and oversight of protection and response efforts, flow of threat information, and protection risk assessments.

A-16. Public law designates DOD responsibilities under the CBRN preparedness program. This program provides the CONOPS, guidance, procedures, policies, and mandatory standards for protecting personnel and critical resources from attacks and CBRN events.

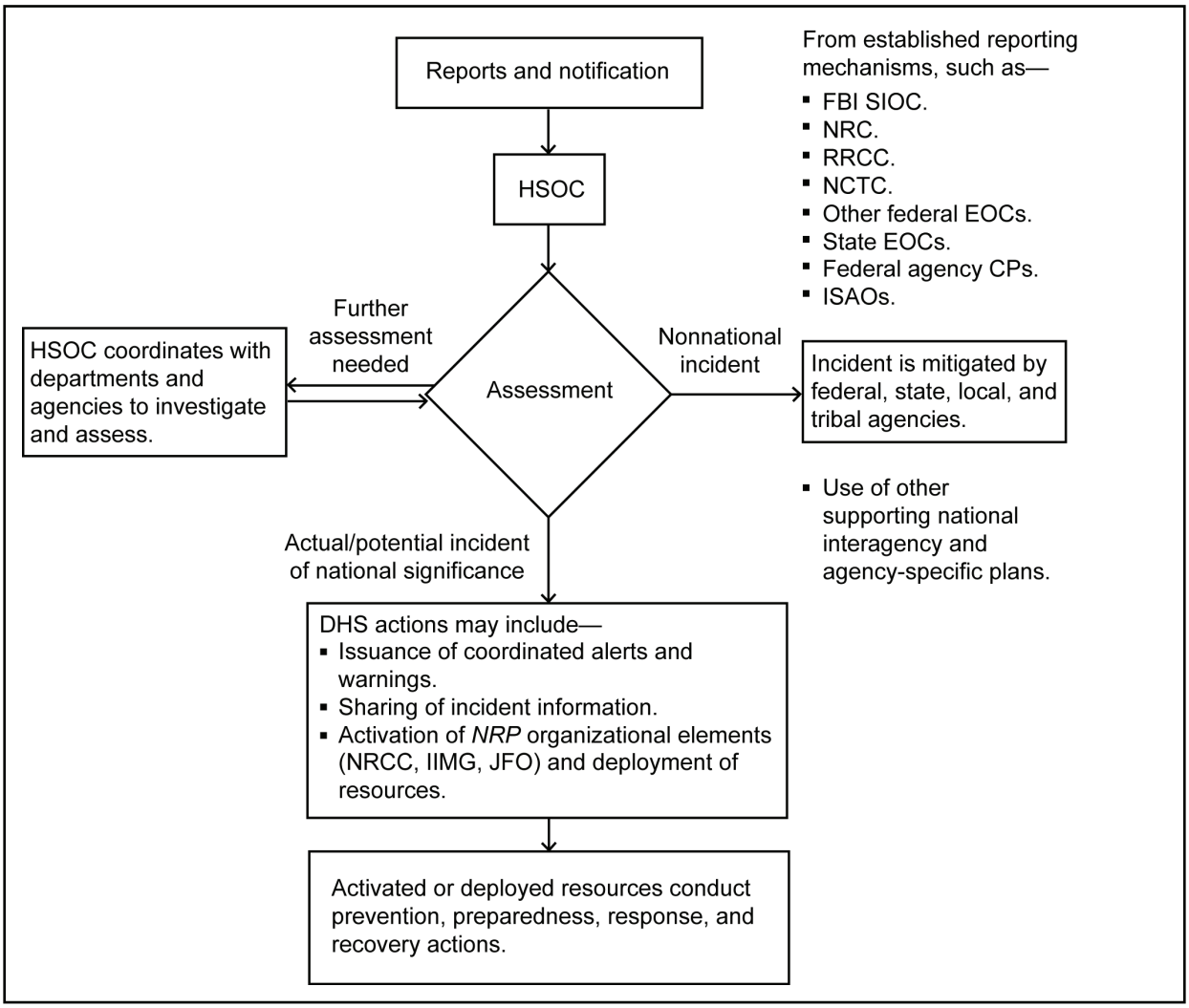

Figure A-2. Flow of Initial National-Level Incident Management Actions

A-17. Personnel should be protected from CBRN attacks. They should respond to attacks with trained and equipped emergency responders. Ports and vessels should remain in operation during critical periods and resume essential operations following an attack. Personnel should adhere to established protection standards as follows:

- Donning of the appropriate level of protection necessary to support mission continuity (essential personnel—military, civilian, and contract personnel).
- Compliance with the procedures and protection level necessary to safely survive an incident (nonessential personnel or the general populace).
- Implementation of the strategic guidance for protection. This is accomplished through proficiency in and proper application of the following joint enabling tasks:
    - Define the parameters of the CBRN.
    - Detect and identify immediate CBRN incidents.
    - Provide information to the decision makers regarding a threat to the populace.
    - Protect all people appropriately.

- Initiate a response through crisis responders.
- Restore services and protect the infrastructure.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR INCIDENT RESPONSE

A-18. When a CBRN incident is detected, trained personnel initiate the ICS/UC and establish an ICP for an on-site response. The ICP is the tactical-level, on-scene incident command authority and is typically located at or in the immediate vicinity of the incident site.

A-19. The ICP also keeps higher HQ informed. The ICP provides directive and nondirective guidance on support and operational procedures for the CBRN response. It serves as the focal point for monitoring unit resources and mission capabilities and coordinates support activities during a response. The location for the site of the incident operations commander (IOC) should be based on criteria established using CBRN and antiterrorism (AT) vulnerability assessments (VAs) Planners should also use this process to identify areas that could serve as alternate ICP sites.

A-20. The CBRN response organizations and operational tasks can be laid across distinct time phases to form a model of response that effectively protects lives and promotes mission accomplishment in the face of a CBRN threat (see *Figure A-3*). Three phases—preincident, incident, and postincident—make up the incident timeline.

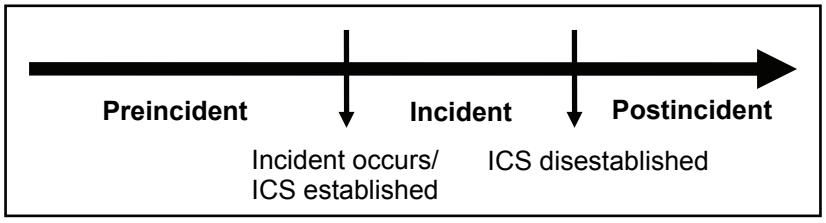

Figure A-3. CBRN Incident Timeline

A-21. Preincident tasks conducted in the first phase provide a constant process of improvement that continues until an incident occurs and the ICS/UC is activated. The incident phase begins when an incident occurs (or if not known, when a responder activates the ICS/UC) and ends when it is deactivated. The postincident phase begins when the ICS/UC is deactivated and continues until the hazard is mitigated.

A-22. The model for response to a CBRN incident *(Figure A-4*) uses crisis responders in the preincident phase to plan and prepare for an attack. During an incident, the team employs the ICS/UC to accomplish incident response tasks. In the postincident phase, the IC and the federal on-scene commander (FOSC), with federal assistance, mitigate the incident using CBRN incident management tasks and HAZMAT remediation.

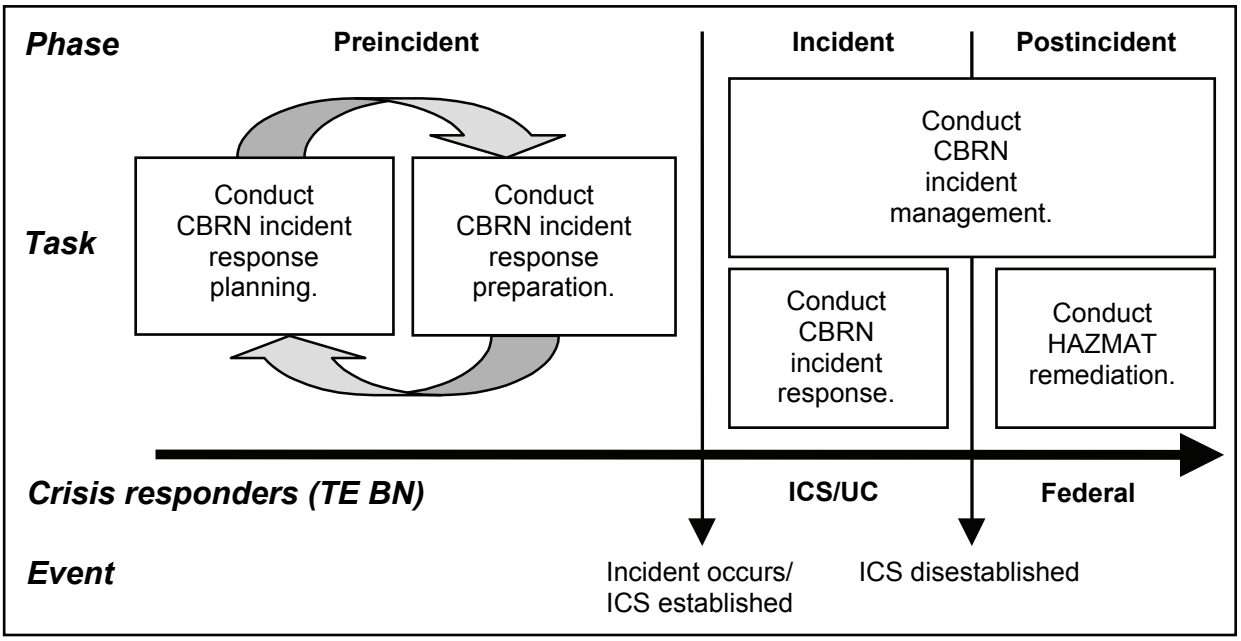

Figure A-4. CBRN Incident Response Model

INCIDENT RESPONSE TASKS

A-23. In *Figure A-4*, five operational tasks illustrate the preparation, mitigation, and recovery necessary in a CBRN incident. Those tasks are further defined below:

- **Conduct CBRN incident response planning *(Figure A-5, page A-10)*.** This planning task determines the vulnerabilities and vulnerability reduction measures through the conduct of a VA and other analyses. The CBRN response plan, including plans for all functional areas, is written and coordinated.
- **Conduct CBRN incident response preparation *(Figure A-6, page A-11)*.** This task implements the vulnerability reduction measures determined through the VA and functional area analyses. This task and the previous planning task are conducted in a continuous cycle to systematically reduce the attack vulnerability.
- **Conduct CBRN incident response *(Figure A-7, page A-12)*.** This task, conducted after a CBRN attack occurs, includes executing the CBRN response plan and mitigating the hazard.
- **Conduct CBRN incident management *(Figure A-8, page A-13)*.** This task is conducted after an attack occurs and continues until full recovery is achieved.
- **Conduct HAZMAT remediation.** This task, conducted after the ICS/UC is disestablished, implements the programs needed to assist personnel and resume functions directly impacted by the incident.

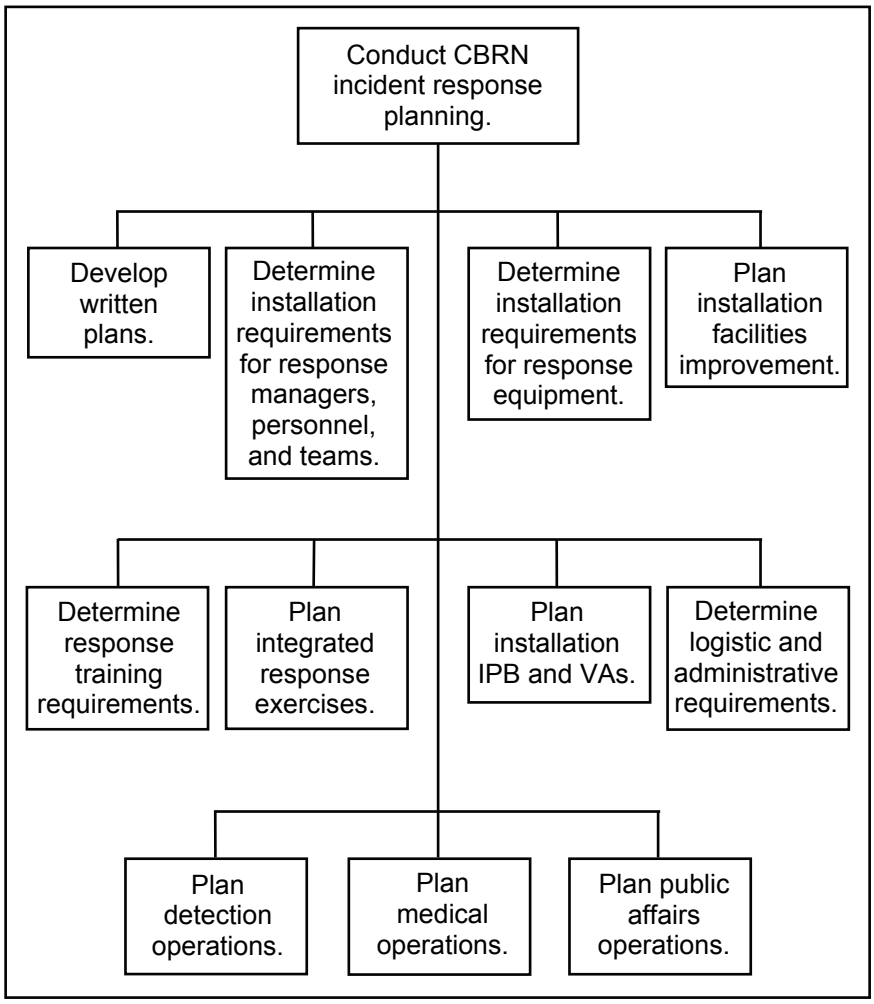

Figure A-5. CBRN Incident Response Planning

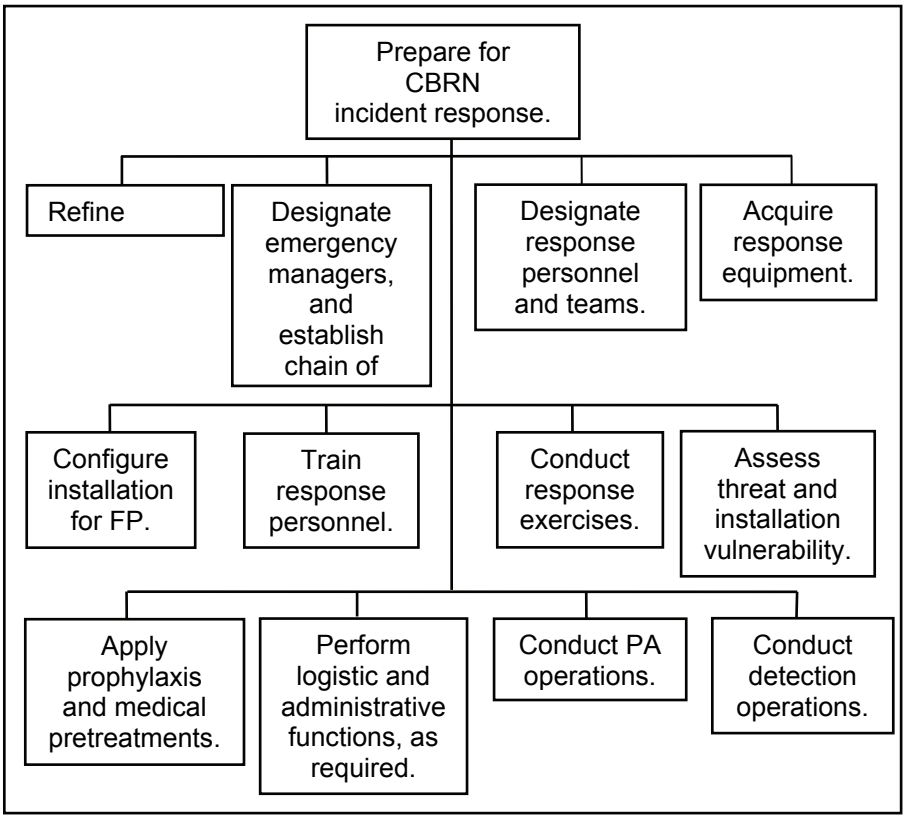

Figure A-6. CBRN Incident Response Preparation

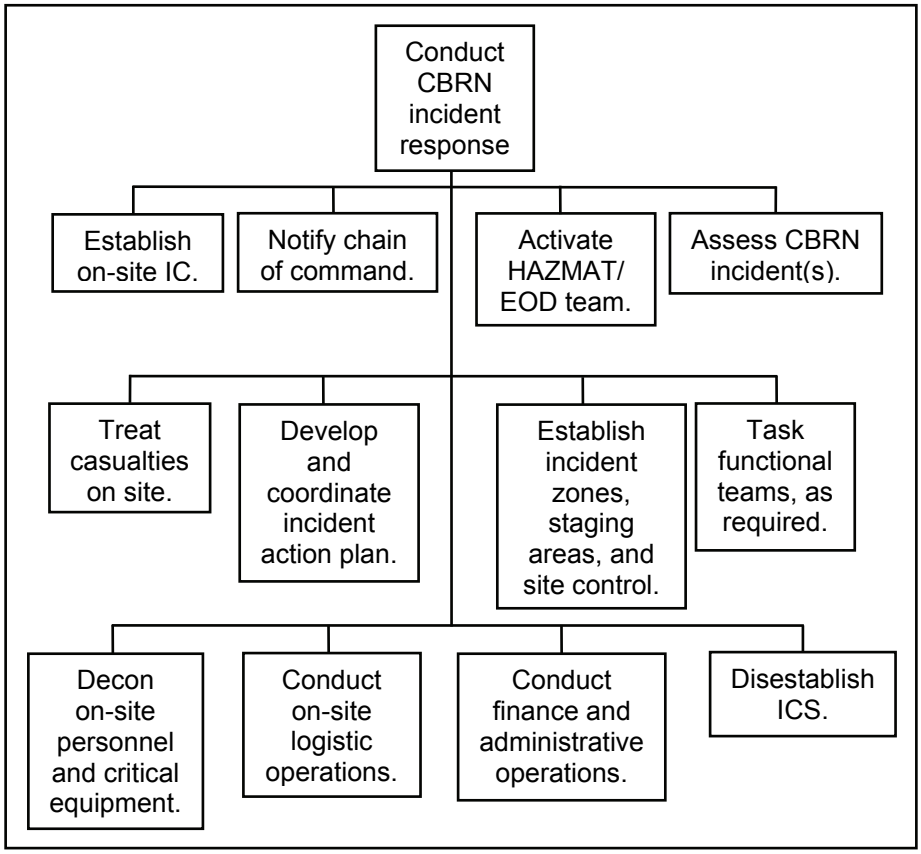

Figure A-7. CBRN Incident Response

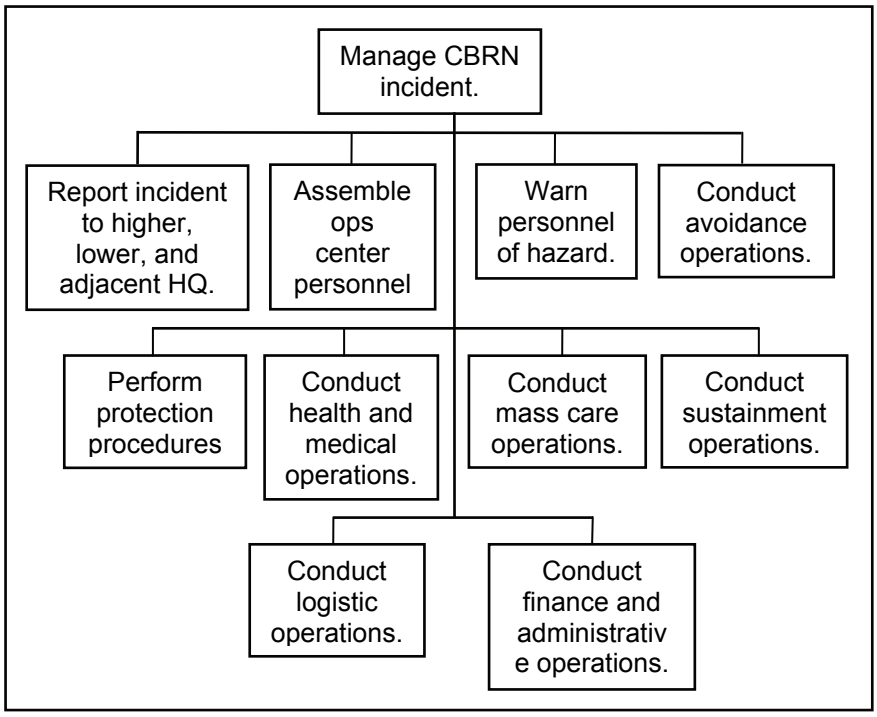

Figure A-8. CBRN Incident Management

INCIDENT COMMAND SYSTEM AND UNIFIED COMMAND

A-24. Federal law mandates the ICS and UC response system. The senior first responder (with the proper training requisite) implements the ICS or UC response system. The person who assumes the role of the IC has responsibility for directing and/or controlling resources by virtue of legal, agency, or delegated authority.

Note. The senior first responder must meet the proper training requirements to implement an ICS or UC response.

A-25. The IC is responsible for all aspects of a response, including developing incident objectives and managing all incident operations. The IC sets priorities and defines the ICS organization. Regardless of whether other positions are assigned, an IC will always be designated.

A-26. The IC may assign deputies. The deputies must have the same qualifications as the IC and be prepared to take over the IC position anytime.

A-27. The organization of an ICS is built around five major management functions: command, planning, operations, logistics, and finance. These functions can be applied to any incident, large or small. The IC retains responsibility for these functions, sometimes delegating them to another individual. A major advantage of using the ICS organization is the flexibility of the IC to tailor the organization as needed. The modular organization of the ICS allows responders to scale their efforts and apply sections of the structure that best meet the specifics of the incident. In some incidents, functional elements that may be formally established or delegated to another individual are limited. However, if there is a need to expand an organization, additional positions exist within the ICS framework to meet virtually any need. For example, while one incident may not require the activation of planning, logistic, or finance and administration sections, other incidents may require that some or all sections of the ICS organization be established. There

are no hard-and-fast rules for when or how to expand the ICS organization. In addition, in responses involving responders from a single jurisdiction, the ICS establishes an organization for comprehensive response management. If an incident involves more than one agency or jurisdiction, the IC can expand the ICS framework to address multijurisdictional coverage.

A-28. The roles of the ICS participants vary depending on the incident; the roles may even vary during the same incident. Staffing considerations are always based on the needs of the incident. The number of personnel and the organizational structure are based solely on the size and complexity of the incident. There is no absolute standard to follow. However, large-scale incidents usually require that each component or section be set up separately, with different staff members managing each section. A basic operating guideline is that the IC is responsible for all activities until command authority is transferred.

A-29. Another key aspect of an ICS is the development of an incident action plan (IAP). The IC and the planning section chief typically establish a planning cycle. The planning section develops an IAP for the next operational period (usually 12 or 24 hours long) and submits it to the IC for approval. The creation of a planning cycle and the development of an IAP for a particular operational period help the IC to focus available resources on the highest priorities and incident objectives. The planning cycle, if properly practiced, brings together everyone's input and identifies critical shortfalls that need to be addressed to carry out the IC's objectives.

A-30. Agencies must be able to use the ICS on a day-to-day basis for routine situations and major emergencies.

INCIDENT COMMANDER

A-31. The senior emergency response official responding to an incident is in charge of the site-specific ICS. All emergency responders and their communications are coordinated and controlled through this individual or by designated senior officials.

A-32. The senior official on site has the responsibility for controlling operations. Initially, it is the senior officer on scene with responding emergency equipment. As more senior officers arrive (division officer, senior law enforcement official, IC), the position is passed up the previously established line of authority.

A-33. The senior official in charge of the ICS identifies, to the extent possible, all hazardous substances present and addresses a site analysis, the use of engineering measures, maximum exposure limits, HAZMAT handling procedures, and the use of new technologies.

A-34. Based on the hazardous substances and/or conditions present, the senior official in charge of the ICS implements the appropriate emergency operations and ensures that the level of PPE is appropriate for the hazard.

A-35. Personnel exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard must wear a positive-pressure SCBA while engaged in emergency response operations. The senior official in charge of the ICS determines, through the use of air-monitoring equipment, the level of respiratory protection necessary.

A-36. The senior official in charge of the ICS must limit the number of emergency response personnel in the areas of potential or actual exposure to incident or site hazards. Only personnel actively performing emergency operations should enter the site. Operations conducted in hazardous areas must be performed using the buddy system (groups of two or more).

A-37. The senior official in charge of the ICS must designate a safety officer (SO) to identify and evaluate hazards and implement safety precautions. The person must have specific knowledge of the dangers presented at the site.

A-38. When site operations are judged by the SO to be IDLH and/or to otherwise involve imminent danger, the SO has the authority to alter, suspend, or terminate operations. The SO must immediately inform the senior official in charge of the ICS of any actions to be taken to reduce the hazard.

A-39. After emergency operations have terminated, the senior official in charge of the ICS implements the appropriate decontamination procedures.

A-40. An IC who assumes control of an incident scene beyond the first-responder awareness level (such as the on-scene commander), must have completed at least 24 hours of training equivalent to the first-responder operations level. Additionally, the IC's supervisor must certify that he—

- Knows how to implement the ICS.
- Knows how to implement an emergency response plan.
- Understands the hazards and risks associated with working in chemical-protective clothing.
- Knows how to implement the local emergency response plan.
- Understands the state emergency response plan and the availability of the federal regional response team.
- Understands the importance of decontamination procedures.

UNIFIED COMMAND

A-41. Although a single IC normally controls all command functions, an ICS organization may be expanded to a UC. The UC is a structure that brings together the ICs of all major organizations involved in the incident to coordinate an effective response, while continuing to carry out their own jurisdictional responsibilities. The UC links the organizations responding to the incident and provides a forum for these entities to make consensus decisions. Under a UC, responders from various jurisdictions and/or agencies (such as the FBI, the Department of Energy [DOE], and the Centers for Disease Control and Prevention [CDC]) may blend to create an integrated response team.

A-42. A UC may be initiated when multiple jurisdictions are involved in a response effort. These jurisdictions may be represented by—

- Geographic boundaries (such as two states).
- Governmental levels (such as local, state, or federal).
- Functional responsibilities (such as firefighting or nuclear releases).
- Statutory responsibilities (such as responsibilities of the FBI or the DOD).
- Various combinations of levels and responsibilities.

A-43. The UC makeup for a specific incident is determined on a case-by-case basis, taking into account the—

- Specifics of the incident.
- Objectives outlined in existing response plans.
- Decisions reached during the initial meeting of the UC.

A-44. The makeup of a UC may change as an incident progresses and the situation transforms. The UC requires a team effort, but the number of personnel involved must remain small to maintain simplicity and efficiency.

A-45. The UC is not a "decision committee." It is created to command response operations. Since time is of the essence, the UC must develop synergy operations based on the capabilities of the various representatives. There should be a personal acknowledgement of each representative's unique capabilities, a shared understanding of the situation, and agreed-upon common objectives. With different perspectives, comes the risk of disagreements—most of which can be resolved through an understanding of the underlying issues. Contentious issues may arise, but the UC framework provides a forum and a process to resolve problems and find solutions. If situations arise where members of the UC cannot reach a consensus, the UC member representing the agency with primary jurisdiction over the issue makes the final decision.

A-46. A complete list of OSHA regulations regarding the ICS and UC is located at *<http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=0&p_keyvalue>*.

A-47. There are a number of ICS and/or UC training tools available on the Internet to prepare personnel for an installation response. Many of the responders in the follow-on elements must be familiar with these tools to promote a unity of effort. Some of these tools include—

- **Position task books (PTBs).** PTBs—
  - Were developed for designated positions within the National Interagency Incident Management System (NIIMS).
  - Include requirements for certification in ICS positions.
  - Include tasks for ICs (Types 1, 2, and 3 per the *NRP*); SOs; liaison officers; information officers; and positions in the planning, logistic, and finance sections.
  - Can be viewed at Web site <*http://www.osha.gov/SLTC/etools/ics/ics_tasks.html#ops*>.
- **ICS site safety plan (SSP) worksheets.** ICS SSP worksheets—
  - Include a hazard identification, evaluation, and control section; an air-monitoring log; a site map; a PPE section; decontamination procedures; an emergency response plan; and a *29 CFR 1910.120* site safety and health compliance plan that includes a drum compliance checklist.
  - Are located at Web site <*http://www.osha.gov/SLTC/etools/ics/pdf/ics_uscg_ssp_checklists.pdf*>.
- **Information on the National Mutual-Aid and Resource Management System.** The National Mutual-Aid and Resource Management System is—
  - An initiative undertaken by the Federal Emergency Management Agency (FEMA) within the DHS to support the NIIMS.
  - Designed to enhance emergency readiness and response operations through a comprehensive and integrated system. The installation IOC can use this tool to obtain information on specific resource capabilities, locations, costs, and support requirements to augment needed resources.
- **A national typing protocol.** The national typing protocol is—
  - Used to assess current and required CBRN response capabilities. Installations may use a resource management process outlined in NIMS to identify and type resources.
  - Designed to inventory and manage resources. This is one of the NIMS resource management tools designed to promote common interoperability and a "common language" for interagency discussion and the integration of resources.

Note. For the purposes of this FM, "typing" a resource means categorizing the resources that an IC would need when responding to a CBRN event. The elements of the national typing protocol include category, kind, components, metrics, and type data. These elements are defined and discussed in *Appendix B*.

PLANNING

A-48. The preparation for responding to a CBRN incident includes identifying response planning assumptions. These assumptions may include—

- A situation where responders are overwhelmed by the extent of the response effort.
- Multiple CBRN incidents.
- Infrastructure (communications or transportation) damage, destruction, or contamination.
- Difficulty reaching the incident scene.
- Unknown hazards.
- The need for additional response personnel (based on factors such as work-and-rest cycle management for CBRN response teams).
- TIM hazards.

Note. This portion of the plan should include a CONOPS that outlines guidance and suggested actions. A tailored CONOPS, appropriate to each, provides a template. A CONOPS should outline—

- Actions to detect, identify, and contain CBRN contamination.
- Follow-on actions during recovery operations (cleanup and/or disposal of contaminated materials).
- Representation, as required, to support incident command operations.
- Additional support requirements for various response capabilities.
- Coordination with other support elements (surveillance, sampling, or sheltering).
- Procedures for maintaining, receiving, analyzing, and forwarding status reports.
- Damage assessments.
- Reach-back capability for technical and operational information.

