COLORADO CSEPP COMMUNITY

RECOVERY PLAN

June 2016

Executive Summary

Purpose

The purpose of the Chemical Stockpile Emergency Preparedness Program (CSEPP) Recovery Plan is to outline the coordination and support activities that occur in the recovery phase following a chemical event at Pueblo Chemical Depot (PCD). The term "recovery" includes measures to assess the hazard and perform other urgent tasks in the area affected by the emergency; a controlled process for reentry, restoration, and remediation; and provision of services to persons, businesses and other organizations affected by the emergency. The primary purpose of recovery activities is to protect public health and safety while returning the community to normal or near normal conditions.

The Colorado CSEPP Team has been an active participant in the evolution of CSEPP recovery planning and preparedness, beginning April 15, 1992 when it identified the programmatic need for resolution of recovery issues during a Table Top Exercise (TTX) conducted in Pueblo.

Between January 2014 and August 2015, a series of seminars and tabletop exercises had been conducted focusing on different aspects of the plan with the goal of validating its contents. Additional stakeholders were brought into the processes that were not included when the original plan was written. Changes in regulatory requirements were also updated. This was accomplished as the first set of chemical munitions was being destroyed.

Management of such an incident will conform to the principles of the National Incident Management System (NIMS) as required by Colorado Executive Order D 011 04, dated December 6, 2004 and the PCD and / or PCAPP Contingency Plan pursuant to the facility permit or interim status plans and the Colorado Hazardous Waste Regulations, 6 CCR 1007-3, Section 264.1(g)(8)(iii).

Context of Recovery from a Chemical Event

It is impossible to predict the exact situation that would follow in the aftermath of a chemical event. Much would depend on the origin of the event, the severity of the event, the response to it, and other parameters such as the weather. However, at least some circumstances may be anticipated in advance, and this Plan is based on those assumptions to a considerable extent. Planning for recovery should take into account the probable circumstances and should incorporate measures to address the issues they will raise.

It should be noted that a chemical event may or may not involve a release of chemical agent, and when there is a release; it may or may not be enough to be detectable or pose a hazard off-post. A recovery process should be considered for any chemical event in which the public is notified of an emergency and protective action recommendations are issued to the public. However, the recovery process will be simpler if, after the situation is assessed, it is determined that there was no release or a minimal release. The Plan is not based on any assumption as to the severity of the event; it is intended to cover the full range of chemical events ranging from purely precautionary notices to severe events involving significant hazards off-post.

Assumptions

For severe events where there is a significant release of chemical agent and a possibility that it was transported off-post, it can be anticipated that there will be uncertainty as to the nature and extent of any residual hazard. Protective actions will likely have been initiated based on assumptions as to the amount of agent released (e.g., the maximum credible event or MCE), combined with computer modeling of its dispersal. The process of determining whether there is any residual hazard may likely take a few days to a few weeks. If investigation at the scene of the event reveals no releases, that period might be reduced. If investigation or monitoring indicates a possibility of aerosol deposition, that period might be increased.

In such an event, off-post officials would have a number of concerns relating to monitoring, sampling, hazard assessment, and protective actions during the recovery period, specifically including:

- Concern for aerosol deposition. Under some circumstances, it is possible that chemical agent would be dispersed as an aerosol (very small droplets) and subsequently deposited as contamination on downwind surfaces off-post. Studies have shown that this is unlikely to occur, and if did occur it would be limited to a small area near the installation. An unusual combination of factors is needed to make aerosol deposition a possible health risk beyond the installation boundary: detonation of a number of explosively configured munitions filled with persistent agent (mustard), combined with a fire hot enough to cause the munitions to detonate and carry the aerosols well above ground level in a heated plume. In addition, the right atmospheric conditions are needed to transport the aerosol significant distances in order for the droplets to fall out beyond the installation boundary.

- Concern for other hazards caused by the chemical event. The chemical event may cause secondary hazards in the affected area. For example, rapid evacuation of the population might leave some industrial facilities or critical infrastructures vulnerable to loss or damage that, in turn, could pose a health and safety threat. Traffic accidents on evacuation routes in the hazard area might create situations that necessitate response in potentially hazardous areas to save lives.

- Concern for other hazards not caused by the chemical event. Disasters such as earthquakes or tornadoes might cause or contribute to a chemical event, create separate response requirements, and complicate the chemical event response.

- Concern for those who evacuated from areas that were never at risk. Because of the conservative assumptions that are built in to the protective action decision-making process, it is likely that many people will have evacuated from areas that were never dangerous. This population will strain resources to provide care and shelter for evacuees until they return home.

COLORADO CSEPP COMMUNITY RECOVERY PLAN

DISCLAIMER: The Colorado Department of Public Health and Environment (CDPHE) recognizes that various aspects of sampling, collection, and clean-up from a chemical agent incident at the Pueblo Chemical Depot remain fluid. Thus, as a regulatory agency for hazardous materials within the State of Colorado proposed procedures and criteria are pending review by the Department. Therefore, the Department is unable to fully support this plan in toto.

Approval by Designated Authorities

This off-post recovery plan is hereby approved as the basis of integrated community chemical event recovery operations for Pueblo County, Pueblo Chemical Depot, and the State of Colorado.

Chairperson, Pueblo Board of County Commissioners	14 Oct 2015 Date
Commander, Pueblo Chemical Depot	23 may 2016 Date
Governor of Colorado or Authorized Representative	14 OCT 2015 Date

Record of Changes

Date	Pages / Subject Revised	Pages Updated By: (Name)
7/1/2012	Name change. Division of Emergency Management from the Department of Department of Local Affairs was renamed Office of Emergency Management (moved into the Division of Homeland Security and Emergency Management) within the Department of Public Safety	Throughout document
10/1/12	Removal of references to Service Response Force (deleted from Army Regulation)	p. 15, 81, 107, and 118
1/2/14	Update of publication dates of various documents	Throughout document
1/24/14	Inclusion of the Colorado Department of Agriculture	p. 14
9/20/15	Removal of reference DA Pam 50-6	Throughout document

Distribution

City and County of Pueblo Health Department
Colorado Department of Agriculture
Colorado Department of Public Health and Environment / Hazardous and Waste Management Division
Colorado Department of Public Health and Environment / Office of Emergency Preparedness and Response
Colorado Department of Public Safety / Division of Homeland Security and Emergency Management
EPA Region VIII
FEMA Region VIII
Pueblo County Sheriff's Office / Emergency Services Bureau
U.S. Army / Assembled Chemical Weapons Alternatives
U.S. Army / Chemical Materials Activity
U.S. Army / Pueblo Chemical Depot

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BASE PLAN

I. Purpose

This Recovery Plan is designed to coordinate and support activities that occur in the recovery phase following a chemical event at Pueblo Chemical Depot (PCD). The term "recovery" includes measures to assess the hazard and perform other urgent tasks in the area affected by the emergency; a controlled process for reentry, restoration, and remediation; and provision of services to persons, businesses and other organizations affected by the emergency. The primary purpose of recovery activities is to protect public health and safety while returning the community to normal or near normal conditions.

II. Scope

A. The US Army Pueblo Chemical Depot (PCD) located near Pueblo, CO is one of two Army installations that currently store chemical weapons (as of 2015). The Depot's current mission is to ensure the safe, secure storage of the chemical weapons stockpile. Encompassing approximately 23,000 acres, PCD reports to the US Army Chemical Materials Agency (CMA). The US Army Element, Assembled Chemical Weapons Alternatives (ACWA) is the program responsible for the destruction of the chemical stockpile at PCD. The technology used is a neutralization process followed by bio-treatment.

B. All the chemical weapons stored at PCD are hazardous wastes. The EPA ID No. for PCD is CO8213820725. PCD stores most of the chemical weapons stockpile in 94 igloos under interim status pursuant to Compliance Order No. 06-01-05-01 and Part 265 of the Colorado Hazardous Waste Regulations. PCD also manages eleven permitted storage igloos under Permit No. CO-02-08-08-01 for over-packed chemical weapons that have leaked and for other agent related wastes generated from the stockpile storage mission. ACWA will treat the chemical weapons at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) facility under hazardous waste Permit No. CO-04-07-01-01. Requirements for storage and management of the weapons are specified or will be specified in the interim status plans and permits for PCD and PCAPP. These requirements include Preparedness and Prevention and Contingency Plan requirements for preventing and responding to any releases of hazardous waste that must be followed by PCD or PCAPP in the event of a release of mustard agent on or off the facility in accordance with 6 CCR 1007-3, Section 264.1(g)(8)(ii). Note that while initial, emergency responses to a release are exempt from certain Hazardous Waste Regulations, later assessment and remediation of the release are specifically regulated by the Hazardous Materials and Waste Management Division (HMWMD). 6 CCR 1007-3, Section 264.1(g)(8)(iii).

C. In the event of a release of mustard agent on or off PCD, the Colorado Department of Public Health and Environment (CDPHE), Hazardous Materials and Waste Management Division will issue a permit in accordance with C.R.S. Section 25-15-308(2) defining the corrective action measures to be taken to remediate any areas of contamination. The

permit will also outline any security requirements necessary to prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto active areas of remediation. While this CSEPP plan generally describes the activities and coordination that will occur in the event of an off-site release from PCD, it does not supersede any decisions or compliance requirements for clean-up of any hazardous wastes that may be defined by CDPHE in a permit or order after the release occurs.

III. Situation Overview

Chemical weapons have been stored at PCD continuously since the 1950s. Some munitions have leaked while they are in storage; some are physically moved to assist in the inspection of other munitions. When demilitarization of these munitions begins they will be moved to the processing facility. This degradation and movement increases the risk that an unintentional release could occur, resulting in a potential (however slight) that a portion of the chemical agent could travel off-post. Weather conditions could exacerbate the situation by dispersing concentrations of the chemical agent over a wider area.

A. Hazard Analysis

1. Assessment of the hazard to public health and safety in the affected area will serve as a basis for allowing reentry by emergency teams and for determining when unrestricted reentry can occur, whether *ingestion pathway protective measures* are needed, and whether cleanup measures will be required. Hazard Assessment will primarily be conducted by the Army, but Pueblo County and the State of Colorado will work with the Army to ensure that hazard assessment resources will be directed where they are most needed.

2. Hazard assessment for recovery involves determining the extent of residual hazard posed by chemical agent, including localized residual vapors as well as any contamination of water, soil, vegetation, crops, animals, buildings, vehicles and other objects.

3. The Installation will gather data at the scene of the chemical event to identify the agent involved and estimate the quantity of agent released (if any) and how it was dispersed (e.g. whether there was fire or explosion). Computer modeling will be used to estimate the areas affected by vapor passage and by aerosol deposition, if any. Monitoring and sampling will be used to check for residual agent in specific locations.

4. There may be an initial urgent need to perform monitoring to support the entry of emergency response teams into the restricted area to assist persons who did not evacuate. If such assistance is needed in the restricted area, real-time monitoring will be used to establish whether the teams are properly protected for the environment in which they are operating. Procedures for access to restricted areas are described below.

5. The U.S. EPA can provide assistance with evaluating environmental impact through its extensive network of contract resources for monitoring, sampling and laboratory sample analysis. Assistance can be provided if requested by the Army. Such assistance may require cooperation with the Army regarding sample transport and provision of laboratory standard samples (used for calibration of laboratory instruments) of chemical agents.

6. Monitoring and Sampling Priorities

    a. After a chemical event, the Incident Commander, after consultation with CDPHE and other applicable agencies, will determine whether and where monitoring and sampling will be performed, and will determine what areas should receive priority based on the circumstances at the time.

    b. To ensure that recovery proceeds as quickly as possible consistent with public health, animal health, and safety, off-post monitoring and sampling will be prioritized to support: (1) reentry to the restricted area to perform vital missions; (2) allowing access to specific transportation corridors, utilities and other critical infrastructures as soon as possible, (3) progressive clearing of areas for unrestricted reentry, and (4) providing assurance of safety to the public with respect to key locations.

    c. In general, unless monitoring is urgently needed in order to support a vital mission, monitoring and sampling within off-post projected hazard areas (areas where an agent plume has passed according to computer projections) will begin as soon as possible (within the first 24 hours) after the release is terminated, and an Emergency permit for site characterization and clean-up have been approved by CDPHE. This time is needed to accommodate the organization and equipping of sampling teams, to develop the specific priorities, protocols, and locations for monitoring and sampling, and to set up the infrastructure to deploy the teams safely. Allowing some time for the dissipation of short-term hazards will provide a truer picture of any residual hazard of concern for reentry decisions. Also, it avoids putting monitoring and sampling teams at unnecessary risk.

7. Performance of Vital Missions in the Restricted Area

    In a restricted area that has been evacuated there might be a need for reentry to perform missions vital to public health, animal health, and safety. For example, there might be persons who were unable to leave and require assistance, or an emergency repair to collective protection equipment. First priority for monitoring would be to accompany responders performing such missions. In support of such missions, real-time monitoring for residual agent would be performed to allow responders to operate in the area using appropriate personal protective equipment (PPE) and to ensure that persons can be evacuated without encountering an agent hazard.

8. Clearing of Critical Infrastructure

    a. Some facilities and locations may merit priority for monitoring and sampling, in order to minimize disruption of the community or to provide services needed for public health and safety. Examples may include:

        (1) US HWY 50
        (2) Colorado HWY 96
        (3) Railroads
        (4) County Road 3
        (5) County Road 601

    b. The particular facilities or locations affected will depend on the chemical event scenario.

9. Progressive Clearing for Unrestricted Reentry

    a. Monitoring will be performed in order to support the decision process for unrestricted reentry to areas that were restricted during the initial set of emergency protective actions. This will be performed in a phased manner to allow those areas not at risk to be quickly opened for reentry, and to concentrate monitoring resources where results will be the most useful for decision-making.

    b. Initial hazard predictions based on modeling and protective actions will likely be based on some sort of assumption as to the amount of chemical released. For events associated with agent operations, the maximum credible event (MCE) for the daily work plan would be used. For events not associated with active operations, such as an event detected during non-duty hours, a standard "non-operational event scenario" or other default assumption would be used. As installation personnel respond to the event, they will be better able to determine whether a release actually occurred and its true source term. Once that is determined, a new hazard assessment will be performed. It is expected that in most cases, the new hazard assessment will result in a revised source term that is smaller than the initial, assumption-based source term. That in turn will lead to a smaller projected hazard area. (The term "projected hazard area" is used to denote the area that may be affected by an agent plume, according to computer modeling.) In light of these probabilities, four distinct zones can be identified for purposes of reentry decisions, monitoring and sampling:

    c. Reentry Area 1 - Areas outside of the initial projected hazard area, that were evacuated because they were part of a protective action zone impacted by the projected hazard area.