Note. Operational requirements for HAZMAT response include incident response and postincident remediation requirements as follows:

- HAZMAT emergency response requirements (according to *29 CFR 1910.120q*).
- Access to *DA Pam 50-6* to reference the policies and procedures for a response to a chemical accident or incident and for reference to the policies and procedures prescribed for chemical accident or incident response and assistance (CAIRA) operations.
- Access to references outlining the operational requirements for postincident CBRN remediation, including *Engineer Manual (EM) 1110-1-502* (guidance on performing remedial and corrective actions at HAZMAT waste sites, such as preliminary assessments, site investigations, remedial investigations, and feasibility studies).
- EOD support. The Army is responsible for providing EOD support to U.S. military operations. Each EOD element is geographically positioned to support large regional or national response efforts and FEMA regions.

Medical

A-49. *FM 4-02.7* provides information on planning health service support in a CBRN environment. This information may include—

- Medical treatment.
  - Information on medical treatment for exposure to biological agents can be found in *FM 8-284*.
  - Medical treatment and control measures regarding communicable diseases can be found in *FM 4-02.33*. This FM identifies diseases by numeric codes assigned according to the *International Classification of Diseases*.
  - Medical treatment requirements for operations in CBRN environments can be found in *AR 40-12* and *FM 4-02.7*.
  - Medical treatment for nuclear and radiological exposure can be found in *FM 4-02.283*. This manual classifies and describes potential nuclear and radiological threats and hazards; describes the biological aspects of blast, thermal radiation, and ionizing radiation and their effects on the body; and describes the procedures for administering first aid and diagnosing, treating, and managing casualties.
  - *FM 8-285* is a reference guide for trained members of the Armed Forces Medical Services and other medically qualified personnel regarding the treatment of chemical-agent casualties and conventional military chemical injuries. This FM also provides information on first aid (self-aid, buddy aid, and combat lifesaver [CLS] aid).

- Emergency medical requirements.
    - *FM 8-500* provides responders and hospital emergency personnel with guidance on the proper medical management for patients exposed to HAZMAT in a field environment. This FM organizes chemicals by groups and protocol, taking into account the physiological effects of the agent on the body. It also includes a protocol for radioactive compounds.
    - *AR 40-13* outlines the procedures for medical support following a nuclear and/or chemical accident or incident. This regulation identifies potential chemical accidents and/or incidents and the response and assistance requirements necessary to control the events. It describes the use of laboratory services and lists required equipment.

Telecommunications and Information Technology

A-50. The preparation for responding to a CBRN incident includes identifying communications and information technology (IT) planning assumptions. These assumptions may include the possibility that—

- The initial reports outlining CBRN-related information are fragmented and present an incomplete picture of communications capabilities.
- Adverse weather conditions and other environmental factors may disrupt the use of external and mobile communications.
- The capability to acquire real-time information may be restricted or nonexistent.
- The initial priority following an incident is lifesaving operations, concurrent with establishing control of the area and restoring communications (as the situation permits).

A-51. The IT portion of the plan includes a CONOPS that outlines guidance and suggested actions. A CONOPS should—

- Identify the uniform emergency communications procedures to be used.
- Stipulate that communications management occur on a bottom-up basis and that decisions be made at the lowest level. Only issues requiring adjudication or additional resources are referred to a higher level.
- Require that a damage assessment be performed on the communications and IT infrastructure and that a timeline for restoring capabilities be developed.
- Prioritize the requirements and monitor the developing situation and the response.
- Identify the procedures for receiving and providing information and status reports.
- Identify the procedures for coordinating service provisions and restoration, as required.
- Address communications interoperability with supporting response assets.
- Identify reach-back capabilities for support, as required.
- Outline the procedures for communicating with the ICP.
- Identify communications assets (as required) within the affected areas.
- Identify the training required for telecommunications and IT personnel (awareness level training).
- Include weather information for the area of concern.

Transportation

A-52. The preparation for responding to a CBRN incident includes identifying transportation planning assumptions. These assumptions may include the possibility that the—

- Transportation infrastructure might sustain damage or contamination, limiting access to the incident site.
- Limited transformation capacity might decrease the effectiveness of the response.
- Damage and communications disruptions might delay or prevent coordination for transportation support.
- Movement of resupply or support assets might create congestion.

A-53. The transportation plan outlines procedure guidance and suggests a tailored CONOPS. The execution of the plan may be modified based on the METT-TC. A transportation CONOPS should—

- Provide for representation at the ICP.
- Provide memorandums of understanding (MOUs) or memorandums of agreement (MOAs) to use civilian transportation assets, as required.
- Recognize state transportation policies and plans.
- Provide time-phased response guidelines for required transportation resources (additional response teams or supplies).
- Provide a list of transportation resources to facilitate the movement of personnel and goods to and from the incident site.
- Incorporate the control function for assistance in obtaining transportation assets and track the movement of resources to the incident site.
- Emphasize communication and coordination between the unit and the supporting transportation assets.
- Include situational-awareness information (such as downwind hazard areas and contaminated areas).
- Include a transportation damage assessment.

Emergency Public Information and External Communications

A-54. The preparation for responding to a CBRN incident involves the identification of emergency public information and the planning for external communications. Plans may—

- Ensure that authoritative information regarding the incident is disseminated to the lowest level to squelch unsubstantiated rumors.
- Ensure the dissemination of critical information to the public and outside agencies.
- Provide accurate, consistent, timely, and easy-to-understand information.

A-55. The plan for emergency public information and external communications information should include a CONOPS that outlines the operational guidance, provides suggested actions, and provides a template appropriately tailored to each requirement. Additionally, the CONOPS should—

- Provide for representation at the ICP, when required.
- Identify training requirements.
- Identify a central point for coordination and information release.
- Identify the type of information to be released.
- Identify specialized capabilities such as linguists, if required.
- Identify procedures for monitoring news coverage to ensure the accurate dissemination of information.
- Identify the broad range of resources to be used to convey and/or correct information.

A-56. *DODD 5230.16* contains DOD policies, responsibilities, and procedures for releasing information to the public during accidents and incidents involving nuclear weapons, radioactive materials, and improvised nuclear devices.

A-57. *DODD 4650.2* contains policies, responsibilities, and requirements for using the Military Affiliate Radio System (MARS). The MARS is used as an alternate communications capability during emergency situations.

EXECUTION

A-58. If a terrorist CBRN event occurs, personnel in the ICP immediately initiate the notification and resource activation process. Depending on the initial assessment, the IOC may direct personnel to—

- Activate the emergency rosters and initiate post notification and warning sirens.
- Implement local MOUs/MOAs and alert local off-post or HN offices.
- Request additional resources through Army, federal, and established civilian channels to augment the response capability.

Note. A terrorist CBRN attack may overwhelm the capability of personnel to respond, detect, assess, maintain operations, and contain the threat. The TE battalion, as with most other local, state, or federal entities, does not have the authority or the expertise to respond unilaterally to all aspects of terrorist CBRN threats or incidents. However, the *NRP* provides direction and guidance.

A-59. Critical or disastrous situations triggering national-level interest are initially reported on an operations report (OPREP) 3 PINNACLE level. (Refer to *Figure A-9* for a visual representation of this process.) The OPREP 3 system is used to report significant events and incidents to the highest levels of command. According to *Chairman of the Joint Chiefs of Staff Memorandum (CJCSM) 3150.03*, the ICP submits an OPREP 3 when national-level interest has been determined. Therefore, in the event of a terrorist CBRN incident, the ICP sends an OPREP 3 (with the flag word PINNACLE) directly to the National Military Command Center (NMCC). Initial voice reports should be made within 15 minutes of an incident; message reports should be submitted within 1 hour. The initial report must not be delayed to gain additional information. Follow-up reports can be submitted as additional information becomes available. The IC submits—

- **Voice reports.** The IC submits voice reports sequentially to the NMCC, appropriate commands, reporting unit parent service, and intermediate superior command. Conference calls or concurrent telephone calls may be used if no delays are encountered and security is maintained. A telephone line between the NMCC and the IC must remain open throughout the duration of the incident.
- **Communications reports.** The IC submits OPREP 3 reports (with IMMEDIATE or FLASH precedence) as soon as possible following an event or incident.

Note. Actions taken in the first minutes following a terrorist attack are critical to the success of the response.

Note. The *CJCSM 3150.03* series contains specific guidance on preparing an OPREP 3.

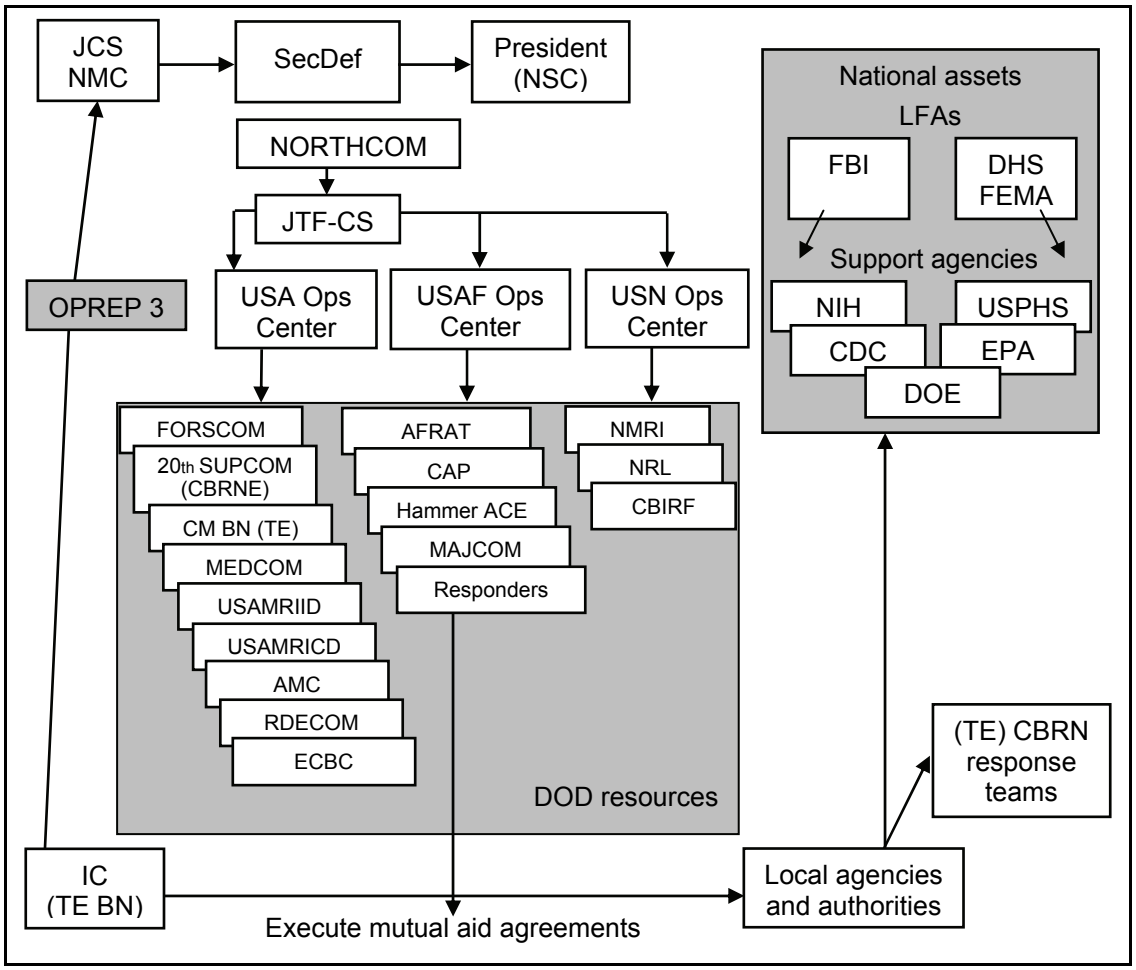

Figure A-9. Notification and Resource Activation Process for Domestic CBRN Events

IMPLEMENTING A PLANNED CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR RESPONSE

A-60. A planned CBRN response begins when an incident report is submitted in the notification chain (emergency operators, fire or law enforcement personnel), CBRN detectors sound an alert, or observer personnel report an event. All personnel (including noncombatants) should be trained to recognize CBRN events and know how to notify authorities of a suspected attack. The planned CBRN response includes—

- Initiating the response.
  - The IC maintains and activates the alert notification procedures. The IC uses designated means, such as the radio net, to notify members of the ICP, emergency responders, and other functional teams (depending on the severity of the incident).
  - The IC establishes the ICS after the area is secured and begins establishing the parameters of the hot and warm zones. If, following hostile force actions, the event is determined to be CBRN-related, fire suppression, casualty evacuation, and CBRN teams enter the site to provide the IC with a full assessment of the situation. EOD (or equivalent) personnel lead the way into the hot zone to assess the situation for secondary devices. The initial IC may delegate direct control of the hot zone to another designated officer.

The IC provides C2 information on the entire incident scene (including the hot, warm, and cold zones) to the IOC.

- Responders approach the incident site from an upwind or crosswind direction when directed, maintaining a safe distance from the site to maximize individual safety. The likelihood of numerous victims is extremely high when dealing with a terrorist attack. However, if there is confirmation that no victims are involved, the IC may conduct detection operations and then cordon the area to conduct decontamination operations. Responders must treat the incident site as a potential crime scene when safety permits. If CBRN materials are suspected or detected, the commander ensures that the IOC accomplishes the appropriate notification and reporting requirements.
- If the FBI (or DOS if overseas) assumes jurisdiction for the investigation, the commander must provide the initial and immediate response to isolate, contain, and mitigate the effects of the incident. Command of military elements remains within military channels.
- The IOC activates response organizations, beginning with those requested by the IC. Response at the incident site should be initially limited to minimum elements until the degree of damage can be determined. The severity of the incident may dictate that the IC remain located at a distance (the functional area responders and the designated IC may or may not be physically located at the incident site). The IC may request additional elements from the various functional areas, depending on the situation. Resources requested by the IC assemble at a predesignated staging area. The staging area should be located a safe distance from the incident site to prevent interference with the CBRN team and to reduce exposure to hazards. In a CBRN environment, the IC should limit the number of personnel responding to or near the incident site.
- The ICs must ensure a smooth transition. The smooth transition between the initial and follow-on IC depends on the transfer of accurate information. This transition may occur when all initial emergency actions have been completed and it is safe for the IC to move toward the incident perimeter. The initial IC maintains control of the incident site and evaluates the site situation to determine when it is safe and practical for other response elements to proceed closer. This information is relayed through the IOC.
- The CBRN/HAZMAT team assists the IC in determining the nature of the incident. If the team does not possess a detection capability for a particular hazard, it must continue to assist with operations until a team with detection capability arrives. When follow-on forces are required, the CBRN team remains on site to inform them of the extent and characteristics of the incident.
- The CBRN/HAZMAT team establishes the parameters of the incident site. Due to the technical nature of detection equipment and the potential hazards of various CBRN materials, initial response operations are likely to proceed slowly. A large number of responders may be required to mitigate a CBRN emergency. Personnel must use extreme caution during all known and suspected CBRN events to ensure the safety of functional area responders. Expect delays in identifying or mitigating the effects of CBRN material at the site, particularly when functional area responders lack resources and must wait for the arrival of properly trained personnel, specialized equipment or vehicles, and support personnel.

- Initiating protective measures.
    - Responders must don the appropriate level of PPE. Most CBRN material can penetrate ordinary clothing. Without proper PPE and individual breathing apparatuses, personnel entering a contaminated area may become casualties. If there are indications of a CBRN attack or evidence of hazardous agents, PPE provides personnel protection; however, equipment contamination may occur during rescue operations.
    - The IOC activates the required notification plan, contacts designated civilian authorities, and notifies higher HQ. The commander implements the appropriate DOD force protection condition (FPCON).
    - The IOC activates established mass notification measures to warn, advise, or support persons in a potentially affected area when it is apparent that an incident will endanger the population or the local community.

Note. The Homeland Security Advisory System does not apply to incidents involving military installations. The FPCON is used to rate threats and set specific measures for military facilities.

- Identifying the threat and taking control of the incident area.
    - The IC determines the cordon size based on the presence or suspected presence of hazardous agents before responders are permitted to enter a hot zone. Security forces then establish the cordon perimeter based on the IC's recommendation. The security forces control access to the site by establishing an entry control point (ECP) to serve as the sole entrance and exit from the incident site. Only authorized personnel are allowed to enter the site. Additionally, the security forces establish ECP procedures by creating authorization lists, checking identification cards, and issuing badges. Firefighters or other designated personnel establish decontamination lanes (separate lanes for victims and responders), which are staffed by qualified personnel.
    - Emergency medical personnel treat and transport casualties, but on-site responders perform decontamination operations in the field. The responders provide on-site medical support (such as ensuring that personnel donning PPE receive preentry physical screenings) and protect critical systems from damage or additional damage. The IC establishes and maintains communications between the incident site and the IOC to ensure that the most up-to-date information is transmitted. As the situation allows, on-site responders should begin stabilizing the incident to mitigate the impact.
    - Responders must be prepared to manage multiple incidents and be alert to the possibility (after arriving at the incident site and throughout the response phase) of secondary devices deployed at each incident site. A thorough search by trained personnel must be conducted as soon as the situation allows.

Note. Terrorists may execute several incidents at different locations in quick succession.

A-61. Detailed information about an incident site should be formulated into an SSP. This document is essential for advance planning and safe incident operations. Information in this plan includes—

- Hazard identification worksheets (with potential health effects, pathways of dispersion, exposure routes, and control measures)
- An air-monitoring log
- A site map
- A PPE log

- An emergency response plan showing places of refuge and site security measures
- A decontamination log that includes the location, size, and diagram of the decontamination site
- The equipment used at the site
- The contamination avoidance practices implemented
- The decontamination steps taken.

Also, commanders must develop a sketch containing the locations and types of specific hazards. The sketch should contain, at a minimum, the—

- Hazard areas (cold zone, warm zone, hot zone, and minimum safe distances [MSDs]).
- Site terrain.
- Ingress and egress routes.
- Site accessibility by vehicle and on foot.
- Off-site populations or environments at risk.
- Pertinent weather information (such as the wind conditions, temperature, and predicted forecast).
- Site maps (detailed and to scale).

A-62. Trained first responders must be equipped with CBRN detection capabilities for the identification of specific threats. These responders should be assembled at predesignated locations until called forward by the IC. The CBRN team may be able to make presumptive CBRN identification, but if initial test results prove to be negative or ambiguous, more sensitive CBRN detection devices or methods may be required. Once the incident site has been established, trained detection teams gather additional information through the employment of specialized detection equipment and methods. Biological and unknown chemical-agent samples collected at the incident sites should be evacuated, through controlled channels, to a laboratory facility for definitive identification. Specific chain-of-custody, packaging, and marking requirements apply to all items removed from the scene.

A-63. Determining hazards from a low-level radiological incident includes estimating the exposure to external ionizing radiation. To address concerns regarding potential long-term health hazards, the Army medical community has developed ways to detect, assess, and record health risks. Procedures for Level II radiation surveys and assessments by preventative medicine personnel have been established. These methods require minimal resources and give a quick estimate of the dose or maximum duration of a mission in a low-level radiation environment.

A-64. Responders should take every precaution possible to preserve evidence following a terrorist attack. The evidence obtained and supported by a properly documented chain of custody is crucial in the investigation, arrest, and conviction of the perpetrator(s). Preserving evidence should come second only to individual safety and protection and the preservation of property.

A-65. To assist with the CBRN identification and warning process, the IC uses an approved software program to prepare a hazard effects prediction. Personnel should select, institute, and train with a software program that supports the process requirements and enhances the emergency planning capabilities for hazard identification, vulnerability assessments, risk analyses, response capabilities assessments, and planning development. Also, the type of hazard and the weather conditions are critical factors in the process.

A-66. Response elements must make every effort to reduce or avoid the contamination of personnel and the surrounding population. Using the hazard effects prediction process, the IC may be able to identify areas requiring evacuation. Shifting winds and weather conditions may require the movement of an established cordon and result in the evacuation of areas with potential contamination. The security force manages evacuations authorized by the IC and provides assistance with establishing a new cordoned area. Responders are directed to avoid the hazard area unless wearing the appropriate PPE established by the IC.

A-67. The IC establishes decontamination priorities. The decontamination of exposed personnel and casualties is the top priority, followed by equipment, facilities, and areas. Personnel must establish, as soon

as possible, emergency decontamination lanes to process responders, contaminated persons, and contaminated casualties.

DECONTAMINATION OPERATIONS

A-68. The IC assembles the functional area response elements in a secure staging area, upwind from the incident site and outside the contamination control line. A staging area manager is assigned to check all incoming resources, dispatch resources at the IC's request, and request support at the staging area (as required). See *Figure A-10* for information on setting up the cordon perimeter, decontamination lanes, and assembly areas and identifying the hot, warm, and cold zones.

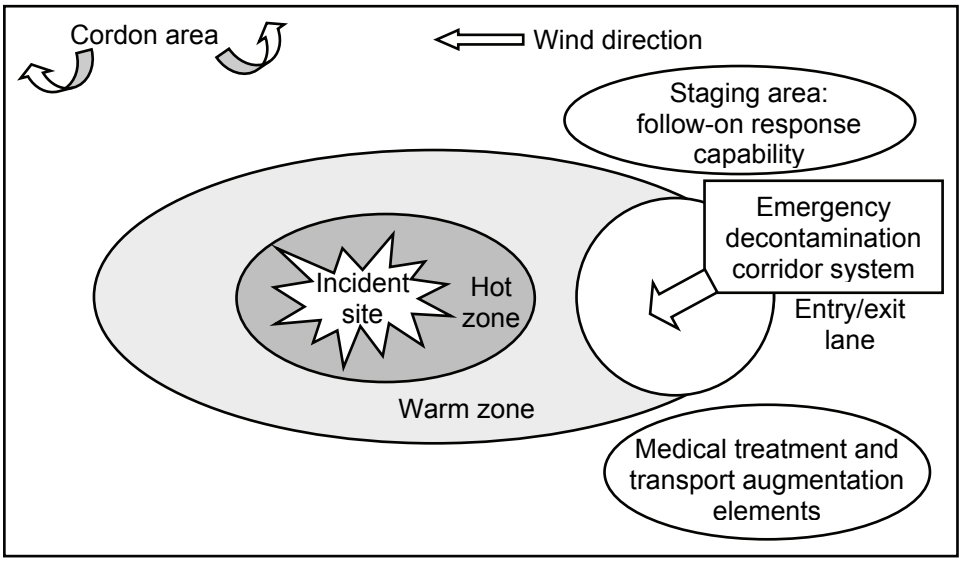

Figure A-10. Site Management Operations

A-69. Site management must include established procedures to rapidly account for and communicate with functional-area response team members engaged in activities at the incident site. These procedures must include a means to specifically identify and track the activities of all response team members entering and leaving the hot zone and any area where individual medical survival and special PPE is required. Additional site management operations include—

- **Maintaining incident site control.** Security response elements should treat the incident site as a potential crime scene until relieved by the applicable investigative element, such as the FBI. All responders, including firefighting personnel, should perform crime scene maintenance and protect potential evidence during their operations (within the limits of their response efforts to control fires, save lives, and protect property). Physical evidence collected at the scene of an incident site is often the most reliable evidence, and it serves a crucial role in connecting the perpetrator to the scene. No evidence, including a confession, is uncontestable in court.
- **Protecting and securing classified information and material.** Staff planners and security personnel should develop plans to protect and secure classified material until it is turned over to proper authorities. The IC, the IC's staff, firefighters, EOD, and emergency medical services (EMS), in conjunction with security response elements, should be trained and exercised in the procedures for releasing information through the public affairs office (PAO) and/or the Joint Information System (JIS). The PAO, using the JIS to encompass all public information related to an incident, conducts information release functions. The JIS includes all federal, state, local, private organization, and public information officers and joint information centers (JICs) established to support an incident. The JIC is established to provide a physical location where public affairs professionals involved in incident management activities can come together to perform critical emergency information and crisis communications functions. It is vital that the JICs have the most current and accurate information regarding incident management activities.

- **Conducting casualty management operations.** Medical and fire emergency services provide emergency medical response at the incident site, including lifesaving medical care and support for responders. The use of CB agent pretreatment drugs, prophylaxis medication, and agent antidotes is determined based on the type of incident and the availability of medical supplies. Ideally, casualties and personnel in the designated cordon area should be decontaminated before leaving the scene. However, if decontamination is incomplete or if contaminated persons leave the scene voluntarily, the receiving medical facility (military or civilian) must be prepared to decontaminate and treat personnel upon arrival. After the medical facility receives notice of a CBRN incident or attack, all medical personnel engaged in the response must be informed of the nature of the emergency and the type of suspected contamination. Medical personnel must don PPE and be prepared to perform additional decontamination operations as necessary.

Note. Many military medical facilities only offer limited inpatient care or reduced operating hours. Additionally, civilian medical facilities may not accept contaminated patients. These issues must be addressed in MOUs or MOAs with the local community.

- **Designating decontamination facilities.** The CBRN emergency response plan should designate the procedures for identifying and operating decontamination facilities. Commanders must ensure that—
  - Staff planners; engineers; and facility management, transportation, security, public health, and IT offices assist the medical officer in the selection of the appropriate locations. Although areas need not be set aside solely for decontamination operations, planners must ensure that the appropriate procedures are in place to prevent or minimize the spread of contamination during an incident.
  - Primary and alternate facilities are clearly identified, stocked with supplies, and staffed (by name or position) according to the procedures for emergencies.
  - Outside portable facilities such as wading pools or outdoor showers are considered as alternatives to indoor decontamination areas, when necessary. Wastewater from decontamination sites is contaminated and must be contained to prevent the spread of contamination.
  - Bags are available to collect, identify, and retain or dispose of contaminated clothing and personal effects. Plans and provisions must be made for managing patients and securing their personal effects until proper disposal methods are determined.
  - The decontamination plan includes measures for primary, supplementary, and auxiliary ventilation separate from the ventilation system for the rest of the selected facility. Real-time detection instruments should be used to monitor the inside ambient air. Although not all chemicals are volatile enough to produce a gas vapor, the ventilation should be turned off in a decontamination facility without a self-contained ventilation system.

Note. Airborne contaminants can be transported via the ventilation system. Morgues with isolated ventilation systems are often used for decontamination operations.

- **Preventing the spread of contamination.** Responders must ensure that contamination does not spread beyond the cordoned area. Using existing building and area notification systems, responders should notify the area population and provide information on the proper safety precautions to be taken. When contamination cannot be contained within the condoned area, the local community or HN must be warned and advised to institute mutual agreements (MOAs/MOUs). Shelter-in-place operations may be directed to ensure that ventilation systems, doors, and windows are airtight.

- **Ensuring the availability of reach-back support.** Various organizations can provide technical reach-back support in the form of individual expertise, plans, and material. Response plans and procedures should include current technical reach-back contact information (with organization names and telephone numbers) of specialized DOD support, such as EOD, WMD-civil support team (CST), and TE battalion personnel. See *Chapter 7* for more information on reach-back support.
- **Providing relief-in-place support.** Emergency responders (individuals or teams) are relieved of their mission by a second shift, augmentees, or other incoming responders. Procedures must be in place to ensure a safe and seamless transition. These procedures may include—
    - Relieving responders sequentially, simultaneously, or in a staggered sequence. A sequential relief occurs when each team is relieved in succession. A simultaneous relief occurs when all teams are relieved at the same time. A staggered relief occurs when the commander relieves each team in a sequence determined by the state of operations. Simultaneous relief takes the least time to execute. Sequential or staggered relief can take place over an extended period of time.
    - Conducting a deliberate or hasty relief operation, depending on the amount of time available for planning, preparation, and execution. In a hasty relief, detailed planning that describes exactly what an IC needs to accomplish a mission results in a shorter execution time. In a deliberate relief, the ICS and his staff need more planning time to identify, develop, and coordinate solutions to potential problems and to ensure the availability of resources when and where they are needed.
- **Implementing a UC.** If federal civil authorities assume command of a scene, they must be prepared to implement and participate in a UC.

ON-SITE CONSIDERATIONS

A-70. After arriving at the scene, the entry leader conducts a complete site-specific risk assessment. The risk of entering a hazardous environment must be weighed against the need. The risk assessment must include the—

- Identification of on-site hazards.
- Level of potential risk exposure to identified hazards.
- Level of chemical toxicity.
- Methods used to control hazard exposure.

A-71. During a chemical response operation, personnel may encounter hazardous conditions that require them to consult with personnel in authoritative leadership roles or with personnel who have specific knowledge or training. These hazardous conditions may include—

- **Confined spaces.** A marine chemist or technician must be consulted to ensure that a confined space is safe for entry. Refer to *29 CFR 1910.146* for additional information.

Note. The definition of a confined space (per *29 CFR 1910.146*) is a space that—

- Is large enough and configured in such a way that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit. For example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.
- Is not designed for continuous employee occupancy.

- **Unknown hazards.** An unknown hazard is any substance not confidently identified or supported by documents (manufacturer or shipping papers) to confirm its presence. Level A

protection is required to enter areas with unknown hazards. If the safety hazard increases, the entry leader may authorize Level B protection. Common safety hazards include—

- Restricted access or egress areas.
- Slippery conditions.
- Climbing or steep elevations
- Thermal limitations (frosting, freezing, heat stress on PPE or equipment).

- **The need to don PPE.** To determine the level of PPE required, the entry leader must consider the—
  - Chemical resistance level of the hazardous substance (including that for temperature changes).
  - Durability of the PPE.
  - Movement limitations the PPE imposes on personnel.
  - Level of contamination upon site entry.
  - Physical state of the hazardous substance.

Note. Material safety data sheets (MSDSs), toxicology occupational medicines and environmental sciences (TOMES) database, and decision support tools (DSTs) must be used to obtain specific chemical information and manufacturer recommendations when determining the level of PPE protection required. The level and type of protection must continually be reevaluated to ensure that it is adequate for current operations and changing conditions.

- **The need to don respiratory protection.** The team supervisor, in coordination with the entry leader, must determine the level and type of respiratory protection required. The respiratory protection program must also provide guidelines for determining the appropriate level of protection.

SITE SAFETY PLAN

A-72. Following the emergency phase of the response, the responders must develop an SSP for each incident. The SSP—

- Is reviewed by the hazardous-substance team supervisor and presented to the FOSC for signature.
- Is read and signed by all members of the response team (at the request of the hazardous-substance team supervisor).
- Follows the lead agency's SSP.

HEAT STRESS HAZARDS

A-73. During a chemical response, team personnel may encounter heat stress hazards. Personnel wearing permeable clothing with evaporative cooling should follow the manufacturer's recommendations for environmental heat stress monitoring and a work/rest regimen. Personnel wearing impermeable clothing should follow the recommendations for monitoring heat stress as established by the EPA *(Table A-1)* and perform the following:

- Measure the air temperature (ta) using a mercury thermometer. Ensure that the bulb is shielded from radiant heat. Estimate the percentage of sunshine by figuring the amount of time the sun is not covered by clouds thick enough to produce a shadow (100 percent sunshine equates to no cloud cover and a sharp, distinct shadow; 0 percent sunshine equates to no shadows).
- Calculate the adjusted air temperature (ta adj) by using the equation ta adj ºF = ta ºF + 13 times the percentage of sunshine to obtain information for a work level of 250 kilocalories/hour.