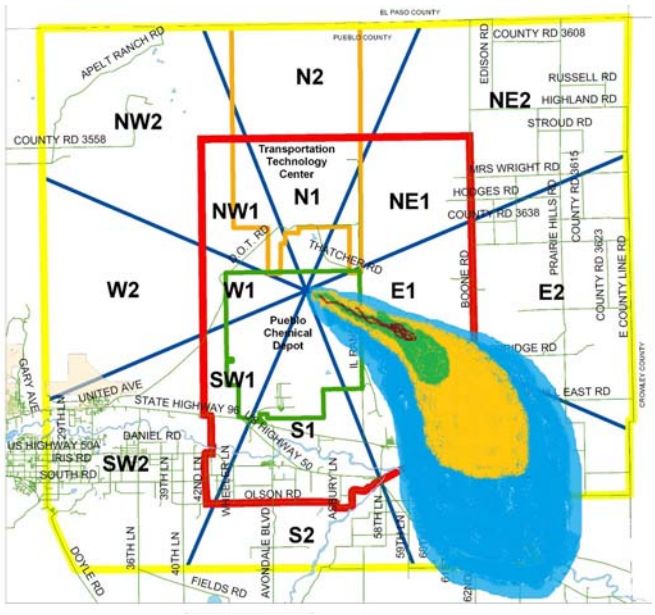
    d. Reentry Area 2 - Areas inside the initial projected hazard area, but outside of the revised projected hazard area that is determined after the post-accident assessment.

e. Reentry Area 3 - Areas inside the revised projected hazard area.

f. Reentry Area 4 - Areas that are potentially contaminated with aerosol deposition. This area can only exist in some very specific scenarios and will likely be quite small as compared with the area where a vapor plume might have traversed.

g. The four areas are illustrated in a series of figures beginning on the next page. The figures depict a hypothetical chemical depot and the community near the depot, divided into a number of pre-designated protective action zones.

Figure 1: Initial and Revised Plume Estimates and Safety Envelopes



Initial plume estimate

Revised plume estimate

Initial safety envelope

Revised safety envelope

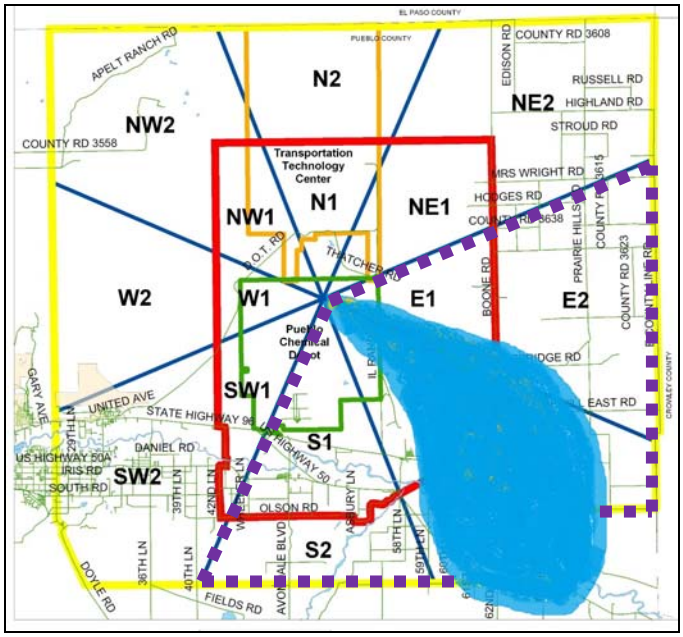
Predesignated protective action zones

Note: Plume outline for illustration purposes only. Not based on actual data

Figure 1 shows an example of an initial and revised plume projection and their associated hazard areas. The figure depicts irregular plumes and safety envelopes as would be projected using the

WebPuff™ software.

Figure 2: Initial Evacuation or Shelter Area



Initial Safety Envelope

Note: Plume outline for illustration purposes only. Not based on actual data

Figure 2 above shows the area that would be evacuated (or sheltered in place) based on the example hazard area. The shaded area includes each pre-designated protective action zones that is touched by the projected hazard area (safety envelope).

Figure 3: Reentry Area 1

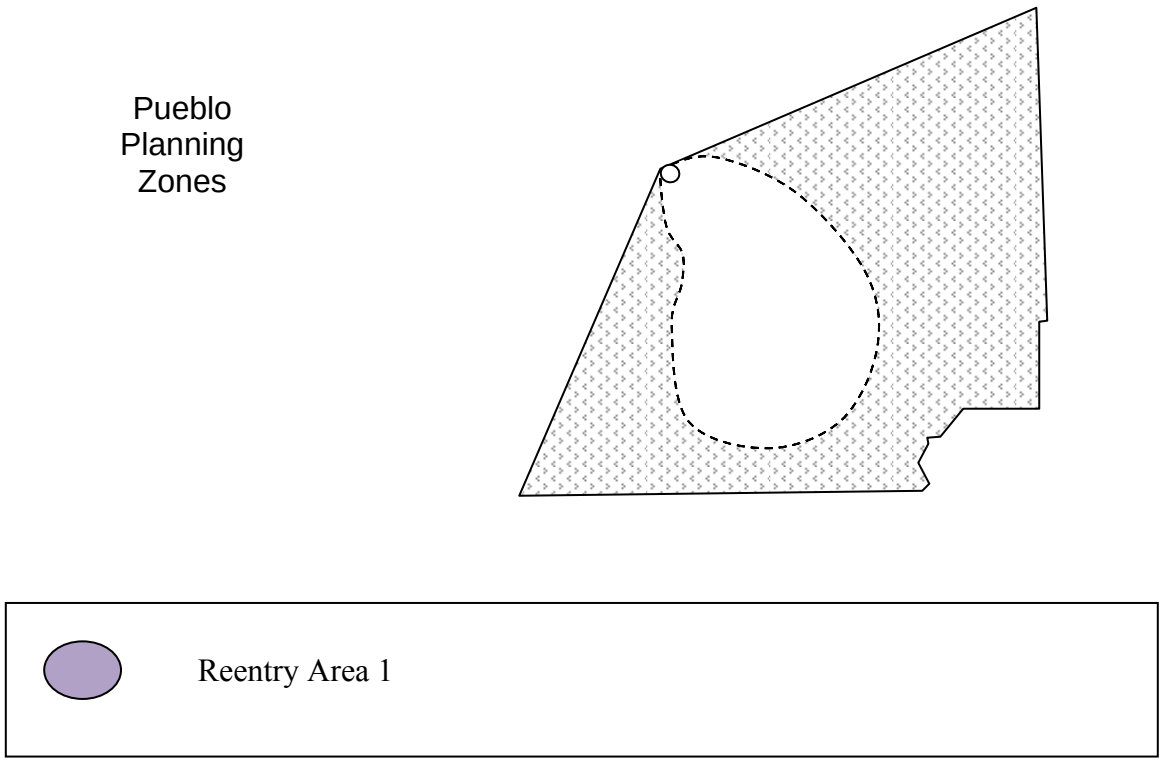


Figure 3 above shows Reentry Area 1. Reentry Area 1 represents an area that, even according to the initial, conservative hazard estimate, was not exposed to chemical agent. It is the area outside of the initial projected hazard area but within the pre-designated protective action zones that the hazard area touched. Protective actions were applied to this area because of the pre-designated protective action zone structure, but at no time was agent projected to have affected this area. Reentry Area 1 can be cleared for unrestricted reentry as soon as the hazard has been contained on the installation. Unrestricted reentry might have to be delayed if cleanup and recovery operations on-post will pose a risk of agent release. For example, if damaged munitions have to be moved, that may pose a risk of agent release and require that reentry be postponed until the operation is completed. No monitoring of Reentry Area 1 is required, because agent was never projected to enter the area.

Figure 4: Reentry Area 2

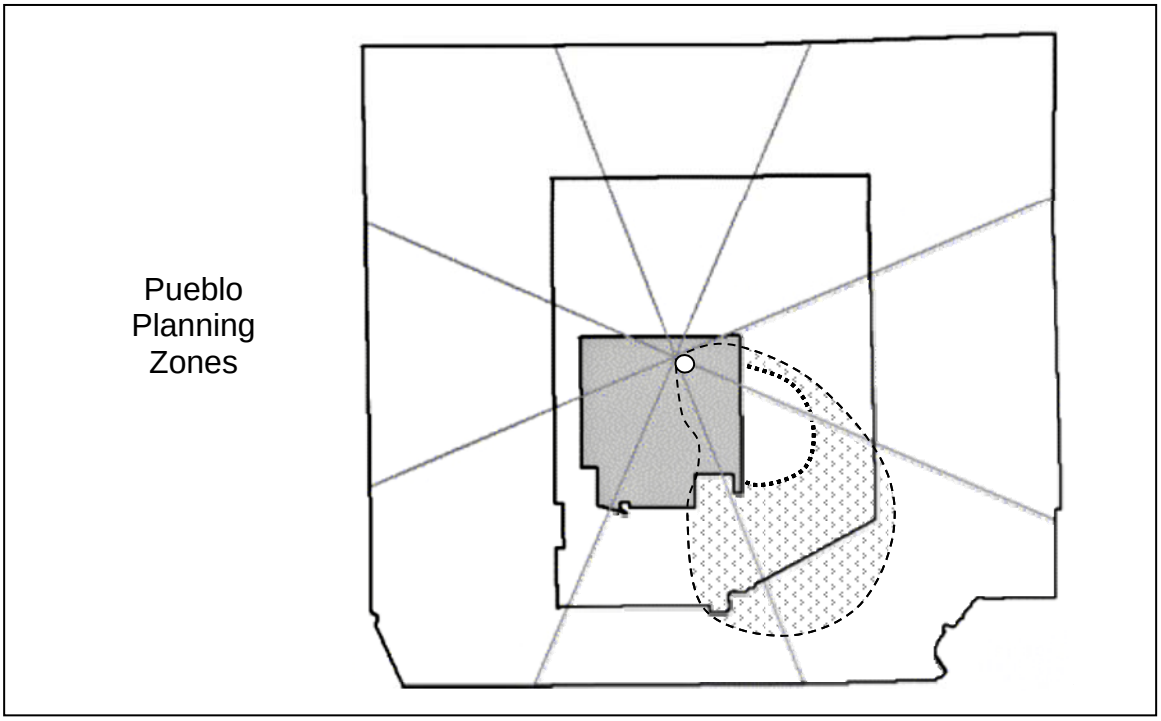


Figure 4 above shows Reentry Area 2, which is the area inside the initial projected hazard area (safety envelope) but outside of the revised hazard area. The logical assumption is that Reentry Area 2 is also safe to enter without monitoring, since based on the updated source term information; no hazard is projected in that area. However, since the public may have been told initially that agent may have entered this area, some further actions may be appropriate to provide assurance that it is safe to reenter. Selected sampling and analysis may also be needed to offset concerns about perceived damages, especially to agricultural resources.

Figure 5: Reentry Area 3

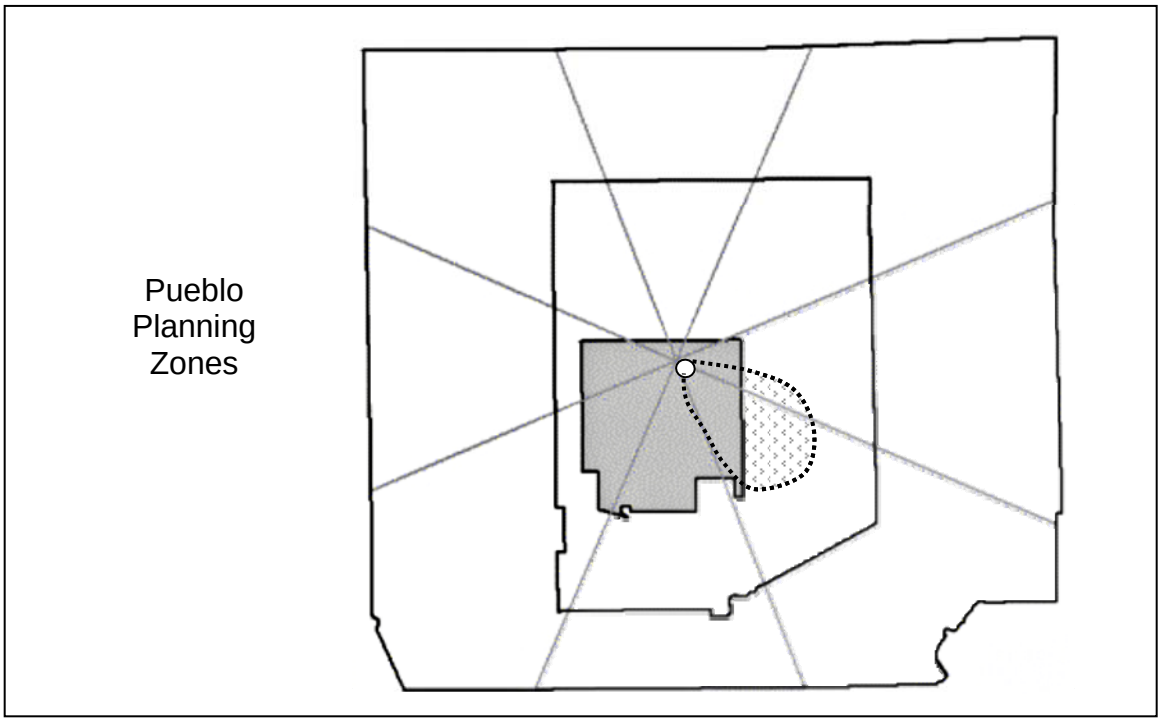


Figure 5 shows Reentry Area 3. This is the area within the revised projected hazard area. Based on modeling with WebPuff™, that is the area where vapor hazards might have been present before the plume dissipated. Prior to unrestricted reentry, selective air monitoring will be performed within this area in locations where agent vapors may have lingered, e.g., inside structures. In addition, soil, water, vegetation and other surface material monitoring and sampling may be performed (even if model projections do not suggest the possibility of agent deposition) to allay concerns over public safety and offset perceived damage to agricultural resources and products and other property in the area.

Figure 6: Reentry Areas 3 and 4 in Deposition Scenario

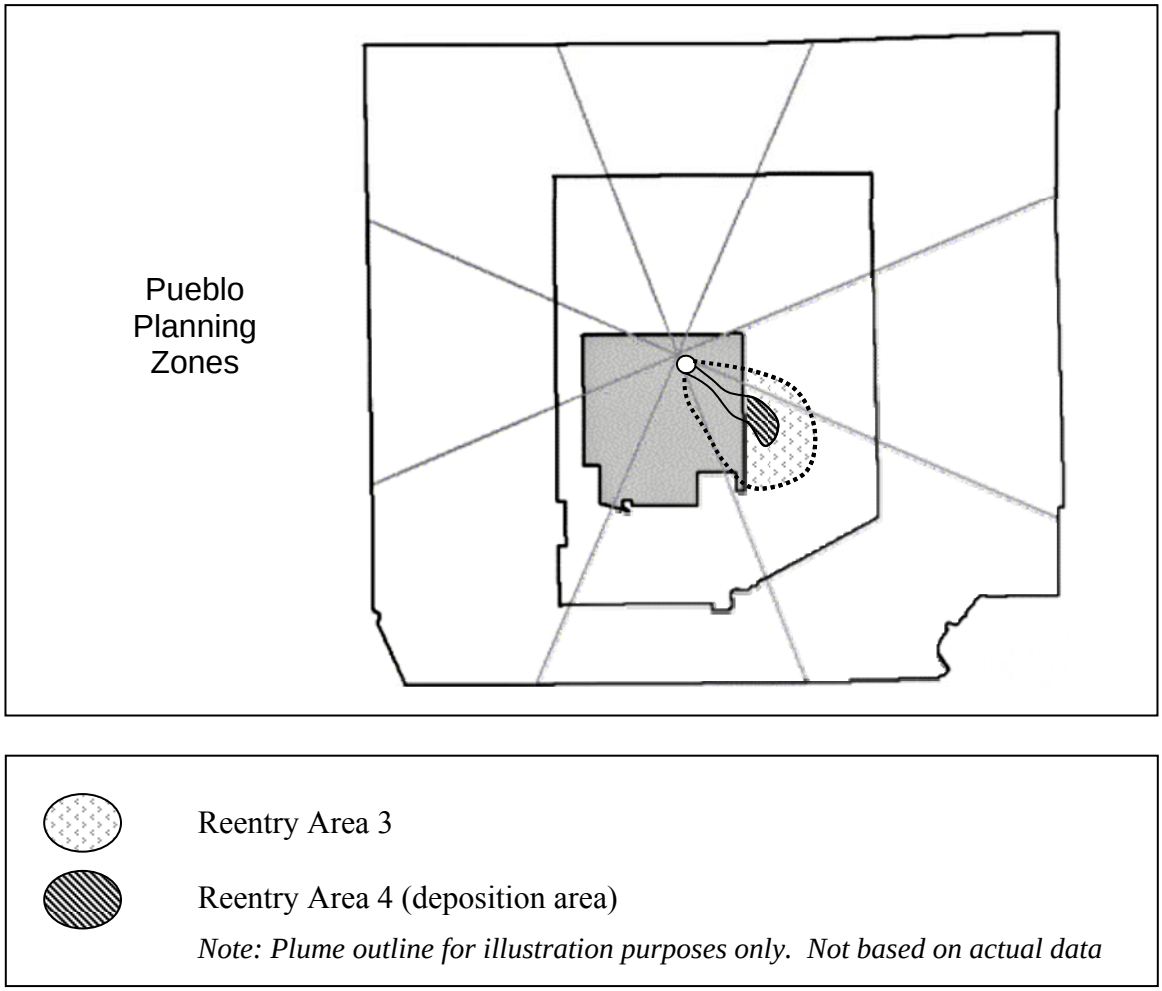


Figure 6 shows Reentry Areas 3 and 4 for a scenario involving the possibility of aerosol deposition. Reentry Area 4 is the area that is potentially contaminated with deposited agent. This area only exists in specific scenarios involving a fire affecting explosively-configured HD. Note that the area of potential aerosol deposition is expected to be relatively small and close to the source. When it is determined that there may be such deposition, a more comprehensive program of air, soil, water, vegetation, animal feed, milk, and other sampling may be required to ensure that the public can safely return to the area. In such instances, the requirements for any sampling to delineate horizontal and vertical extent of any hazardous waste contamination and any, long-term restoration or clean-up effort will be defined in a permit or order issued by CDPHE for the affected area.

In order to clear the largest area for unrestricted reentry in the least possible time, generally the priority for monitoring and sampling will proceed from the outside in, i.e. Reentry Area 2, then 3, then 4. In some cases it may be possible to clear both Reentry Areas 2 and 3 by monitoring in Area 2.

10. Clearing of Other Priority Locations

The particular facilities or locations affected will depend on the chemical event scenario and the projected hazard area. Examples of the types of facilities that might be on such a list include:

a. Ranches, farms, and backyard facilities containing farm animals

b. Schools and daycare centers

c. Residential areas

d. Major businesses

e. Water treatment facilities

11. Monitoring and Sampling Resources

a. The following monitoring and sampling resources are expected to be available to support recovery operations:

(1) US Army
(2) US EPA
(3) Colorado National Guard – Civil Support Team
(4) USDA (Support role only)
(5) Local resources

b. The sampling grid will be established under a hazardous waste permit or order and may field utilize GPS technology and Pueblo County's existing GPS reference points i.e. High Accuracy Reference Network (HARN). The hazardous waste permit or order will also define the density of the grid which will be based on incident specific circumstances, including the nature, magnitude, and extent of the release.

B. Capability Assessment

The PCD will be responsible for developing a capability assessment, which provides part of the foundation for determining the type of mitigation strategy. The assessment process also continues to identify gaps or weaknesses that may need to be addressed through mitigation planning goals and actions deemed practical considering the state's capabilities to implement them. Finally, the capability assessment highlights the positive measures in place or underway for continued support and enhanced installation mitigation efforts.

C. Mitigation Overview

1. PCD will be responsible for taking preventive measures to insure any release of chemical agent is minimized; and that if a release were to occur, systems are in place to detect such a release, notification of the installation response force, and notification of applicable off-post agencies in accordance with their permits and interim status plan and 6 CCR 1007-3, Parts 264 and 265, Subparts C and D respectively.

2. In accordance with standard procedures, a daily work plan will be created and available on WebPuff™.

D. Planning Assumptions

1. Under some circumstances, it is possible that chemical agent would be dispersed as an aerosol (very small droplets) and subsequently deposited as contamination on downwind surfaces off-post. Studies have shown that this is unlikely to occur, and if did occur it would be limited to a small area near the installation. An unusual combination of factors is needed to make aerosol deposition a possible health risk beyond the installation boundary: detonation of a number of explosively configured munitions filled with persistent agent (mustard), combined with a fire hot enough to cause the munitions to detonate without destroying most of the chemical agent in the explosion and carry the aerosols well above ground level in a heated plume. In addition, the right atmospheric conditions are needed to transport the aerosol significant distances in order for the droplets to fall out beyond the installation boundary.

2. The chemical event may cause secondary hazards in the affected area. For example, rapid evacuation of the population might leave some industrial facilities or critical infrastructures vulnerable to loss or damage that, in turn, could pose a health and safety threat. Traffic accidents on evacuation routes in the hazard area might create situations that necessitate response in potentially hazardous areas to save lives.

3. Disasters such as earthquakes or tornadoes might cause or contribute to a chemical event, create separate response requirements, and complicate the chemical event response.

4. Because of the conservative assumptions that are built in to the protective action decision-making process, it is likely that many people will have evacuated from areas that were never dangerous. This population will strain resources to provide care and shelter for evacuees until they return home.

V. Concept of Operations

A. Management of such an incident will conform to the principles of the National Incident Management System (NIMS) as required by Colorado Executive Order D 011 04, dated December 6, 2004 and the PCD and / or PCAPP Contingency Plan pursuant to the facility permit or interim status plans and the Colorado Hazardous Waste regulations.

B. A chemical stockpile accident or incident with potential or actual agent impacts off-post raises a series of inter-jurisdictional challenges regarding the issue of "who is in charge", in both the response and recovery phases of the incident. The Incident Command System (ICS) provides a means to meet those challenges, whether it is organized as a single or unified (multi-agency, multi-jurisdictional) command. The following agencies have been designated as the Designated Emergency Response Authority (DERA):

   1. For the Pueblo Chemical Depot, the U.S. Army

   2. Unincorporated parts of the County, the Pueblo Sheriff's Office

   3. Federal / State / County highways, the Colorado State Patrol

C. The Incident Commander is responsible to the Agency Administrator for the administration and management of the assigned incident, and all activities that occur during the incident. Those incident command responsibilities are organized under the general categories of finance, logistics, operations, plans, public information, and safety.

D. Operations will be conducted in four phases:

   1. First, a chemical release occurs on the Depot. Immediate response will be initiated by Depot personnel.

   2. Second, upon notification and available data through WebPUFF™, the County of Pueblo can make a Protective Action Decision (PAD) of evacuation or Shelter-In-Place for residents in and around the Depot.

   3. Third, incident recovery. Measures will be taken to determine the actual extent of the release into the off-post area. If necessary, additional environmental recovery will take place in accordance with procedures outlined in CDPHE permits / orders.

   4. Forth, community recovery. The State Recovery Plan is activated which is focused on such areas as economic recovery, restoration of lifelines, long-term housing, etc.

E. Organization and Assignment of Responsibilities

   Once the determination has been made that community resources (to include mutual aid partners) will be needed to assist in the evacuation of designated areas or to conduct sampling activities, the Agency Administrator will establish a Unified Command with representatives from the Pueblo Chemical Depot, City and County of Pueblo, and the State of Colorado. The Command and General Staff structure will be determined by the Unified Command based upon a rapid needs assessment.

   1. Assignment of Responsibilities

a. Board of County Commissioners (BOCC) or designee - make decisions regarding reentry to off-post restricted areas and lifting of general population protective actions that will be consistent with the protection of public health and environment as defined under a permit or order for the clean-up issued by CDPHE. Designated the Agency Administrator. Pueblo County will take the lead in coordinating provision of county services to persons and organizations affected by the emergency.

b. Pueblo City-County Health Department – the Department exists for the common good and is responsible for demonstrating strong leadership in the promotion of physical, behavioral, environmental, social, and economic conditions that improve health and well-being; prevent illness, disease, injury and premature death; and eliminate health disparities.

c. Colorado Department of Public Safety / Division of Homeland Security & Emergency Management (DHSEM) - DHSEM leads, manages and coordinates state level actions for all-hazards preparedness, natural hazards mitigation, emergency response and disaster recovery in support of local governments within Colorado.

d. Colorado Department of Public Health and Environment / Office of Emergency Preparedness and Response - The Office of Emergency Preparedness and Response Division (OPRD) lead state agency responsible for coordinating the public health and medical response activities as well as supporting mass fatality response for all-hazard emergency or disaster events.

e. Colorado Department of Public Health and Environment / Hazardous and Waste Management Division - The Hazardous Materials and Waste Management Division (HMWMD) regulates solid waste management, and hazardous waste storage, treatment and disposal. The HMWMD also regulates the clean-up of hazardous waste or hazardous constituents when released to the environment.

f. The Colorado Department of Agriculture (CDA) has the authority and responsibility to diagnose, control, and eradicate livestock diseases that are of statewide concern in order to guard the public health, safety, and welfare. Furthermore, CDA is responsible for regulation related to livestock disease or other livestock emergencies affecting livestock in the state. CDA is the lead agency for all emergencies in Colorado involving animal disease.

g. EPA Region VIII – Through its On-Scene Coordinators, the EPA will provide technical assistance to the Pueblo County Emergency Response Authority and off-post community a chemical agent crosses the installation fence line.

h. FEMA Region VIII - The Federal Emergency Management Agency (DHS / FEMA) will coordinate provision of disaster assistance under the Stafford Act.

i. Pueblo County Sheriff's Office – through resolution 09-47, has been designated as the Pueblo County Emergency Response Authority for hazardous substance incidents occurring within the unincorporated areas of Pueblo County.

j. U.S. Army / Pueblo Chemical Depot - The U.S. Army will take the lead with respect to hazard assessment, including environmental monitoring, sampling and evaluation; cleanup of residual hazards and other response and remediation under the National Contingency Plan (NCP). Army operations will be directed initially by the Installation Commander.

2. Phases:

a. Phase 1 (Release on the Depot) In accordance with established procedures in the facility preparedness and Prevention Plans and Contingency Plans, Depot personnel will respond to the release of the chemical agent. The Depot will be responsible for issuing a PAD for personnel on the Depot only. The PAD can be either evacuation or Shelter-In-Place. Notification will be made to the County of Pueblo of the incident along with an off-post Protective Action Recommendation (PAR).

b. Phase 2 (Notification of the County) Upon notification of a chemical release, the Pueblo County Sheriff's Office will initiate their own notification procedures to other local entities, the general public, and DEM of the situation and the actions they are directing. If the Depot decides to evacuate personnel, the County will assist in that evacuation and possible shelter operations.

c. Phase 3 (Incident Recovery)

(1) Environmental Response. After a chemical event involving dispersal of chemical agent off-post, the Army will carry out measures to assess damage and restore the environment in the affected area, in conformance with applicable federal and State regulations, and in consultation with the U.S. EPA, state and local governments and interest groups. Environmental response and removal response actions will be carried out so as to protect the health and safety of the public and the environment. Specific procedures for conducting any sampling activities to determine the nature and extent of any release of hazardous waste, including mustard agent will be defined in a permit or order issued by CDPHE. The following sections provide general guidance for conducting sampling operations.

(a) The Waste Analysis Plan (WAP) outlines the analytical methods, equipment, and capabilities that the US. Army possesses at PCD to safely manage the mustard agent munitions.

(b) Sample Control and Documentation

(i) It is necessary to document sample collection and to maintain sample control so that legally and scientifically defensible data are produced. The purpose of sample control is to unambiguously connect the origin, history, and analytical test results of each sample. Various procedures for sample control have been discussed for environmental and Chemical Weapons Convention treaty verification applications. Federal agencies use the Uniform Federal Policy-QAPP document (http://www.afcee.af.mil/resources/chemistry/ufp-qAPP/index.asp) or http://www.epa.gov/fedfac/documents/qualityassurance.htm

(ii) Sample control is conducted through assigning a unique identifier, most often a number or a bar code, to each sample. This sample identifier is placed on sample bottles, is written in field and laboratory notebooks (which are also controlled and have their own unique names / numbers so that they can be unambiguously identified), and is recorded on test result reports. Logbook entries should describe the sampling event as accurately as possible and include the date and time of sampling, the method of sample collection, condition of the site relevant to sample validity when applicable, results of associated field measurements (such as on-site meteorological data) and calibration information pertaining to the field instruments used, and the name of the field personnel performing the work.

(iii) A documented chain-of-custody (COC), or historical record, is also established and follows each sample through collection, transport, analysis, and final data reporting. In addition to a sample's unique identifier, information provided by COC might include the identifier of the field logbook that documents the sampling event, date and time of sample collection, the sample matrix and container, the sampler's name, the project name, the name of the analytical laboratory providing services, the required laboratory tests and turn-around times, and any additional instruction to the laboratory. The date and time the sample is relinquished and by whom and the date and time it is received by the carrier or analyst is noted on the COC. Samples must be under the direct control of the individual signing for the samples on the COC form at all times. This includes storing the samples in a locked, secure facility under the control of the COC signatory.

(c) Transport of Samples

(i) As described below, a number of different samples are likely to be collected during the decontamination phase responding to a chemical release. Precautions need to be taken in moving samples from the site of collection to the site of analysis in order protect the health of individuals exposed to the samples during transport and in order to preserve sample integrity. In this section, precautions necessary for health protection of individuals potentially exposed to the samples during transport and preservation of samples during transport are

described.

(ii) Samples collected at the site of a chemical agent release may themselves present a health hazard and their transport should be treated as transport of a hazardous material. Samples will either be transported to an onsite location for analysis or be taken to an offsite laboratory specializing in the detection of trace concentrations of chemical agents. Transport of samples within the response site boundaries should follow all site requirements for contamination control. For example, contamination control may require additional external packaging at the boundaries of specific contamination zones. Procedures and facilities for this additional packaging should be in-place prior to the transport of samples. Composition of packing materials should be selected so that it forms a barrier to permeation of contaminant materials and their vapors. The outside of packages containing samples should be screened for contamination by the use of MINICAMs.