Note. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

Table A-1. Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers

Adjusted temperature	*Normal work ensemble*	*Impermeable ensemble*
90ºF (32.2ºC) or above	After each 45 min of work	After each 15 min of work
87.5º–90ºF (30.8º–32.2ºC)	After each 60 min of work	After each 30 min of work
82.5º–87.5ºF (28.1º–30.8ºC)	After each 90 min of work	After each 60 min of work
77.5º–82.5ºF (25.3º–28.1ºC)	After each 120 min of work	After each 90 min of work
72.5º–77.5ºF (22.5º–25.3ºC)	After each 150 min of work	After each 120 min of work

SITE SETUP

A-74. The following requirements apply to the setup of response sites (RSs):

- The entry team leader must ensure that members of the response team are assigned specific tasks. All assignments must be noted on the RS setup checklist.
- The hazardous-substance team supervisor or entry leader must use the standard three-zone system (exclusion, contamination reduction, and support) at all chemical incidents.
- The team members must ensure that the proper PPE is worn during all duties.
- Team personnel must evaluate the decontamination selection, as discussed in *Chapter 4*. In cases where decontamination must be performed using solutions, team personnel should follow the minimum standard decontamination line setup as identified in *Chapter 4*.
- The team members must calibrate and/or field-test equipment, according to the manufacturer's instructions, prior to initial entry. All equipment discrepancies must be reported to the entry leader and corrected prior to equipment use.

PREENTRY PROCEDURES

A-75. Medical personnel must conduct examinations on all entry, backup, and decontamination personnel before responders enter the exclusion zone. Follow-up medical monitoring must also be conducted at the conclusion of each work shift. All information must be recorded. The medical personnel use the following guidelines from the American Heart Association:

- Blood pressure must not exceed 140 systolic or 100 diastolic beats per minute (bpm).
- Pulse rate must not exceed 100 bpm.
- Body temperature must not drop below 98ºF or rise above 99.2ºF.
- Resting respiration range must be between 15 and 20 breaths per minute.

A-76. The entry leader must ensure that the backup and decontamination teams, when assigned, are at their designated areas prior to and throughout entry operations.

A-77. The FOSC must meet with the team supervisor and/or entry leader to develop and review initial entry objectives. The entry leader must ensure that the objectives are clearly communicated to the entry teams.

A-78. Personnel entering into locations where the contamination levels are unknown must carry the proper warning equipment. This equipment includes—

- A photoionization detector (PID).
- A flame ionization detector (FID).

- A combustible gas indicator (CGI).
- An oxygen meter.
- An alarming radiation dose rate meter.

Note. The number of entry personnel and the entry objectives determine if additional instrumentation is required.

A-79. Hazardous-substance teams responding to an incident must complete the mission with zero chemical exposure. The following levels have been established to measure the exposure risk. These action levels may not be exceeded unless authorized by the team commander. More stringent standards may be established for a given site and will be set by the team supervisor or entry leader.

- Flammable atmospheres must not exceed 10 percent of the lower explosive limit (LEL) for PPE Levels A through D.
- Oxygen-enriched atmospheres must not exceed a level greater than 22 percent oxygen for sea level shipboard responses or greater than 23.5 percent oxygen for shore side responses.
- Sea level atmospheres must not drop below 19.5 percent oxygen for PPE Levels C and D if all other hazards have been eliminated.
- Radiation dose rates must fall within established standards.
- Concentrations of toxic chemicals must not exceed the most conservative exposure limits found in standard HAZMAT response chemical references (*NIOSH Pocket Guide*, OSHA guidance, American Conference of Governmental Industrial Hygienists [ACGIH] guidance, MSDSs, TOMES database), as determined by the IC.

Sampling Plans

A-80. Sampling plans are used to establish transfer points, escort requirements, and chain-of-custody operations. Team personnel rarely develop sampling plans on their own. These plans are normally developed in concert with the EPA or NOAA scientific support coordinator. The SO or unit industrial hygienist (IH) reviews any sampling plans developed by team personnel and ensures that the FOSC, team supervisor, and entry leader receive the plans for review.

Briefings

A-81. The site team leaders must brief the entry, backup, and decontamination teams and ensure that all personnel understand their assignments prior to entry into the exclusion zone.

A-82. The site team leaders must ensure, at a minimum, that personnel information briefings occur at the start and end of each operational shift. Safety briefings must occur when there are significant changes in operations or in the hazard characteristics. The SO or unit IH must ensure that the safety plan is continually updated. The team leaders must ensure that any changes are brought to the attention of the entire response team.

A-83. The team supervisor and/or team leader ensure that personnel know and understand the procedures for handling emergencies within the exclusion zone.

A-84. The decontamination team supervisor and/or team leader ensure that the decontamination line and emergency decontamination procedures are thoroughly explained to all personnel during a walk-through demonstration.

ENTRY PROCEDURES

A-85. There are several procedures that must be observed as the team prepares to enter the exclusion zone.

Safety Considerations

A-86. The following safety procedures must be observed while the team is in the exclusion zone:

- The team supervisor or entry leader must authorize the supplied "on-air" time. The SO must record the start time, and the entry leader must monitor the air time.
- The team supervisor and entry leader must notify the command when CBRN exposure, injury, or modifications to an action level occurs.
- The entry team must monitor the wind direction at all times.
- All team personnel must ensure that they have clear paths to the evacuation routes and are able to hear emergency evacuation signals at all times.
- The entry team must avoid unnecessary contact with contaminated surfaces whenever possible.
- The entire entry team must proceed to the decontamination line if an SCBA low-pressure alarm sounds on any team member.
- All responders must use the buddy system. Entries must always be made with at least two responders.
- The entry team must leave the immediate area and notify the entry team leader for further guidance when an action level is reached.
- The entry leader must maintain a continuous line of sight with his team members. If this is not practical, continuous radio communications are acceptable. Other acceptable means of maintaining contact include the use of lifelines or staging radio repeaters at various intervals or the use of an air horn with prearranged signals.
- All unexpected hazards must be reported to the entry leader for further action.

Communications

A-87. The following communication operations must be observed while the team remains in the exclusion zone:

- The entry team must report initial entry readings, changes in readings, new hazards, and instrument difficulties.
- The entry leader must conduct a communications check every 5 minutes if a line of sight cannot be maintained.
- The only personnel authorized to use the entry team's radio frequency are the team supervisor, entry leader, and SO. Other personnel may use this frequency if a serious safety concern arises.

A-88. Emergency communications must be identified in the SSP and communicated to the entry leaders. Backup measures, including standard hand signals and/or the use of an air horn must be used as outlined in the safety plan.

Emergency Procedures

A-89. The team supervisor or entry leader must review the emergency response plan with the response team. The following emergency procedures must be observed while the team remains in the exclusion zone:

- If a team member is injured or involved in an emergency situation, the team supervisor, entry leader, SO, or FOSC must he notified.
- The team supervisor must conduct an assessment and coordinate the emergency efforts.

EGRESS PROCEDURES

A-90. The following egress procedures must be observed as the team exists the exclusion zone and begins decontamination operations:

- The decontamination team leader must be informed of all issues concerning decontamination procedures.
- The SO must observe decontamination operations to ensure contamination is removed as thoroughly as possible. If the SO determines that a modification to the decontamination line is needed, he notifies the decontamination team leader.
- Team members should remove and properly dispose of work clothing worn under the PPE to prevent the possible spread of contamination.
- The medical team must examine all team personnel and record the amount of time spent in the hot zone, the body temperature, and the respiration rate on a potential exposure and medical monitoring form.
- The entry team supervisor, entry team leader, SO and, if available, the replacement entry team conduct debriefing operations with the exiting entry team. The exiting team should report monitor readings, hazards, and physical descriptions of the exclusion zone.
- The team supervisor, entry leader, SO, and/or EMT review the SSP and update it as necessary.

Site Demobilization

A-91. The following procedures must be performed as the team begins site demobilization procedures:

- The team supervisor and entry leader ensure that all equipment is decontaminated and inventoried prior to stowage.
- The team supervisor and/or entry team leader meet with the IC to discuss repair or replacement of damaged and destroyed equipment.
- The team supervisor and entry team leader ensure that all consumable items are disposed of according to applicable regulations.
- All personnel complete potential exposure forms and turn them over to the EMT or SO before leaving the site. The EMT or SO routes the forms to the team supervisor or entry team leader

Debriefing

A-92. The team supervisor and/or the entry leader meet with the FOSC or IC and conduct a final debriefing. The discussion should focus on the pros and cons of the operation and should be documented for use in future operations. The team supervisor and/or entry leader must also ensure that the IC signs all cost documentation and purchase orders.

Appendix B

Personal Protection

This appendix focuses primarily on levels of personal protection, the PPE currently available, and general guidelines for selecting PPE. The amount and type of protection required during a HAZMAT incident depends on the type of hazard that may be encountered. Multiple types of PPE may be needed to ensure proper protection for all potential installation CBRN/HAZMAT scenarios.

LEVELS OF PERSONAL PROTECTION

B-1. Individual protection levels have been established for protection against toxic industrial chemicals (TIC)/TIM, and MOPP levels have been established for protection against CBRN.

INDIVIDUAL PROTECTION

B-2. OSHA has established four levels of individual skin and respiratory protection *(29 CFR 1910.120, Appendix B)*. The type of PPE worn is determined by the level of protection necessary for a particular incident. The PPE must be worn in accordance with guidelines published by OSHA and the NFPA. The use of PPE results in an increase in mental and physiological stress (heat stress, respiratory resistance), which must be carefully monitored and evaluated through all phases of the operation. The four OSHA-established levels of protection are—

- **Level D.** Level D protection consists of the work uniform. Neither skin nor respiratory protection is provided; therefore, this level should not be specified at an incident site where such hazards exist. Military battle dress uniforms and coveralls meet Level D requirements.
- **Level C.** The Level C ensemble consists of a chemical-resistant suit, full face piece, and air purification device. Chemical-resistant hoods, aprons, boots, and gloves should also be worn. Three layers of gloves may be used—an inner layer of latex gloves and middle and outer layers of chemical-resistant gloves. Level C protection may be selected when an airborne substance has been identified and is being monitored. All criteria for the use of air purification devices must be met, and the proper filters for the known hazard must be available. Air monitoring must continue throughout the operation to ensure that Level C protection remains effective. An escape mask should be worn in case of a change in conditions that renders the air purification device ineffective. The escape mask provides the responder with the protection necessary to move to the decontamination line.
- **Level B.** Level B protection consists of nonencapsulating, chemical-resistant suits—often called *splash suits* or *rain suits*. There are several Level B configurations, but none are vapor-tight. Depending on the configuration, an SCBA is worn inside or outside the suit. The Level B ensemble also includes chemical-resistant outer boots and three pairs of gloves—an inner layer of latex gloves and middle and outer layers of chemical-resistant gloves. Level B protection should be considered when the highest level of respiratory protection is required but lower levels of skin and eye protection are adequate. Level B is the minimum level of protection recommended for initial site entry—prior to the identification and monitoring of all hazards.
- **Level A.** Level A protection consists of a totally encapsulating suit with gloves and boots attached. Respiratory protection is provided by an SCBA worn inside the suit or by a supplied-air system. Chemical-resistant boots are worn over the boots attached to the suit. Two pairs of gloves (inner latex gloves and outer chemical-resistant gloves) are worn under the suit gloves. A radio may also be worn under the suit. Additional items that may be necessary include hard hats,

cooling vests, and kneepads. The Level A ensemble should be used when the highest level of respiratory, skin, and eye protection is required.

MISSION-ORIENTED PROTECTIVE POSTURE

B-3. The purpose of MOPP gear is to protect personnel against CBRN contamination. The MOPP ensemble consists of an overgarment, protective mask, hood, overboots, and protective gloves. In addition, personnel have mask carriers, M8/M9 detector paper, individual decontamination kits, and nerve agent antidote kits (NAAK). Standardized MOPP levels are used to communicate the necessary level of protection for a specific situation. Flexibility of the system allows commanders to adjust MOPP levels to accomplish a particular mission with the maximum protection and lowest risk possible. The standardized MOPP levels are—

- **MOPP-ready.** Protective masks are carried with the load-bearing equipment (LBE). Individual MOPP gear is labeled and stored no farther back than a logistic site; it is ready to be brought forward to the individual when needed—a process that should take no longer than 2 hours. Units in MOPP-ready status are highly vulnerable to persistent agent attacks. Therefore, personnel are equipped with field-expedient items (wet-weather gear) that are identified for use in the event of an unanticipated CBRN attack or release. If it is determined that CBRN weapons have been used or that their use is a threat, the unit automatically upgrades to MOPP0.
- **MOPP0.** PPE is issued to individuals, who then inspect and prepare the equipment for use. Protective masks are carried with the load-carrying equipment (LCE). Other PPE items, including the standard-issue overgarment, must be "readily available." To be considered "readily available," the equipment must be carried by each individual and stored within reach (work area, vehicle, watercraft). Individuals should be capable of donning their PPE in 8 to 10 minutes. Units in MOPP0 status are highly vulnerable to persistent agent attacks and automatically upgrade to MOPP1 if it is determined that persistent CBRN weapons have been used or that their use is a threat. MOPP0 is primarily specified when an enemy is capable of CB employment but there is no indication of immediate CB use.
- **MOPP1.** When directed to MOPP1 status, personnel immediately don the overgarment. Other PPE making up the individual MOPP gear (mask, gloves) is carried or readily available. Contact lenses must be removed and protective-mask optical inserts used, if necessary. The M8 or M9 paper is attached to the overgarment, and the decontamination kit and NAAK are carried or kept at hand. In hot weather, the overgarment jacket may be left open and the overgarment may be worn directly over underwear. Leaders are responsible for monitoring hydration levels. The MOPP1 ensemble provides a great deal of protection against persistent agents. This level is primarily specified when a CB attack is possible.
- **MOPP2.** Personnel wear the overgarment and footwear covers. The mask, mask carrier, and gloves are carried. Decontamination kits, the M8 or M9 paper, and NAAK are carried or kept at hand. Personnel wear protective-mask optical inserts, if necessary. As with MOPP1, the overgarment jacket may be left open, but trousers must remain closed. Hydration levels must also be maintained. MOPP2 is primarily specified when a CB attack is possible.
- **MOPP3.** Personnel wear the overgarment and protective mask. The protective gloves are carried. To allow for relief at MOPP3, particularly in hot weather or when the heat stress index (HSI) is high, personnel may open the overgarment jacket and roll up the protective-mask hood for ventilation, but the trousers must remain closed. MOPP3 is used when personnel are operating inside areas where there are no chemical-agent contact hazards; MOPP3 is not appropriate if a contact hazard is present.
- **MOPP4.** Personnel completely encapsulate themselves by closing the overgarments, adjusting all drawstrings to minimize openings, and donning the protective gloves. MOPP4 is used when the highest degree of protection is required or when CB agents are known to be present but the actual hazard has not been determined. MOPP4 is a level of protection similar to that of OSHA Level C. As with the other MOPP levels, flexibility is allowed so that relief may be provided to the individual. Once the hazard has been identified and risk assessment measures have been employed, the overgarment may be left open.

- **Mask-only.** The mask is worn with the long-sleeve duty uniform (for limited skin protection). The mask-only command may be issued in situations where riot control agents are employed and no CB threat exists or where there is a downwind vapor hazard from a nonpersistent CB agent. However, mask-only is not normally appropriate when blister or nerve agents are involved.

B-4. MOPP gear is designed to protect personnel from CBRN agents in a contaminated environment; it provides only limited protection from some TIM. Therefore, personnel equipped with standard MOPP gear must not remain in a TIM environment; they must seek a clean area as soon as possible. Operations that take place in a suspected TIM environment may require the use of a higher level of protection than standard MOPP.

PERSONAL PROTECTIVE EQUIPMENT

B-5. Various types of PPE, including respiratory equipment and protective ensembles, are used to protect personnel from exposure to toxic agents.

Note. This discussion does not include a comprehensive list of all CBRN defense equipment. Furthermore, the products described in this section may not necessarily be available as standard equipment for all CBRN crisis responders.

RESPIRATORY PROTECTION

B-6. The respiratory system is the most direct and generally the most critical exposure route. Therefore, respiratory protection is the primary personal-protection concern.

Definitions

B-7. The following definitions pertaining to respiratory protection are included in *29 CFR 1910.134* (the *OSHA Respiratory Standard*):

- *Canister* or *cartridge* refers to a container that houses a filter, sorbent, or catalyst (or a combination of these items) and is designed to remove specific contaminants from the air which passes through.
- *Escape-only respirator* refers to a respirator which is intended to be used only for emergency exit.
- *High-efficiency particulate air (HEPA) filter* refers to a filter that is at least 99.97 percent efficient in removing monodisperse particles of 0.3 micrometers in diameter from the air.
- *Powered air-purifying respirator (PAPR)* refers to an air purification device that uses a blower to force ambient air through air-purifying elements to the air inlet covering.
- *SCBA* refers to a particular type of atmosphere-supplying device for which the breathing-air source is designed to be carried by the user.
- *Supplied-air respirator (SAR)* or *airline respirator* refers to a particular type of atmosphere-supplying device for which the breathing-air source is not designed to be carried by the user.

Occupational Safety and Health Administration Requirements

B-8. *29 CFR 1910.134*, which is available at *<http://www.osha.gov/SLTC/respiratoryprotection/index.html>*, specifies that an effective respiratory protection program include a written program document that, at a minimum, addresses the following elements:

- Procedures for the selection of respirators.
- Medical evaluations of personnel required to wear respirators.
- Procedures for the fit-testing of respirators.

- Procedures for the proper use of respirators in routine and emergency situations.
- Procedures to ensure adequate air quality, quantity, and (for SARs) flow.
- Training on respiratory hazards and the proper use, maintenance, and limitations of respirators.
- Identification of filters, cartridges, and canisters.
- Procedures for maintaining pertinent records (medical evaluations, fit tests).
- Procedures and schedules for cleaning, disinfecting, maintaining, repairing, storing, inspecting, and discarding respirators.
- Procedures for evaluating program effectiveness.

The Army Respiratory Program

B-9. According to *AR 11-34*, when required by the job, the ability to use respiratory protective equipment (RPE) is a condition of employment. Therefore, personnel who are assigned duties that involve access to chemical surety materiel must be capable of wearing protective clothing and equipment (PCE) (*AR 50-6, paragraphs 3-13 a [3]* and *6-3 g*). In addition, prior to being assigned to tasks that require the use of a respirator, personnel must undergo a medical evaluation. The requirements of this evaluation are listed in *AR 40-5*, *Technical Bulletin* (*TB) Medical (MED) 502/Defense Logistics Agency Manual (DLAM) 1000.2*, and *TB MED 509*. The medical status of respirator users is reviewed at least annually by the installation medical authority (IMA).

Types of Respiratory Protection

B-10. Respiratory protection may be provided by either air purification or atmosphere-supplying devices.

Air Purification Devices

B-11. Air purification devices are respirators or filtration devices that remove particulate matter, gases, or vapors from the atmosphere. There is no separate source of air; air purification devices use ambient air, which is then purified or filtered before inhalation. These devices range from half-mask, face piece-mounted cartridges with no eye protection to full face piece, dual-cartridge masks with eye protection. Particle-removing respirators have a mechanical filter that separates contaminants from the air. Air purification devices used for gases or vapors are commonly equipped with a cartridge which contains sorbent material that absorbs or reacts with the hazardous gas or vapor. The cartridge appropriate for the expected contaminant(s) (acid gas, organic vapor) must be selected.

B-12. There are limitations to the use of air purification devices. They—

- Should never be used in the presence or potential presence of unidentified contaminants.
- Should never be used in IDLH or oxygen-deficient atmospheres containing less than 19.5 percent oxygen.
- Must be used in conjunction with the constant monitoring of contaminant and oxygen levels.
- Protect only against specific chemicals and only at specific concentrations. Their effectiveness against two or more chemicals simultaneously is highly questionable.
- Have relatively short protection durations. Once they have been opened, the sorbent canisters begin to absorb humidity and air contaminants—whether they have actually been put into use or not. As a result, the efficiency and service life of the air purification device dramatically decrease.

B-13. The limitations of air purification devices make their use in emergency response situations challenging. Air purification devices should not be used at nontraditional release sites unless qualified personnel (IHs) have monitored the surrounding environment and determined that such devices may be safety used.

Atmosphere-Supplying Devices

B-14. An atmosphere-supplying device is a respiratory protection device that supplies a source of air. These devices provide the highest level of protection available against airborne contaminants, and they may be used when operating in IDLH and oxygen-deficient atmospheres.

B-15. There are two types of atmosphere-supplying devices—SCBA and SARs. Although SCBA is the most commonly used type, SARs, or airline respirators (which supply air from a remote source, through an airline hose, to the user), may be used when extended working times are required—such as during decontamination or remedial operations. Dual-flow SCBAs, which receive air supplies from either an SCBA or an airline, may provide additional flexibility for both entry and decontamination operations.

B-16. Only positive-pressure devices, which maintain positive pressure in the face piece during both inhalation and exhalation, should be used during nontraditional CBRN or HAZMAT response operations.

Respiratory Products

B-17. Government-approved COTS supplies and equipment are used for personal protection. The results of ongoing, government-conducted testing and evaluation programs enable the continuing addition of items to the list of government-approved COTS supplies and equipment. Information on approved COTS items may be obtained through the chain of command or from the AMC logistics assistance representative.

Note. The mention of trade names does not constitute official or commercial endorsement of particular products.

B-18. Examples of specific products designed for respiratory protection include—

- **MSA 4500 SCBA rebreather with rebreather bottles.** The MSA 4500 *(Figure B-1)* is a rugged SCBA that connects to a portable air supply. It has a unique "heads-up" display that shows low air-pressure warnings. This SCBA, which is flame- and heat-resistant, should be worn during the most demanding CBRN activities. The MSA 4500 is available in three sizes for optimum fit.

Figure B-1. MSA 4500 SCBA Rebreather

- **3M™ 6000 DIN air purification device and FR 64 respirator.** The 3M 6000 DIN air purification device and FR 64 respirator provide respiratory protection against all known TIM and CWAs and many biological agents. Air purification devices are certified for use only when the types of contaminants are known, contamination is below IDLH levels, and sufficient oxygen is present. Protection times for air purification devices vary based on the type of hazard present, the fitness level of the individual, and the level of physical activity that must be sustained during operations. When mated with the FR 64 single DIN-threaded cartridge, the air purification device is capable of filtering CWAs. It is also NIOSH-approved for use against organic vapors, chlorine, hydrogen chloride, sulfur dioxide, hydrogen fluoride, chlorine dioxide,

hydrogen sulfide (escape), ammonia, methylamine, formaldehyde, and all known TIM. When exposed to moisture, the FR 64 canister does lose some of its protective capability; therefore, it is hermitically sealed in a pouch to minimize contact with the environment. The manufacturer-supplied user's guide provides further guidance on the use of the equipment and a more complete list of TIM.

- **3M PAPR with FR 64 cartridges.** The PAPR *(Figure B-2)* is a motorized system which uses a filter to clean ambient air before the air is delivered to the breathing cavity in the mask. Each PAPR system includes a headpiece, blower, breathing tube, and battery. Due to the clean, forced-air supply, PAPRs allow for easier breathing and generally provide some relief against heat stress. The PAPR is usually included in Level B protective equipment when there is a wide array of unknown dusty agents, mists, fumes or radionuclides. Although FR 64 cartridges are acceptable for a wide array of agents, filter cartridge selection may need to be reassessed once specific agents are positively identified. The *3M™ Respirator Selection Guide* should be consulted for further information on filter selection.

Figure B-2. 3M Power-Flow PAPR With FR 64 Cartridge

- **3M full face piece respirator, FR-M40.** The 3M FR-M40 full face piece respirator has been NIOSH-approved for use with 3M cartridge FR-C2A1 or 3M cartridge FR 64 for acid gases (including chlorine), chloroacetophenone (CN), 2-chlorobenzalmalononitrile (CS), and P100 particulate filters. A single FR-C2A1-DIN threaded cartridge may be mounted on either the right or left side of the respirator. The FR-C2A1 cartridge meets military specifications *Military Specification (MIL-SPEC)-C-51560* and *EA-C-1704*. The respirator has several unique design features. For example, silicone creates a perfect face seal, allowing for maximum comfort and increased confidence in fit-testing results, while an optional butyl rubber second skin protects the face piece, increasing respirator life and decreasing decontamination costs. In addition, a butyl-coated nylon hood, which covers the head and neck, is easily donned to add additional protection against chemical agents. The hood meets *MIL-SPEC-C-51251*. An integral drinking device permits the user to replenish fluids without removing the mask. A dual-eyepiece format permits a simple interface between the respirator and the optics and allows for the equipment to be folded for storage. FR-M40 accessories include clear and gray eyepiece outserts, spectacle kits, and butyl rubber second skins. The FR-M40 fits into a storage bag/carrying pouch with a strap and has been used for years by U.S. armed forces all around the world.

PROTECTIVE ENSEMBLES

B-19. Acceptable types of chemical-protective clothing include totally encapsulating and nonencapsulating ensembles, which offer specific levels of liquid and/or vapor hazard threat protection.

National Fire Protection Agency Standards

B-20. The NFPA has established three standards for hazardous materials protective ensembles. Commercial protective ensembles should be certified to meet these NFPA standards. The NFPA standards are—

- ***NFPA 1991 Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies.*** This standard is equivalent to that of the OSHA Level A protective ensemble. It includes protective garments, gloves, and footwear; respiratory protection is not addressed as part of this standard.
- ***NFPA 1992 Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies.*** This standard is equivalent to that of the OSHA Level B protective ensemble. It includes protective garments, gloves, and footwear; respiratory protection is not addressed as part of this standard.
- ***NFPA 1994 Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents.*** This standard applies to garments, gloves, and footwear designed to protect against TIC, chemical warfare agents (CWAs), and biological warfare agents (BWAs). It does not apply to respiratory protection or to ensembles designed for firefighting or protecting against radioactive materials. It also does not apply to protective ensembles that were manufactured before 2 August 2001 and intended for use in chemical/biological terrorism incidents.

Note. The NFPA 1994 standard and other relevant NFPA standards/supplements are available at *<http://www.nfpa.org/aboutthecodes/list_of_codes_and_standards.asp>*.

Note. A list of PPE which has been certified by the Safety Equipment Institute (SEI) to meet specific standards, such as those outlined in *NFPA 1991*, *NFPA 1992*, and *NFPA 1994*, is available at *<http://www.seinet.org/CPL/contents.htm>*.

Products

B-21. Examples of specific protective ensembles include—

- **Joint service lightweight integrated suit technology (JSLIST) ensemble.** The current standard DOD protective ensemble is the JSLIST ensemble *(Figure B-3, page B-8)*. This ensemble consists of a two-piece, front-opening suit (jacket with hood and trousers); adjustable suspenders; a pair of multipurpose over boots (MULO) (effective for rain/snow/CB); and gloves. The suit liner has a nonwoven front that is laminated to activate carbon spheres and is bonded to a knitted back that absorbs chemical agents. The JSLIST ensemble provides 24 hours of continuous protection against CWAs, BWAs, and radiological (alpha and beta) particles. In an uncontaminated environment, the ensemble may be worn for 45 days with up to six launderings or over 120 days with no launderings. The JSLIST ensemble should be the protective ensemble of choice during fair-weather CBRN counterterrorism operations in which personnel are likely to encounter a suspect agent but are not expected to be immersed in water. Under the direction of combatant commanders, personnel may be required to carry and wear the JSLIST ensemble. At just under 6 pounds, the new JSLIST suit is about half the weight of the battledress overgarment. It is available in a four-color woodland or three-color desert camouflage pattern.

Figure B-3. JSLIST Ensemble

- **Disposable Toxicological Agent Protective System (DTAPS)®.** The Level A DTAPS *(Figure B-4)* was specifically designed for use in domestic preparedness, CBRN, and WMD environments. The suit is constructed of low-visibility fabric that consists of a multilayer composite chemical barrier laminated to a strong, nonwoven substrate. It features a vapor-tight zipper with double splash flaps and an expanded, three-layer visor for improved field of vision. The system protects against industrial chemicals and chemical and biological warfare agents.

Figure B-4. DTAPS

- **Level B TYCHEM® suit.** Level B protection requires that the operator wear a hooded, one- or two-piece, chemical-resistant (splash-proof) suit and an SCBA. Level B TYCHEM suits *(Figure B-5)* are constructed of high-strength, nonwoven materials containing nonhalogenated films on either side. The seams are taped or double-taped. The suit was specifically developed for protection against toxic and corrosive gases, liquids, and solid chemicals. It has been tested against more than 280 substances; in 260 of these cases, there was no permeation observed after 8 hours of continuous contact. Level B TYCHEM suits are used by the chemical and petrochemical industries, emergency HAZMAT teams, and hazardous materials/waste cleanup crews. The suits are lime-yellow in color (for high visibility) and are available in a variety of styles—from aprons and coveralls to Level A gas-protective ensembles.

Figure B-5. Level B TYCHEM Suit

- **TYVEK® F suit.** The TYVEK F suit *(Figure B-6, page B-10)* is a lightweight, impermeable, coverall-type suit with an inherent hood and booties to reduce the number of enclosures/fasteners necessary. The hood and the wrist and ankle openings have close-fitting elastic seals. The front closure, near the chest area, has double-baffled zippers. All enclosure areas (front chest zipper, wrist to glove, boot to leg, hood to mask) must be duct-taped to ensure a proper "air-tight" seal. Although all impermeable membranes do break down at some point (depending on the contact hazards present and the amount of time the suit is exposed to these hazards), the TYVEK F suit provides excellent protection against almost all known TIM, CWAs, biological agents, and radiological particulates (alpha and beta). The suit is designed as a one-time-use overgarment for emergency personnel when dermal protection is necessary and evacuation from a site is expected to take an extended period of time. The suit must **not** be used to continue inspections or to perform rescue response activities. TYVEK F suits may pose a significant health concern to the user due to a lack of material "breathability," which quickly results in increases in core temperatures of the body—especially during periods of intense physical activity. Therefore, team members must be continually monitored during escape operations. Suit size is not critical, except that the suit must be large enough to fit comfortably. Additional TYVEK F protective slip-over boots are available and should be worn over any footwear and duct-taped to the suit for additional protection.