(iii) Samples destined to offsite laboratories for analysis may fall under hazardous material transportation regulations. Note that there are only a few laboratories in the United States that are capable of conducting analyses of chemical warfare agents (CWAs) and, thus, to which samples containing CWAs could be sent. Within the United States, samples might be transported by highway, air, rail, and / or water. The transport of hazardous materials / environmental samples is governed by regulations that are based on the mode of sample transport. For example, highway transportation of hazardous materials is governed by Department of Transportation 49 Code of Federal Regulations (CFR), civilian air transport is governed by International Air Transport Association (IATA) and International Civil Air Organization (ICAO) Technical Instructions, military air transport is governed by Air Force Joint Manual 24-404 (AFJM 24-404), and water transportation is governed by International Maritime Dangerous Goods (IMDG) Code. Sample packaging and labeling will need to conform to the regulations under which the shipping company operates. However, in a federally declared State of Emergency, there is precedent for the U.S. Secretary of Transportation to waive some regulatory requirements. In addition, both the military and the U.S. Federal Bureau of Investigation have special authority and provisions for shipping hazardous materials.

(iv) Shipping samples that are considered to be neat agents will be difficult, if not impossible. If samples can be designated as environmental samples, which typically have low or negligible concentrations of hazardous constituents (as would be the case after decontamination procedures have been applied), sampling shipping is considerably easier. The previously described regulations will specify appropriate sample shipping and packaging protocols. There are also recommended procedures for packaging samples collected by the Organization for Prohibition of Chemical Weapons (OPCW) to verify

the Chemical Weapons Convention treaty. Neat agent and potentially-highly contaminated materials are packaged in a sampling container, placed in a stainless steel secondary container with absorbent material, and placed in a tertiary stainless steel, pressure-tight container (lid sealed with nuts and bolts) before being placed in a shipping crate. All containers are also sealed with tamper-indicating tape or seals. Environmental samples are packaged in a comparable manner, with the exception that, because the concentration of agent residues are expected to be below those associated with extremely adverse health effects, tertiary containment is not necessary. Once packaged, the outside of the sample container could be checked for contamination, as previously described. During transport, samples must be accompanied by a shipping document (*i.e*. a Bill of Lading, Declaration for Dangerous Goods, Airbill, or Manifest) completed and signed by a properly trained (per Defense Transportation Regulations, DOD 4500.9) individual.

(v) Actions should be taken to assure that collected samples accurately reflect conditions at the location and time they were obtained in the contamination zone. Preservation of the integrity of samples requires actions to prevent loss of material from the sample and to prevent contamination of the sample. Loss of material from the sample can occur through direct contact packing materials or through out-gassing of vapors from the sample. Often, environmental samples are shipped in coolers packed with ice to keep the temperature of the sample sufficiently low (4-7ºC) to minimize volatilization of analytes.

(d) Sample Collection

(i) Many different types of samples may be needed to characterize, confirm success of decontamination, and to clear facilities for reuse. This is because many different media may be contaminated and because no single method detects all chemical agents. The type of sample collected, therefore, will be determined by the matrices or media to be sampled and the analytical methods to be used to assess the sample.

(ii) This section describes sample collection methods for air, surfaces, solids (including chips, bulk materials, and soils), vegetation, and liquids. There are distinct advantages and disadvantages in the types of media sampling that need to be considered in selecting sample methods.

(iii) Despite the differences in analytical objectives, these references provide some useful sampling guidelines. For example, in any sampling activity, care should be taken to ensure collection equipment is clean between samples to avoid cross-contamination of samples. Similarly, sample location identification, and sample container markings need to be complete and easy-to-interpret to support chain of

custody requirements.

(e) Air Sample Collection

(i) Air sampling of the general environment and of potentially degassing surfaces provides the most direct evidence of the presence of a CWA. In addition, the air is the pathway of highest concern with respect to human exposure and provides the best quantitative basis to determine risk to humans. However, air sample results do not provide contact or ingestion hazard information. In addition, air sampling is less useful for determining the precise location of CWA contamination to guide decontamination activities.

(ii) Air sampling can be conducted on-site and air samples are commonly used for laboratory methods which have much greater sensitivity. High-volume air samplers and chemical agent monitors (CAMs) are the most common on-site sampling tools. High-volume air samplers can sample over a large area to determine the presence of CWA but cannot determine the specific location of contamination. Small, hand-held chemical agent monitors (CAMs), can rapidly monitor smaller areas.

(f) Surface Sample Collection

(i) Surface samples are used to determine the presence of CWA and to evaluate contact hazard. This method can be used to rapidly determine the contamination extent and decontamination efficacy. Surface sampling may not detect low concentration of absorbed CWA that may still present an inhalation hazard. In addition, sample results do not determine the potential inhalation hazard from the results of surface samples.

(ii) Swipe samples are the most common surface contamination sample collection method. Clean cotton swabs or pads are moistened with a solvent (e.g., methylene chloride or acetonitrile) and then wiped over the area of interest. Forceps or a hemostat can be used to hold the swipe to prevent direct contact by the worker and to reduce contamination of the workers protective clothing (e.g., glove). The swipe is then placed in a clean glass vial and sealed for transport to the analytical laboratory. One unusual swipe sample collection method is for workers to use their booties (shoe coverings) as swipes along the floor to assist in determining the general presence of CWA on floors.

(g) Solid Sample Collection (Chip or Bulk Sampling)

(i) Collection and analysis of pieces of solid materials (e.g., pieces of walls, floors, carpeting, personal protective equipment) allow for the detection of sorbed CWAs. These samples can more definitively

determine the presence of CWA. Chip / bulk sampling may also provide evidence of decontamination verification. The heterogeneity among samples and the characteristics of the material can interfere with the chemical analysis and reduce the reliability of the analysis results. As an example, concrete is an alkaline matrix that promotes rapid degradation of most CWAs.

(ii) Because the CWA is absorbed into the material, analytical results do not provide either a direct measure of contact or inhalation hazard. Pieces of the contaminated surface are chipped or cut, removed, and placed and sealed in clean glass containers and transported to the laboratory for analysis. The sample is further ground and extracted with an appropriate solvent, and the resulting extract is analyzed for the presence of CWA. The destructive sampling collection process and lengthy laboratory extraction time limits the number of samples that can be collected.

(h) Soil, Vegetation, and Liquid Sample Collection

(i) Soils, vegetation, and liquids are special types of solid samples that are relatively easy to collect. Similar to other types of bulk samples, the potential for signal interference is large and laboratory sample handling (extraction and analysis) is slow. In addition, it is not possible to translate the results of the analysis into an inhalation hazard.

(ii) Soil samples can be collected using scoops (spatulas, shovels, pans), coring devices, or sweeping devices. The soil sample should be placed in a clean glass bottle. At the laboratory, the sample should be thoroughly mixed (homogenized) so that the sample has not fractionated based on soil particle size or texture.

(iii) Vegetation can be clipped using shears or vegetation cutters. Both woody material and leaf material should be collected separately because sorption by CWAs will likely be different because of orientation of surfaces and differences in permeability.

(iv) Water samples can be collected using vials, syringes, teflon tubing, bailers, dippers, etc. The choice of sampling equipment will depend of the environment in which the sample is being collected. Syringes may be most appropriate for small puddles, where as bailers or pumps with Teflon tubing best used for deeper water sources.

(2) Actions Implementing RCRA (See Annex C). Insofar as removal response actions will be carried out pursuant to the Colorado Hazardous Waste Act (CHWA), and the following actions will be taken to ensure that legal requirements are fulfilled and the interests of the public are protected: Colorado has been delegated the applicable RCRA program for clean-up of hazardous waste, including mustard agent, in the event of a release.

(a) Issuance of a permit or order, under CHWA.
(b) Participate in negotiations for issuance of a permit or order to provide for a remedial investigation, a corrective measures study, and corrective action.
(c) Periodically review the corrective action progress, conduct compliance inspections and issue approval over clean-up plans, data and analysis and site clean-up upon completion of the corrective action.

(3) Medical Services

(a) Emergency response to a chemical event will include mobilization of medical facilities and services to provide immediate first aid and emergency treatment to potential victims. The Pueblo community will ensure that such capabilities continue during recovery. Exposure to harmful levels of agent is less likely during recovery than during the early parts of the emergency and response, but is still possible.
(b) Medical services during recovery may include dealing with human or animal remains. Special procedures may be required to accommodate the technical aspect of dealing safely with potentially contaminated remains, while allowing investigation of the deaths and final disposition of the remains to proceed.
(c) Medical services also will include provision of services to address the public's concerns about the event, including medical screening and consultation services and mental health counseling.
(d) Medical Services to Support Emergency Worker Operations

(i) Emergency workers may be exposed to harmful levels of agent during reentry and recovery operations due to failure of PPE or other unforeseen circumstances. Medical facilities and staff will remain ready to deal with such situations during recovery. In particular, operations involving entry into restricted areas will be supported by medical capabilities for (a) routine screening of emergency workers for agent exposure symptoms, and (b) prompt treatment in the event that harmful exposures occur.
(ii) Whenever one or more emergency worker teams is operating in a restricted area, medical capabilities will be activated to provide routine screening and prompt treatment capability in accordance with Pueblo County hazardous materials response protocols.

(e) Standby Capabilities to Evaluate and Treat Exposure Victims

Members of the public may be exposed to harmful levels of agent during recovery if they remain in or enter restricted areas that have been evacuated. The Pueblo medical community will coordinate the provision of medical resources for treatment.

(f) Management of Human Remains

(i) Human remains may be discovered in a restricted area, or may originate at a medical facility when a patient is pronounced dead.
(ii) Upon notification of a death, emergency management personnel will notify the Pueblo County Coroner or appropriate law enforcement agencies. Remains will not be moved or disturbed without the Coroner's approval.
(iii) If it is necessary for the Coroner or appropriate law enforcement agencies to enter a restricted area to perform an investigation, arrangements will be made to support the entry in accordance with all Pueblo County hazardous materials protocols.
(iv) Responsible officials will notify the victim's relatives once the victim's identity has been established, and will coordinate the process of handling and releasing the remains for final disposition in accordance with the family's preferences.
(v) Public officials will be responsible for monitoring and decontamination of human remains.

(g) Dealing with Animal Remains

Capabilities will be activated or placed on standby, as appropriate, for dealing with any animal remains discovered in a restricted area. Public officials from local, state, and federal health, veterinary, and agricultural departments will be responsible for removal and disposition of any such remains, including coordination as needed with hazard analysis staff and environmental officials as needed. Monitoring, decontamination and disposition of animal remains will be performed in accordance with the Colorado Solid and Hazardous Waste Regulations.

(h) Medical Services and Counseling Program

A program is established to provide medical screening and follow-up care, as well as behavioral health counseling for persons affected by the emergency, including both emergency workers and members of the general public.

d. Phase 4 (Community Recovery)(State Recovery Plan activated)

(1) Social Services

(a) Provision of social services following a chemical event is intended to reduce the degree of human suffering and expedite return to the normal affairs of daily life for the affected population. Social services for those affected by the chemical event will be coordinated by the Pueblo community.

(b) It is anticipated that a chemical event will result in an increased need for social services among the affected population. Even if actual off-post hazard is minimal or absent, the stress of a period of increased risk, as well as the resultant precautionary or spontaneous protective actions, will likely cause some persons to seek social services who otherwise would not do so. In a more severe accident scenario, social service needs may be multiplied.

(c) Social service needs during recovery from a chemical event will depend on the population affected, the severity of the event, and other factors. Some needs, such as psychological counseling, provision of food and clothing, and employment assistance, will be similar to their everyday counterparts. Other needs, such as assistance with relocation and disaster aid applications, will be peculiar to a post-emergency situation. For this reason, a wide variety of services have been planned for; social service coordinators will determine and provide for the particular needs of the community that are called for after a chemical event.

(2) Relocation

(a) After a chemical event involving deposition of mustard agent, it may be necessary to control reentry of evacuated areas for an extended period. Long-term relocation of residents, businesses, animals, ranching, and farming operations as well as government offices may require Pueblo County to provide or seek arrangements for services to support individuals and organizations affected by a long-term relocation.

(b) Long-term relocation involves a transition from a short-term evacuation situation. Residents evacuating for a short time may initially stay with friends or relatives, in a mass care shelter, or a motel. These options become less attractive as the period of stay increases. For schools, businesses and government offices, opening operations in a new location (temporary or permanent) becomes more attractive as the relocation period increases.

(c) Relocation assistance can be obtained from the federal government following a Presidential declaration of emergency or disaster. Specifically DHS / FEMA is authorized under the Stafford Act to assist individuals and families with relocation. Assistance may take the form of payments to offset temporary housing costs, or direct provision of temporary housing. The Stafford Act also authorizes the Small Business Administration (SBA) to assist businesses with relocation and other disaster-related costs.

G. Direction, Control, and Coordination

1. The DERA for the Depot and unincorporated parts of Pueblo County possesses the authority to issue evacuation orders for their jurisdictions, if the conditions warrant.

2. Chairperson, Board of County Commissioners (BOCC) or designee is the Agency Administrator - makes decisions regarding reentry to off-post restricted areas and lifting of general population protective actions consistent with any effective security requirements that may be specified in the permit or order issued by CDPHE, and after consultation with any other response agencies. Pueblo County will take the lead in coordinating provision of county services to persons and organizations affected by the emergency.

3. Messaging to the public is a shared responsibility amongst all parties involved. The release of all information to the general population concerning response and recovery activities will follow the guidelines in Annex E (Public Information).

4. Safety Officer. The Incident Safety Officer will be responsible for coordinating and implementing safety measures, including approving entry into restricted areas, establishing personnel protection procedures and controls, and ensuring use of appropriate protective equipment consistent with the requirements for management of any hazardous waste that may be specified in a permit or order issued by CDPHE. To protect public health and safety, access to the restricted area will be prohibited, except through the following protocol:

   (a) Access will be allowed by permission of the Unified Command, with the concurrence of the Safety Officer.

   (b) Access will be allowed at designated entry points only. Entry may be limited to particular routes and locations within the restricted area. Duration of missions in the restricted area may likewise be limited

   (c) Staging Area personnel will verify that each person using PPE in the restricted area is appropriately trained and qualified on the equipment.

   (d) Entry point personnel will record each entry to the restricted area, including names of personnel, reason for entry, level of PPE worn and monitoring equipment used, and entrance/exit times for all persons entering the restricted area. Records will be retained of all entries.

   (e) The Safety Officer will ensure that all procedures and equipment used for the management of any contaminated waste or environmental media have been approved and specified in the PCD Waste Analysis Plan.

   (f) Entry point personnel will check that each person entering the restricted area has appropriate monitoring support, PPE, communications and other logistical support; and an estimated exit time.

(g) Entry point personnel will be prepared to perform expedient decontamination and emergency first aid procedures if needed.

H. Information Collection, Analysis, and Dissemination

1. After emergency protective actions have been implemented, depending on the particular circumstances of the chemical event, there may be residual hazards including residual chemical agent vapor, or in rare cases aerosol deposition. Hazard assessment during recovery will estimate the residual hazard.

2. Assessment of the hazard to public health and safety in the affected area will serve as a basis for allowing reentry by emergency teams and for determining when unrestricted reentry can occur, whether ingestion pathway protective measures are needed, and whether cleanup measures will be required. Hazard Assessment will primarily be conducted by the Army, but Pueblo County and the State of Colorado will work with the Army to ensure that hazard assessment resources will be directed where they are most needed.