Figure B-6. TYVEK F Suit

- **Kleenguard® coveralls (recycled Kleenguard extra suits).** Kleenguard coveralls (recycled Kleenguard extra suits) *(Figure B-7)* are constructed of a patented Microforce™ barrier fabric. The fabric is three layers thick—the first and third layers are spun and bonded, and the second layer is melted. This arrangement results in excellent breathability and particulate holdout. The coverall suits have zippered fronts with 1-inch flaps and elastic backs, wrists, and ankles. They are relatively well-fitted, due to the Reflex® garment design. The Kleenguard suit is worn during general cleanup, maintenance, and shutdown operations; in environments containing dust or other fine particles, such as fiberglass; when working with oil or grease; or while processing food or performing mold remediation.

Figure B-7. Kleenguard Coveralls (Recycled Kleenguard Extra Suits)

ADDITIONAL ITEMS

B-22. In addition to respiratory equipment and chemical ensembles, there are other PPE items that may be used to protect against toxic agents.

Chemical-Protective Undergarment

B-23. The chemical-protective undergarment (CPU) *(Figure B-8)* consists of a hooded or nonhooded jacket, pants, booties and gloves. CPUs are constructed of a durable composite fabric containing polymerically encapsulated carbon for the absorption of CWAs. These undergarments offer an additional barrier against liquid or vapor incursions into the outer layer of protective garments. The polymerically encapsulated carbon reduces sweat poisoning (skin pruning). The fabric also possesses unique stretch characteristics, providing enhanced comfort.

Figure B-8. CPU

Multipurpose Over Boots

B-24. The MULO is created by injection-molding an elastomer blend that has been compounded to provide the necessary chemical and environmental protection. MULOs, which incorporate two quick-release side buckles, are designed to be worn over standard-issue footwear. They provide protection against water' snow; mud; and petroleum, oil, and lubricants (POL). They are also flame-resistant. MULOs can be decontaminated to an operationally safe level using standard decontaminants. They provide 60 days of durability and 24 hours of protection against liquid chemical agents.

Vinyl Overshoes

B-25. The green vinyl overshoe (GVO) is a plain, olive-drab (OD) green, vinyl overshoe with elastic fasteners. The black vinyl overshoe (BVO) is very similar to the GVO—except for the color and enlarged tabs on each elastic fastener. Personnel may wear GVOs or BVOs over their combat boots to protect their feet from contamination by all known agents, vectors, and radiological particles (alpha and beta). As long as GVOs/BVOs remain uncontaminated and serviceable, protection may continue for a maximum of 60 days. Following exposure to any known CB agent, GVOs/BVOs worn with combat boots provide 24 hours of protection. GVOs/BVOs may be decontaminated with a 5 percent high-test hypochlorite (HTH solution or a 5 percent household bleach solution. If signs of deterioration are evident following decontamination, the overshoe should be replaced.

Gloves

B-26. Personnel operating in a CBRN environment should wear chemical-protective gloves. The thicker the glove, the greater the degree of protection, but also the greater the loss of manual dexterity.

B-27. Heavy gloves may make it difficult for medical personnel to provide advanced medical care. Other potential health issues regarding gloves include meeting Food and Drug Administration (FDA) requirements for examination gloves, maintaining sterility, and changing gloves after touching each patient.

B-28. There are several types of chemical-protective gloves available, including—

- **Outer butyl rubber/inner nitrile gloves.** An outer butyl rubber glove may be worn over an inner, disposable, nitrile glove. Butyl rubber gloves are available in varying thicknesses (7, 14, 17, 25, and 30 mils). A minimum thickness of 14 mils is recommended for the outer glove. Inner nitrile gloves, which are comparatively thin, are available in 4 and 5 mils.
- **JSB1GU gloves.** JSB1GU gloves *(Figure B-9, page B-12)* consist of an outer glove and a thin, inner, impermeable liner. They provide protection from liquid, vapor, and aerosol CB hazards. The JSB1GU fulfilled an urgent U.S. Special Operations Command requirement for a glove

with increased tactility and dexterity. The glove is durable for up to 14 days and offers 24 hours of protection in a contaminated environment.

Figure B-9. JSB1GU Gloves

- **Chemical-protective glove set.** As long as chemical-protective glove sets remain serviceable, they protect against CB agents and alpha and beta radioactive particles. The glove sets are available in three thicknesses—7, 14, and 25 mils. Personnel whose tasks require extreme tactility and/or sensitivity and who will not be exposing the gloves to harsh treatment generally use the 7-mil glove set. Personnel (aviators, vehicle mechanics, and members of weapons crews) whose tasks require tactility and sensitivity and who will not be exposing the gloves to harsh treatment use the 14-mil glove set. Personnel who perform close combat tasks and other types of heavy labor use the more durable 25-mil glove set. In the event that 14- or 25-mil glove sets become contaminated with liquid chemical agents, they should be decontaminated or replaced within 24 hours of exposure. In the event that a 7-mil glove set becomes contaminated, it should be replaced or decontaminated within 6 hours of exposure. Gloves may be decontaminated with a 5 percent chlorine solution or a 5 percent HTH solution. Members of all services use the chemical-protective glove sets.

Skin Exposure Reduction Paste Against Chemical Warfare Agents

B-29. Skin exposure reduction paste against chemical warfare agents (SERPACWA) is a topical skin protectant. Imprecise taping or natural folds of material at the neck, wrist, ankle, or any other closure site may cause the skin immediately under these areas to be vulnerable to CWA exposure. The simple application of SERPACWA *(Figure B-10)* to the skin at these closure sites can provide significant protection against the threat of dermal contact with chemical agents and offers personnel yet another option for enhancing individual protection and survivability.

Chemical-Protective Helmet Cover

B-30. The chemical-protective helmet cover is a one-piece configuration constructed of butyl-coated nylon cloth, which is gathered at the opening by elastic webbing enclosed in the hem. The helmet cover protects the helmet from CB contamination and radioactive alpha and beta particles. It is OD green in color and is available in only one size. U.S. Army and Marine Corps units are the primary users of the chemical-protective helmet cover.

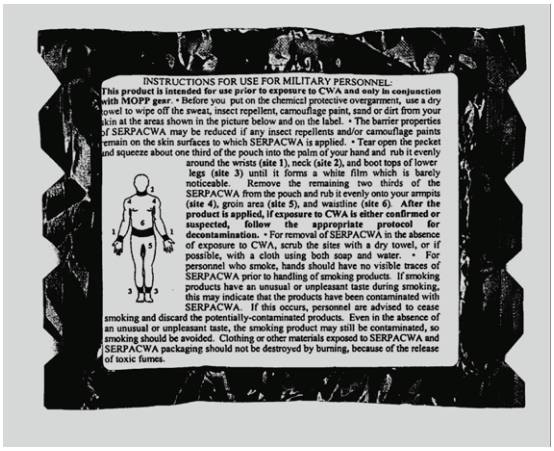

Figure B-10. Label for SERPACWA

GENERAL GUIDELINES FOR SELECTING PERSONAL PROTECTIVE EQUIPMENT

B-31. The level and type of PPE required for a specific CBRN incident depends on the threat analysis, hazard assessment, and exposure estimates conducted for the particular situation. For instance, a threat analysis might indicate that there is a reasonably high probability of exposure to a certain TIM; thus, the use of a particular type of air purification device cartridge or a specific type of glove may be necessary. Likewise, CBRN and TIM hazard assessments and exposure estimates conducted for the CBRN incident might indicate that the level of PPE needs to be upgraded or may be permitted to be downgraded. Based on the professional judgment of properly trained and certified personnel, the commander determines the level and type of PPE to be worn in any given situation. It is, however, possible to make some general recommendations regarding the selection of PPE; such recommendations are presented in this section.

FIRST RESPONSE

B-32. Personnel who respond during the initial phase of a CBRN event or incident, when the agent or airborne concentration is unknown, usually wear Level A or Level B PPE. A lesser level of protection is generally not deemed acceptable, unless or until air monitoring or a hazard analysis indicates otherwise.

B-33. The *NAERG*, which serves as a reference for first responders during the initial phase of a TIM or release other than attack (ROTA) incident, provides information regarding initial isolation and minimum protective action distances, as well as PPE. The *NAERG* provides a quick cross-reference index for identification numbers, guide numbers, and an alphabetical listing of names of materials that are then incorporated into a table of initial isolation and minimum protective action distances to the 90th percentile (90 percent probability that the hazard will not exceed these distances). Like *FM 3-11.3*, the *NAERG* is primarily designed for use during the initial phases of an incident; therefore, it may have limited applicability at fixed locations. The *NAERG* is available at <*http://hazmat.dot.gov/pubs/erg/gydebook.htm*>.

B-34. The American Industrial Hygiene Association (AIHA) Emergency Response Planning Guidelines (ERPGs) consist of 1-hour contact duration planning guidelines to protect workers and the general public from the consequences of accidental chemical releases. The ERPGs should also be considered in instances of terrorism involving TIC.

FOLLOW-ON RESPONSE

B-35. The area surrounding a CBRN incident is divided into three concentric zones—a hot zone, a decontamination zone, and a support zone. The PPE selected for a particular individual depends on which zone(s) that individual is expected to enter.

Hot Zone

B-36. The hot zone (or exclusion area) is the area immediately surrounding the chemical release; it is presumed to pose an immediate health risk to all persons, including rescuers. The following general PPE recommendations apply to personnel operating in the hot zone:

- Worst-case possibilities concerning toxicity must be assumed when an unidentified chemical is present. Depending on the situation, Level A PPE (including pressure-demand SCBA) must be worn.
- SARs (airline respirators) should not be used because the air hose may be degraded by chemicals or heat or the hose may become tangled. In addition, the use of SARs is impractical during emergency operations.
- Air purification devices are rarely appropriate for responding to CBRN incidents, since most of these incidents involve at least one of the following conditions which would preclude the use of an air purification device: an unidentified contaminant, an unknown concentration of contaminant, a concentration of contaminant above the NIOSH IDLH value, an oxygen-deficient atmosphere (less than 19.5 percent O^2), or high relative humidity.

Toxic Industrial Chemical Environment

B-37. When selecting respirators to be used at a TIC incident site, the following exposure limits should be considered:

- IDLH concentrations, as published by the NIOSH. Atmosphere-supplying devices are the only types of respirators considered acceptable for use in an IDLH atmosphere. Air purification devices are not allowed in IDLH atmospheres, as permanent adverse health effects or even death may result.
- PELs, as published by OSHA.
- Threshold limit values (TLVs), as published by the ACGIH.
- Workplace environmental exposure levels (WEELs), as published by the AIHA.

The appropriate respirator must be selected when the IDLH, PELs, TLVs, or WEELs concentrations are exceeded.

Biological Warfare Agent Environment

B-38. When inhaled, BWAs may cause infection and disease. The risk of exposure to infectious aerosols may be reduced through the use of respiratory protection. The selection of respiratory protection against BWAs should consider the—

- Severity of the disease (lethality rate).
- Probability of infection. The probability of acquiring an infection via inhalation is based on the dose inhaled, the infectious dose of the agent (which depends on the particle size and the individual's immune system, vaccination status, nutritional status, stress level, and age), where the agent is deposited in the respiratory tract, and the respirator-assigned protection factor.
- Availability and use of an effective vaccine or other prophylaxis.
- Historical/epidemiological record with regard to the ability of specific PPE to prevent secondary transmission.

B-39. Although respiratory protection reduces the risk of exposure to infectious aerosols, it may not eliminate the risk altogether. Some leakage into the mask may occur—either through the filter media or between the user's face and the face piece seal. However, even in the event that leakage does occur, the

dose inhaled is reduced, and the probability of infection subsequently decreases. If the dose inhaled as a result of respirator leakage is lower than the infectious dose, the risk is effectively eliminated.

B-40. Some efforts have been made to develop risk-based methods for the selection of respiratory protection against infectious aerosols. The probability of infection is calculated based on the estimated dose inhaled, the infectious dose of the BWA, and the type of respirator used (and the associated leakage and protection factor). Risk-based methods for respiratory protection against infectious aerosols in general are under development by the AIHA and the American National Standards Institute (ANSI). Though risk-based methods may theoretically be ideal for selecting respiratory protection against BWA, they may not currently be practical or realistic

B-41. A tight-fitting, Class N-95 particulate, half face piece air purification device is the minimum level of respiratory protection required for infectious aerosols. The use of a more protective respirator may lower the risk of infection even more. For instance, general rules of thumb are as follows:

- A tight-fitting, full face piece air purification device provides more protection than a half face piece air purification device.
- A tight-fitting, full face piece PAPR provides more protection than a nonpowered, full face piece air purification device.
- An atmosphere-supplying device (SCBA, airline) provides more protection than a tight-fitting, full face piece PAPR.

B-42. Regarding the air-purifying, particulate-filter media currently used in respirators, Class 100 particulate filters provide a higher level of filtration efficiency than Class 99 and Class 95 particulate filters and Class 99 filters provide a higher level of filtration than Class 95 filters.

Decontamination Zone

B-43. The decontamination (or warm) zone surrounds the hot zone. Primary contamination is not expected; however, to avoid chemical exposure from contaminated victims, personnel working in the decontamination zone must make use of protective clothing and equipment. The following recommendations apply to personnel operating in the decontamination zone:

B-44. Generally, the level of PPE worn in the decontamination zone is the same as that worn in the hot zone unless air monitoring or professional judgment indicates that a lower level of PPE is safe. For example, if a Level A encapsulating (NFPA vapor-protective) suit is required in the hot zone, but the risk of secondary contamination is low, a Level B nonencapsulating (NFPA splash-protective) suit may be acceptable for the decontamination zone. Likewise, if the risk of inhaling off-gassing vapors is low (the chemical is not highly volatile or the decontamination area is established in an outdoor location with good natural ventilation), a lower level of respiratory protection may be acceptable. However, air contaminants should be identified and their concentrations measured prior to recommending a lower level of respiratory protection.

B-45. If the agents of concern are CWAs or TIM, personnel working in primary triage direct potentially contaminated patients to the ambulatory (nonmedical) or nonambulatory (medical) decontamination station. If necessary, lifesaving procedures are performed at the nonambulatory decontamination station. Those performing decontamination or assisting in the decontamination must wear PPE. Once patients leave decontamination stations, they are considered clean and proceed to secondary triage.

B-46. If the agents of concern are BWAs or radioactive materials, a minimum of Level C PPE is recommended. This includes TYVEK (or equivalent) garments, a hood, rubber gloves, boot covers, and a full face piece air purification device equipped with a P-100 or HEPA filter. However, if available, a PAPR is preferred for respiratory protection.

B-47. It is difficult for medical personnel wearing respirators and heavy gloves to provide advanced medical care in the decontamination zone. Furthermore, it may not be safe to operate electronic equipment (cardiac monitors) in the decontamination zone and it may also be difficult to decontaminate such equipment. Therefore, electronic equipment is not usually taken into the decontamination zone. For these

reasons, advanced medical care is generally not administered until after the victim has been transferred out of the decontamination zone into the surrounding support zone.

Support Zone

B-48. The support (or cold) zone is the area surrounding the decontamination zone. There is expected to be no risk of exposure in the support zone.

Table B-1 contains additional information regarding the type of PPE appropriate for various categories of agents that may be encountered in the hot, decontamination, and support zones.

CONFINED-SPACE OPERATIONS

B-49. Confined spaces increase the hazards associated with toxic, flammable, and explosive materials or atmospheres and oxygen-depleted or enriched atmospheres. Personnel operating in confined spaces may experience fires, explosions, injury, illness, or death. Therefore, confined spaces are considered unsafe for entry or work until testing has been conducted and conditions have been determined to be acceptable. Personnel who operate in confined spaces must be appropriately trained and certified according to applicable regulatory guidance, and they must wear the appropriate PPE.

Special Safety Requirements

B-50. Confined-space operations are considered hazardous. The following restrictions apply:

- Supervisors of personnel required to enter or work in a confined space must ensure the use of appropriate PPE for the operation, exposure, and expected hazards. PPE shall be available when needed, maintained in good condition, and cleaned daily following contact with irritants, caustics or toxic materials (fuels, sludge).
- When toxic materials or atmospheres are present or may be introduced into a confined space, personnel must, regardless of ventilation, wear approved respiratory-protective equipment in addition to any other required PPE.
- When operating in oxygen-enriched atmospheres or when flammable or explosive materials, gases, or vapors are present or may be introduced into the confined space, only approved, intrinsically safe, spark-proof or explosive-proof equipment may be used. All other potential ignition sources must be controlled, and adequate fire protection must be provided.

Respiratory Protection

B-51. All exposures or potential exposures within a confined space must be carefully evaluated prior to the selection of the appropriate respiratory protective devices. Only approved respirators may be used for confined-space operations. At a minimum, evaluations shall consider—

- The atmosphere in general.
- Whether the confined space is IDLH.
- The oxygen level.
- The types of contaminants present or likely to be present or generated (vapors, mists, fumes).
- Concentrations of contaminants.
- Appropriate exposure limits of contaminants (TLV, PEL, threshold limit value ceiling [TLVC]).

Table B-1. PPE Recommendations

	CWA	***TIM***	***BWA***	***Radiological/nuclear***
Hot zone (exclusion area)	Level A (initially) with NIOSH-certified SCBA. The PPE level may be lowered if air monitoring indicates it is safe to do so.	Level A or B (initially) with NIOSH-certified SCBA—the level depends on the chemical or situation. The PPE level may be lowered if air monitoring indicates it is safe to do so.	Level A or Level B (with NIOSH-certified SCBA) or Level C (either with NIOSH-certified PAPR equipped with HEPA filters or with NIOSH-certified full face piece air purification device equipped with a P-100 filter, depending on the situation).	*Short-duration exposure:* Level C with a NIOSH-certified full face piece, nonpowered air purification device equipped with a combination P-100 filter and organic vapor and acid gas cartridges/ canister (acceptable) or a PAPR equipped with a combination HEPA or P-100 filter and organic vapor and acid gas cartridges/canister (preferred); gloves; TYVEK or equivalent garments; hood; and boot covers. *Extended-duration exposure (days, weeks, months):* Level B or Level C with a PAPR equipped with a HEPA or P-100 filter and organic vapor and acid gas cartridges/canister, depending on the situation; gloves; TYVEK or equivalent garments; hood; and boot covers.
Decontamination (warm) zone	Same PPE level as that used in the hot zone or one PPE level lower than that used in the hot zone if professional judgment or air monitoring indicates it is safe.	Same PPE level as that used in the hot zone or one PPE level lower than that used in the hot zone if professional judgment or air monitoring indicates it is safe.	One PPE level lower than that used in the hot zone.	Same PPE level as that used during short-duration exposure in the hot zone.

Table B-1. PPE Recommendations (continued)

	CWA	*TIM*	*BWA*	*Radiological/nuclear*
Support (cold) zone	Standard precautionary PPE	Standard precautionary PPE	Standard precautionary PPE	Standard precautionary PPE
Note. When responding to fires or entering buildings on fire, structural firefighting gear should be worn—including helmet, SCBA, and turnout gear (thermally insulated coat, pants, and boots). ***Note.*** For T-2 mycotoxins, the PPE to be used is the same as that described for CWAs and TIM.				

B-52. Breathable air is to be provided during confined-space operations. Compressed breathable air supplied to respiratory protective devices, such as SCBA, shall, at a minimum, meet the ANSI requirements for Grade D (compressor source) breathable air. The requirements for Grade D breathable air are presented in *Table B-2*.

Table B-2. ANSI Requirements for Breathable Air

Component	*Grade D (compressor source) breathable air*
Oxygen (by volume)	19.5–23.5%
Carbon dioxide (by volume)	1,000 ppm (maximum)
Carbon monoxide (by volume)	10 ppm (maximum)
Oil (mist and vapor) and particulate matter	5 mg/m3 (maximum)

ADDITIONAL RESOURCES

B-53. Other resources that provide further guidance regarding the selection of PPE are shown below.

Guide for the Selection of Personal Protective Equipment for Emergency First Responders

B-54. The *Guide for the Selection of Personal Protective Equipment for Emergency First Responders (National Institute of Justice [NIJ] Guide 102-00, Volumes I, IIa, IIb, and IIc)* contains an overview of types of respirators and other PPE, an explanation of the factors to be considered in PPE selection, and an evaluation of the ability of manufacturers' PPE to protect against CWA, TIM, and BWA. The guide is available at <*http://www.ojp.usdoj.gov/nij/pubs-sum/191518.htm*>.

Managing Hazardous Material Incidents

B-55. There are three volumes contained in the ATSDR guide entitled Managing Hazardous Material Incidents (MHMIs). Volume I covers emergency medical services, *Volume II* addresses hospital emergency departments, and *Volume III* deals with medical management guidelines for acute chemical exposures to CWAs, TIC, and other chemicals. Each of these volumes is available at <*http://www.atsdr.cdc.gov/mhmi/*>.

Occupational Safety and Health Administration Personal Protective Equipment Requirements

B-56. The basic OSHA requirements for a PPE program are covered under *29 CFR 1910.132*, with specific pieces of protective equipment addressed in subsequent parts of the regulation. The requirements can be accessed at <*http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9777*>.

NIOSH Guide to Industrial Respiratory Protection

B-57. The *NIOSH Guide to Industrial Respiratory Protection (DHHS [NIOSH] Publication No. 87-116)* is available at <*http://www.cdc.gov/niosh/87-116.html*>.

NIOSH Guide to the Selection and Use of Particulate Respirators

B-58. The *NIOSH Guide to the Selection and Use of Particulate Respirators (DHHS [NIOSH] Publication No. 96-101)* is available at <*http://www.cdc.gov/niosh/userguid.html*>.

TB Respiratory Protection Program in Health Care Facilities—Administrator's Guide

B-59. The *TB Respiratory Protection Program in Health Care Facilities—Administrator's Guide (DHHS [NIOSH] Publication No. 99-143)* is available at <*http://www.cdc.gov/niosh/99-143.html*>.

Recommendations for Chemical Protective Clothing (A Companion to the NIOSH Pocket Guide to Chemical Hazards)

B-60. *Recommendations for Chemical Protective Clothing (A Companion to the NIOSH Pocket Guide to Chemical Hazards)* is available at <*http://www.cdc.gov/niosh/ncpc1.html*>.

A Guide for Evaluating the Performance of Chemical Protective Clothing

B-61. *A Guide for Evaluating the Performance of Chemical Protective Clothing (DHHS [NIOSH] Publication No. 90-109)* is available at <*http://www.cdc.gov/niosh/90-109.html*>.

Miscellaneous Web Sites

B-62. The following Web sites provide additional information regarding the selection of PPE:

- Standards for personal protective gear for first responders may be found at <*http://www.dhs.gov/xfrstresp/standards/*>.
- Emergency response guidance is available at <*http://www.osha.gov/SLTC/emergencyresponse/index.html*>.
- Guidance regarding hospital emergency response may be accessed at <*http://www.osha.gov/Publications/OSHA3152/osha3152.html*>.
- A list of PPE which has been certified by the Safety Equipment Institute (SEI) as meeting certain standards, such as those of the NFPA, ANSI, and American Society for Testing and Materials (ASTM), is available at <*http://www.seinet.org/CPL/contents.htm*>.
- Guidance on the selection of PPE is available at <*http://www.osha.gov/SLTC/personalprotectiveequipment/index.html*>.
- The following link for NIOSH-approved CBRN SCBA respirators is sponsored by the CDC and the NIOSH: <*http://www.cdc.gov/niosh/npptl/topics/respirators/cbrnapproved/scba/default.html*>.
- OSHA guidance regarding respiratory protection may be found at <*http://www.osha.gov/SLTC/respiratoryprotection/index.html*>.
- The following site has links to various other Web sites which contain information about respirators: <*http://www.cdc.gov/niosh/respinfo.html*>.
- Information about protecting against blood-borne pathogens can be found at <*http://www.osha.gov/SLTC/bloodbornepathogens/index.html*>.
- *The DOD-NIOSH-OSHA-Sponsored Chemical and Biological Respiratory Protection Workshop Report* is available at <*http://www.cdc.gov/niosh/pdfs/2000-122.pdf*>.

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Appendix C

Chemical Warfare Agent Threshold Values

This appendix provides exposure guidance to be used for military and domestic support operations. Included are TLVs, worker population limits (WPLs), PELs, IDLH levels, ERPGs, short-term public emergency guidance levels (SPEGLs), acute exposure guideline levels (AEGLs), airborne exposure limits (AELs), short-term exposure limits (STELs), and air military exposure guideline limits (MEGs) for selected CWAs.

Note. This appendix contains a comprehensive—but **not** all-inclusive—list of low-level protective limits. Commanders should not rely on this information as the sole source for search and survey, PPE selection, extraction, decontamination, medical support, or any other operation conducted in a chemical warfare environment.

HEALTH EFFECTS AND EXPOSURE LIMITS

C-1. Health effects and exposure limits depend on the toxicity and carcinogenicity of the CWA.

TOXICITY

C-2. Toxicity is a measure of the degree to which a substance is considered poisonous (capable of causing injury, illness, or death). The toxicity of a CWA is determined by its effects on the target (organism, organ, tissue). There are many factors which affect the toxicity of a substance—its physical form (solid, liquid, gas), the concentration, the pathway of administration (ingestion, inhalation, dermal contact, injection), the duration and frequency of exposure, and the genetic makeup and overall health of the individual.

C-3. For noncarcinogenic CWAs, it is presumed that there is a threshold concentration below which exposure to the CWA will not result in adverse health effects. However, because individuals typically respond differently to identical doses of a toxin, a population level measure of toxicity, which relates the probability of an outcome for a given individual in a population, is often used to determine exposure limits. Threshold levels used as occupational exposure limits (chemical concentrations to which workers may be exposed without experiencing adverse health effects) are defined in *Table C-1, page C-2*. Threshold levels used as general population exposure limits in emergency situations are defined in *Table C-2, page C-3*.

Table C-1. Occupational Exposure Limits

Threshold level	*Definition*
TLV[1]	Refers to airborne concentrations of substances and represents conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effects.
TLV-TWA[1]	The TWA concentration for a normal 8-hr work day and 40-hr work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.
TLV-STEL[1]	The concentration to which workers may be continuously exposed for a short period of time without suffering from (1) irritation, (2) chronic or irreversible tissue damage, or (3) narcosis of a sufficient degree to increase the likelihood of accidental injury, to impair self-rescue, or to materially reduce work efficiency, provided that the daily TLV-TWA is not exceeded.
TLV ceiling[1]	The concentration that should never be exceeded during working exposure.
WPL	The TWA concentration for a normal 8-hr work day and 40-hr work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.
PEL[2]	The TWA concentration for a normal 8-hr work day and 40-hr work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.
IDLH[2]	A maximum airborne concentration from which one could escape without any irreversible health effects within 30 min.
[1]ACGIH [2]OSHA ***Note.*** Of the levels listed, only those defined by OSHA constitute actual regulatory limits; the ACGIH-defined levels serve only as guidance.	

Table C-2. General Population Exposure Limits

Threshold level	*Definition*
ERPG[1]	The maximum concentration in air below which it is believed nearly all individuals could be exposed for up to 1 hour without (1) experiencing other than mild, transient adverse health effects or perceiving a clearly defined objectionable odor (ERPG-1), (2) experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action (ERPG-2), or (3) experiencing or developing life-threatening health effects (ERPG-3).
SPEGL[2]	An acceptable concentration for unpredicted, single, short-term exposure of the general public in emergency situations. May be developed for different exposure periods (1, 2, 4, 8, 16, or 24 hr).
AEGL (EPA NAC/AEGL)[3]	Proposed short-term threshold or ceiling exposure value intended for the protection of the general public, including susceptible or sensitive individuals, but not those who are hypersusceptible or hypersensitive. Represents the airborne concentration of a substance at or above which it is predicted that the general population (as defined above) could experience (1) notable discomfort (AEGL-1), (2) irreversible or other serious, long-lasting effects or impaired ability to escape (AEGL-2), or (3) life-threatening health effects or death (AEGL-3). Developed for four exposure periods—30 min and 1, 4, and 8 hr.

[1]ERPGs, which are used during emergency planning and response operations, are intended to protect most, but not all, individuals in the general population (AIHA 2002). All populations include hypersensitive individuals who experience adverse effects at concentrations below these guidelines.
[2]SPEGLs (defined by the NRC, 1986b) and AEGL-1 levels are equivalent.
[3]AEGLs are synonymous with CEELs.
Note. The DOE SCAPA has published TEELs for about 680 chemicals. TEELs are based on the levels set forth by the AIHA and are designed to serve as interim ERPGs until final ERPG values can be established. TEELs, which range from TEEL-0 to TEEL-3, are based on the correlation between acute data and existing values (TLVs, IDLHs, and STELs).

C-4. Actual threshold concentration values for selected CWAs are presented in *Tables C-3 to C-5*.

- *Table C-3, page C-4,* lists AELs for unprotected personnel exposed to the G series nerve agents tabun (GA), sarin (GB), soman (GD), and cyclosarin (GF); the V-series nerve agent VX; and the sulfur mustard gas blister agents HD, H, and HT.
- *Table C-4, page C-5,* lists AELs for protected personnel exposed to GA, GB, GD, GF, VX, HD, H, HT, the blister agent lewisite (L), the sulfur mustard gas blister agent HL, and the nitrogen mustard gas blister agents HN-1 and HN-3.
- *Table C-5, page C-6,* lists exposure limits for other industrial chemicals that may be used as CWAs (blood, choking, vomiting, and incapacitating agents). The exposure limits presented in these tables are useful only if appropriate instrumentation and trained personnel are available to measure agent concentrations at the site.

Table C-3. AELs for Unprotected Personnel

Agent	*WPL (8-hr) (mg/m3)*	*STEL (mg/m3)[1&2]*	*IDLH (mg/m3)*	*GPL (mg/m3)*
GA[1], GB[1]	0.000030	0.00010	0.100	0.0000010
GD[1], GF[1]	0.000030	0.00020	0.050	0.0000010
VX[2]	0.000001	0.00001	0.003	0.0000006
HD[2], H[2]	0.000400	0.00300	0.700	0.0000200 (includes HT)

[1]For GA, GB, GD, and GF, a worker may be exposed to the STEL concentration no more than four times per day, with a time lapse of at least 60 min between successive exposures.

[2]For VX, HD, H, and HT exposures, a worker may be exposed only once per day at the STEL.

Note. AELs are listed in *AR 385-61* and *68 FR 58348-58351*.

Note. All AELs are concentration *and* time values, as opposed to concentration-only values. While administrative controls may be used to limit the duration of potential exposure to workers, they cannot be used to limit potential public exposure. Therefore, administrative controls significantly affect only the WPL protective action level.

Table C-4. AELs for Protected Workers

Agent and level of protection	*12-hr (mg/m3)*	*8-hr (mg/m3)*	*4-hr (mg/m3)*	*2-hr (mg/m3)*	*15-min STEL (mg/m3)[1]*
GA, GB					
APR	0.00100	0.00150	0.0030	0.0030	0.0050
SAR[2]	0.02000	0.03000	0.0600	0.0600	0.1000
SCBA/SAR[3]	0.20000	0.30000	0.6000	0.6000	1.0000
GD, GF					
APR	0.0015	0.00150	0.0015	0.0015	0.0015
SAR[2]	0.0300	0.03000	0.0300	0.0300	0.0300
SCBA/SAR[3]	0.3000	0.30000	0.3000	0.3000	0.3000
VX					
APR	0.00003	0.00005	0.0001	0.0002	0.0005
SAR[2]/SAR[3]	0.00060	0.00100	0.0020	0.0040	0.0100
SCBA	0.00600	0.01000	0.0200	0.0400	0.1000
HD[4], H, HT					
SAR[2]	0.27000	0.40000	0.8000	1.6000	3.0000
SCBA/SAR[3]	0.00200	4.00000	8.0000	16.0000	30.0000
L[4], HL					
SAR[2]	3.00000	3.00000	3.0000	3.0000	3.0000
SCBA/SAR[3]	30.00000	30.00000	30.0000	30.0000	30.0000
HN-1[4], HN-3					
SAR[2]	3.00000	3.00000	3.0000	3.0000	3.0000
SCBA/SAR[3]	30.00000	30.00000	30.0000	30.0000	30.0000

[1]Exposures at the STEL shall not occur more than once per day.

[2]SAR without an escape bottle.

[3]SAR with an escape bottle.

[4]For mustard agents, APRs are to be used for escape only.

Note. AELs are listed in *AR 385-61* and *68 FR 58348-58351*.

Note. All AELs are concentration *and* time values, as opposed to concentration-only values. While administrative controls may be used to limit the duration of potential exposure to workers, they cannot be used to limit potential public exposure. Therefore, administrative controls significantly affect only the WPL protective action level.

Table C-5. Exposure Limits for Industrial Chemicals Used as CWAs

Chemical or agent	*PEL as 8-hr TWA (or 15-min STEL)*		*IDLH*	
	mg/m3	*ppm[1]*	*mg/m3*	*ppm[1]*
CK	0.600	0.30	NS	NS
AC	11.000	10.00	55.0	50.0
SA[2]	0.200	0.05	3.0	
CG[2]	0.400	0.10	8.1	2.0
DP[3]	--	--	NS	NS
BZ	0.004	--	0.2	0.5
Chlorine	(2.900)	(1.00)	29.0	10.0
DF	0.008	--	--	--
QL	0.030	--	0.9	--
HF[2]	2.500	--	--	--
PS	0.700	0.10	13.4	2.0
Chloroform[2]	9.700	2.00	--	500.0
DM, DA, DC	No air monitoring required[4]			

[1]Parts per million (ppm) is by volume at 20°C and 1 atmosphere.
[2]From the *NIOSH Pocket Guide.*
[3]Monitored as phosgene.
[4]Appropriate engineering/process controls shall be used to minimize exposure.

Note. "No standard (NS)" means there is data available; however, no OSHA or Army standard has been established. Commanders shall be notified prior to operations involving these chemicals/agents, and monitoring/exposure levels are to be determined on a case-by-case basis.

Note. "- - " means there is no data available.

CARCINOGENICITY

C-5. Carcinogens are substances that promote cancer by altering cellular metabolism or by directly damaging cellular deoxyribonucleic acid (DNA), thereby interfering with normal biological processes. The EPA has developed the following scheme for categorizing chemicals according to their carcinogenic potential:

- **Cancer A.** Chemicals in this category are known human carcinogens. Epidemiological studies have indicated that there is sufficient evidence to support a causal association between exposure to the chemical and the occurrence of cancer.
- **Cancer B.** These chemicals are probable human carcinogens. There is limited evidence from epidemiological studies and/or sufficient evidence from animal studies to indicate that there is an association between exposure to the chemical and the occurrence of cancer.
- **Cancer C.** Cancer C chemicals are possible human carcinogens. There is limited evidence from animal studies, but inadequate evidence or a lack of data from epidemiological studies to indicate that there is an association between exposure to the chemical and the occurrence of cancer.
- **Cancer D.** These chemicals are nonclassifiable. There is inadequate or no human or animal evidence of association with carcinogenicity.
- **Cancer E.** There is no evidence that these chemicals are associated with human carcinogenicity. There is no evidence of carcinogenicity in adequate epidemiological or animal studies.

C-6. It is presumed that exposure to carcinogenic CWAs results in adverse health effects, regardless of the dose. Because the risk of exposure to cancer-causing chemicals cannot be completely eliminated, health guidelines are traditionally established based on predetermined "acceptable" increased risks of cancer. The EPA often identifies a range of 1 in 10,000 (or 1×10^{-4}) to 1 in 1,000,000 (or 1×10^{-6}) increased risk of cancer cases from involuntary exposure to environmental chemicals as acceptable over the course of a lifetime. An excess cancer risk of 1×10^{-6}, which represents the more conservative end of the spectrum, is the number most frequently used in decisions regarding the protection of large sectors of the general civilian population in cases where the population has no choice in exposure. (For example, the FDA limits carcinogenic food additives to levels that present no greater than a 1×10^{-6} excess cancer risk.) In contrast, many industrial standards for the work environment offer protection only to the level of 1×10^{-3} increased cancer risk or lower. (For example, the protection level could be as low as an increased risk of 1×10^{-2} [1 in 100 or 1 percent].) This increased cancer risk is sometimes considered "acceptable" in the workplace because of the "voluntary" nature of the exposure and because it is often not technologically and/or financially feasible to control exposures to even lower levels in the work environment. The U.S. Supreme Court has upheld the industry basis for such standards.

MILITARY APPLICATION

C-7. Because they may be called upon to render assistance to civil authorities, military response personnel should be familiar with the threshold concentration values presented in *Tables C-3 to C-5 (pages C-4 to C-6)*. However, these threshold values were developed for settings that differ considerably from those associated with uncontrolled spill sites. Therefore, the use of these values by military personnel responding to a CWA incident is somewhat limited. At best, published TLV, PEL, and IDLH values may be used as benchmarks for assessing the relative toxicity of agents and, possibly, as aids for selecting appropriate levels of PPE. Alternate threshold levels are required for military personnel operating in a CWA environment.

EXPOSURE ASSUMPTIONS

C-8. Military personnel may be exposed to CWAs through ingestion, inhalation, dermal contact, or injection. The first indication that exposure has occurred is likely to be the onset of noticeable health effects. The severity of these effects depends on the physical form of the agent (solid, liquid, or gas), its concentration, the pathway of administration, the duration and frequency of exposure, and the genetic makeup and overall health of the individual. For example, a short-duration or low-frequency exposure to a CWA may result only in minimal adverse effects (mild irritation), whereas a longer-duration or higher-frequency exposure may produce more severe effects (immediate, significant, and/or prolonged medical symptoms), which could interfere with the mission function—or even result in death. Sensitive individuals are especially vulnerable to the effects of CWAs.

C-9. In general, deployed military populations consist of relatively healthy, fit, male and nonpregnant female adults, usually 18 to 55 years of age, with an average weight of about 70 kilograms (approximately 154 pounds); exposure guidelines are generally developed accordingly. While it is common to assume that military personnel, who must meet and maintain basic health and fitness requirements, have no predisposing physical or mental factors that could exacerbate exposure to environmental chemicals, such assumptions are not entirely supported by scientific evidence. An assessment of factors that may lead to chemical-specific susceptibilities suggests that many predisposing factors—such as illness (asthma), physical and emotional stressors, lifestyle choices (smoking, alcohol use), and genetic traits—exist within the deployed military population (which includes active duty, reserve, and National Guard personnel). Therefore, the possibility of heightened sensitivity may need to be considered when establishing certain protective measures—even for military personnel. For example, although only a minority of the U.S. population is genetically predisposed to anticholinesterase depression, it is not a condition for which military personnel are screened. Therefore, the greater sensitivity of individuals who are affected by this condition is taken into account when establishing nerve-agent guidelines.

C-10. The risk of exposure must be assessed and integrated into overall military operational risk management. One of the goals of the military is to limit exposure so that it is as low as reasonably achievable (ALARA). As a result, MEGs have been developed for several CWAs. In addition, commanders must ensure that all personnel—including military, civilians, and contractors—use appropriate PPE when participating in operations involving detected or suspected CWAs.

MILITARY EXPOSURE GUIDELINES

C-11. Due to the breadth of military operations, several "representative" conditions were considered for the development of MEGs for CWAs. The selected exposure scenarios were based on reasonable anticipations of deployment conditions and durations; however, actual exposure conditions are rarely identical to those assumed during guidance development. Therefore, the use of assumed exposure conditions results in varying degrees of certainty with regard to the level of protection provided by the MEGs. The MEGs that should be applied in any particular situation are those that were developed using exposure scenarios which most closely approximate the actual conditions encountered.

C-12. For military operations, the level of acceptable risk varies depending on the mission. In some situations—particularly those involving adversarial or hostile environments—high levels of exposure to relatively potent CWAs are considered acceptable given the alternative hazards faced. However, MEG values were developed so that—taking sensitivity into account—exposures at levels below the MEGs are not expected to result in the adverse health effects associated with a particular agent, while exposures at levels above the MEGs may or may not result in the adverse health effects. The inability to attribute adverse health effects to exposures above MEGs indicates that the guidelines should not be used for the retrospective assessment of health effects and cannot be used to determine specific numbers of casualties.

C-13. Although AEGLs were established for use with the general population and are applicable mainly to domestic accident/terrorist scenarios, they include federally endorsed health criteria and, in spite of their

conservatism, are also considered appropriate for military application. MEGs, therefore, consist largely of AEGLs. Where AEGLs were not available, ERPGs were used.

1-Hour Air Military Exposure Guidelines

C-14. The 1-hour air MEGs were developed for three general levels of health effects—minimal, significant, and severe. These three levels of 1-hour air MEGs are defined as follows:

- **Minimal.** The 1-hour, minimal-effects air MEG is the airborne concentration above which continuous exposure for 1 hour could begin to produce mild, nondisabling, transient, reversible effects, if any. Such effects should not impair performance. An increase in concentration or duration of exposure could result in performance degradation—especially for tasks requiring extreme mental/visual acuity or physical dexterity/strength.
- **Significant.** The 1-hour, significant-effects air MEG is the airborne concentration above which continuous exposure for 1 hour could begin to produce irreversible, permanent, or serious health effects that may result in performance degradation and incapacitate a small portion of individuals. An increase in concentration and/or duration of exposure increases the incidence and severity of effects.
- **Severe.** The 1-hour, severe-effects air MEG is the airborne concentration above which continuous exposure for 1 hour could begin to produce life-threatening or lethal effects in a small portion of individuals. An increase in concentration or duration of exposure increases the incidence of lethality and severity of nonlethal effects.

8-Hour and 14-Day Air Military Exposure Guidelines

C-15. The 8-hour and 14-day air MEG values have been established for continuous, 8-hour to 14-day exposures representative of brief deployments. The potential variation in the circumstances for exposure and properties of health effects for many substances can be significant for exposures of this duration range. The 8-hour and 14-day air MEGs are defined as follows:

- **8-hour air MEGs.** The 8-hour air MEG is the airborne concentration above which continuous exposure for 8 hours could begin to produce mild, nondisabling, transient, reversible effects, if any. Such effects should not impair performance. An increase in concentration or duration of exposure could result in performance degradation—especially for tasks requiring extreme mental/visual acuity or physical dexterity/strength.
- **14-day air MEGs.** The 14-day air MEG is the airborne concentration below which continuous exposure (24 hours per day) for up to 14 days should not impair performance; significant, noncarcinogenic threats should not be an issue. An increase in concentration or duration of exposure could result in the degradation of performance or an increase in the potential for delayed/permanent disease.

C-16. Although it was not possible to delineate three separate levels of health effects for exposures of 14 days, the levels established for 8-hour exposures can be considered intermediate guidance for exposure levels between the 1-hour minimal effects air MEGs and the 14-day air MEGs.

Military Exposure Guideline Limits

C-17. Actual MEG limits for G series nerve agents (GA, GB, GD, and GF), nerve agent VX, and sulfur mustard (blister agent HD) are presented in ***Table C-6****, page C-11.* For each of these CWAs, health effects have been categorized into three levels (minimal, significant, and severe) for 10-minute, 1-hour, 8-hour, and 24-hour exposure intervals. These three health effect levels, which directly correspond to AEGL Levels 1 through 3, are described as follows:

- **Minimal health effect level (AEGL-1).** A minimal health effect level is the airborne concentration at or above which it is predicted that the general population, including "susceptible" individuals, could experience notable discomfort; irritation; or certain asymptomatic, nonsensory effects. However, the effects are transient, are not disabling, and are reversible upon cessation of exposure.
- **Significant health effect level (AEGL-2).** A significant health effect level is the airborne concentration at or above which it is predicted that the general population, including "susceptible" individuals, could experience an impaired ability to escape or irreversible or other serious, long-lasting health effects.
- **Severe health effect level (AEGL-3).** A severe health effect level is the airborne concentration at or above which it is predicted that the general population, including "susceptible" individuals, could experience life-threatening health effects or death.

C-18. The information contained in *Table C-6* is intended to be used as guidance when conducting military operations involving CWAs. Because environmental monitoring may indicate variations in actual concentrations of a CWA over time, MEG limits should be selected based on the most representative exposure durations listed in *Table C-6.*

EMERGENCY EXPOSURE GUIDANCE LEVELS

C-19. The National Research Council (NRC)/Committee on Toxicology (COT) has developed emergency exposure guidance levels (EEGLs) for military personnel operating in emergency situations. An EEGL is defined as "a concentration of a substance in air that may be judged by DOD to be acceptable for the performance of specific tasks during rare emergency conditions." EEGLs may allow for more substantial effects than do the primary levels cited as MEGs; therefore, EEGLs should not be considered to be "hygienic" or "safe."

PUBLIC EXPOSURE GUIDELINES

C-20. If an incident occurs near a population center, military response personnel may be required to render assistance to civil authorities. It is, therefore, necessary that military responders be familiar with public exposure limits. When military personnel are involved in assisting civil authorities, public guidelines must be followed in accordance with *68 Federal Register (FR) 58348-58351.*

Table C-6. MEG Limits

Chemical CAS no.	*Air MEG*					*Potential symptoms and target organs/systems*
	Health effect level	*10-min mg/m3 [ppm]*	*1-hr mg/m3 [ppm]*	*8-hr mg/m3 [ppm]*	*24-hr mg/m3 [ppm]*	
GA 77-81-6	Minimal	0.0069 [0.0010]	0.00280 [0.00042]	0.00100 [0.00015]	0.00030 [0.00005]	Runny nose, tightness of chest, miosis, dimness of vision, difficulty breathing, drooling, excessive sweating, nausea, vomiting, and CNS effects. Local effects to pupils, respiratory system, and CNS.
	Significant	0.0870 [0.0130]	0.03500 [0.00530]	0.01300 [0.00200]	0.00400 [0.00067]	
	Severe	0.7600 [0.1100]	0.26000 [0.03900]	0.10000 [0.01500]	0.03000 [0.00500]	
Note. This information is based on the relative potency from GB *(NRC 2003)*. ***Note.*** The 24-hr MEG is derived from the 8-hr AEGL by straight-line extrapolation of the 8-hr AEGL Ct. ***Note.*** The IDLH is 0.1 mg/m3 *(DA Pam 40-173)*.						
GB 107-44-8	Minimal	0.0069 [0.0012]	0.00280 [0.00048]	0.00100 [0.00017]	0.000300 [0.000057]	Runny nose, tightness of chest, miosis, dimness of vision, difficulty breathing, drooling, excessive sweating, nausea, vomiting, cramps, involuntary defecation or urination, twitching, jerking, staggering, headache, confusion, and drowsiness. Coma and convulsion, at high exposures, leading to cessation of breathing and death. Local effects to pupils, respiratory system, CNS, and gastrointestinal system.
	Significant	0.0870 [0.0150]	0.03500 [0.00600]	0.01300 [0.00220]	0.004000 [0.000730]	
	Severe	0.3800 [0.0640]	0.13000 [0.02200]	0.05100 [0.00870]	0.020000 [0.002900]	
Note. At the minimal level, symptoms include reversible miosis, headache, eye pain, rhinorrhea, tightness in the chest, cramps, nausea, and malaise. Performance limitations are possible for night operations and aircrews and for tasks involving distance or spatial judgment. At the significant level, symptoms include reversible miosis, dyspnea, red blood cell (RBC)-ChE inhibition, and single fibre electromyography (SFEMG) changes. Performance limitations are possible for night operations and aircrews and for tasks involving distance or spatial judgment. Symptoms at the severe level are based on GB vapor experimental Sprague-Dawley rat lethality data (LC01, LC50). ***Note.*** The IDLH is 0.1 mg/m3 *(DA Pam 40-173)*.						

Table C-6. MEG Limits (continued)

Chemical CAS no.	*Air MEG*					*Potential symptoms and target organs/systems*
	Health effect level	*10-min mg/m3 [ppm]*	*1-hr mg/m3 [ppm]*	*8-hr mg/m3 [ppm]*	*24-hr mg/m3 [ppm]*	
GD 96-64-0	Minimal	0.00350 [0.00046]	0.00140 [0.00018]	0.000500 [0.000065]	0.000200 [0.000022]	Runny nose, tightness of chest, miosis, dimness of vision, difficulty breathing, drooling, excessive sweating, nausea, vomiting, cramps, involuntary defecation or urination, twitching, jerking, staggering, headache, confusion, and drowsiness. Coma and convulsion at high exposures, leading to cessation of breathing and death. Local effects to pupils, respiratory system, CNS, and gastrointestinal system.
	Significant	0.04400 [0.00570]	0.01800 [0.00220]	0.006500 [0.000850]	0.002000 [0.000280]	
	Severe	0.38000 [0.04900]	0.13000 [0.01700]	0.051000 [0.006600]	0.020000 [0.002200]	

Note. This information is based on the relative potency from GB *(NRC 2003)*.
Note. The 24-hr MEG is derived from the 8-hr AEGL by straight-line extrapolation of the 8-hour AEGL Ct.
Note. The IDLH is 0.05 mg/m3 *(DA Pam 40-173)*.

Table C-6. MEG Limits (continued)

Chemical CAS no.	*Air MEG*					*Potential symptoms and target organs/systems*
	Health effect level	*10-min mg/m3 [ppm]*	*1-hr mg/m3 [ppm]*	*8-hr mg/m3 [ppm]*	*24-hr mg/m3 [ppm]*	
GF 329-99-7	Minimal	0.00350 [0.00049]	0.0014 [0.00020]	0.000500 [0.000070]	0.000200 [0.000023]	Runny nose, tightness of chest, miosis, dimness of vision, difficulty breathing, drooling, excessive sweating, nausea, vomiting, cramps, involuntary defecation or urination, twitching, jerking, staggering, headache, confusion, and drowsiness. Coma and convulsion, at high exposures, leading to cessation of breathing and death. Local effects to pupils, respiratory system, CNS, and gastrointestinal system.
	Significant	0.04400 [0.00620]	0.018 [0.0024]	0.006500 [0.000910]	0.002000 [0.000300]	
	Severe	0.38000 [0.05300]	0.13 [0.018]	0.051000 [0.007100]	0.020000 [0.002400]	

Note. This information is based on the relative potency from GB *(NRC 2003)*.
Note. The 24-hr MEG is derived from the 8-hr AEGL by straight-line extrapolation of the 8-hr AEGL Ct.
Note. The IDLH is 0.05 mg/m3 *(DA Pam 40-173)*.

Table C-6. MEG Limits (continued)

Chemical CAS no.	***Air MEG***					***Potential symptoms and target organs/systems***
	Health effect level	***10-min mg/m3 [ppm]***	***1-hr mg/m3 [ppm]***	***8-hr mg/m3 [ppm]***	***24-hr mg/m3 [ppm]***	
VX 50782-69-9	Minimal	0.000570 [0.000052]	0.000170 [0.000016]	0.0000710 [0.0000065]	0.0000240 [0.0000022]	AChE inhibitor. Headache, runny nose, nasal congestion, nausea, vomiting, giddiness, anxiety, difficulty sleeping/thinking, muscle twitching, weakness, abdominal cramps, and CNS effects. Local effects to pupils, respiratory system, CNS, and gastrointestinal system.
	Significant	0.007200 [0.000650]	0.002900 [0.000270]	0.0010000 [0.0000950]	0.0003300 [0.0000320]	
	Severe	0.029000 [0.002700]	0.010000 [0.000910]	0.0038000 [0.0003500]	0.0013000 [0.0001200]	
Note. Symptoms at the minimal and significant levels are derived by relative potency from the study of multiple minimal or transient effects in human volunteers exposed to agent GB. Performance limitations are possible for night operations and aircrews and for and tasks involving distance or spatial judgment. Symptoms at the severe level are derived by relative potency from the study of GB vapor experimental Sprague-Dawley rat lethality data (LC01, LC50) *(NRC 2003)*. ***Note.*** The IDLH is 0.01 mg/m3 *(DA Pam 40-173)*.						
HD 505-60-2	Minimal	0.40 [0.06]	0.067 [0.010]	0.008 0.001	0.00300 [0.00033]	Potent alkylating agent; mutagenic. Delayed eye and mucous membrane irritation, conjunctivitis, blindness, edema of the eyelids, necrosis of the respiratory tract and exposed skin, nausea, and vomiting.
	Significant	0.60 [0.09]	0.100 [0.020]	0.013 [0.002]	0.00400 [0.00067]	
	Severe	3.90 [0.59]	2.100 [0.320]	0.270 [0.040]	0.09000 [0.01300]	
Note. The 24-hr MEG estimate is derived from the 8-hr AEGL by straight-line extrapolation of the 8-hr AEGL Ct. ***Note.*** The IDLH is 2 mg/m3 *(DA Pam 40-8)*.						

Appendix D

Standard Decontaminants

This appendix contains an overview of the various types of military standard decontaminants, standard expedient decontaminants, and natural decontaminants. It does not, however, include a complete listing of all substances that may be used as decontaminants. Numerous substances are currently undergoing testing to determine their potential for use as decontaminants. Existing military utility assessment test data should be sought and caution should be exercised when considering the use of nonstandard decontaminants.

MILITARY STANDARD DECONTAMINANTS

D-1. Military standard decontaminants are those decontaminants that have undergone sufficient testing to allow for accurate predictions of outcome when they are used in decontamination operations. These decontaminants are endorsed by the military and are available through the military supply system. There are several types of military standard decontaminants.

DECONTAMINATING AGENT, SUPER-TROPICAL BLEACH

D-2. Decontaminating agent, super-tropical bleach (STB) is a mixture of chlorinated lime and calcium oxide in white powder form. It is suitable for use against most CWAs. Upon manufacture, STB contains 30–35 percent available chlorine. Due to this high chlorine content, protective masks and gloves are required for handling. Packaged STB is very stable and, under normal storage conditions, decomposes slowly. However, when stored in high-temperature environments, STB loses about 1 percent of its available chlorine content each month. Therefore, STB should be stored in a cool, dry place and discarded after the expiration date—which is subject to extension based on random testing.

D-3. STB is particularly effective against G and V series nerve agents, lewisite, and most biological agents. However, vapors—which could be toxic—are generated during decontamination operations involving these agents. While STB is also effective against liquid mustard agents, strong exothermic reactions may occur. The severity of these reactions depends on numerous variables (such as the purity of the liquid mustard). Some reactions may be severe enough to result in flash fires or damage to the decontaminated surface itself. Therefore, if liquid mustard is present, STB should be used only in exceptional circumstances—and then only when special consideration has been given and measures have been taken to mitigate the effects of the toxic vapors expected to be emitted. For example, the mixing of STB with water or earth not only facilitates its distribution, but also diminishes the severity of the exothermic reaction.

D-4. To reduce the severity of exothermic reactions resulting from the use of STB on surfaces contaminated with liquid mustard, the STB may be mixed with water to form a "slurry" or "paste" or with earth to form a "dry mix."

- **Slurry or paste.** There are two types of slurry or paste—one for manual application and another for application with the M12A1 power-driven decontaminating apparatus (PDDA).
    - For manual application with swabs, brushes, or brooms, the most effective slurry consists of approximately equal parts (by weight) of STB and water, prepared by mixing 50 pounds of bleach with 6 gallons of water.
    - For application with the PDDA, 1,300 pounds (or approximately 26 50-pound cans) of STB, 225 gallons of water, and both antiseize and anti
    - foam compounds are combined and continuously agitated.

- **Dry mix.** Dry mix is composed of two parts (two shovelfuls) of STB to three parts (three shovelfuls) of earth or other dry material. Detergent should not be added to the dry mix. For the decontamination of liquid chemical agents in small areas with short grass, approximately 1 pound of dry mix should be applied to each square yard. For brushy or wooded areas, 3–5 pounds per square yard is considered adequate. Dry mix may also be placed under equipment to protect against contamination by agents flushed from the equipment. In areas where boots are likely to be exposed to agents, personnel may shuffle their boots in dry mix prior to and following the completion of decontamination operations.

WARNING

DO NOT mix STB with anything except water or earth. Avoid solvents, acids, and organic materials.

Note. The use of STB mixtures on agents that have solidified as a result of low temperatures is not effective. A hot prewash is recommended to increase effectiveness.

D-5. STB may be applied in paste form to the surface of permeable material that has been contaminated so that the STB acts as a protective barrier to the contamination. Liquid chemical agents that have been absorbed into the ground or other porous material do not react with the STB because the agents do not come into direct contact with the surficial barrier. However, as long as the STB retains its chlorine content, it serves to neutralize any contaminant vapors emitted from within the permeable material. Because STB decomposes, the protective coating should be renewed at least every 24 hours. If the protective coating is compromised by abrasion or traffic, vapors may again become a hazard and the STB protective coating must be renewed.

D-6. Following decontamination, it is possible to leave the STB—depending on the surface type. However, STB should be thoroughly rinsed from metal surfaces immediately following the specified 30-minute contact time. The metal surface should then be oiled or greased to prevent corrosion. On porous surfaces, such as wood, several applications of STB may be necessary. When decontamination is complete, the surface may be flushed with water and the resulting STB slurry removed.

D-7. Due to its caustic nature, STB may cause serious degradation of electronic equipment and components; therefore, contact with these sensitive materials should be avoided. STB is corrosive to most metals and injurious to most fabrics, resulting in significant reductions in the lifecycles of these items. In addition, STB has a slight effect on other nonmetals and a moderate effect on sealants. STB may explode when heated to temperatures above 300°F.

DECONTAMINATING AGENT, HIGH-TEST HYPOCHLORITE

D-8. Decontaminating agent, HTH is a type of bleach—available in granular or tablet form—that contains a minimum of 70 percent calcium hypochlorite. It is used to decontaminate individuals and personal protective material. HTH contains a higher percentage of chlorine than STB does; therefore, it is more corrosive. When decontamination operations include a prerinse and postrinse, HTH does not blister the paint on vehicles that have not been treated with chemical agent resistant coating (CARC); however, it may cause severe metal corrosion.

D-9. HTH is an oxidizer; thus, violent reactions and fires may result when it is in close proximity to fuels, oils, greases, paints, organic solvents, cellulose products, and any other material that is easily oxidized. Therefore, HTH should be kept isolated from these materials. In addition, HTH also reacts with rags, fabrics, detergent, antifreeze, and ammonia. When heated, HTH decomposes to chlorine gas, phosgene,

and other toxic and corrosive fumes so it should not be used near heat sources or open flames. Furthermore, it should not be stored near heat sources, in areas adjacent to ammunition storage, or in areas where the maximum temperature exceeds 100°F under normal operating conditions. Contact with moisture causes the formation of toxic chlorine gas, which may pose a problem in the event that HTH is accidentally sprayed with small amounts of water during firefighting operations. This reaction may be controlled by drenching the area with excess water. Due to volatility, containers used for holding oxidizers should have warning labels indicating the reactivity and associated hazards. Stowage areas must be kept cool, dry, and well ventilated. HTH has a shelf life of 2 years; an expiration date is printed on each bottle.

D-10. HTH is most effective when it is in solution with a detergent. The detergent dissolves the contaminant and brings it into contact with the hypochlorite, allowing a chemical reaction to take place. When preparing HTH decontamination solutions, the HTH should first be added to water and mixed until it is dissolved. The detergent should then be added to the mixture and the mixture stirred thoroughly. Additional information regarding the preparation of HTH solutions is available in *Table D-1* and *Table D-2*.

WARNING

Never add water to HTH or add HTH to water with which detergent has already been mixed. A dangerous reaction may result in either case.

Table D-1. Preparation of Decontamination Solution Using HTH (6-Ounce Bottles)

% HTH solution	*4 gal water + 3 oz detergent*	*10 gal water + 9 oz detergent*	*20 gal water + 13 oz detergent*
1	1	2	4.5
2	2	5	9.5
3	3	7	14
5	5	12	24
10	9	22	44

Table D-2. Preparation of Decontamination Solution Using HTH (Granular)

Quantity of water	*Quantity of HTH (granular) necessary to give 5% available chlorine (50,000 ppm)*	*Quantity of HTH (granular) necessary to give 0.2% available chlorine (2,000 ppm)*
40 gal	25 lb	1.0 lb
5 gal	3 lb	2.0 oz (5 Tbs)
1 gal	10 oz (1 to 0.5 c)	0.5 oz (1 Tbs)
1 qt	2.5 oz (6 Tbs)	0.1 oz (1 Tbs)

M100 SORBENT DECONTAMINANT SYSTEM

D-11. The M100 Sorbent Decontaminant System (SDS) is a contamination removal medium composed of free-flowing, reactive, highly absorptive powder manufactured from aluminum oxide. Each M100 SDS consists of two 0.7-pound packs of reactive, sorbent powder; two wash mitt type sorbent applicators; a case; straps; and detailed instructions. An optional chemical agent-resistant mounting bracket is also available. The M100 SDS has replaced the M11 and M13 portable decontamination apparatuses. The

M100 mounting bracket was designed with the same mounting hole configuration as the M11s, allowing for easy replacement.

REACTIVE SKIN DECONTAMINATION LOTION

D-12. Reactive skin decontamination lotion (RSDL) is a bright yellow, viscous liquid impregnated into a sponge pad, which is packaged as a single unit in a heat-sealed foil pouch. The RSDL is spread onto skin suspected of having become exposed to chemical agents or toxins as soon as possible after the exposure occurs. The RSDL reacts with these chemical substances, rapidly neutralizing them so that they are non-toxic. The resulting liquid can then be removed with water. The FDA has approved RSDL for use by the U.S. military and the first-responder community.

STANDARD EXPEDIENT DECONTAMINANTS

D-13. Standard expedient decontaminants are those substances that, due to their physical and chemical properties, allow for reasonably predictable outcomes when used in decontamination operations. Although many of these items are available through the military supply system, they are not intended primarily for use in decontamination operations. Rather, their use as decontaminants is a secondary, off-label application.