3. Hazard assessment for recovery involves determining the extent of residual hazard posed by chemical agent, including localized residual vapors as well as any contamination of water, soil, vegetation, crops, animals, buildings, vehicles and other objects.

4. The Installation will gather data at the scene of the chemical event to identify the agent involved and estimate the quantity of agent released (if any) and how it was dispersed (e.g. whether there was fire or explosion). Computer modeling (along with other possible information sources) may be used to estimate the areas affected by vapor passage and by aerosol deposition, if any. Monitoring and sampling will be used to check for residual agent in specific locations.

5. The Army will have trained personnel, equipment, and procedures for monitoring and assessing agent contamination, including specific capability and institutional experience in chemical agent detection and in operating under conditions of actual or potential contamination in accordance with the facility's Preparedness and Prevention and Contingency plans in their hazardous waste permits and interim status plans.

6. Monitoring, sampling, and evaluation of contaminated materials and geographic areas will be conducted based upon established procedures and in compliance with federal and State regulations. There may be an initial urgent need to perform monitoring to support the entry of emergency response teams into the restricted area to assist persons who did not evacuate. If such assistance is needed in the restricted area, real-time monitoring will be used to establish whether the teams are properly protected for the environment in which they are operating.

7. The U.S. EPA can provide assistance with evaluating environmental impact through its extensive network of contract resources for monitoring, sampling and laboratory

sample analysis. Assistance can be provided if requested by the Army. Such assistance may require cooperation with the Army regarding sample transport and provision of laboratory standard samples (used for calibration of laboratory instruments) of chemical agents.

8. All information concerning monitoring, sampling, and evaluation processes, procedures, and results will be shared amongst all Pueblo CSEPP partner agencies.

I. Communications

Communications (pre- during- and post-release) with all appropriate parties (governmental, public, and private) will be conducted through the most rapid and effective method available at the time. This will include, but not be limited to: telephone, internet, texting, Tone Alert Radios, Sirens, media broadcasts, social media systems, 800MHz Digital Trunked Radio system, etc.

J. Administration, Finance, and Logistics

1. Once an incident occurs, all documents, notes, etc related to the incident will be collected, secured, and maintained for after action reporting, lessons learned, potential legal action, etc.

2. If this release results in either a Gubernatorial or Presidential disaster declaration, financial accounting will follow State and federal accounting rules.

3. Logistical support will be provided through pre-established mutual aid agreements as well as Connect Colorado.

4. Claims will be processed through applicable sources such as Military Claims Authority, Individual Assistance, Public Assistance, etc as outlined in the State Recovery Plan.

K. Plan Development and Maintenance

This plan will be reviewed and revised as necessary. The Colorado CSEPP Integrated Process Team will be responsible for initiating the review. The plan will be circulated to relevant organizations and officials with a request for comments every two years. The plan will also be reviewed when significant changes occur in the community being protected, when the potential for an accident or incident changes, or when capabilities to recover from a chemical event change. The revised plan will be developed, reviewed, approved, and distributed using the same protocols used for publication of the initial Recovery Plan.

L. Authorities and References

6 CCR 1007-3, Colorado Hazardous Waste Regulations

Army Regulation 200-1, Environmental Protection and Enhancement, 21 February 1997
City and County of Pueblo Emergency Operations Plan, TBD
Colorado Revised Statute 24-33.5-701, Colorado Disaster Emergency Act of 1992
Colorado Revised Statute 25-15-3, State Hazardous Waste Management Program
Colorado State Emergency Operations Plan, March 2015
Colorado State Hazardous Waste Permits Nos. 06-01-05-01 and CO-04-07-01-01 and the CDPHE approved Waste Analysis Plan, Preparedness and Prevention Plan and Contingency Plan for the interim status hazardous waste igloos.
Colorado State Recovery Plan, March 2015
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601 et seq.
Defense Environmental Restoration Program (DERP) 10 U.S.C. §§ 2701 et seq.,
DOD and Army Environmental Restoration Regulations, Guidance and Analysis
DOD Management Guidance for the Defense Environmental Restoration Program (October 2001)
DODI 4715.7, Environmental Restoration Program, April 22, 1996,
EPA regulations implementing CERCLA: 40 CFR Parts 300-373. Also known as the National Contingency Plan.
Executive Order 12580, President Ronald Reagan, Superfund Implementation, January 23, 1987
Executive Order D 011 04, Governor Bill Owens, National Incident Management System, December 6, 2004
National Response Framework, May 2013
Robert T. Stafford Relief and Emergency Assistance Act (42 USC 5121-5207)

Annex A Analytical Laboratories
Colorado CSEPP Recovery Plan

I. There are a number of commercial and government laboratories that are certified to work with Chemical Warfare Agents (CWAs). These laboratories would be used when there is a need to analyze samples of soil, water and vegetation that are suspected to be contaminated with CWAs. Certified CWA laboratories use CWA standards in order to quantify their analysis. CWA standards are essential for insuring that results from one laboratory can be compared to the results of another laboratory. The U.S. Army has a quality assurance program for the preparation, analysis, storage, and use of chemical agent standards. This program is called the Chemical Agent Standard Analytical Reference Material (CASARM) Program. The CASARM program is managed by CMA, which also certifies the CWA laboratories.

II. The list below is current as of March 1, 2011. Some of the facilities are listed as "Government Facility" or "Contractor Chemical Agent Facilities," meaning they were certified to handle neat (i.e. undiluted) chemical agent as well as Research, Development, Testing and Evaluation (RDTE) dilute solutions of chemical agent. Other facilities are listed as "Contractor RDTE Solution Facilities" meaning they were certified to handle only small quantities of RDTE dilute solutions of chemical agent. (See AR 50-6, Table 6-1, for a list of the threshold quantities of RDTE dilute solutions of chemical agent.)

III. Since environmental samples originating off-post should not contain concentrations of agent exceeding RDTE dilute solution thresholds, any of the facilities listed below should be qualified to handle off-post recovery samples. The Army may utilize other analytical resources as necessary.

Government Facility:

U.S. Army Edgewood Chemical Biological Center
Chemical Evaluation Laboratory
Building E5100
Aberdeen Proving Ground, MD 21010-5424
Phone (410) 436-3555/2772
FAX (410) 436-3003

Lawrence Livermore National Laboratory
7000 East Avenue
Livermore, CA 94550
Phone (925) 422-1100
Fax (925) 422-1370

Contractor Chemical Agent Facilities:

Battelle
505 King Avenue
Columbus, OH 43201
Phone (614) 424-5404
FAX (614) 424-4905

Geomet Technologies, Inc.
8577 Atlas Drive
Gaithersburg, MD 20877
Phone (301) 417-9605
FAX (301) 990-1925

Contractor RDTE Solution Facilities:

Argonne National Laboratory
9700 South Cass Avenue
Argonne, IL 60439-4832
Phone (630) 252-9873
FAX (630) 252-6407

Truetech, Inc.
680 Elton Ave.
Riverhead, N.Y. 11901-2585
Phone: (631) 727-8600
FAX: (631) 727-7592

Annex B Chemical Agent Exposure Standards
Colorado CSEPP Recovery Plan

I. The chemical agent exposure standards in the tables below have been published by military and civilian authorities, in either proposed or final form. There are standards for air, drinking water, soil, and total chronic exposure. The standards are based on prevention of long-term toxic effects. In general the standards were not developed specifically as a basis for CSEPP recovery decisions. Some were developed as a basis for determining the need for use of personal protective equipment. The soil contamination standards were evaluated primarily for purposes of determining whether contaminated areas on-post can be leased or conveyed for civilian redevelopment.

II. The CDPHE senior toxicologist will make final recommendations to HMWMD for any standards associated with agricultural or livestock products to be defined in a permit or order issued by HMWMD to clean-up any contamination. These standards will be reviewed by CDPHE in determining the applicable standards for clean-up of any hazardous waste, including mustard agent in the environment, under a permit or order.

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Table 1: Summary of Chemical Agent Air* Exposure Values: Existing Information as of 8/03/04 POC: V. Hauschild, USACHPPM, 410-436-5213

Media - AIR	Standard Name	Population	Exposure Scenario	H/HD/HT (Mustard)	GA (Tabun)	GB (Sarin)	GD/GF	VX	Lewisite	Notes/Status
Airborne Exposure Limits (AELs) mg/m³	**IDLH** (Immediately Dangerous to Life/Health)	civilian/ DoD worker	one time exposure	**0.7** [a,b]	**0.1** [a,c]	**0.1** [a,c]	**0.05** [a,d]	**0.003** [a,c] **	**NA**	US Army established new policy 18 June 2004 (***ref a***), re: Airborne Exposure Limits for Nerve and Blister Agents. The implementing policy endorses use of CDC's recently recommended new AELs for agents GA, GB, VX {*Federal Register* notice 9 Oct 2003; ***ref b}***, and sulfur mustard (H, HD) {*FR* notice 3 May 2004; ***ref c}***, as well as new AELs for additional agents GD, GF (these other agents were based on relative potency to the new CDC value of GB per ***ref d***). The Army policy applies to all agent operations and activities except tactical military operations and training. The policy includes new procedures including use of the STEL, which is a new AEL not addressed by previous Army Regs/DA Pams or related procedures. In general, the STEL is considered a more appropriate value for many alarm-based procedures that previously were based on the 8-hr TWA (WPL). The policy supersedes existing DA policies, regs, and DA Pams where guidance conflicts. ×Note that the GD/GF STEL value (0.0002) in DA 2004 policy was a typo. ** See next page for info re: new VX data. ***Since no longer in US Stockpile, no re-evaluation of Lewisite performed since 1988 CDC-approved AELs. (see more next page)
	STEL (Short-Term Exposure Limit)	civilian/ DoD worker	occasional 15-minute exposure	**0.003** [a,b] [3E-3]	**0.0001** [a,c] [1E-4]	**0.0001** [a,c] [1E-4]	**0.00005** ×[d] [5E-5]	**0.00001** [a,c] [1E-5]**		
	WPL (Worker Population Limit)	civilian/ DoD worker	Time-weighted average (TWA) for daily, 8-hour, 30 year exposure	**0.0004** [a,b] [4E-4]	**0.00003** [a,c] [3E-5]	**0.00003** [a,c] [3E-5]	**0.00003** [a,d] [3E-5]	**0.000001** [a,c] [1E-6]**	**0.003**[e,f,***] --	
	GPL (General Population Limit)	civilian general population	24-hour/daily, lifetime TWA	**0.00002**[a,b] [2E-5]	**0.000001**[a,c] [1E-6]	**0.000001**[a,c] [1E-6]	**0.000001**[a,d] [1E-6]	**0.0000006**[a,c] [6E-7]**	**0.003**[e,f,***] --	
Acute Exposure Guideline Levels* (AEGLs) mg/m³	**AEGL - LEVEL 1** Potential minor discomfort or noticeable effects; reversible	civilian general population one time exposure for emergency/ accident scenario	10 MIN:	**0.40**	**0.0069**	**0.0069**	**0.0035**	**0.00057**	**NA**¥	***No changes to AEGL values*** ¥ Lewisite AEGLs are now under development by the National Advisory Committee on AEGLs, anticipated proposal of draft values in mid-2005 Final CWA AEGLs were published in May 04 by National Research Council (NRC) Committee on Toxicology (COT) (available at www.nap.edu) ***ref g*;** AEGLs are guidelines not regulatory standards. However, there is an Army-FEMA policy letter requiring use of these AEGLs for the Chemical Stockpile Emergency Planning Program (CSEPP) ***ref h***. Associated CSEPP guidance provides suggested use (such as AEGL 2 as action level for shelter in place/evacuation); but policy includes allowance for site-specific (State, local) decision-making. USACHPPM has also prepared fact sheets on AEGLs and their use, available at http://chppm-www.apgea.army.mil/Chemical-agent/
			30 MIN:	**0.13**	**0.0040**	**0.0040**	**0.0020**	**0.00033**		
			1 HR:	**0.067**	**0.0028**	**0.0028**	**0.0014**	**0.00017**		
			4 HR:	**0.017**	**0.0014**	**0.0014**	**0.00070**	**0.00010**		
			8 HR:	**0.0083**	**0.0010**	**0.0010**	**0.00050**	**0.000071**		
	AEGL- LEVEL 2 Level where more obvious effects begin; potentially impacting functional abilities or ability to escape; potential delayed recovery		10 MIN:	**0.60**	**0.087**	**0.087**	**0.044**	**0.0072**		
			30 MIN:	**0.20**	**0.050**	**0.050**	**0.025**	**0.0042**		
			1 HR:	**0.10**	**0.035**	**0.035**	**0.018**	**0.0029**		
			4 HR:	**0.025**	**0.017**	**0.017**	**0.0085**	**0.0015**		
			8 HR:	**0.013**	**0.013**	**0.013**	**0.0065**	**0.00104**		
	AEGL - LEVEL 3 Life threatening; Level of potential initial fatalities		10 MIN:	**3.9**	**0.76**	**0.38**	**0.38**	**0.029**		
			30 MIN:	**2.7**	**0.38**	**0.19**	**0.19**	**0.015**		
			1 HR:	**2.1**	**0.26**	**0.13**	**0.13**	**0.010**		
			4 HR:	**0.53**	**0.14**	**0.070**	**0.070**	**0.0052**		
			8 HR:	**0.27**	**0.10**	**0.051**	**0.051**	**0.0038**		
MEGs mg/m³	**Military Exposure Guidelines (Air)**	USACHPPM Technical Guide 230 (***ref i***) provides MEGs (for industrial chemicals as well as the agents listed here) and application guidance for assessing/characterizing exposures to military personnel in deployed settings as required by DoD Force Health Protection policy. The TG 230 was recently reviewed by the NRC and will be updated (next version due out Jan-Feb 2005) to accommodate several NRC recommendations and other new information. The new versions will include slightly modified CWA MEGs which will be based on findings of USACHPPM Technical Report 47-EM-5863-04 (see ***ref j*** below)								

Table 1. Summary of Chemical Agent Air* Exposure Values: Existing Information as of 8/03/04 POC: V. Hauschild, USACHPPM, 410-436-5213

BLACK Numbers are final approved values documented by official Army regulation/policy as well as CDC
GREEN Numbers are final approved values documented by official Army regulation/policy but are not addressed by CDC/other Federal agency
BLUE Numbers have been developed/endorsed by non-DoD federal proponents for Army and non-Army use
RED indicates previous official DA/CDC values that are now obsolete; outdated/superseded references
* The criteria listed in this Table are designed for protection from inhalation and ocular exposures as most sensitive exposure routes; separate vapor exposure limits for percutaneous vapor absorption are also now officially endorsed by Army for occupational use [in mg/m^3 GA = 11.1; GB = 6.0; GD/GF= 1.5; VX= 0.13; and H=0.1; per ***ref d***)
** New 2004 data generated from animal toxicological studies specifically performed to assess validity of previous assumption re: VX toxicity (which is the warfare agent that had particularly limited toxicity data and was recommended to be studied further by the National Research Committee) are showing that the VX AELs may over estimate its toxicity (and thus be overly protective (low) AELs). Army has requested that the CDC consider the new data which is to be published in a report being prepared by the US Army Edgewood Chemical and Biological Center (ECBC) and is expected to be published @ end 2004. It is not yet known whether this will result in future reconsideration of the AELs for VX.
*** Lewisite AELs are all based on detection; no true IDLH exists (AR 385-61, Table 2-2 and 2-3)