SOAP OR DETERGENT

D-14. Soap or detergent provides a good cleansing medium for the removal of dirt, grease, or other contamination from personnel and items such as clothing and aircraft. The use of hot, soapy water is effective against G series agents, it slowly destroys V series agents, and it emulsifies and carries off (but does not neutralize) mustard agents. Soap solutions may be used in bucket-and-broom processes as well as in many standard power-driven decontamination apparatuses. Although soapy water remains effective as long as suds are maintained, a solution of 10 pounds of soap in 11 gallons of water is recommended for decontamination operations involving G series agents.

CAUSTIC SODA (SODIUM HYDROXIDE OR LYE)

D-15. Caustic soda is a white solid that dissolves easily in water or alcohol. The chemical name for caustic soda is sodium hydroxide; however, it is commonly referred to as *lye*.

- **Caustic soda/water solution.** A solution of caustic soda and water destroys G-series agents on contact and hastens the hydrolysis of lewisite. Mustard agents, however, are destroyed only after prolonged contact. Water solutions of caustic soda are effective in most concentrations, but in general, the more concentrated the solution, the faster the decontamination process. A 5 percent solution (prepared by dissolving 5 pounds of caustic soda in 12 gallons of water) is recommended. However, cotton and woolen clothing are greatly deteriorated by even a 5 percent solution. In addition to concentration, temperature also affects the rate of decontamination. Hot solutions tend to work faster than cold ones.
- **Caustic soda/alcohol solution.** A solution of caustic soda and alcohol is effective against agents 3-quinuclidinyl benzilate (BZ) and VX. Alcoholic solutions of caustic soda may be prepared by dissolving 5 pounds of caustic soda in a mixture consisting of 6 gallons of water and 6 gallons of alcohol.

D-16. Caustic soda burns human tissue and eats away clothing on contact. Inhalation of the dust or concentrated mist damages the respiratory system. Ingestion damages the digestive tract. Therefore, the use of a mask and gloves is mandatory when handling caustic soda. Skin that comes in contact with either the solid or solution form of caustic soda must be flushed immediately with copious amounts of water, and associated clothing must be removed at once. If the eyes are involved, they must be flushed with warm water and medical treatment must be sought immediately.

D-17. The process of dissolving caustic soda into solution generates a considerable amount of heat; therefore, containers of the solution must not be handled with bare hands. In addition, solutions should not be prepared in aluminum, magnesium, tin, or zinc containers because contact with these metals can result in the formation of flammable hydrogen gas. Iron or steel containers, however, are suitable. Glass or

earthenware containers may be used in emergencies, provided the solution is constantly stirred to keep the temperature down.

WASHING SODA (SODA ASH OR LAUNDRY SODA)

D-18. Washing soda is a white powder with alkaline properties. Common names include "soda ash" and "laundry soda." Commercial grades may contain large amounts of sodium carbonate. Solutions of washing soda are very effective against G series agents. In addition, hot solutions are effective in combating CN contamination. However, washing soda does not destroy blister agents as readily as caustic soda or sodium hypochlorite do, nor does washing soda destroy V series agents as readily as sodium hypochlorite does.

AMMONIA AND AMMONIUM HYDROXIDE

D-19. Ammonia (NH_3) and ammonium hydroxide (NH_4OH)—a liquid solution of ammonia in a water base—are effective decontaminants for several chemical agents. Although ammonia may be used against G series agents, it acts more slowly than caustic soda (or even caustic potash—another agent that may be used as a neutralizer). Ammonia is incompatible with copper, copper alloys, acids, galvanized iron, zinc, aluminum, bronze, dimethyl sulphate, mercury, and alkali metals.

COMMON SOLVENTS

D-20. Common organic liquids (such as kerosene, alcohol, and deicing fluids) may be used as solvents for many chemical agents. Solvents work not by destroying the agents, but by dissolving and removing them from contaminated surfaces. The solvents must be used carefully to avoid spreading contamination. Contaminated surfaces are wiped several times using swabs saturated with solvent. The number of times an area is swabbed is determined by the amount of grease on the surface, the amount of contamination present, and whether the area is to be treated with another decontaminant. Swabs are replaced as necessary.

D-21. Most organic solvents are fire hazards, and some are toxic; therefore, suitable safety precautions should be observed when using solvents for decontamination operations. In addition, swabs used to wipe agents from contaminated surfaces become contaminated themselves and must, therefore, be disposed of as contaminated waste. The cloth end of the swab must not be allowed to touch bare skin or clothing.

DEGREASING SOLVENT

D-22. Self-emulsifying degreasing solvent is a noncorrosive liquid that may be diluted with water or kerosene. It is commonly used to clean automotive engines and aircraft by removing grease and oily dirt. It may also be used in decontamination operations to remove chemical agents that are held by the grease and oil. The degreasing solvent is applied to contaminated equipment and allowed to remain in contact with the equipment for 15 minutes or more, depending on the degree of contamination. Water—preferably under pressure—is then used to remove the solvent and flush the dirt, grease, oil, and chemical agents from the equipment. Contaminated waste must be disposed of properly.

ABSORBENTS

D-23. Absorbents are various materials used to absorb and remove—but not destroy—chemical agents. Soil, clay, dust, charcoal, coal, and sawdust are examples of items that may be used as absorbents. Absorbents are contaminated after use and must, therefore, be handled as contaminated waste.

ADSORBENTS

D-24. An adsorbent adheres—or becomes mechanically or chemically attached—to a chemical agent, but does not destroy the agent. After use, the adsorbent is contaminated and must, therefore, be handled as contaminated waste.

HOUSEHOLD BLEACH

D-25. Household bleach is composed of 2–6 percent (by weight) sodium hypochlorite (NaOCl) in water. It is useful for cleaning items contaminated with all types of microorganisms and most chemical agents.

Although household bleach causes the metal parts of vehicles to corrode, it may be used for vehicle wash-down if decontamination is indeed required, a 5 percent available chlorine solution is needed, and the lack of water is a concern (see *FM 3-11.5, Appendix C*).

NATURAL DECONTAMINANTS

D-26. Natural forms of decontamination include earth, water, fire, and weathering. A full discussion of the considerations and recommendations, as well as the advantages and disadvantages of this approach, is available in *FM 3.11.5, Appendix C*.

ADDITIONAL INFORMATION

D-27. Reference information for military standard decontaminants, standard expedient decontaminants, and natural decontaminants is presented in *Tables D-3* through *D-5 (pages D-7* through *D-19)*.

Table D-3. Standard Military Decontaminants

STB (NSN 6850-00-297-6653)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical G agents V agents Lewisite Biological	Allow 30 min of contact; rinse with clear water. Is not effective against mustard agent if it has solidified at low temperatures. Apply several times to porous surfaces.	Produces a very strong exothermic reaction on contact with liquid blister agent or DS2. Gives off toxic vapors on contact with G agents. Is not recommended for ship use. Store on top deck only. Do not inhale or allow it to touch exposed skin. Wear a protective mask or respiratory protective device when handling. Store in an unheated warehouse, away from combustibles and metals subject to corrosion. Is corrosive to very corrosive to most metals. Rinse thoroughly, dry, and oil metal surfaces following decontamination. Has a slight effect on nonmetals. Is damaging to most fabrics. Has a moderate effect on sealants.	Slurry paste: Consists of equal parts (by weight) STB and water. Mix one 50-lb drum of STB with 6 gal of water. Dry mix: Mix two shovelfuls of STB to three shovelfuls of earth or inert material (ashes). Slurry mix, chemical: Consists of 40 parts STB to 60 parts water (by weight). For M12A1 PDDA, chemical: Mix 1,300 lb of STB, 225 gal of water, 12.5 lb of antiset, and 24 oz of antifoam. Slurry mix, biological: Mix 7 parts STB to 93 parts water (by weight). For M12A1 PDDA, biological: Mix 150 lb of STB, 225 gal of water, 12.5 lb of antiset, and 24 oz of antifoam. Camouflage: Lampblack or dye mixes may be added for camouflage.

Table D-3. Standard Military Decontaminants (continued)

Calcium hypochlorite (HTH or HTB) (NSN 6810-00-255-0471: 6 oz; NSN 6810-01-225-2682: 25 lb; NSN 6810-00-225-0472: 100 lb)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical G agents V agents Lewisite Mustards Biological, including bacterial spores	Reacts rapidly (within 5 min) with mustard agents and lewisite. Acts faster than STB. Allow 15 min of contact for biological agents. Can be used as a dry mix or slurry. Is the standard shipboard oxidizer for chemical decontamination.	Produces a very strong exothermic reaction on contact with liquid blister agent or DS2. Gives off toxic vapors on contact with G agents. Is not recommended for ship use. Store on top deck only. Do not inhale or allow it to touch exposed skin. Wear a protective mask or respiratory protective device when handling. Store in an unheated warehouse, away from combustibles and metals subject to corrosion. Is corrosive to very corrosive to most metals. Has a slight effect on nonmetals. Is damaging to most fabrics. Has a moderate effect on sealants. Rinse thoroughly, and oil metal surfaces. Pure HTH burns on contact with VX and HD. Has toxic vapors; burns skin. Wear a minimum of a protective mask and rubber gloves when handling. Use HTH only if STB is not available. Is more corrosive than STB. Destroys clothing.	Chemical: Mix 5 lb of decontaminant to 6 gal of water (10% solution). Biological: Mix 1 lb of decontaminant to 6 gal of water (2% solution). PDDE: Mix a slurry of 1 part decontaminant to 2 parts water. (A heavier slurry clogs the decontamination apparatus.)

Table D-3. Standard Military Decontaminants (continued)

Mask sanitizing solution			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical Biological	Use on a previously cleaned mask with filter elements/canisters removed. Place the mask face up, and attach the canteen to the mask at the drinking tube. Drain one canteen full of sanitizing solution through the mask. Rinse the mask with two canteens of clear water. Immerse the mask and outserts in the sanitizing solution. Agitate the mask for 5 min. Rinse it twice in clear water, agitating 2–3 min each time. Dry all parts of the mask, and reassemble. Use 1 gal of solution for every 10 masks.	Is harmful to skin and clothing if undiluted; remove by flushing with water. Is corrosive to metals unless they are rinsed, dried, and lubricated following decontamination.	Fill a standard plastic canteen to the shoulder with water. Add a 0.5-g tube of calcium hypochlorite from the water purification kit (NSN 6810-00-266-6976). Cover the canteen, and shake vigorously for 30 sec. Mix bulk quantities as follows: Add 2.0 g of calcium hypochlorite from a 6-oz jar (NSN 6810-00-255-0471) to 1 gal of water. Use a ratio of about 1 lb of soap per gal of water for smaller amounts of solution. Mix 2 pt of detergent to 450 gal of water in the M12A1 PDDA.
Soap and detergents: detergent, GP, liquid (NSN 7930-00-282-9699)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Physical removal only	Scrub or wipe the contaminated surface with a hot, soapy water solution, or immerse the item in the solution.	Casualty-producing levels of contamination may remain in the runoff so it must be considered contaminated.	Mix 75 lb of powdered soap in 350 gal of water. If powdered soap is not available, use bar laundry soap (75 lb of soap cut into 1-in pieces and dissolved in 350 gal of hot water). Use a ratio of about 1 lb of soap per gal of water for smaller amounts of soap solution. Mix 2 pt of detergent to 450 gal of water in an M12A1 PDDA.
M100 SDS			
Target agent	***Use***	***Caution/safety***	***Preparation***
Physical removal of all—limited efficacy	Use on contaminated equipment to remove and neutralize chemical agents from surfaces.	Nontoxic and noncorrosive. Use at temperatures of 25°–120°F. Decontaminates a 12.5-m2 surface contaminated with 10 g of agent per m2 in less than 15 min.	Packaged ready to use. Requires no water/mixing to complete mission.

Table D-3. Standard Military Decontaminants (continued)

RSDL			
Target agent	***Use***	***Caution/safety***	***Preparation***
G and V nerve agents; vesicants, such as mustard	Apply RSDL to the suspected contamination site with a vigorous scrubbing action. Don protective clothing over the RSDL.	Mild eye irritant.	Packaged ready to use. Requires no mixing to complete mission.

Table D-4. Standard Expedient Decontaminants

Sodium hypochlorite (household bleach)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical V agents Blister agents G agents Biological Radiological	Reacts rapidly (within 5 min) with blister and V agents. Allow 10–15-min of contact for biological agents. Apply undiluted with brooms, brushes, or swabs. Is an approved decontaminant for ship use. A 5:1 concentration is recommended.	Harms skin and clothing if undiluted. Remove from skin and clothing by flushing with water. Stored in a cool place. Limited storage is a problem. Corrodes metals unless rinsed, dried, and lubricated after decontamination.	For chemical decontamination, no mixing is required. For biological decontamination, dilute by adding 2 parts bleach to 10 parts water. For cotton clothing and utensil decontamination, dilute 2 c of bleach to 1 gal of water. For application, mix with equal parts water and spray from the PDDE.
Note. The reaction time between sodium hypochlorite and G series agents is slower than with V or H series agents.			
Ethylene glycol			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical–physical removal only	Scrub on contaminated surfaces, and rinse thoroughly.	Removes contamination only; does not neutralize. Runoff residue must be considered contaminated.	Mix equal parts solution and water.
Solvents (gasoline, DP8, diesel fuel, kerosene, and similar solvents)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical–physical removal only	Scrub on contaminated surfaces and rinse thoroughly.	Removes contamination only; does not neutralize. Runoff residue must be considered contaminated.	None.
Sodium carbonate (washing soda, soda ash, or laundry soda)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical G agents CN	Reacts rapidly (normally within 5 min) with G agents. Is an approved decontaminant for ship use. Use with a hot solution to decontaminate CN effectively. Has a recommended concentration of 5% by weight.	Do not use against VX. Cannot detoxify VX, and extremely toxic byproducts are created. Does not dissolve or detoxify mustard agents. There is no problem with storage.	Mix 10 lb of washing soda to 12 gal of water (10% solution).

Table D-4. Standard Expedient Decontaminants (continued)

Ammonia or ammonium hydroxide (household ammonia)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical G agents	Slower-acting than sodium hydroxide or potassium hydroxide.	May require the use of SCBA or a special-purpose mask.	No mixing is required.
Note. Ammonium hydroxide is a water solution of ammonia.			
Diethyl ether			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical	Good decontaminant for use in arctic regions. Freezing point is -241°F; boiling point is 93°F. Available through medical supply facilities.	Is extremely flammable. Does not neutralize agents.	None.
2-propanone (acetone)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical–physical removal only	Effective for dissolving and flushing agent. Good for use in arctic regions. Freezing point is -203°F; boiling point is 133°F. (It evaporates rapidly.) Commonly obtained as fingernail polish remover or paint thinner.	Is extremely flammable. Does not neutralize agents.	None.
Hexachloramelamine			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical Mustard	Not soluble in water, but soluble in organic solvents such as gasoline, kerosene, and paint thinner.	Requires the use of a protective mask and rubber gloves. Corrodes metal.	Not soluble in water, but soluble in organic solvents such as gasoline, kerosene, and paint thinner.
Dichloramine-B and dichloramine-T			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical Mustard	Effective in the neutralization of mustard agents.	Require the use of a protective mask and rubber gloves. Corrodes metal.	Not soluble in water, but soluble in certain organic solvents. Normally mixed as a 10% solution in dichloroethane.
Perchloroethylene (tetrachloroethylene)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical–physical removal only	Use in arctic climates. Freezing point is -8°F; boiling point is 250°F. Dissolves H and V agents, but not G agents. Requires no mixing. (Practically insoluble in water.) Is a synthetic solvent widely used in dry cleaning plants.	Removes contamination only; does not neutralize. Runoff residue must be considered contaminated. Is nonflammable. Has low toxicity.	Requires no mixing. (Is practically insoluble in water.)

Table D-4. Standard Expedient Decontaminants (continued)

NaOH (sodium hydroxide) (NSN 6810-00-174-6581: 100 lb)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical G agents Lewisite Biological agents, including bacterial spores	Neutralizes G agents on contact. Allow 15 min of contact. Flush with large amounts of clear water. Use while hot. Causes a red color change upon contact with M8 detector paper. Is effective in direct proportion to the strength of the solution.	Damages skin, eyes, and clothes and can cause upper respiratory or lung damage if inhaled. Wash affected area immediately with large amounts of water, and flush with diluted acetic acid or vinegar. Remove affected clothing. If eyes are involved, flush them at once with large amounts of warm water, and seek medical attention. Requires the use of full rubber protective clothing, gloves, boots, and mask. Runoff is highly corrosive and toxic. Drain runoff into a sump, mark, and bury. Is not recommended for ship use. Store on top deck only. Is not recommended if less toxic caustic decontaminants are available. Substitute with calcium hydroxide, potassium hydroxide, or trisodium phosphate if necessary. Corrodes most metals.	Small amount: Mix 10 lb of lye with 12 gal of water (10% solution) in an iron or steel container (never aluminum, zinc, or tin). Add lye to the water slowly to prevent boiling and splattering due to heat emission. Do not handle mixing container with bare hands. Large amount (PDDE use): Prepare a solution of 0.5 lb of lye for each gal of water. Pump 350 gal of water into the tank unit. Make necessary PDDA connections. Heat water to 122°F. Disconnect heater unit, and add 175 lb of lye to heated water. Circulate solution with pump unit until all lye is dissolved. Temperature will increase noticeably. Use while hot. Simultaneous mixing and applying: Sprinkle dry lye on the contaminated area and then dissolve with a spray of steam or hot water. Do not wash lye off the surface while applying steam or hot water. Paint removal: 1 lb of lye per 2.5 gal of water is capable of removing an average coat of paint from about 11 yd2 of surface. This solution is effective in removing paint on which chemical contamination has adsorbed.

Table D-4. Standard Expedient Decontaminants (continued)

Potassium hydroxide (caustic potash)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical G agents Lewisite Biological	Neutralizes G agents on contact. Allow 15 min of contact. Flush with large amounts of clear water. Use while hot. Causes a red color change upon contact with M8 detector paper. Is effective in direct proportion to the strength of the solution.	Damages skin, eyes, and clothes and can cause upper respiratory or lung damage if inhaled. Wash affected area immediately with large amounts of water, and flush with diluted acetic acid or vinegar. Remove affected clothing. If eyes are involved, flush them at once with large amounts of warm water, and seek medical attention. Requires the use of full rubber protective clothing, gloves, boots, and mask. Runoff is highly corrosive and toxic. Drain runoff into a sump, mark, and bury. Is not recommended for ship use. Store on top deck only. Is not recommended if less toxic caustic decontaminants are available. Substitute with calcium hydroxide, potassium hydroxide, or trisodium phosphate if necessary. Corrodes most metals.	Small amount: Mix 10 lb of lye with 12 gal of water (10% solution) in an iron or steel container (never aluminum, zinc, or tin). Add lye to the water slowly to prevent boiling and splattering due to heat emission. Do not handle mixing container with bare hands. Large amount (PDDE use): Prepare a solution of 0.5 lb of lye for each gal of water. Pump 350 gal of water into the tank unit. Make necessary PDDA connections. Heat water to 122°F. Disconnect heater unit, and add 175 lb of lye to heated water. Circulate solution with pump unit until all lye is dissolved. Temperature will increase noticeably. Use while hot. Simultaneous mixing and applying: Sprinkle dry lye on the contaminated area and then dissolve with a spray of steam or hot water. Do not wash lye off the surface while applying steam or hot water. Paint removal: 1 lb of lye per 2.5 gal of water is capable of removing an average coat of paint from about 11 yd2 of surface. This solution is effective in removing paint on which chemical contamination has adsorbed.
Detrochlorite			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological	Use the thickened bleach on vertical surfaces. Allow 30-min of contact; rinse with water. Apply by means of the PDDA. (Coverage is 1 gal per 8 yd2.)	Explosive if the wetting agent and calcium hypochlorite are mixed in a dry and undiluted state. Very corrosive.	Mix (by weight) 19.3% diatomaceous earth, 0.5% anionic wetting agent, 2.9 % calcium hypochlorite (70% available chlorine), and 77.3% water. Mix wetting agent and diatomaceous earth with water before adding the calcium hypochlorite.

Table D-4. Standard Expedient Decontaminants (continued)

Iodine water purification tablets			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological	Use when impractical to boil drinking water. Use two iodine tablets per canteen. This is effective against most biological agents.	None	None.
Ethylene oxide			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological, including bacterial spores	Apply 30 lb for every 1,000 ft3. Allow 6 hr of contact. (Contact time must be doubled for each 20°F drop in temperature below 75°F.) Use in an airtight enclosure.	Flammable and explosive. Not recommended for interior use.	None.
Disinfectant chlorine (NSN 6840-00-270-8172)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological	Use to decontaminate utensils, mess gear, exteriors of sealed containers, and food products that can withstand soaking. Allow 30 min of contact (stirring occasionally). Rinse thoroughly in potable water. Make fresh solutions for rinsing and disinfecting utensils for each 100 persons. Prepare an emergency solution by mixing one level MRE spoonful of calcium hypochlorite (water disinfecting powder) to each 10 gal of water. Use about 1/3 canteen cup of 5% liquid chlorine bleach (if available) to each 10 gal of water.	Dispose of any food or vegetables that are damaged and any outer leaves that are bruised or torn. Do not cut or peel fruits and vegetables before disinfecting. Use solution only once.	Dissolve one package of disinfectant in 20 gal of warm (100°F) potable water.
Hyamine (benzethonium chloride)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological	Allow 5 to 30 min of contact. Use a 0.1%–1% solution (1 lb of hyamine for every 12 gal of water yields a 1% solution.)	Very toxic. Estimated fatal dose to man is 1–3 g. Care should be taken when mixing to avoid inhalation of powder. Not to be used on aircraft or ships.	Use a 0.1%–1% solution. (1 lb of hyamine for every 12 gal of water yields a 1% solution.)

Table D-4. Standard Expedient Decontaminants (continued)

Formalin (formaldehyde)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological, including bacterial spores	Use for interior decontamination of relatively close areas. Allow vapors to remain 16 hr in a closed structure; aerate until the odor is no longer objectionable. Spray formalin at 70°–80°F with 85% relative humidity for optimum conditions. Spray at 70% relative humidity for minimal effectiveness. Increase exposure time to 24 hr at 60°F. Apply as a vapor from standard insecticide sprayers or vaporize by heat or bubbling steam from a pan.	Is corrosive. Curls and discolors paper. Leaves a white residue. Vapors are very toxic. Vapors are not flammable. Open flame should not be used for vaporizing when methanol has been added to the agent. When steam is used, the source of the steam should be outside the area being decontaminated. Personnel entering an area containing formalin vapors should— • Wear a protective mask. • Wear washable outer clothing that is fastened to prevent vapors from entering at wrists, ankles, or neck. • Remove outer clothing after emerging from vapors. • Shower and put on clean clothing as soon as possible.	No mixing is required. However, less residue remains and less aeration is required if a mixture of 5 parts formalin and 3 parts methanol is used. A 0.8 qt mixture should be used per 1,000 ft3 of space.
Peracetic acid (PAA)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological, including bacterial spores	Allow 10 min of contact. Wipe with a rag or swab (immerse small items). Remove excess acid and aerate for 10–15 min or until no objectionable odor remains. Is available as a 40% solution. Mix 1 qt of PAA to 3.5 gal of water. (Add PAA to the water.)	Burns and blisters skin. Fumes are highly irritating. May explode if heavy-metal ions come in contact with the agent. Protective mask and clothing are required. A 40% solution has a low flash point (105°F); a 3% solution is nonflammable. Is stored in original containers under refrigeration to prevent decomposition. Corrodes iron with prolonged exposure. Deteriorates rubber, plastic, and leather; and damages most other materials.	Is available as a 40% solution. Mix 1 qt PAA to 3.5 gal water. (Add PAA to the water.)

Table D-4. Standard Expedient Decontaminants (continued)

Carbon dioxide and ethylene oxide mixture (>87% ethylene oxide)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Biological	Use in an airtight enclosure. (Recommended for interior use.) Allow 12 hr of contact (doubled for each 20°F drop in temperature below 75°F). Apply 30 lb for every 1,000 ft3. Aerate items next to the skin for 18 to 24 hr.	Is nonflammable. Blisters skin.	None.
Oxidizing agents (nitric acid, aqua regia, sodium dichromate, and potassium permanganate)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Radiological	Dissolves surfaces containing absorbed radioactive contamination. Apply to the surface or dip the item. Rinse thoroughly with water and detergent and then with clear water.	Use only under the supervision of a trained individual. Use a neoprene or rubber protective apron, gloves, boots, and safety glasses. (Rubber offers only limited protection.) Is extremely corrosive; exposure must be limited.	Aqua regia is prepared by mixing 3 parts concentrated hydrochloric acid and 1 part concentrated nitric acid. Other oxidizing agents do not require mixing.
Complexing agents (versene, citric acid, sequesterene, sodium citrate, tartanic acid, sodium oxalate, sodium tartrategoxalic acid, othophosphoric acid, and similar agents)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Radiological–physical removal only.	Allow 30 min of contact; flush with water. Apply as a film over the surface using the PDDE, firefighting apparatus, or a tree or garden sprayer.	Does not neutralize contamination. Runoff will be contaminated.	Mix 3%–5% of the agent (by weight) in water.
Acids (sulfuric acid, hydrochloric acid, oxalic acid, and similar acids)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Radiological	Dissolves rust and mineral deposits holding radioactive material on metal surfaces. Allow 1 hr of contact. Flush with water, scrub with a water-detergent solution, and flush again with water.	Requires the use of respiratory protection in closed areas. May require the use of rubber boots, gloves, aprons, and goggles. Can produce boiling and splattering of the solution when mixed. Is difficult to handle and harmful to the body, especially the eyes. Flush the area immediately with water. Use a 5% solution of water and baking soda (sodium bicarbonate).	None.

Table D-4. Standard Expedient Decontaminants (continued)

Sealants (concrete, asphalt, earth, paint and similar materials)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Physical seal only Chemical Biological Radiological	Sealants are used to physically seal in or shield contamination. Chemical: 4 in of earth provides good protection. Biological: Burial of items is an effective means of sealing off contamination. Radiological: 12 in of earth provides good protection from fallout. (3 in reduces the dose rate by about one-half.) 1 in of asphalt or concrete completely absorbs alpha and beta radiation. 0.25 in of grout shields alpha and beta radiation.	A break in the surface of the sealant exposes the contamination. Contaminated areas covered with sealants must be marked with appropriate CBRN warning signs.	

Table D-5. Natural Decontaminants

Water			
Target agent	***Use***	***Caution/safety***	***Preparation***
Physical removal only Chemical Biological Radiological	Can be used to flush contamination from surfaces. Hot water with soap increases effectiveness in removing agents. Boiling for 15 min (30 min at high altitude) destroys biological agents.	Effective in physically removing contamination, but does not neutralize it. Do not use water on lewisite.	None.
Seawater			
Target agent	***Use***	***Caution/safety***	***Preparation***
Physical removal only	Removes but does not neutralize contamination.		None.
Steam			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical Biological Radiological	Removes but does not neutralize contamination.	Effective in physically removing contamination, but does not neutralize it.	None.
Absorbents (earth, sawdust, ashes, rags, and similar materials)			
Target agent	***Use***	***Caution/safety***	***Preparation***
Physical removal only Chemical Biological Radiological	Used to physically remove gross contamination from surfaces.	Contamination is transferred from the surface to the absorbent. The absorbent becomes contaminated and must be disposed of accordingly. Contamination sufficient to produce casualties may well remain on surfaces.	None.
Weather/time			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical Biological Radiological	UV light kills most bio-organism agents and organisms, and radioactive substances decay over time.		None.
Burning			
Target agent	***Use***	***Caution/safety***	***Preparation***
Chemical Biological	Removes but does not neutralize contamination.	Creates downwind hazards. Requires that sentries be posted to keep people out of the danger area.	None.

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Appendix E

Sample Documents

This chapter implements Standardization Agreement (STANAG) 4359.

The forms, documentation, and reports described in this appendix are for use in TE battalion operations. Escort operations, sampling operations, and reporting criteria are discussed.

ESCORT OPERATIONS

E-1. The following documents are used by TE battalion S-3s, TEOs, and ground teams:

- Technical escort officer memorandum. A sample memorandum for the TEO containing special orders, use of force, and special instructions involving the use of weapons during off-post escort missions is provided as Figure E-1, page E-2.
- Trip report for air escort. The TEO completes this report to record mission actions. It is then forwarded from the TEO to the TE battalion commander, with reviews conducted by the S-3. A sample trip report for air escort is provided as Figure E-2, page E-6.
- Trip report for ground team escort. The ground team leader completes this report to record mission actions. It is included as an attachment to the TEO memorandum. A sample trip report for ground team escort is provided as Figure E-3, page E-10.
- Toxic pickup team equipment checklist. The TEO uses this checklist as a task and equipment checklist. A sample checklist is provided as figure E-4, page E-3.
- Risk assessment matrix/worksheet. The TEO or designated team leader completes this worksheet on the day of the mission. The purpose of the worksheet is to determine the risk associated with mission completion on the scheduled delivery date. It is included as an attachment to both the ground and operational trip reports. A sample risk assessment matrix/worksheet is provided as Figure E-5, page E-18.
- Aircraft commander's/ship captain's briefing. The TEO uses this document to brief the aircraft commander or ship captain on the nature of the mission. It is included as an attachment to the TEO's operational trip report. A sample aircraft commander's/ship captain's briefing is provided as Figure E-6, page E-19.
- Off-post mission worksheet. The TE battalion S-3 uses this worksheet in planning off-post escorts. A sample off-post mission worksheet is provided as Figure E-7, page E-20.
- Mission planning/briefing worksheet. The TEO uses this worksheet to brief the TE team members. A sample mission planning/briefing worksheet is provided as Figure E-8, page E-24.

DEPARTMENT OF THE ARMY
XX Chemical Battalion (Technical Escort)
Street Address
City, State ZIP+4

SAMPLE

OFFICE SYMBOL Date

MEMORANDUM FOR Technical Escort Officer

SUBJECT: Special Orders, Use of Force, and Special Instructions for Technical Escorts Off Post

1. Purpose. This order is applicable to all armed XX Chemical Battalion (CM BN) (TE) personnel assigned to the movement of chemical or biological agents.

2. Special Orders.

a. Establish a limited area around the cargo. The site of the limited area is security-dependent and is established by the technical escort officer (TEO). Use a minimum of six armed personnel when in possession of cargo.

b. Strictly control entry into the limited area. No one enters without authority of the TEO or team leader. The two-person rule is in effect. Access to the limited area is restricted to personnel listed on the accompanying entry control roster (ECR).

c. Lock magazine into weapon when custody of the cargo is assumed. Chamber rounds only on order of the TEO or team leader. If he is incapacitated, the senior team member gives the order. Weapons must remain on “safe” at all times.

d. Carry, conceal, and holster 9-mm pistols on “safe” when performing off-post escorts. Carry shotguns and M16/M4 rifles at port arms.