REFERENCES:

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a) Department of the Army, Memorandum Subject: *Implementation Guidance Policy for New Airborne Exposure Limits for GB. GA, GD, GF, VX, H, HD, and HT*; signed by Mr. Raymond J. Fatz, Deputy Assistant Secretary of the Army, (Environment, Safety and Occupational Health); OASA(I&E), **June 18 2004**.
b) Department of Health and Human Services (DHHS) Centers for Disease Control (CDC); Interim Recommendations for Airborne Exposure Limits for Chemical Warfare Agents H and HD (Sulfur Mustard); Federal Register, vol 69, No 85, pp 24164-2468, **May 3 2004.**
c) Department of Health and Human Services (DHHS) Centers for Disease Control (CDC); Final Recommendations for Protecting Human Health from Potential Adverse Effects of Exposure to Agents GA, GB, and VX; Federal Register, vol 68, No 196, pp58348-58351, **Oct 9 2003**.
d) Department of the Army Office of the Surgeon General Memorandum, Subject: *Nerve Agent Percutaneous Exposure Criteria and Airborne Exposure Levels (AELs) for GD.GF in Use of Interim DA Guidance on Implementation of the New AELs,* **29 June 2004**
e) Department of Health and Human Services (DHHS) Centers for Disease Control (CDC); *Recommendations for Protecting Human Health and Safety Against Potential Adverse Effects of Long-Term Exposure to Low-Doses of Agents GA, GB, VX, Mustard Agents (H. HT, HD) and Lewisite (L)*, *Federal Register*, Vol. 53 No 50, page 8504, Tuesday, March 15, 1988.
SUPERCEDED BY ABOVE, EXCEPT FOR LEWISITE
f) AR 385-61: *The Army Chemical Agent Safety Program*; Safety; 28 February 1997 **PARTS OF THIS DOCUMENT ARE NOW SUPERCEDED BY Reference a.**
g) National Research Council (NRC) Volume 3, Acute Exposure Guidelines for Selected Airborne Chemicals, National Academy Press, Pre-Publication Advance Public copy 14 March, 2003, www.nap.edu
h) Chemical Stockpile Emergency Preparedness Program, US Army and US Federal Emergency Management Agency (FEMA) Policy Paper #20 (Revised), Subject: Adoption of Acute Exposure Guidelines Levels (AEGLs); **February 2003**.
i) USACHPPM Technical Guide (TG) 230, Chemical Exposure Guidelines for Deployed Military Personnel, Current version: Version 1.3 with **May 2004 Update**; new version to be published in Jan-Feb 2005 – will have new CWA MEGs based on findings and conclusions of USACPPM Technical Report 47-EM-5863-04 (see ***ref j*** below).
j) USACHPPM Technical Report 47-EM-5863-04; Acute Toxicity Estimation and Operational Risk Management of Chemical Warfare Agent Exposures; **May 2004**.

Table 2. Summary of Multi-Media Chemical Agent Toxicity and Exposure Values: Existing Information as of 8/03/04 POC V. Hauschild, USACHPPM, 410-436-5213

Media	Standard/Guideline Name	Population	Exposure Scenario	H/HD/HT (Mustard)	GA (Tabun)	GB (Sarin)	GD/GF	VX	Lewisite	Notes/Status
WATER	**FDWS** (Field Drinking Water Standards) ug/L	designed for military * but can have civilian applications	Safe for up to 7 days							The last published version of TB Med 577 (***ref a***) was in 1986, this has being superseded and the new values shown have been endorsed by DoD (see ***ref b***). The new version of TB Med 577 is still DRAFT (final publication expected in end 2004 (410-436-3919 for info) * See note below (next page)
			normal/humid climate - 5 L/day ingestion rate	**(140)** [b]	**(12*** [b]**)**	**(12*** [b]**)**	**(12*** [b]**)**	**(12*** [b]**)**	**(80** [b]**)**	
			dry/arid climate - 15 L/day ingestion rate	**(47** [b]**)**	**(4*** [b]**)**	**(4*** [b]**)**	**(4*** [b]**)**	**(4*** [b]**)**	**(27** [b]**)**	
SOIL	**HBESL-Residential** (Health-Based Environmental Screening Level) mg/kg	civilian general population: adults and children	daily exposure via ingestion, inhalation, and dermal contact for a lifetime	**0.01** [c,d,e]	**2.8** [c,d,e]	**1.3** [c,d,e]	**0.22** [c,d,e]	**0.042** [c,d,e]	**0.3** [c,d,e]	HBESLs were endorsed by Army headquarters (ESOH) in May 1999 **(*ref c*)** and were derived (by Army, ***ref d***) using chronic toxicity criteria with risk assessment models and assumptions similar to EPA Reg IX preliminary remediation goals (PRGs). HBESLs are conservative screening criteria for assessing potential long-term human exposure to soil contaminated from liquid agent (ambient vapor alone would be unlikely to result in deposition or soil contamination). HBESL are also used as criteria to determine public release of decontaminated items/property (***ref e***). Note that many agent-certified laboratories may not be able to achieve these levels. Also note that where there is potential HD or VX soil contamination, breakdown products may also warrant evaluation (***see ref d, f & App F***).
	HBESL-Industrial mg/kg	civilian general adult population	frequent exposures via ingestion, inhalation, and dermal contact: 250 days/year for 30 years	**0.3** [c,d]	**68** [c,d]	**32** [c,d]	**5.2** [c,d]	**1.1** [c,d]	**3.7** [c,d]	
WASTE	**$HWCL_{sol}$**[e] (solid hazardous waste control limit) mg/kg	civilian/DoD worker	possible occasional exposure at HW treatment facility	**6.7** [g,h]	**680** [g,h]	**320** [g,h]	**52** [g,h]	**10** [g,h]	**37** [g,h]	Waste values were derived (by Army **– *ref g,h***) using chronic toxicity criteria with a risk assessment model similar to that used by EPA Region IX. Assumptions denote specific exposure scenarios associated with waste materials and workers potentially exposed to them (assumes exposures to the general public are controlled) were used. Values were initially documented in a Department of Army proposed hazardous waste management rule presented to the State of Utah (***ref h***) and later in an Oct 2000 USACHPPM memo to PMCD (***ref g***). Values were not officially endorsed by Utah but as of June 2004 were **endorsed in DA policy (*ref e*) for site-specific consideration/use.**
	$HWCL_{Liq}$[e] (liquid hazardous waste control limit) mg/L	worker civilian/DoD	possible occasional exposure at HW treatment facility	**0.7** [g,h]	**20** [g,h]	**8.3** [g,h]	**0.3** [g,h]	**0.08** [g,h]	**3.3** [g,h]	
	NHWCL[e] (non-hazardous waste control limit (haz waste exemption level)[f] mg/kg	worker civilian/DoD	possible occasional exposures at a non-HW land disposal facility	**0.3** [g,h,e]	**68** [g,h,e]	**32** [g,h,e]	**5.2** [g,h,e]	**1.1** [g,h,e]	**3.7** [g,h,e]	
Chronic Toxicity Reference Criteria (for use in risk assessment calculations)	**RfD_o** (Oral Reference Dose) mg/kg-day	General population: adults and children	chronic (lifetime) ingested dose at or below which no adverse health effects are expected	**0.000007** [i, j, k]	**0.00004** [i, j, k]	**0.00002** [i, j, k]	**0.000004** [i, j, k]	**0.0000006** [i, j, k]	**0.0001** [i, j, k]	NRC/COT (***ref i, 1999***) gave general endorsement of values; addressed in DA OTSG endorsement letter of final RfDs (Feb 2000, ***ref j***); most current documentation of basis and overall status of these values is in a peer-reviewed article (***ref k***)
	CSF_o Oral Cancer Slope Factor $(mg/kg/day)^{-1}$	General population: adults and children	represents the potency of the agent by ingestion to cause increased cancer risk	**7.7** [i, j, k]	**Not determined to be a carcinogen**					In 1999 the NRC/COT ***(ref i)*** endorsed a less conservative HD CSF_o of 1.6; DA OTSG (Feb 2000) has currently endorsed use of the 7.7 (***ref j, ref k)***
	Inhalation Unit Risk $(ug/m^3)^{-1}$	General population: adults and children	Represents the potency of the agent by inhalation to cause increased cancer risk	**0.0041** [i]						See Table 20 HD HCD, Nov 2000 ***(ref l)***

Table 2. Multi-Media Chemical Agent Toxicity and Exposure Values Summary Table: Existing Information as of 8/03/04 POC V. Hauschild, USACHPPM, 410-436-5213

NOTES:

( ) Numbers in parentheses are from draft documents
GREEN Numbers in Green are currently documented in official Army regulation/policy/or through DA Headquarter endorsement
BLUE Numbers have been developed/endorsed by non-DoD federal proponents for Army and non-Army use
RED Numbers are still officially used/endorsed by Army/other approving entity source **but** revisions are proposed/underway
BLACK Numbers black are final technical values but are not officially approved for implementation through a proponent agency

***** Application of drinking water criteria. It is noted that contamination of large water supplies with chemical agents is relatively unlikely due to effects of hydrolysis, dilution, and the neutralizing effects of common water treatment processes (e.g. chlorine). These values were designed for a military scenario, in which smaller containerized water supplies directly used for consumption might be intentionally contaminated with significant amounts of agent. Theoretically this situation could result in residual agent levels of concern for several days. The values here assume up to 7 days exposure at 5-15 liters/day consumption – which is an extremely high rate of drinking based on hot environments and high physical activity. Although these drinking water values were not originally developed for general population application, they would be appropriate for use as screening levels for civilian applications where ingestion rates range from 1-liters/day and where most releases to a water supplies would involve the hydrolysis, dilution, and treatment processes.

REFERENCES:

a) TB Med 577, *Sanitary Control and Surveillance of Field Water Supplies*, March 1986.

b) Memorandum, DASG-HS-PE, 16 Apr 1997, Subject: Tri-Service Field Water Standards for Nerve Agents.

c) Memorandum, Headquarters Department of the Army, Office of the Assistant Secretary for Installations, Logistics, and Environment, SUBJ: Derivation of Health-Based Environmental Screening Levels (HBESLs) for Chemical Warfare Agents, May 28 1999.

d) USACHPPM/ORNL Technical Report: *Health-Based Environmental Screening Levels for Chemical Warfare Agents*, March 99.

e) Department of the Army, Memorandum Subject: *Implementation Guidance Policy for New Airborne Exposure Limits for GB. GA, GD, GF, VX, H, HD, and HT*; signed by Mr. Raymond J. Fatz, Deputy Assistant Secretary of the Army, (Environment, Safety and Occupational Health); OASA(I&E), June 18 2004.

f) Munro et al.; *The Sources, Fate, and Toxicity of Chemical Warfare Agent Degradation Products,* Environmental Health Perspectives, Volume 107, Number 12, December 1999 pp 933-974

g) Memorandum, USACHPPM; MCHB-TS-EES; SUBJ: Response to State of Oregon Comments on the Utah Chemical Agent Rule (UCAR), 23 October 2000; NOTE: This response includes USACHPPM Information Paper "*Management Criteria for Chemical Warfare Agent (CWA)-Contaminated Waste and Media*" 10 October 00 as well as USACHPPM Technical Paper: "*Chemical Warfare Agent Health-Based Waste Control Limits*", dated October 2000**.**

h) U.S. Army –Proposed Utah Chemical Agent Rule (UCAR), May 1999 (Volume 1, Section XI. Development of Health-Based Waste Management Concentration Levels."

i) *Review of the U.S. Army's Health Risk Assessments for Oral Exposure to Six Chemical-Warfare Agents*, National Research Council, National Academy Press, Wash DC, 1999; www.nap.edu

j) Memorandum, (Army OTSG) MCHB-CG-PPM, Chronic Toxicological Criteria for Chemical Warfare Compounds, 16 February 2000.

k) Opresko, D.M, et all, 2001. Chemical Warfare Agents: Current Status of Oral Reference Doses*, Reviews of Environmental Contamination and Toxicology Vol 172, pp 65-85.*

l) USACHPPM Technical Report: *Evaluation of Airborne Exposure Limits for Sulfur Mustard (HD): Occupational and General Population Exposure Criteria,* Technical Report 47-EM-3767-00**,** November 2000

Annex C Cleanup Procedures under RCRA
Colorado CSEPP Recovery Plan

I. Overview

A. This annex describes and compares procedures, rules, and responsibilities for environmental cleanup under the Colorado Hazardous Waste Act, C.R.S. 25-15-101 *et seq* (CHWA), Colorado Hazardous Waste Regulations (CHWR), Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC § 9601 *et seq*.), and the Resource Conservation and Recovery Act of 1976 (42 USC § 6901) (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. All statutes are designed to ensure that the environmental impacts associated with the release are thoroughly investigated, and that timely remedial action is taken to protect the public health, welfare, and the environment. Both statutes would potentially apply to cleanup of a CAI.

B. Under the Colorado Hazardous Waste Regulation (6 CCR 1007-3) the Colorado Department of Public Health and Environment (CDPHE) has the regulatory responsibility governing the release of mustard agent from an interim status and permitted hazardous waste storage facility. Once a release has occurred that requires clean-up measures beyond those initially needed, a permit or compliance order would be issued by CDPHE for clean-up.

C. Below are summaries of requirements under each statute and how they might apply to cleanup after a chemical event. Following those summaries is a brief discussion of options for negotiating an interagency agreement to cover cleanup requirements under both statutes.

D. Requirements under CHWA:

1. Requirements under the CHWRs are based on the fact that PCD has a permit and interim status for the storage of chemical weapons which are hazardous wastes in Colorado.

2. Under CHWA after immediate emergency response actions have been performed, the emergency coordinator must "provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility." (6 CCR 1007-3, Section 264.56(g)) Note that such material (for example, contaminated debris, soil or equipment) then becomes hazardous waste that must be stored, handled and accounted for in the same manner as other hazardous waste stored at the site.

3. If operations are shut down as a result of the event, before they may be restarted, the responsible Army official must notify the state that all emergency equipment listed in the contingency plan is cleaned and ready for deployment (i.e., that emergency response capability has been restored). (6 CCR 1007-3, Section 264.56(i))

4. Within 15 days after the event, a report is due detailing the incident including identity and quantity of material involved, extent of any injuries, assessment of actual or potential hazards to human health or the environment, and estimated quantity and disposition of recovered materials. (6 CCR 1007-3, Section 264.56(j))

5. 6 CCR 1007-3, Sections 264.100 and 264.102 describe Colorado's requirements for conducting corrective action. In general, the corrective action process includes five elements: initial site assessment, site characterization, interim actions, evaluation of remedial alternatives, and implementation of the selected remedy.

6. Approval of the final remedy must be granted by CDPHE-HMWMD pursuant to a permit or order which will outline the requirements for completion of corrective. At a minimum, the public and affected community should be given notice and an opportunity to comment before a corrective action implementation is terminated and a facility, or area of contamination is released from its CHWA corrective action obligations. (See Announcement of Availability and Request for Comment on "Completion of Corrective Action Activities at RCRA Facilities" Guidance, published by the U.S. EPA on February 27, 2002 (67 Fed. Reg. 9174)).