3. Use of Force.

a. Minimum force must be used to remove or disperse persons interfering with the technical escort mission. If the mission continues to be hindered, local law enforcement authorities must be contacted for assistance.

b. The use of force, including deadly force, is authorized under the following conditions:

(1) To prevent theft or sabotage of chemical or biological materials.

(2) To immediately recover unlawfully taken chemical or biological materials.

(3) To ensure immediate security of a penetrated limited area.

(4) In self-defense when in imminent danger of death or serious injury.

Figure E-1. Sample TEO Memorandum

OFFICE SYMBOL
SUBJECT: Special Orders, Use of Force, and Special Instructions for Technical Escorts Off Post

c. Prior to the use of deadly force, the following options should be considered in the order listed:

(1) Use of verbal persuasion.

(2) Use of chemical aerosol irritants or unarmed defense techniques. (Note: Chemical aerosol irritants are subject to local restrictions.)

(3) Presentation/threat of deadly force.

(4) Use of deadly force.

Note. Escort personnel are not to remove their weapons from their holsters unless there is reasonable expectation that use of the weapon may be necessary.

d. Deadly force is justified only under conditions of extreme necessity and as a last resort, when all lesser means have failed or cannot be employed. All other means must be exhausted.

e. If possible, when using a firearm—

(1) Give orders to halt before firing.

(2) Shoot with the intent to render persons incapable of continuing the activity or course of behavior.

(3) Fire shots with regard for the safety of innocent bystanders. The security of the chemical or biological material is paramount over the safety of hostages.

f. Warning shots are prohibited.

g. You are a security guard—not a police officer. Do not engage in off-post civilian law enforcement responsiblities/duties. Immediately notify authorities in the event of an incident.

h. Nothing in these rules limits your inherent right or responsibility to defend yourself and members of your escort team.

i. It is illegal to entrap someone in order to use deadly force.

j. The presence of hostages must not deter taking decisive action to prevent unauthorized access to or the capture or removal of chemical or biological material. The welfare and safety of any hostage is to be considered in determining specific actions to take but, in all instances, the security of the chemical or biological material is paramount.

Figure E-1. Sample TEO Memorandum (continued)

OFFICE SYMBOL
SUBJECT: Special Orders, Use of Force, and Special Instructions for Technical Escorts Off Post

4. Special Instructions.

a. Brief the team on the current FPCON level, the escort route, and the risk assessment prior to movement.

b. Verbally transmit the duress code to the S-3 operations and team members.

c. Once the cargo has been delivered to the receiver, remove magazines from weapons in an inconspicuous area outside the XX CM BN (TE) limited area as directed by the TEO or designated team leader.

d. Under the supervision of the TEO or designated team leader, clear weapons in an approved clearing barrel prior to turn-in.

e. After completing the mission, place weapons and ammunition in separate carrying cases.

Battalion Commander
LTC, CM
Commanding

Figure E-1. Sample TEO Memorandum (continued)

OFFICE SYMBOL
SUBJECT: Special Orders, Use of Force, and Special Instructions for Technical Escorts Off Post

Signature Record

Printed name	Rank	Signature	SSN	WPN type	Serial number	Auth date

Privacy Act Statement

Authority: 10 USC 3012.

Purpose: To provide a means of positive identification of personnel moving chemical surety material. To provide necessary and sufficient identifying data for ensuring that technical escort personnel understand special orders connected with the movement of chemical surety material.

Routine uses: The proponent must indicate what agencies if any outside of DoD they plan to share this information with.

Disclosure: Voluntary. Failure to disclose required information will result in the denial of participation in surety duty.

Figure E-1. Sample TEO Memorandum (continued)

DEPARTMENT OF THE ARMY
XX Chemical Battalion (Technical Escort)
Street Address
City, State ZIP+4

OFFICE SYMBOL Date

MEMORANDUM THRU Technical Escort Officer

FOR Commander, XX Chemical Battalion (Technical Escort)

SUBJECT: Trip Report for Escort Mission Number _____

1. Background.

   a. References.

      (1) AR 50-6, AR 95-27, 49 CFR, and TM 38-250.

      (2) XX CM BN (TE) SOP, Escort Letter of Instruction (LOI).

   b. Mission.

   c. Location.

2. Personnel.

   a. XX CM BN (TE) personnel.

      (1) (4)

      (2) (5)

      (3) (6)

   b. External points of contact (POCs).

	Name	Organization	Phone
(1)	_____	_____	_____
(2)	_____	_____	_____
(3)	_____	_____	_____

Figure E-2. Sample Trip Report for Air Escort

OFFICE SYMBOL
SUBJECT: Trip Report for Escort Mission Number_____

3. Execution.

a. Date of mission.

b. Time departed TE BN operations.

c. Time departed pickup location.

d. Time arrived TDY location.

e. Time deliveries completed.

1st _____ 2d _____ 3d _____

f. Time TE BN operations notified.

1st _____ 2d _____ 3d _____

g. TE BN personnel contacted.

1st _____ 2d _____ 3d _____

h. Intermediate stops.

	Location	Reason	Time arrived	Time departed
(1)				
(2)				
(3)				
(4)				

i. Agents/materials transported.

	Type	Quantity	CSM/bio/other	Shipper	Receiver
(1)					
(2)					
(3)					

Figure E-2. Sample Trip Report for Air Escort (continued)

OFFICE SYMBOL
SUBJECT: Trip Report for Escort Mission Number _____

j. Monitoring checks.

Type / Time taken / Test # / Results	Type / Time taken / Test # / Results
(1) ____ /_____ /_____ /_____	(6) ____ /_____ /_____ /_____
(2) ____ /_____ /_____ /_____	(7) ____ /_____ /_____ /_____
(3) ____ /_____ /_____ /_____	(8) ____ /_____ /_____ /_____
(4) ____ /_____ /_____ /_____	(9) ____ /_____ /_____ /_____
(5) ____ /_____ /_____ /_____	(10) ____ /_____ /_____ /_____

k. Mode of transportation and route.

(1) Aircraft _____ (Type/tail #)	(2) Aircraft _____ (Type/tail #)
_____ to _____	_____ to _____
_____ to _____	_____ to _____
_____ to _____	_____ to _____

4. Issues/Discussion.

5. Recommendations.

6. Attachments (if applicable).

a. Letter of appointment.

b. Letter of instruction.

c. Letter of identification.

d. Special orders, use of force, and special instructions for technical escorts off post.

e. Mission/planning briefing.

f. Toxic pickup team and equipment checklist.

g. Risk assessment matrix/worksheet.

h. Aircraft commander's/ship captain's briefing.

Figure E-2. Sample Trip Report for Air Escort (continued)

OFFICE SYMBOL
SUBJECT: Trip Report for Escort Mission Number_____

i. Off-post mission worksheet.

j. DA Form 1594, Daily Staff Journal or Duty Officer's Log.

k. DD Form 1149, Requisition and Invoice/Shipping Document.

l. DD Form 1911, Materiel Courier Receipt.

m. DOT transportation papers.

n. Miscellaneous documentation (REPSHIPs, strip maps).

Reviewed by:

_____
Escort Officer

_____
Operations Officer

_____
TE BN S-3

_____
Executive Officer (XO)

_____
Deputy to the Commander

_____
Commander, XX CM BN (TE)

Prepared by:

_____
Technical Escort Officer

Figure E-2. Sample Trip Report for Air Escort (continued)

DEPARTMENT OF THE ARMY
XX Chemical Battalion (Technical Escort)
Street Address
City, State ZIP+4

OFFICE SYMBOL Date

MEMORANDUM THRU Technical Escort Officer

FOR Commander, XX Chemical Battalion (Technical Escort)

SUBJECT: Trip Report for Ground Team Leader Number _____

1. Background.

   a. References.

      (1) AR 50-6, AR 95-27, 49 CFR, and TM 38-250.

      (2) XX CM BN (TE) SOP, Escort Letter of Instruction (LOI),

   b. Mission.

   c. Location.

2. Personnel.

   a. XX CM BN (TE) ground team personnel.

      (1) (3)

      (2) (4)

   b. External points of contact (POCs).

	Name	Organization	Phone
(1)	_____	_____	_____
(2)	_____	_____	_____
(3)	_____	_____	_____

Figure E-3. Sample Trip Report for Ground Team Escort

OFFICE SYMBOL
SUBJECT: Trip Report for Ground Team Leader Number _____

3. Execution.

   a. Dates of mission: _____

   b. DTG departed home station: _____

   c. DTG arrived TDY location: _____

   d. DTG departed TDY location: _____

   e. DTG coordination completed: _____

   f. Local time TE S-3 operations notified: _____

   g. TE BN person contacted:

      1st _____ 2d _____ 3d _____

   h. Intermediate stops/layovers:

	Location	Reason	Time arrived	Time departed
(1)	_____	_____	_____	_____
(2)	_____	_____	_____	_____

   i. Mode of transportation and route:

      (1)

      (2)

4. Issues/Discussion.

5. Recommendations.

6. Attachments (if applicable).

   a. Letter of appointment.

   b. Letter of instruction.

   c. Letter of identification.

Figure E-3. Sample Trip Report for Ground Team Escort (continued)

OFFICE SYMBOL
SUBJECT: Trip Report for Ground Team Leader Number _____

d. Special orders, use of force, and special instructions for technical escorts off post.

e. Mission/planning briefing.

f. Toxic pickup team and equipment checklist.

g. Risk assessment matrix/worksheet.

h. Off-post mission worksheet.

i. DA Form 1594, Daily Staff Journal or Duty Officer's Log.

j. DD Form 1149, Requisition and Invoice/Shipping Document.

k. DD Form 1911, Materiel Courier Receipt.

l. DOT transportation papers.

m. Miscellaneous documentation (REPSHIPS, strip maps).

Reviewed by:

_____
Escort Officer

_____
Operations Officer

_____
TE BN S-3

_____
Executive Officer (XO)

_____
Deputy to the Commander

_____
Commander, XX CM BN (TE)

Prepared by:

_____
Technical Escort Ground Team Leader

Figure E-3. Sample Trip Report for Ground Team Escort (continued)

Toxic Pickup Team Equipment Checklist
(For use of this checklist, see XX CM BN [TE] SOP.)

Date: _____

Operations branch: _____

Pickup team: TEO _____

Leader _____ Member _____

Member _____ Member _____

Member _____ Member _____

Member _____ Member _____

1. S-3 Operations:

	Yes	No
a. Are all personnel cleared by XX CM BN (TE) surety/security?	_____	_____
b. Is the TEO certified?	_____	_____
c. Are the custodian's authorization memos on file with the unit?	_____	_____
d. Has the receiver been notified to meet the team upon arrival?	_____	_____
e. Have approved and alternate routes been selected and have the current threat conditions and risk assessment information been given to the TEO?	_____	_____
f. Has the TEO been briefed IAW applicable unit SOPs?	_____	_____
g. Has the security officer been notified to have security guards monitor the radio and set up traffic CPs as required?	_____	_____

_____

Signature, S-3 Operations

Page 1 of 5

Figure E-4. Sample Toxic Pickup Team Equipment Checklist

Toxic Pickup Team Equipment Checklist (continued)
(For use of this checklist, see XX CM BN [TE] SOP.)

2. TEO/Leader:

	Yes	No
a. Personal equipment:		
(1) Protective mask	_____	_____
(2) Auto injectors (Mark I™), 3 per member	_____	_____
(3) Mobility badge	_____	_____
(4) Medical alert card/necklace/bracelet	_____	_____
(5) Valid Optional Form (OF) 346, U.S. Government Motor Vehicle Operator's Identification Card	_____	_____
(6) Commercial driver license (CDL) – civilians only	_____	_____
(7) Military/DOD civilian identification card	_____	_____
(8) Identification tags – military only	_____	_____
(9) Level C (Tyvek-F®, M2 TAP boots, nonstandard gloves, CPUs, coveralls, surgical gloves)	_____	_____
b. Vehicles:		
(1) Sweep vehicle	_____	_____
(2) Toxic pickup truck with covered bed	_____	_____
(3) Guard vehicle	_____	_____
(4) Fire extinguishers (3 total)		
(a) 2, Class 10 BC fire extinguishers with cargo vehicle	_____	_____
(b) 1 fire extinguisher with guard vehicle	_____	_____
(5) Chocks for cargo vehicle	_____	_____

Page 2 of 5

Figure E-4. Sample Toxic Pickup Team Equipment Checklist (continued)

Toxic Pickup Team Equipment Checklist (continued)
(For use of this checklist, see XX CM BN [TE] SOP.)

	Yes	No
c. Mission equipment:		
(1) Decontaminants (soda ash, bleach, liquid soap, 5-gallon water can [full]). Type of decontaminant_____	_____	_____
(2) Leak-seal and packaging material (6-mil plastic bags [various types and sizes], plaster of paris, duct tape, sponges, brushes, buckets, spill pads, tie-down straps, 6-mil plastic sheeting)	_____	_____
(3) Equipment (torque wrench, sockets, crescent wrench, claw hammer, banana oil, first aid kit, Phillips screwdriver, flat-tip screwdriver, radios, cell phone)	_____	_____
(4) Placards	_____	_____
(5) M18A2 kit, Dräger tube(s) or ICAM	_____	_____
(6) M18A2 kit, Dräger tube(s) or ICAM (backup)	_____	_____
d. Weapons:		
(1) M9 pistol	_____	_____
(2) Holster	_____	_____
(3) Weapon cases (2)	_____	_____
(4) Ammunition	_____	_____
(5) Ammunition pouch	_____	_____
(6) Magazines (2)	_____	_____
(7) DA 2818, Firearms Authorization	_____	_____
(8) Body armor	_____	_____

_____
Signature, TEO/team leader

Figure E-4. Sample Toxic Pickup Team Equipment Checklist (continued)

Toxic Pickup Team Equipment Checklist (continued)
(For use of this checklist, see XX CM BN [TE] SOP.)

3. TEO:

	Yes	No
a. Prior to pickup:		
(1) Has the team been briefed IAW applicable unit SOPs?	_____	_____
(2) Has the letter of instruction been provided and read?	_____	_____
(3) Has the letter of appointment been provided?	_____	_____
(4) Has the equipment portion of this checklist been completed?	_____	_____
b. Conduct of pickup:		
(1) Is the cargo—		
(a) Properly packaged?	_____	_____
(b) Properly labeled?	_____	_____
(c) Correctly annotated on a DD Form 1911 and/or DD Form 1149 (shipping papers)?	_____	_____
(d) Accompanied by sufficient copies of DD Form 1911 and the shipping papers?	_____	_____
(2) Was acceptance of the cargo refused for any reason?	_____	_____
State reason(s) _____		
(3) Have monitoring checks been completed?	_____	_____
(4) Did personnel wear protective masks?	_____	_____
(5) Has the vehicle been properly placarded for the agent or material transported?	_____	_____
(6) Has the TE BN S-3 Operations been notified of departure with the cargo?	_____	_____

Page 4 of 5

Figure E-4. Sample Toxic Pickup Team Equipment Checklist (continued)

Toxic Pickup Team Equipment Checklist (continued)
(For use of this checklist, see XX CM BN [TE] SOP.)

	Yes	No
c. Vehicle movement:		
(1) Did the vehicles maintain safe speeds?	_____	_____
(2) Was the proper interval maintained between vehicles?	_____	_____
(3) Was the TE BN S-3 Operations informed of arrival at the delivery point(s)?	_____	_____
(4) Were placards present on vehicles?		
(5) Were M18A2 Kits, Dräger tubes, or ICAMs on hand?	_____	_____
(6) Were M18A2 Kits, Dräger tubes, or ICAMs (backup) on hand?	_____	_____
d. Unloading cargo:		
(1) Did the receiver meet the team?	_____	_____
(2) Did the cargo arrive properly, without damage?	_____	_____
(3) Have the monitoring checks been completed?	_____	_____
(4) Did personnel wear protective masks?	_____	_____
(5) Did the receiver sign for the cargo?	_____	_____
e. Actions after mission:		
(1) Have the vehicles undergone PMCS and been cleaned, refueled, and secured?	_____	_____
(2) Have the completed dispatches for the vehicles been turned in?	_____	_____
(3) Has all the equipment been cleaned and secured?	_____	_____
(4) Have weapons been cleared, cleaned, and turned in?	_____	_____
(5) Was all appropriate paperwork turned in to the TE BN S-3?	_____	_____

_____
Signature, TEO

Page 5 of 5

Figure E-4. Sample Toxic Pickup Team Equipment Checklist (continued)

Risk Assessment Matrix/Worksheet
(For use of this worksheet, see XX CM BN [TE] SOP.)

1. Date/time: _____

2. Event: _____

3. Hazards: _____

4. Countermeasures: _____

Endurance

Environmental Preparation	Rest/physical conditioning Optimum	Adequate	Minimal
Nonacclimated	3	4	5
Partially acclim	2	3	4
Acclimated	1	2	3

Planning

	Preparation In-depth	Adequate	Minimal
Guidance			
Vague	3	4	5
Implied	2	3	4
Specific	1	2	3

Proficiency

Task	Proficient	Experienced	Inexper
Complex	3	4	5
Routine	2	3	4
Simple	1	2	3

Complexity

	Operational area Inside	Outside	Remote
Ops length			
>40 hr	3	4	5
8–40 hr	2	3	4
<8 hr	1	2	3

Weather

Temp (°F)	Clear/ dry	Overcast/ drizzle	Fog/rain snow/ice
0–31	3	4	5
32–59	2	3	4
60–89	1	2	3
90–100	4		
101+	5		

Equipment

PPE/ monitoring	Excellent	Good	Poor
Low level	1	2	3
Gross level	2	3	4
Level A	1	2	3
Level B	2	3	4
Level C	3	4	5

Task organization

Command/ control	Support	Day	Night
OPCON	3	4	5
Attached	2	3	4
Organic	1	2	3

Total risk assessment

Risk	Points	Decision level
Low	0–14	TEO
Medium	15–25	CO cdr
High	26+	BN cdr

Total points _____

Decision level signatures:

_____ TEO signature

_____ CO cdr signature

_____ BN cdr signature

Figure E-5. Risk Assessment Matrix/Worksheet

Aircraft Commander's/Ship Captain's Briefing
(For use of this document, see XX CM BN [TE] SOP.)

Tail/ship number _____ Date _____

1. This is to acknowledge that I, _____, the aircraft commander/ship captain, and my crew have been briefed by _____ of the XX Chemical Battalion (TE) on the nature of the mission and have been provided the following information:

   a. Security classification _____

   b. Requirement for escorts: AR 95-27, Sec A, Para 5; TM 38-250, Attachment 24.

   c. Passengers are/are not permitted.

2. The following information was provided on the cargo:

   a. Proper shipping name _____

   b. Hazard classification _____

   c. Quantity _____

   d. Net explosive weight _____

   e. Location in aircraft/vessel _____

   f. Decontaminant _____

   g. Neutralizing material _____

   h. Protective equipment _____

   i. First aid procedures _____

   j. Monitoring requirements _____

   k. Emergency procedures _____
   _____

3. Specific location where ground team anticipates linkup _____

Ranks and names of crew members	Ranks and names of escorts
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

_____ _____
Signature of aircraft commander/ship captain Printed name

Date/time information received _____

CF:
Aircraft commander/ship captain
Technical escort officer (TEO)

Figure E-6. Aircraft Commander's/Ship Captain's Briefing

Off-Post Mission Worksheet
(For use of this worksheet, see XX CM BN [TE] SOP.)

Privacy Act Statement

Authority: 10 USC 3012.

Purpose: To provide a means of positive identification of personnel moving chemical surety material. To provide necessary and sufficient identifying data for ensuring that technical escort personnel understand special orders connected with the movement of chemical surety material.

Routine uses: The proponent must indicate what agencies if any outside of DoD they plan to share this information with.

Disclosure: Voluntary. Failure to disclose required information will result in the denial of participation in surety duty.

Date_____

1. Type mission: CSM Dilute RCWM Other (Circle one)
2. Type escort: Air Road Sea Rail (Circle one)
3. Documentation: Mission number _____

   Advanced REPSHIP_____ Received_____
4. Requested delivery date_____
5. Fund cite/XO _____
6. Cargo to be moved:

   Agent(s)_____

   Quantity_____
7. Shipper POC_____

   Address _____

   Telephone number_____

   Coordination date_____
8. Consignee POC_____

   Address_____

   Telephone number_____

   Coordination date_____

Page 1 of 4

Figure E-7. Off-Post Mission Worksheet

Off-Post Mission Worksheet (continued)
(For use of this worksheet, see XX CM BN [TE] SOP.)

9. RDECOM POC _____

Address _____

Telephone number _____

Coordination date _____

Mission departure _____ Mission complete _____

10. Aviation POC _____

Address _____

Telephone number _____

PIC and crew _____

Coordination date _____

11. Cargo flight information: One way Round trip (Circle one)

Departure location _____ DTG _____

Type aircraft/tail number _____ / _____

Type aircraft/tail number _____ / _____

Enroute stop(s) _____

_____

12. Other cargo information _____

_____

13. Escort team composition:

Name	Rank	SSN

Page 2 of 4

Figure E-7. Off-Post Mission Worksheet (continued)

Off-Post Mission Worksheet (continued)
(For use of this worksheet, see XX CM BN [TE] SOP.)

14. Support coordination:

a. Departure airfield POC _____

Address _____

Telephone number _____

Coordination date _____

b. Fire department POC _____

Address _____

Telephone number _____

Coordination date _____

15. Support coordination:

a. Arrival airfield POC _____

Address _____

Telephone number _____

Coordination date _____

b. Vehicle POC _____

Address _____

Telephone number _____

Coordination date _____

c. Police escort POC _____

Address _____

Telephone number _____

Coordination date _____

d. HAZMAT department POC _____

Address _____

Telephone number _____

Coordination date _____

Page 3 of 4

Figure E-7. Off-Post Mission Worksheet (continued)

Off-Post Mission Worksheet (continued)
(For use of this worksheet, see XX CM BN [TE] SOP.)

e. Force protection conditions:

	Location	POC	Threat
Pickup point			
Enroute stop(s)			
Dropoff point			

Notes

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Figure E-7. Off-Post Mission Worksheet (continued)

Mission Planning/Briefing
(For use of this worksheet, see XX CM BN [TE] SOP.)

Mission no._____ Date of request_____ Request received by_____

Job requested by_____ Mission number_____

Date and time of transfer_____

Date and time reported to Ops branch_____

Cargo description

Number of containers	Content weight/volume	Agent(s)/material
_____	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

SAMPLE

Agent decon_____ Skin decon_____

Placards_____

Custodians

Received from_____ Phone number_____

Location_____

Transferred by_____ Date_____

Received from_____ Phone number_____

Location_____

Person contacted

Armor_____ HHC_____

Security guards_____ (X) CO_____

Health clinic_____ (X) CO_____

Fire department_____ Security div_____

RDECOM EOC_____

Force protection condition level_____ Job order number_____

Figure E-8. Mission Planning/Briefing Worksheet

E-2. The following forms, documentation, and reports are used by TEOs and TE teams during TE operations:

- ***DA Form 1594.*** This form is used to record events from the time an escort mission begins until the mission is complete.
- ***DD Form 626 (Motor Vehicle Inspection [Transporting Hazardous Materials]).*** This form, which is to be completed for all vehicles that must be marked or placarded in accordance with *49 CFR*, is prepared for the cargo vehicle during technical escort operations.
- ***DD Form 1149.*** This form is used to track and account for the number of containers in an escort shipment.
- ***DD Form 1911.*** This form identifies the chain of custody for the item(s) transported. Information concerning the shipper, the receiver—and anyone taking possession of the containers in between—is entered on the form.
- ***DD Form 2890.*** This form meets the requirements of the *International Convention for the Safety of Life at Sea (SOLAS) 74, Chapter VII, Regulation 54* and *Marine Pollution Convention for the Prevention of Pollution From Ships (MARPOL) 79/78, Annex III, Regulation 4* and may, therefore, be used as a declaration of dangerous goods.
- ***DD Form 2890C (DOD Multimodal Dangerous Goods Declaration Continuation Sheet).*** This form is used when the number of items shipped exceeds the space available on *DD Form 2890*.

FORMS AND DOCUMENTATION FOR SAMPLING OPERATIONS

E-3. When collecting samples, the technical CBRN sampling team completes the following documents:

- Sample log. In compliance with STANAG 4359, a log of the samples collected is maintained. An example of this type of log is provided as Figure E-9, page E-26.
- Site diagram. This diagram is used to sketch a diagram of the site. A sample of a site diagram is provided as Figure E-10, page E-27.
- Sample labels. Each sample must be labeled. An example of a label and a description of minimum labeling requirements are provided as Figure E-11, page E-28.
- DD Form 1911. This form (also mentioned in the previous section) actually originates during sample collection. It identifies the chain of custody for the item (s) transported. Information concerning the shipper, the receiver- and anyone taking possession of the containers in between – is entered on the form.

Sample Log
(For use of this log, see XX CM BN [TE] SOP.)

GPS coordinates
Coordinate/location

Date _____/_____/_____ Time _____

Mission case number _____

Preparer/assistant _____
_____

Sampling Team
_____
_____
_____
_____
_____
_____

Sample #	Location	Description	Sampled by	Type	Lot #	Photo #	Comments

Page ____ of ____

Figure E-9. Sample Log

Site Diagram
(For use of this diagram, see XX CM BN [TE] SOP.)

GPS coordinates
Coordinate/location

Date _____/_____/_____ Time _____

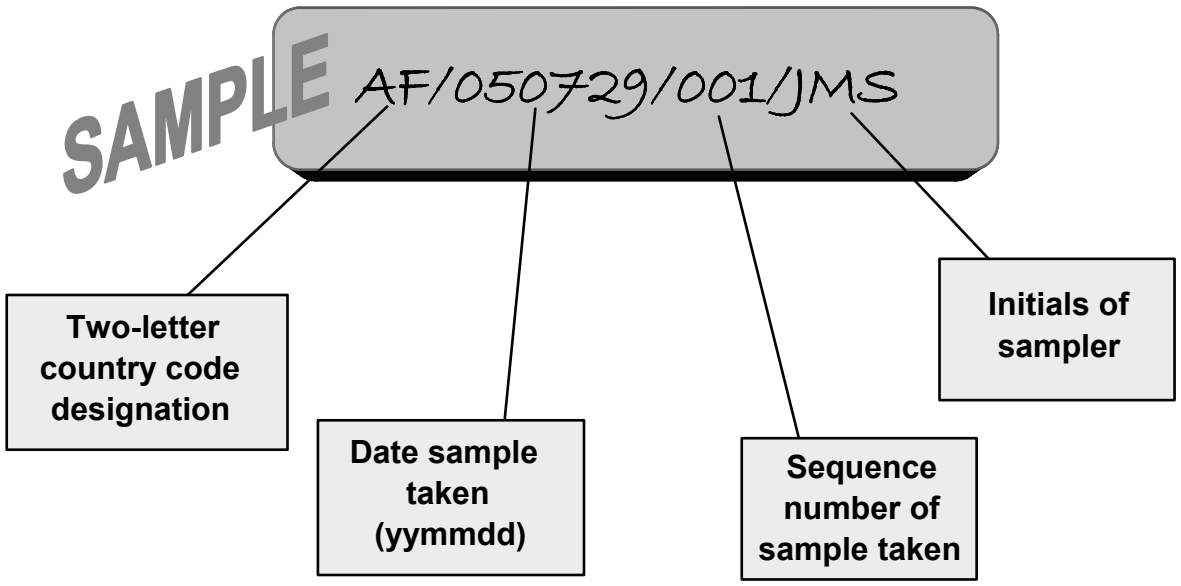
Mission case number _____

Preparer/assistant _____
_____

References
Scale disclaimer
Compass orientation
Evidence
Fixed objects
Measurements
Key/legend

Page ____ of ____

Figure E-10. Site Diagram



The minimum information required for a sample label is—

- Country code—only if outside the United States.
- The date the sample was taken.
- The sample number. This example indicates that this was the first sample taken at this location.
- The initials of the person taking the sample.

There are a minimum of three labels for each sample taken. One label is attached to the sample container, one label is attached to the secondary container, and the final label is attached to the overpack container.

These sample labeling procedures comply with *STANAG 4359*.

Figure E-11. Sample Label

REPORTING CRITERIA

E-4. Reporting requirements accompany certain TE battalion operations.

FORCE TRACKING REPORT

E-5. The shipping agency transmits an advance force tracking report, also known as a report of shipment (REPSHIP), to the receiving agency one week before the shipping date. The advance REPSHIP contains the following information in the order listed:

- Transportation release number.
- Shipping order number.
- Name of carrier and exact routing instructions.
- Vehicle number (car or tail number).
- Bill of lading number.
- Requisition number and a reference to the message authorizing shipment.
- Brief description of contents.
- Date/time group (DTG) of departure.
- Estimated date and time of arrival.
- Name, grade, and social security number (SSN) of the technical escort team members assigned to accompany the shipment.

Note. The security classification should be assigned in accordance with *AR 380-86*.

E-6. Technical reach-back POCs are listed at <*https://www.us.army.mil/suite/page/409522*> The POCs may be accessed by scrolling down and clicking on the "Technical Reachback" link.

E-7. The shipping agency transmits a final report to the receiving agency on the day the chemical agents are shipped.

E-8. The receiving agency records the DTG of arrival and the physical condition of the cargo on the original advance REPSHIP message (added as items 11 and 12) and then, within two workdays of receipt of the shipment, returns the report to the shipping agency at the original REPSHIP address. Chemical events that occur during shipment are reported as prescribed in *AR 50-6*, *Chapter 11*.

AFTER-ACTION REPORT

E-9. The after-action report (AAR) is developed using a structured review process which allows participating Soldiers, leaders, and units to determine what happened during a mission or during training operations, why it happened, and how similar situations might be handled differently in the future. The AAR process consists of four parts:

- **Review of what was meant to happen.** The evaluator and participants review what was meant to happen based on the commander's intent, the objectives, applicable training and evaluation outlines (T&EOs), and/or the unit training plan.
- **Summary of what did happen.** The evaluator and participants determine what actually happened during the mission/training task. A factual account is vital. For force-on-force training, opposing force (OPFOR) members assist in the AAR process by describing the training events and outcomes from their points of view.

- **Evaluation of what went right and what went wrong.** The participants identify the strong and weak points of their performance. The evaluator guides the discussions, ensuring that the conclusions reached by the participants are doctrinally sound, consistent with Army standards, and relevant to the wartime mission.
- **Explanation of how the task should be executed in the future.** The evaluator assists the chain of command in determining what changes need to be made the next time the task is performed. The recommended improvements to procedures result in individual and organizational motivation to conduct future sustainment training to standard.