7. At installations where a final disposal facility permit has been issued, cleanup would be conducted under permit conditions. Temporary storage of contaminated debris, wreckage, soil, or other contaminated items resulting from the event may require modification of the permit to accommodate a Corrective Action Management Unit or Temporary Unit

E. Use of Interagency Agreements to Reduce Duplication of Effort

1. After a chemical event, cleanup requirements under CHWA will apply.

2. CDPHE requires oversight of cleanup at sites under the CHWRs because PCD/PCAPP is a permitted and interim status hazardous waste facility.

3. A release from PCD/PCAPP would be a new release from a permitted and/or interim status facility fully subject to the CHWRs.

4. Lastly it should be noted that at any given installation, there may already be adequate physical arrangements and oversight mechanisms in place to cover post-event cleanup. While events that lead to protective actions off-post have been exceedingly rare, leaking munitions per se are not rare and every chemical storage installation has had to deal with them. The challenges of a post-emergency cleanup may not be drastically different in quality from those faced regularly in response to leaking munitions. Such response activities will be described under the interim status contingency plan for the stockpiled munitions.

Annex D Sample Interagency Agreement For Environmental Cleanup
Colorado CSEPP Recovery Plan

Below is a **sample** interagency agreement for cleanup of hazardous material contamination pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As explained in Section H, an interagency agreement between the U.S. Department of Defense (DOD) and the U.S. Environmental Protection Agency (EPA), which also includes the state as a party, is the preferred method of specifying roles, responsibilities, and procedures for the cleanup effort. This **sample** form is intended to illustrate the types of issues and considerations that should be taken into account in drafting such an agreement.

IN THE MATTER OF:

UNITED STATES DEPARTMENT OF DEFENSE	CONSENT AGREEMENT UNDER CERCLA SECTION 120 and 106(a)

DEPARTMENT OF THE ARMY

CONSENT AGREEMENT

WHEREAS, the U.S. Department of Defense (DOD) was directed by Congress in December 1985 to destroy the U.S. stockpile of lethal unitary chemical weapons in such a manner as to provide maximum protection to the environment, the general public, and the personnel involved in the destruction (Public Law 99-145, DOD Authorization Act of 1986).

WHEREAS, the Federal Emergency Management Agency (FEMA) and the U.S. Department of the Army (Army) have entered into a Memorandum of Understanding dated October 8, 1997, establishing the framework of cooperation between the FEMA and the Army for developing and implementing plans and programs for emergency preparedness in connection with the storage and ultimate disposal of chemical warfare materials.

WHEREAS, in conjunction with handling such stockpile of chemical weapons, there was an unintended release of chemical agent and emergency responses have been undertaken.

WHEREAS, the Army now is commencing recovery and restoration procedures to ensure that the environmental impacts associated with the release are thoroughly investigated and that a timely remedial action is taken to protect the public health, welfare, and the environment in conformance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC § 9601 *et seq*.) (CERCLA) and CERCLA guidance and policy regulations, the Resource Conservation and Recovery Act of 1976 (42 USC § 6901) (RCRA), the _____ of the State of _____, (the State) the National Environmental Policy Act of 1969 (42 USC § 4321 *et seq*.) (NEPA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (43 CFR 300).

I. PURPOSE AND SCOPE OF THIS CONSENT AGREEMENT

The purpose of this document is to establish the roles, responsibilities, and relationship between the United States Environmental Protection Agency (US EPA), the State, and the Army, hereinafter collectively referred to as the "Parties," regarding the implementation of a remedial action at _____ (Site). This Agreement establishes a procedural framework between the Parties in order to facilitate interagency cooperation, the exchange of information, and participation in implementing the remedial action.

Specifically, the purpose of this Agreement is to:

a) Identify remedial alternatives for the release site, on and off post, prior to the implementation of final remedial action for the Site;

b) Establish requirements for the performance of a Remedial Investigation (RI) to determine fully the nature and extent of the threat to the public health or welfare or the environment caused by the release at the Site; establish requirements for the performance of a Feasibility Study (FS) for the Site to identify, evaluate, and select alternatives for the appropriate remedial action to mitigate or abate the release at the Site in accordance with CERCLA and applicable State law;

c) Identify the nature, objective, and schedule of the remedial action to be taken at the Site, and the applicable or relevant and appropriate standards of cleanup to be attained at the Site;

d) Implement the selected remedial action in accordance with CERCLA, NCP, NEPA, and applicable State law and meet the requirements of CERCLA § 120 for a federal facility;

e) Coordinate remedial action at the Site with the emergency response actions already taken at the Site;

f) Expedite the cleanup process to the extent consistent with protection of human health and the environment; and

g) Provide for operation and maintenance of any remedial action selected and implemented pursuant to this Agreement.

II. JURISDICTION

The US EPA enters into this Agreement pursuant to its authorities as set forth in Sections 106(a) and 120(a) and (e) of CERCLA, Sections 6001, 3008(h), 3004(u), and (v) of RCRA, and Executive Order 12580.

The Army enters into this Agreement pursuant to its authorities as set forth in Executive Order 12580, Section 120 of CERCLA, and the Defense Environmental Restoration Program (DERP), 10 USC § 2701 *et seq*. The Army is a responsible party within the meaning of CERCLA Section 107 with respect to the release of chemical agent at the Site. The Department of the Army is authorized to act on behalf of the Secretary of Defense for all functions, which are relevant to this Agreement delegated by the President through Executive Order 12580.

The State enters into this Agreement pursuant to its authorities as set forth in Sections 120 and 121(f) of CERCLA, Subpart F of the NCP, Subpart G of the NCP as a Natural Resource Trustee,

Sections 6001, 3004(u), and (v) of RCRA, and applicable State statutes and regulations governing the Army's RCRA permit for the _____ facility.

III. DEFINITIONS

The terms used in this Agreement shall have the same meaning as defined in Section 101 of CERCLA, the NCP, Section 1004 of the Resource Conservation and Recovery Act of 1976 (42 USC § 6904) (RCRA), and 40 CFR Parts 260-66 and 268. In addition, the following terms shall be defined as follows:

"Days" shall mean calendar days, unless business days are specified. Any submittal or written statement of dispute that under the terms of this Agreement would be due on a Saturday, Sunday, or federal holiday shall be due on the next business day.

"Deadlines" means schedules as well as that work and those actions which are to be completed and performed in conjunction with such schedules established pursuant to this Agreement.

"Force Majeure" means any event arising from causes beyond the control of a Party that causes a delay in or prevents the performance of any obligation under this Agreement, including, but not limited to, Acts of God, fire, war, insurrection, civil disturbance, explosion, unanticipated breakage or accident to machinery, equipment or lines of pipe despite reasonably diligent maintenance, technological impracticability or inability, adverse weather conditions that could not be reasonably anticipated, unusual delay in transportation, restraint by court order or order of public authority, inability to obtain, at reasonable cost and after exercise of reasonable diligence, any necessary authorizations, approvals, permits or licenses due to action or inaction of any governmental agency or authority other than the Army, delays caused by compliance with applicable statutes or regulations governing contracting, procurement or acquisition procedures, despite the exercise of reasonable diligence, and insufficient availability of appropriated funds, if the Army shall have made timely request for such funds as part of the budgetary process as set forth in Part XIII of this Agreement. A Force Majeure shall also include any strike or other labor dispute, whether or not within the control of the Parties affected thereby. Force Majeure shall not include increased costs or expenses of Response Actions, whether or not anticipated at the time such Response Actions were initiated.

"Site" means the _____ site, as defined in Part V.

"Submittal" means every document, draft, report, schedule, deliverable, work plan, or other item to be submitted to US EPA or the State by the Army pursuant to this Agreement.

IV. PARTIES

The Parties to this Agreement are the US EPA, the Army, and the State. The terms and conditions of this Agreement do not and shall not be construed to inure to the benefit of any other natural person, corporation, association, governmental agency, or entity not a signatory hereto. The terms of this Agreement shall be binding upon the Parties.

V. STATEMENT OF FACTS

_____ is located in _____,_____. _____ is owned by the United States and operated by the Army in part as a chemical weapons storage facility. The Site constitutes a "facility" within the meaning of that term as defined in CERCLA Section 101(9) and is a federal facility under CERCLA Section 120. On _____, 20__, an unintended release of chemical agents occurred. This accident resulted in the release of _____ into the environment. [*Insert specific facts of dispersal, pathways, characterization, etc.*]

On _____, 20__, the following emergency response was initiated:

[*Insert specific sequence of events following the accident.*]

On _____, 20__, the Site was listed on the National Priorities List (NPL).

VI. WORK TO BE PERFORMED

The Parties agree that the Army shall plan and conduct a Remedial Investigation/Feasibility Study (RI/FS) at the Site leading to the development and implementation of a Remedial Action Plan in accordance with US EPA regulations and guidance documents. Work specifically required for remediation of the site, including delineation of operable units, development of a Scope of Work, a RI/FS Work Plan (including a Sampling and Analysis Plan, Health and Safety Plan, and Quality Assurance Project Plan), Community Relations Plan, RI Report, Initial Screening of Alternatives Report, FS Report, Remedial Action Plan, Record of Decision, Remedial Design/Remedial Action Work Plan, and if necessary, a plan for restoration, rehabilitation, replacement, or acquisition of natural resources pursuant to Section G of the NCP, will be based on available and acceptable data and other information, including information and data collected prior to the effective date of this Agreement. Schedules for completing each document will be set forth in the Scope of Work, which will be provided within _____ (__) days of the effective date of this Agreement.

The RI and FS investigations will be conducted consistently with Executive Order 12580; the NCP, DERP and the US EPA document entitled *Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA – Interim Final* (EPA/540/G-89/004, Washington, D.C.). The RI/FS process shall also meet the requirements of NEPA in assessing the impacts of various remedial actions, which are considered, and in developing the Remedial Action Plan.

VII. STATUTORY COMPLIANCE AND RCRA/CERCLA INTEGRATION

The Parties intend to integrate into this comprehensive Agreement such RCRA and CERCLA obligations as the Army may have regarding the Site. Therefore, the Parties intend that activities covered by this Agreement will achieve compliance with CERCLA and the NCP; will satisfy the State's responsibilities under Subpart G of the NCP regarding restoration of natural resources; and will satisfy the corrective action requirements of Sections 3004(u) and (v) and 3008(h) of RCRA.

Based on the foregoing, the Parties intend that any remedial action selected, implemented, and completed under this Agreement shall be deemed by the parties to be protective of human health and the environment such that remediation of releases covered by this Agreement shall obviate the need for further corrective action under RCRA. The parties agree that with respect to releases of hazardous waste and hazardous waste constituents covered by this Agreement, RCRA, the applicable State Act and the regulations adopted thereunder may be considered as applicable or relevant and appropriate requirements pursuant to Section 121 of CERCLA and the NCP.

The Parties recognize that the requirement to obtain permits for response actions undertaken pursuant to this Agreement shall be as set forth in CERCLA and the NCP. The Parties further recognize that on-going hazardous waste management units or activities remaining at the Site after completion of the remedial action taken hereunder may require the issuance of permits (e.g., RCRA Facility Operating Permits) under applicable Federal and State laws. This Agreement does not affect the requirements, if any, to obtain such permits.

VIII. REPORTING, REVIEW, AND EXTENSIONS OF TIME

A. Reporting

The Army shall provide written monthly progress reports to US EPA and the State concerning the work performed under this Agreement. The reports shall address technical progress during the reporting period, variances from previously planned activities, planned activities for the coming reporting period, work schedules, and issues related to implementation of work plans and work progress. In addition, the Army, US EPA, and the State shall maintain necessary communications to maintain work progress and the timely exchange of information.

B. Review of Submittals

Review of a Submittal by US EPA and the State shall concern all aspects of the Submittal (including completeness) and shall include, but not be limited to, technical evaluation of any aspect of the Submittal, and consistency with CERCLA, the NCP, other applicable laws, regulations, and any other pertinent guidance or policy promulgated by US EPA or the State. Comments by US EPA or the State shall be sufficiently specific and in such detail so that the Army can reasonably respond to the comments and, if appropriate, make revisions to the relevant Submittal. Comments shall refer to any pertinent sources of authority or references upon which the comments are based. Upon request of the Army, US EPA or the State shall provide a copy of the cited authority or reference. Authorized representatives of the Army shall make themselves readily available to US EPA or the State during the comment period for purposes of informally responding to questions and comments on draft Submittals.

1. Primary Submittals

Primary Submittals include all documents that are major and discrete portions of the required activities covered by this Agreement. Primary Submittals include:

a. Scope of Work;

b. RI/FS Work Plan, including:

– Quality Assurance Project Plan;
– Health and Safety Plan;
– Sampling and Analysis Plan(s);

c. Community Relations Plan;
d. RI Report;
e. Initial Screening of Alternatives Report;
f. FS Report;
g. Remedial Action Plan;
h. Record of Decision; and

i. Remedial Design/Remedial Action Work Plan.

US EPA or the State shall review and comment on draft Submittals directly to the Army. Following receipt of comments on a Submittal, the Army shall issue responses to the comments received and issue a draft final primary Submittal reflecting any appropriate revisions in accordance with such comments. A draft final primary Submittal shall become the final primary Submittal, unless the Submittal is revised pursuant to Section X.

2. Secondary Submittals

Secondary Submittals include, but are not limited to, monthly reports, environmental monitoring data reports, and other documents that are in support of primary Submittals. Secondary Submittals shall be provided by the Army subject to review and comment by US EPA and the State. Although the Army may respond to the comments received, secondary Submittals are not expected to undergo revisions. Secondary Submittals may be revised, in the Army's sole discretion, in the context of the corresponding final primary Submittal, if appropriate to be issued.

3. Identification and Determination of Potential AGARS

For those primary Submittals or secondary Submittals that consist of or include ARAR determinations, the Project Managers shall meet to identify and propose, to the best of their ability, all potential AGARS pertinent to the report being addressed. Draft ARAR determinations shall be prepared by the Army in accordance with Section 121(d)(2) of CERCLA, the NCP, and the pertinent guidance issued by US EPA and the State, which is not inconsistent with CERCLA and the NCP.

In identifying potential AGARS, the Parties recognize that actual AGARS can be identified only on a site-specific basis and that AGARS depend on the specific hazardous substances, pollutants, and contaminants at a site, the particular actions proposed as a remedy, and the characteristics of a site. The Parties recognize that ARAR identification is necessarily an iterative process and that potential AGARS must be re-examined throughout the RI/FS process until a ROD is issued.

C. Extensions of Time

A deadline set forth in any primary final Submittal shall be extended upon receipt of a timely request for extension for good cause. Any request for extension shall be submitted to the other Party in writing and shall specify the deadline sought to be extended, the length of the extension sought, any other related deadlines that would be affected if the extension is granted, and the cause for the request. Good cause includes, but is not limited to:

1. An event of *force majeure*;

2. A delay caused by another Party's failure to meet any requirement of this Agreement or any primary final Submittal;

3. A delay caused by the good faith invocation of dispute resolution or the initiation of judicial action;

4. Any work stoppage ordered pursuant to this Agreement, federal or state statute or regulations or court order; or

5. A factor outside of the reasonable control of a Party.

IX. REMEDIAL PROJECT MANAGERS

A. Designation

The US EPA, the State, and the Army shall each designate a Remedial Project Manager (RPM). Except as provided otherwise in this Agreement, RPMs are responsible for implementing the duties of their respective agencies under this Agreement. Within ten (10) days of the effective date of this Agreement, the Parties shall notify each other of the name, address, and telephone numbers of their respective RPMs. Any Party may change its designated RPM by notifying the other Party, in writing, within five (5) days after the change. To the maximum extent possible, communications between Parties concerning the terms and conditions of this Agreement shall be directed through the RPM.