E-10. There are several advantages of an AAR over a critique. For example, the AAR—

- Focuses on training/operation objectives derived directly from the key mission-essential task list (METL).
- Emphasizes meeting Army standards rather than proclaiming success or failure.
- Encourages self-discovery of important lessons by posing leading questions to participants.
- Allows for the participation of a large number of individuals and leaders.

E-11. The AAR serves as feedback for training and operations. For example, leaders understand that it is not possible to perform all tasks to standard; therefore, in their initial planning, they allocate time and other resources for retraining. Retraining allows the participants to apply the lessons learned during the AAR and implement corrective actions as necessary. The retraining should be conducted at the earliest opportunity so that AAR observations and evaluations may be immediately incorporated into unit training to standard. Training is incomplete until the Army standard is achieved.

E-12. The AAR process is often "tiered," using multiechelon, leader development techniques. Following a general review with all participants, senior trainers may conduct extended professional discussions with selected leaders. These discussions usually involve specific reviews of leader contributions. Commanders use this review process as a link between leader training and leader development.

SITUATION REPORT

E-13. A situation report (SITREP) is used to keep higher and lower staffs advised and updated on the reporting commander's critical situation. It provides information on significant events, intelligence, force status and dispositions, logistics, the overall unit situation, and political/diplomatic events. In accordance with *FM 101-5-2*, the general lines of a SITREP are—

- LINE 1—DTG.
- LINE 2—UNIT (unit making the report).
- LINE 3—REFERENCE (report title, originator, and DTG).
- LINE 4—ORIGINATOR (unit identification code of the unit originating the report).
- LINE 5—REPORTED UNIT (unit identification code of the reported unit).
- LINE 6—HOME LOCATION (universal transverse mercator [UTM] or six-digit grid coordinate with military grid reference system [MGRS] grid zone designator for the home location of the reported unit).
- LINE 7—PRESENT LOCATION (UTM or six-digit grid coordinate with MGRS grid zone designator for the present location of the reported unit).
- LINE 8—ACTIVITY (brief description of the reported unit's current activity).
- LINE 9—EFFECTIVENESS (commander's evaluation of the reported unit's combat effectiveness).
- LINE 10—OWN SITUATION DISPOSITION/STATUS (organization or operational control, changes to previously reported major combatant and support force locations, current deployments, changes in task force designations, significant degradation of unit mission readiness, projected requirements for additional forces, and proposed deployments).
- LINE 11—LOCATION (UTM or six-digit grid coordinate with MGRS grid zone designator).

- LINE 12—SITUATION OVERVIEW (a brief overall assessment of the situation, including circumstances or conditions that increase or materially detract from the capability and readiness of forces assigned or under OPCON of the command or service).
- LINE 13—OPERATIONS (offensive and defensive operations carried out by major combatant elements and a summary of results; allied-force operations; plans for combat operations during the 24 hours following completion of the report, including objectives and probable enemy reaction; and deviations from previously reported intentions/plans).
- LINE 14—INTELLIGENCE/RECONNAISSANCE (capabilities, operations, threat changes, and order of battle, as obtained from significant spot intelligence reports [SPIREPs] or intelligence reports [INTREPs] submitted during the previous 24-hour period).
- LINE 15—LOGISTICS (deficiencies that significantly affect support for planned operations and problems beyond the capability of the service or commander to overcome or alleviate them in a timely manner).
- LINE 16—COMMUNICATIONS/CONNECTIVITY (traffic volume; incompatibilities; quantitative equipment deficiencies; significant outages; and an assessment, provided by the commander-in-chief [CINC] command, control, communications, and computer systems staff section [J-6]/operations staff section [J-3] of the impact of communications degradations and outages on the mission).
- LINE 17—PERSONNEL (mobilization status; factors affecting the readiness of forces/units; daily battle casualties sustained—killed in action [KIA], wounded in action [WIA], or missing in action [MIA]—arranged by service; and the impact of casualties on command mission capability).
- LINE 18—SIGNIFICANT POLITICAL/MILITARY/DIPLOMATIC EVENTS (large-scale military exercises; events emphasizing interests of key segments of the society; indications of civil defense measures contemplated or implemented; events not reported by OPREP 3 PINNACLE but which could result in local, U.S., and international public reaction; civil unrest; and results/decisions of key allied or other foreign government meetings).
- LINE 19—COMMANDER'S EVALUATION (summary of key points from lines 12 through 18, highlighting areas requiring joint chiefs of staff [JCS] actions.
- LINE 20—NARRATIVE (additional information required for clarification of the report).
- LINE 21—AUTHENTICATION (report authentication).

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Glossary

ACRONYMS AND ABBREVIATIONS

Acronym/Term	Definition
AA	avenue of approach
AAR	after-action report
AAR	after-action review
AC	hydrogen cyanide
acclim	acclimated
ACE	Adaptive Communications Element
ACGIH	American Conference of Governmental Industrial Hygienists
AChE	acetyle cholinesterase
Act	active
AEGL	acute exposure guideline level
AEL	airborne exposure limit
AFMAN	Air Force manual
AFRAT	Air Force Radiation Assessment Team
AFRRI	Armed Forces Radiobiology Research Institute
AIHA	American Industrial Hygiene Association
ALARA	as low as reasonably achievable
AMC	Army Materiel Command
ANSI	American National Standards Institute
AO	area of operation
AOR	area of responsibility
APR	air purifiying respirator
AR	Army regulation
ARNG	Army National Guard
ASD	Assistant Secretary of Defense
ASI	additional skill identifier
ASTM	American Society for Testing and Materials
AT	antiterrorism
ATSDR	Agency for Toxic Substances and Disease Registry
ATTN	attention
auth	authorized
bio	biological
BN	battalion
bpm	beats per minute
BRAC	base realignment and closure
BSL 3	Biosafety Level 3
BVO	black vinyl overshoe

BWA	biological warfare agent
BWM	biological warfare materiel
c	cup(s)
C	Celsius
C2	command and control
C4	composition 4
CAA	Clean Air Act
CAIRA	chemical accident or incident response and assistance
CAP	Civil Air Patrol
CARC	chemical-agent resistant coating
CAS	chemical abstract service
CB	chemical-biological
CBIRF	chemical-biological incident response force
CBRN	chemical, biological, radiological, and nuclear
CBRNE	chemical, biological, radiological, nuclear, and high-yield explosives
CCDR	combatant commander
CDC	Centers for Disease Control and Prevention
CDL	commercial driver license
cdr	commander
CEEL	community emergency exposure level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	copy furnished
CFR	Code of Federal Regulations
CG	phosgene
CGI	combustible gas indicator
ChE	cholinesterase
CHRIS	Chemical Hazards Response Information System
CI	critical infrastructure
CINC	commander-in-chief
CJCS	Chairman, Joint Chiefs of Staff
CJCSM	Chairman of the Joint Chiefs of Staff memorandum
CK	cyanogen chloride
CLS	combat lifesaver
CLS	contractor logistic support
CM	chemical
CMA	Chemical Materials Agency
CN	chloroacetophenone
CNS	central nervous system
CO	company
COA	course of action
COE	Army Corps of Engineers

CONOPS	concept of operations
CONUS	continental United States
COR	contracting office representative
COT	Committee on Toxicology
COTS	commercial, off-the-shelf
CP	command post
CP	control point
CPRP	Chemical Personnel Reliability Program
CPU	chemical-protective undergarment
CRA	contamination reduction area
CRD	chemical reconnaissance detachment
CS	2-chlorobenzalmalononitrile
CS	civil support
CSM	chemical survey mission
CSS	combat service support
CST	civil support team
Ct	cummulative exposures
CWA	chemical warfare agent
CWM	chemical warfare materiel
DA	Department of the Army
DA	diphenylchlorarsine
DC	diphenylcyanoarsine
dd	day (two-digit format)
DD	Department of Defense
decon	decontaminant or decontaminate
DF	methylphosphonic difluoride
DHHS	U.S. Department of Health and Human Services
DHS	Department of Homeland Security
DIN	Deutsche Industrie-Normen (in English, German Industrial Standards)
div	division
DLAM	Defense Logistics Agency manual
DM	diphenylaminearsine
DNA	deoxyribonucleic acid
DOD	Department of Defense
DODD	Department of Defense Directive
DOE	Department of Energy
DOS	Department of State
DOT	Department of Transportation
DP	disphosgene
DP8	maltooctaose
DS2	Decontamination Solution Number 2
DST	decision support tool

DTAPS®	Disposable Toxicological Agent Protective System
DTG	date-time group
DTRA	Defense Threat Reduction Agency
ECBC	Edgewood Chemical and Biological Center
ECP	entry control point
ECR	entry control roster
EEGL	emergency exposure guidance level
EH	explosive hazard
EHS	extremely hazardous substance
EM	engineer manual
EMS	emergency medical services
EMT	emergency medical technician
EOC	emergency operations center
EOD	explosive ordnance disposal
EOR	explosive ordnance reconnaissance
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPDS	emergency personnel decontamination station
ERG	Emergency Response Guidebook
ERPG	emergency response planning guideline
ESF	emergency support function
F	Fahrenheit
FBI	Federal Bureau of Investigation
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FHP	force health protection
FID	flame ionization detector
FM	field manual
FMI	field manual interim
FORSCOM	U.S. Army Forces Command
FOSC	federal on-scene commander
FP	force protection
FPCON	force protection condition
FR	Federal Register
FRAGORD	fragmentary order
FRERP	Federal Radiological Emergency Response Plan
ft	foot or feet
ft3	cubic foot or feet
FUDS	formerly used defense sites
g	gram(s)
GA	tabun
gal	gallon(s)

GB	sarin
GD	soman
GF	cyclosarin
GP	general-purpose
GPL	general population limit
GPS	Global Positioning System
GSA	General Services Administration
GVO	green vinyl overshoe
H	a sulfur mustard gas blister agent
HAZMAT	hazardous material
HAZWOPER	hazardous waste operations and emergency response
HD	a sulfur mustard gas blister agent
HD	Homeland Defense
HEPA	high-efficiency particulate air
HF	hydrofluoric acid
HHC	headquarters and headquarters company
HL	a sulfur mustard gas blister agent
HN	host nation
HN-1	a nitrogen mustard gas blister agent
HN-3	a nitrogen mustard gas blister agent
HPGe	high-purity germanium
HPV	high production volume
HQ	a sulfur mustard gas blister agent
HQ	headquarters
hr	hour or hours
HSC	Homeland Security Council
HSDB	Hazardous Substances Data Bank
HSI	heat stress index
HSOC	homeland security operations center
HSPD	Homeland Security Presidential directive
HT	a sulfur mustard gas blister agent
HTB	high-test bleach
HTH	high-test hypochlorite
I&E	installations and environment
IAP	incident action plan
IASO	Information Assurance Security Officer
IATA	International Air Transport Association
IAW	in accordance with
IC	incident commander
ICAM	individual chemical-agent monitor
ICP	incident command post
ICS	Incident Command System

IDLH	immediately dangerous to life or health
IED	improvised explosive device
IH	industrial hygienist
IIMG	interagency incident management group
IMA	installation medical authority
in	inch(es)
IND	improvised nuclear device
inexper	inexerienced
INL	Idaho National Laboratory
INRP	Initial National Response Plan
INTREP	intelligence report
IOC	incident operations commander
IPB	intelligence preparation of the battlefield
IRIS	Integrated Risk Information System
IT	information technology
J-3	operations staff section
J-6	command, control, communications, and computer systems staff section
JAR	joint Army regulation
JCS	Joint Chiefs of Staff
JDOMS	Joint Director of Military Support
JFCOM	Joint Forces Command
JFO	joint field office
JFO	joint forces operations
JIC	joint information center
JIS	Joint Information System
JP	joint publication
JSLIST	joint-service, lightweight, integrated suit technology
JTF	joint task force
kg	kilogram(s)
KIA	killed in action
KR	key resource
L	lewisite
l	liter(s)
lb	pound(s)
LBE	load-bearing equipment
LCE	load-carrying equipment
LEL	lower explosive limit
LFA	lead federal agency
LOI	letter of instruction
LPG	liquefied petroleum gas
LRN	laboratory response network
LTC	lieutentant colonel

m	meter(s)
m2	square meter(s)
m3	cubic meter(s)
MAJCOM	major command (Air Force)
MANSCEN	Maneuver Support Center
MARB	Materiel Assessment Review Board
MARPOL	Marine Pollution Convention
MARS	Military Affiliate Radio System
MDMP	military decision-making process
MED	medical
MEDCOM	U.S. Army Medical Command
MEG	military exposure guideline limit
memo	memorandum
METL	mission-essential task list
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, and civil considerations
mg	milligram(s)
MGRS	military grid reference system
MHMIs	managing hazardous material incidents
MIA	missing in action
MIL-SPEC	military specification
min	minute(s)
ml	milliliter(s)
mm	month (two-digit format)
MOA	memorandum of agreement
MOPP	mission-oriented protective posture
MOU	memorandum of understanding
MRE	meal, ready-to-eat
MSD	minimum safe distance
MSDS	material safety data sheet
MTF	medical treatment facility
MULO	multipurpose over boots
NAAK	nerve-agent antidote kits
NAC	National Advisory Committee
NAERG	North American Emergency Response Guidebook
NAIRA	Nuclear Accident and Incident Response and Assistance
NaOCl	sodium hypochlorite
NaOH	sodium hydroxide
NATO	North Atlantic Treaty Organization
NCP	National Contingency Plan
NCRC	National Counterterrorism Center
NESDIS	National Environmental Satellite, Data, and Information Service

NFPA	National Fire Protection Association
NH3	ammonia
NH4OH	ammonium hydroxide
NIH	National Institutes of Health
NIIMS	National Interagency Incident Management System
NIJ	National Institute of Justice
NIMS	National Incident Management System
NIOSH	National Institute for Occupational Safety and Health
NMC	National Military Command
NMCC	National Military Command Center
NMRI	Naval Medical Research Institute
no.	number
NOAA	National Oceanic and Atmospheric Administration
NORTHCOM	U.S. Northern Command
NOS	National Ocean Service
NPL	National Priorities List
NRC	National Research Council
NRC	National Response Center
NRCC	National Response Coordination Center
NRL	Naval Research Laboratory
NRP	National Response Plan
NS	no standard
NSC	National Security Council
NWS	National Weather Service
OCONUS	outside the continental United States
OD	olive drab
OF	optional form
OJT	on-the-job training
OPCON	operational control
OPFOR	opposing force
OPLAN	operation plan
OPORD	operation order
OPREP	operations report
ops	operations
OSHA	Occupational Safety and Health Administration
oz	ounce(s)
PA	public affairs
PAA	peracetic acid
PACOM	U.S. Pacific Command
Pam	pamphlet
PAO	public affairs office
PAPR	powered air-purifying respirator

PCE	protective clothing and equipment
PDDA	power-driven decontaminating apparatus
PDDE	power-driven decontaminating equipment
PDS	patient decontamination station
PEL	permissible exposure limit
PIC	pilot in charge
PID	photoionization detector
PINS	portable isotopic neutron spectroscopy
PL	public law
PMCS	preventive maintenance checks and services
PMNSCM	product manager for nonstockpile chemical materiel
POC	point of contact
POL	petroleum, oil, and lubricants
PPE	personal protective equipment
ppm	parts per million
PS	chloropicrin
pt	pint(s)
PTB	position task book
QL	diisopropyl aminoethylmethyl phosphonite
qt	quart
RBC	red blood cell
RCRA	Resource Conservation and Recovery Act
RCWM	recovered chemical warfare materiel
RD	reference document
RDECOM	Research, Development, and Engineering Command
RDTE	research, development, test, and evaluation
REL	recommended exposure limit
REPSHIP	report of shipment
RFA	request for assistance
RG-4	Risk Group 4
RM	regional methods
ROTA	release other than attack
RPE	respiratory protective equipment
RRCC	regional response coordination center
RRT	remediation and restoration team
RS	response site
RSDL	reactive skin decontamination lotion
RSP	render-safe procedure
RTECS	Registry of Toxic Effects of Chemical Substances
S-2	intelligence staff officer
S-3	operations staff officer
S-4	logistics staff officer

SA	arisine
SAR	supplied-air respirator
SARA	Superfund Amendments and Reauthorization Act
SCAPA	Subcommittee on Consequence Assessment and Protective Actions
SCBA	self-contained breathing apparatus
SCT	Secretariat of Communications and Transportation of Mexico
SDS	sorbent decontaminant system
sec	second(s)
SecDef	Secretary of Defense
SEI	Safety Equipment Institute
SERPACWA	skin exposure reduction paste against chemical warfare agents
SFEMG	single-fibre electromyography
SFOD	Special Forces operational detachment
SIOC	Strategic Information and Operations Center
SIRA	sampling and identification of radiological agents
SITREP	situation report
SME	subject matter expert
SO	safety officer
SOLAS	Safety of Life at Sea
SOP	standing operating procedure
SPEC	specification
SPEGL	short-term public emergency guidance level
SPIREP	spot intelligence report
SSE	sensitive-site exploitation
SSN	social security number
SSP	site safety plan
STANAG	standardization agreement
STB	super-tropical bleach
STEL	short-term exposure limit
SUPCOM	support command
T&EO	training and evaluation outline
T	bis(2-[2-chloroethylthio]ethyl)ether
TAP	toxicological agent protective
TB	technical bulletin
TB	tuberculosis
Tbs	tablespoon(s)
TDY	temporary duty
TE	technical escort
TEEL	temporary emergency exposure limit
temp	temperature
TEO	technical escort officer
TF	task force

TIC	toxic industrial chemicals
TIM	toxic industrial material
TLV	threshold limit value
TLVC	threshold limit value ceiling
tm	team
TM	technical manual
TNT	trinitrotoluene
TO	theater of operation
TOMES	toxicology occupational medicines and environmental sciences
TRADOC	U.S. Army Training and Doctrine Command
TTP	tactics, techniques, and procedures
TWA	time-weighted average
U.S.	United States
UC	unified command
UN	United Nations
URL	uniform resource locator
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAF	U.S. Air Force
USAMRICD	U.S. Army Medical Research Institute for Chemical Defense
USAMRIID	U.S. Army Medical Research Institute of Infectious Diseases
USC	U.S. code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USG	U.S. Government
USN	U.S. Navy
USPHS	U.S. Public Health Service
UTM	universal transverse mercator
UXO	unexploded ordnance
VA	vulnerability assessment
VOCO	vocal order
VX	a V series nerve agent
WARNORD	warning order
WEE	workplace environmental exposure level
WIA	wounded in action
WMD	weapons of mass destruction
WPL	worker population limit
WPN	weapon
XO	executive officer
yd	yard(s)
yd2	square yard(s)
yy	year (two-digit format)

TERMS

area of operations

An operational area defined by the joint force commander for land and maritime forces. Areas of operation do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces. Also called AO. See also area of responsibility. (JP 3-0)

area of responsibility

The geographical area associated with a combatant command within which a combatant commander has authority to plan and conduct operations. Also called **AOR.** See also **combatant command.** (JP 3-0)

assessment

1. A continuous process that measures the overall effectiveness of employing joint force capabilities during military operations. 2. Determination of the progress toward accomplishing a task, creating an effect, or achieving an objective. 3. Analysis of the security, effectiveness, and potential of an existing or planned intelligence activity. 4. Judgment of the motives, qualifications, and characteristics of present or prospective employees or "agents." (JP 3-0)

chemical, biological, radiological, nuclear, or high-yield explosives incidents

An emergency resulting from the deliberate or unintentional, release of nuclear, biological, radiological, or toxic or poisonous chemical materials, or the detonation of a high-yield explosive. Also called CBRNE incidents. (JP 3-26)

chemical warfare

All aspects of military operations involving the employment of lethal and incapacitating munitions/agents and the warning and protective measures associated with such offensive operations. Since riot control agents and herbicides are not considered to be chemical warfare agents, those two items will be referred to separately or under the broader term "chemical," which will be used to include all types of chemical munitions/agents collectively. Also called CW. (JP 3-11)

civil defense

All those activities and measures designed or undertaken to: a. minimize the effects upon the civilian population caused or which would be caused by an enemy attack on the United States; b. deal with the immediate emergency conditions that would be created by any such attack; and c. effectuate emergency repairs to, or the emergency restoration of, vital utilities and facilities destroyed or damaged by any such attack. (JP 1-02)

combatant command (command authority)

Nontransferable command authority established by title 10 ("Armed Forces"), United States Code, section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or the Secretary of Defense. Combatant command (command authority) cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions. Operational control is inherent in combatant command (command authority). Also called COCOM. See also operational control. (JP 0-2)

command and control

The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures

employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called C2. (JP 0-2)

command post

A unit's or subunit's headquarters where the commander and the staff perform their activities. In combat, a unit's or subunit's headquarters is often divided into echelons; the echelon in which the unit or subunit commander is located or from which such commander operates is called a command post. Also called CP. (JP 1-02)

concept plan

In the context of joint operation planning level 3 planning detail, an operation plan in an abbreviated format that may require considerable expansion or alteration to convert it into a complete operation plan or operation order. Also called CONPLAN. See also operation plan. (JP 5-0)

consequence management

Actions taken to maintain or restore essential services and manage and mitigate problems resulting from disasters and catastrophes, including natural, manmade, or terrorist incidents. Also called CM. (JP 3-26)

continental United States

United States territory, including the adjacent territorial waters,. located within North America between Canada and Mexico. Also called CONUS. (JP 1-02)

course of action

1. Any sequence of activities that an individual or unit may follow. 2. A possible plan open to an individual or commander that would accomplish, or is related to the accomplishment of the mission. 3. The scheme adopted to accomplish a job or mission. 4. A line of conduct in an engagement. 5. A product of the Joint Operation Planning and Execution System concept development phase and the course-of-action determination steps of the joint operation planning process. Also called COA. (JP 5-0)

crisis management

Measures to identify, acquire, and plan the use of resources needed to anticipate, prevent, and/or resolve a threat or an act of terrorism. It is predominantly a law enforcement response, normally executed under federal law. Also called CrM. (JP 3-26)

debarkation

The unloading of troops, equipment, or supplies from a ship or aircraft. (JP 1-02)

Department of the Army

The executive part of the Department of the Army at the seat of government and all field headquarters, forces, Reserve Components, installations, activities, and functions under the control or supervision of the Secretary of the Army. Also called DA. (JP 1-02)

direct support

A mission requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance. Also called DS. (JP 3-09.1)

embarkation

The process of putting personnel and/or vehicles and their associated stores and equipment into ships and/or aircraft. (JP 1-02)

explosive ordnance

All munitions containing explosives, nuclear fission or fusion materials, and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket, and small arms ammunition; all mines, torpedoes, and depth charges; demolition charges; pyrotechnics; clusters and dispensers; cartridge and propellant actuated devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature. (JP 1-02)

explosive ordnance disposal

The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance. It may also include explosive ordnance which has become hazardous by damage or deterioration. Also called EOD. (JP 1-02)

force protection

Preventive measures taken to mitigate hostile actions against Department of Defense personnel (to include family members), resources, facilities, and critical information. Force protection does not include actions to defeat the enemy or protect against accidents, weather, or disease. Also called FP. (JP 3-0)

health service support

All services performed, provided, or arranged to promote, improve, conserve, or restore the mental or physical well-being of personnel. These services include, but are not limited to, the management of health services resources, such as manpower, monies, and facilities; preventive and curative health measures; evacuation of the wounded, injured, or sick; selection of the medically fit and disposition of the medically unfit; blood management; medical supply, equipment, and maintenance thereof; combat stress control; and medical, dental, veterinary, laboratory, optometric, nutrition therapy, and medical intelligence services. Also called HSS. (JP 4-02)

homeland defense

The protection of United States sovereignty, territory, domestic population, and critical infrastructure against external threats and aggression or other threats as directed by the President. Also called HD. (JP 3-0)

homeland security

Homeland security, as defined in the National Strategy for Homeland Security, is a concerted national effort to prevent terrorist attacks within the United States, reduce America's vulnerability to terrorism, and minimize the damage and recover from attacks that do occur. The Department of Defense contributes to homeland security through its military missions overseas, homeland defense, and support to civil authorities. Also called HS. (JP 3-26)

host country

A nation which permits, either by written agreement or official invitation, government representatives and/or agencies of another nation to operate, under specified conditions, within its borders. (JP 2-01.2)

improvised explosive device

A device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic, or incendiary chemicals and designed to destroy, incapacitate, harass, or distract. It may incorporate military stores, but is normally devised from nonmilitary components. Also called IED. (JP 3-07.2)

incident

In information operations, an assessed event of attempted entry, unauthorized entry, or an information attack on an automated information system. It includes unauthorized probing and browsing; disruption or denial of service; altered or destroyed input, processing, storage, or output of information; or changes to information system hardware, firmware, or software characteristics with or without the users' knowledge, instruction, or intent. (JP 3-13)

incident command system

A standardized on-scene emergency management organization that reflects the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries. The incident command system is the combination of facilities, equipment, personnel, procedures, and communications operating with a common organizational structure, designed to aid in the management of resources during incidents. The incident command system is used for all kinds of emergencies and is applicable to small as well as large and complex incidents. The incident command system is used by various jurisdictions and functional agencies, both public and private, or organized fieldlevel incident management operations. Also called ICS. (JP 3-41)

joint publication

A publication containing joint doctrine that is prepared under the direction and authority of the Chairman of the Joint Chiefs of Staff and applies to all Armed Forces of the United States. Also called JP. (CJCSI 5120.02A)

lead federal agency

The federal agency that leads and coordinates the overall federal response to an emergency. Designation and responsibilities of a lead federal agency vary according to the type of emergency and the agency's statutory authority. Also called LFA. (JP 3-26)

materiel

All items (including ships, tanks, self-propelled weapons, aircraft, etc., and related spares, repair parts, and support equipment, but excluding real property, installations, and utilities) necessary to equip, operate, maintain, and support military activities without distinction as to its application for administrative or combat purposes. (JP 1-02)

mission-oriented protective posture

A flexible system of protection against nuclear, biological, and chemical contamination. This posture requires personnel to wear only that protective clothing and equipment (mission-oriented protective posture gear) appropriate to the threat level, work rate imposed by the mission, temperature, and humidity. Also called MOPP. (JP 3-11)

on-scene commander

1. An individual in the immediate vicinity of an isolating event who temporarily assumes command of the incident. 2. The federal officer designated to direct federal crisis and consequence management efforts at the scene of a terrorist or weapons of mass destruction incident. Also called OSC. (JP 3-50)

operational control

Command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority) and may be delegated within the command. When forces are transferred between combatant commands, the command relationship the gaining commander will exercise (and the losing commander will relinquish) over these forces must be specified by the Secretary of Defense. Operational control is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions; it does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called OPCON. See also combatant command (command authority)**.** (JP 0-2)

operation plan

1. Any plan for the conduct of military operations prepared in response to actual and potential contingencies. 2. In the context of joint operation planning level 4 planning detail, a complete and detailed joint plan containing a full description of the concept of operations, all annexes applicable to the plan, and a time-phased force and deployment data. It identifies the specific forces, functional support, and resources required to execute the plan and provide closure estimates for their flow into the theater. Also called OPLAN. (JP 5-0)

personal protective equipment

The equipment provided to shield or isolate a person from the chemical, physical, and thermal hazards that can be encountered at a hazardous materials incident. Personal protective quipment includes both personal protective clothing and respiratory protection. Adequate personal protective equipment should protect the respiratory system, skin, face, hands, feet, head, body, and hearing. Also called PPE. (NFPA 472)

personnel

Those individuals required in either a military or civilian capacity to accomplish the assigned mission. (JP 1-02)

preventive maintenance

The care and servicing by personnel for the purpose of maintaining equipment and facilities in satisfactory operating condition by providing for systematic inspection, detection, and correction of incipient failures either before they occur or before they develop into major defects. (JP 1-02)

reachback

The process of obtaining products, services, and applications, or forces, or equipment, or material from organizations that are not forward deployed. (JP 3-30)

risk assessment

The identification and assessment of hazards (first two steps of risk management process). (JP 1-02)

risk management

The process of identifying, assessing, and controlling risks arising from operational factors and making decisions that balance risk cost with mission benefits. Also called RM. (JP 3-0)

security

1. Measures taken by a military unit, activity, or installation to protect itself against all acts designed to, or which may, impair its effectiveness. 2. A condition that results from the establishment and maintenance of protective measures that ensure a state of inviolability from hostile acts or influences. 3. With respect to classified matter, the condition that prevents unauthorized persons from having access to official information that is safeguarded in the interests of national security. (JP 1-02)

sensitive site exploitation

A related series of activities inside a captured sensitive site to exploit personnel documents, electronic data, and material captured at the site, while neutralizing any threat posed by the site or its contents. Also called SSE. (JP 3-31)

technical escort

An individual technically qualified and properly equipped to accompany designated material requiring a high degree of safety or security during shipment. (JP 1-02)

toxic

Capable of producing illness, injury, or damage to humans, domestic livestock, wildlife, or other organisms through ingestion, inhalation, or absorption through any body surface. (FM 3-110.4)

toxic industrial biological

Any biological material manufactured, used, transported, or stored by industrial, medical, or commercial processes. For example: infectious waste and as biological samples (e.g., biopsies, disease for research). Also called TIB. (JP 3-41)

toxic industrial chemical

Any chemical manufactured, used, transported, or stored by industrial, medical, or commercial processes. For example: pesticides, petrochemicals, fertilizers, corrosives, poisons, etc. Also called TIC. (JP 3-41)

toxic industrial hazard

The hazards resulting from the release, by any means, of toxic industrial materials, resulting in contamination or irradiation of personnel or the environment area or any particular object. Also called TIH. See also toxic. (FM 3-100.4)

toxic industrial material

Any toxic industrial material manufactured, stored, transported, or used in industrial or commercial processes. It includes toxic industrial chemicals, toxic industrial radiologicals, and toxic industrial biologicals. Also called TIM. (JP 3-41)

toxic industrial radiological

Any radiological material manufactured, used, transported, or stored by industrial, medical, or commercial processes. For example: spent fuel rods, medical sources, etc. Also called TIR. (JP 3-41)

vulnerability assessment

A Department of Defense, command, or unit-level evaluation (assessment) to determine the vulnerability of a terrorist attack against an installation, unit, exercise, port, ship, residence, facility, or other site. Identifies areas of improvement to withstand, mitigate, or deter acts of violence or terrorism. Also called VA. (JP 3-07.2)

weapons of mass destruction

Weapons that are capable of a high order of destruction and/or of being used in such a manner as to destroy large numbers of people. Weapons of mass destruction can be high explosives or nuclear, biological, chemical, and radiological weapons, but exclude the means of transporting or propelling the weapon where such means is a separable and divisible part of the weapon. Also called WMD. (JP 1-02)

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