B. Communications

Each RPM shall be responsible for assuring that all communications from the other RPMs are appropriately disseminated and processed by the Party the RPM represents.

C. Imminent and Substantial Endangerment and Removal Actions

Whenever a RPM discovers or becomes aware of a situation that is likely to present an imminent and substantial endangerment to the public health, welfare, or the environment at or near the Site that is directly or indirectly the result of any work related to implementation of this Agreement, he/she shall immediately orally notify the other Party's RPM and shall immediately orally notify the responsible person that immediate correction or attention must take place. All contracts and subcontracts with respect to the Site shall contain a clause requiring such contractor or subcontractor to notify all RPMs of any such situation. If the responsible person is unable or unwilling to correct the situation, any RPM may take appropriate action. If the endangerment occurs as a result of actions performed pursuant to the implementation of this Agreement, the Army shall take immediate action to notify appropriate federal, state, and local authorities.

Notwithstanding any other provision of this Agreement, the Army retains the right, consistent with Executive Order 12580, to conduct a removal action to abate an imminent and substantial endangerment to human health or the environment from the release or threat of release of hazardous constituents, hazardous substances, pollutants, or contaminants at or from the Site. Such actions may be conducted at any time, either before or after the issuance of a ROD. The Army shall provide the US EPA and the State with adequate opportunity for timely review and comment after the Army makes any proposal to carry out such removal actions and before it initiates any such removal action.

D. Field Modifications

The RPMs may agree to make field modifications to the work to be performed pursuant to this Agreement. Modifications may be related to techniques, procedures, or design utilized during field activities that are necessary to complete the investigation and remediation of the site. Field modifications proposed by any Party pursuant to this section must be approved orally by the other Party's RPM to be effective. The RPM suggesting the modification shall document it and its approval.

E. Oversight

The Army's RPM or his/her authorized representative shall be on-site or on call to supervise all work performed at the Site during implementation of the work performed pursuant to this Agreement. The US EPA or the State RPM or his/her authorized representative shall supply a telephone number where he/she can be reached in an emergency. Absence of the US EPA or the State RPM or his/her authorized representative shall not be cause for work suspension.

X. RESOLUTION OF DISPUTES

A dispute is any disagreement between the Parties regarding any interpretation of this Agreement, any schedule, any document, any work to be performed, any procedure, any reimbursement, or any legal requirement or guidance. If a dispute arises under this Agreement, the procedures of this section shall apply, except as provided otherwise in this Agreement. Any resolution of a dispute pursuant to this section may include amendment of any pertinent document. All Parties shall abide by all terms and conditions of any resolution of a dispute.

A. Informal Dispute Resolution

All Parties shall make reasonable efforts to informally resolve disputes through their respective RPMs or authorized representatives. During informal dispute resolution, the RPMs or their authorized representative(s) shall, as appropriate, confer, meet, and exert their best efforts to resolve the dispute within thirty (30) days. If no resolution can be reached during this informal dispute process, the Parties shall follow the process set forth below. Pursuant to the DSMOA or other agreement, the US EPA will act as the State's agent in the process set forth in Subsections B, C, and D below.[If such agreement does not exist, the State may be made a participant in the formal dispute resolution process.] This Part does not apply to disputes concerning the restoration, rehabilitation, replacement, or acquisition of equivalent natural resources pursuant to the State's responsibilities as a natural resource trustee under Subpart G of the NCP. Such disputes, if they cannot be resolved informally, are governed by the recourse set forth in the NCP for natural resource trustees (40 CFR 300.615(e)).

B. Dispute Resolution Committee

The Dispute Resolution Committee (DRC) shall consist of the Commanding Officer at the Site and the US EPA Deputy Regional Administrator. The DRC shall attempt to resolve disputes that the RPMs cannot resolve pursuant to Section VIII(A). The RPM of a disputing Party shall submit to the DRC a written Statement of Dispute setting forth the nature of such dispute, the work affected by the dispute, the Party's position with respect to the dispute, the information the Party is relying upon to support its position, and a proposed resolution. The DRC shall, as appropriate, confer, meet, and exert its best efforts to issue a written decision unanimously resolving the dispute within twenty-one (21) days of receiving the Statement of Dispute.

C. Senior Executive Committee

The Senior Executive Committee (SEC) shall consist of the Assistant Secretary of the Army Installations, Logistics, and the Environment and the US EPA/Region __ Administrator. The SEC shall attempt to resolve disputes that the DRC cannot resolve pursuant to Section VIII(B). The DRC shall submit to the SEC the Statement of Dispute, along with any recommendations of any DRC member. The SEC shall, as appropriate, confer, meet, and exert its best efforts to issue a written decision unanimously resolving the dispute within twenty-one (21) days of receiving the Statement of Dispute.

D. Administrator of US EPA

The Administrator of the US EPA shall resolve disputes that the SEC cannot resolve pursuant to Section VIII(C). The SEC shall submit to the Administrator the Statement of Dispute, along with any recommendations of any SEC member. Following such procedures, as he/she may deem appropriate, the Administrator shall issue a written decision resolving the dispute within twenty-one (21) days of receiving the Statement of Dispute.

E. Extension of Work Schedules Pending Dispute Resolution

Except as provided in this section, all work under this Agreement shall continue pending resolution of such dispute, and shall be completed in accordance with applicable schedules. The

schedule for completing work that is affected by such dispute shall be extended for a period usually not to exceed the actual time taken to resolve such dispute.

F. Suspension of Work Pending Dispute Resolution

The Army shall cause work under this Agreement that is affected by a dispute to be immediately discontinued if the US EPA Waste Management Division Director or the State _____ requests in writing that such work be suspended because, in his/her opinion, such work is inadequate or defective, and its continuation is likely to result in an adverse effect on human health or the environment, or is likely to have an adverse effect on the selection or implementation of a remedial action. US EPA or the State shall give the Army reasonable prior notification that such a request is forthcoming. If the Army believes that the request is inappropriate, the Army may meet with the US EPA Waste Management Division Director or the State _____ to discuss the suspension after suspending the work in accordance with the request. Following this meeting, the Director shall issue a written final decision with respect to the suspension within fifteen (15) days. Such decision may, in the sole discretion of the Army, be immediately referred to the DRC or SEC for dispute resolution.

XI. ADMINISTRATION

A. Access and Confidentiality

At all reasonable times following notification to the Army RPM, and for the purposes of inspecting conditions, activities, records, operating logs, or other documents related to this Agreement, US EPA and the State or their authorized representatives may:

1. Enter and freely move about all property at the Site and off-site areas where work, if any, is being performed or where documents are generated or stored;

2. Conduct such tests as the US EPA or the State RPM deems necessary or appropriate;

3. Use a camera, sound recording device, or other documentary equipment; or

4. Verify any data provided to US EPA or the State by the Army.

The results of any such test, or copies of such photographs, sound recordings, or other products of documentary equipment, or results of such data verification shall be provided to the Army as soon as practicable after its creation or analysis. All parties with access to the Site shall comply with the Health and Safety Plan. Nothing herein shall be interpreted as limiting or affecting any right of entry or inspection authority of US EPA or the State under applicable law.

To the extent that this Agreement requires access to property not owned and controlled by the Army, the Army shall, if necessary, use its best efforts to obtain site access agreements from the present owner(s) of such property. The Army agrees to exercise its authorities pursuant to Section 104(e) of CERCLA when necessary to obtain access from the present owners and/or lessees. With respect to property not owned or controlled by the Army and upon which any monitoring wells or other response actions are to be located, any access agreements obtained by the Army shall provide for written notice to the Army before a conveyance of title, easement, or

other interest in the property is consummated. In the event that property to which the Army has obtained access is subsequently conveyed or leased to a third party, the Army shall use its best efforts to obtain access from the new owner/lessee so that delays or disruptions in work or other response actions are minimized. In the event that agreements for site access are not obtained, the Army shall notify the US EPA.

B. Notifications

All written material under this Agreement shall be delivered via the most expeditious method desirable under the circumstances, and shall be addressed to:

Assistant Secretary of the Army Installations, Logistics, and the Environment
U.S. Environmental Protection Agency
Office of Superfund
State

C. Administrative Record

Pursuant to the delegation of authority under Section 2(e)(2) of Executive Order 12580 and in accordance with the provision of Subpart I of the NCP, the Army shall establish an Administrative Record upon which to base the selection of a remedial action. The Administrative Record shall be made available to the public at or near the site. The Army shall maintain the administrative record for ten years from the date of the termination of this Agreement. After this ten-year period, each Party shall notify the other parties at least forty-five (45) days prior to destruction or disposal of any such documents or records. Upon request, the requested Party shall make available such records or documents or copies of any such records or documents to the requesting Party.

D. Public Participation and Comments

Pursuant to its authority under Executive Order 12580, the Army will develop and implement a Community Relations Plan to provide for public participation and comment in accordance with Sections 113(k) and 117 of CERCLA, Sections 300.415, 300.430, and 300.435 of the NCP, applicable State RCRA statutes and regulations, and NEPA.

E. Permit Acquisition

Pursuant to Section 121(e) of CERCLA, no federal, state, or local permit shall be required for any portion of this remedial action conducted entirely on-site, where such action is selected and carried out in compliance with the requirements of Section 121 of CERCLA. The Army intends to comply with all substantive requirements of all federal, state, or local statutes, ordinances, and properly promulgated rules and regulations in the conduct of this remedial action.

XII. FUNDING AND REIMBURSEMENT

It is the expectation of the Parties to this Agreement that all obligations of the Army arising under this Agreement shall be fully funded. The Army agrees to seek sufficient funding through the DOD budgetary process to fulfill its obligations under this Agreement. Any such payments or obligations of funds by the Army shall be subject to the availability of appropriated funds and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act (31 USC § 1341) nor shall the lack of appropriated funds be construed as a violation of this Agreement. In cases where a payment or obligation of funds would constitute a violation of the Anti-Deficiency Act, the dates established requiring the payment or obligation of such funds shall be appropriately adjusted.

XIII. STIPULATED PENALTIES

In the event that the Army fails to submit a primary document to US EPA pursuant to the appropriate timetable or deadline in accordance with the requirements of this Agreement, or fails to comply with a term or condition of this Agreement which relates to an interim or final remedial action, US EPA may assess a stipulated penalty against the Army. A stipulated penalty may be assessed in an amount not to exceed $5,000 for the first week (or part thereof), and $10,000 for each additional week (or part thereof) for which a failure set forth in this Part occurs.

Upon determining that the Army has failed in a manner set forth above, US EPA shall so notify the Army in writing. If the failure in question is not already subject to dispute resolution at the time such notice is received, the Army shall have fifteen (15) days after receipt of the notice to invoke dispute resolution on the question of whether the failure did in fact occur. The Army shall not be liable for the stipulated penalty assessed by US EPA if the failure is determined, through the dispute resolution process, not to have occurred. No assessment of a stipulated penalty shall be final until the conclusion of dispute resolution procedures related to the assessment of the stipulated penalty.

The annual reports required by CERCLA § 120(e)(5) shall include, with respect to each final assessment of a stipulated penalty against the Army under this Agreement, each of the following:

(a) The facility responsible for the failure;

(b) A statement of the facts and circumstances giving rise to the failure;

(c) A statement of any administrative or other corrective action taken at the relevant facility, or a statement of why such measures were determined to be inappropriate;

(d) A statement of any additional action taken by or at the facility to prevent recurrence of the same type of failure; and

(e) The total dollar amount of the stipulated penalty assessed for the particular failure. Stipulated penalties assessed pursuant to this Part shall be payable to the Hazardous Substances Response Trust Fund only in the manner and to the extent expressly provided for in the Acts authorizing funds for, and appropriations to, the DOD.

In no event shall this Part give rise to a stipulated penalty in excess of the amount set forth in CERCLA § 109.

This Part shall not affect the Army's ability to obtain an extension of a timetable, deadline or schedule pursuant to Part ___ of this Agreement.

Nothing in this Agreement shall be construed to render any officer or employee of the Army personally liable for the payment of any stipulated penalty assessed pursuant to this Part.

XIV. RESERVATION OF RIGHTS AND OTHER CLAIMS

In consideration for the Army's compliance with the provisions of this Agreement, and based on the information known to the Parties on the effective date of this Agreement, the US EPA and the State agree that compliance with this Agreement shall stand in lieu of any administrative, legal and equitable remedies against the Army available to them regarding the currently known release or threatened release of hazardous substances, including hazardous wastes, pollutants, or contaminants at the Site which are the subject to the RI/FS and which will be addressed by the remedial action provided for under this Agreement; except that nothing in this Agreement shall preclude the US EPA or the State from exercising any administrative, legal, and equitable remedies available to them to require additional response actions by the Army in the event that: (1) conditions previously unknown or undetected by US EPA or the State arise or are discovered at the Site; or (2) US EPA or the State receives additional information not previously available concerning the premises which they employed in reaching this Agreement, and the implementation of the requirements of this Agreement are no longer protective of public health and the environment. However, US EPA and the State shall not exercise such remedies until they have made a good faith effort to remediate any such conditions affecting the public health and environment in the course of this Agreement.

Notwithstanding any provision of this Agreement, the State may obtain judicial review of any final decision of the US EPA on selection of the final remedial action, and may invoke its authority under Sections 121(e)(2) and (f). Nothing in this Agreement shall constitute or be construed as a bar or release from any claim, cause of action, or demand in law or equity by or against any person not a Party hereto for any liability such person may have arising out of or relating in any way to this Agreement or the activities undertaken hereunder. US EPA and the State shall not be held as a Parties to any contract entered into by the Army to implement the activities under this Agreement or by virtue of its entering into this Agreement. This Agreement shall not restrict the Parties from taking any legal or response action or asserting any defense for any matter not specifically covered herein.

Nothing contained in this Agreement shall constitute an admission of any liability by the Army for any matters contained herein nor shall anything in this Agreement constitute an admission by the Army with respect to any finding of fact or any legal determination noted herein.

XV. RECOVERY OF EXPENSES

Nothing in this Agreement shall be construed as a restriction or waiver of any rights US EPA, the State, or the Army may have against other potentially responsible parties under CERCLA (including, but not limited to, any rights under Sections 108, 122(h) or 122(j)).

XVI. EXEMPTIONS

The Parties recognize that the President may issue an Executive Order, as needed to protect national security interests, regarding response actions at the Site (or at any other areas therein), pursuant to CERCLA Section 120(j). Such an Executive Order may exempt such area(s) from the requirements of CERCLA for a period of time not to exceed one (1) year after the issuance of the Order. The Army shall obtain access to and perform all actions required by this Agreement within all areas inside the Site, which are not the subject to any such Executive Order issued by the President.

XVII. TERMINATION AND SATISFACTION

When the Army determines that the work governed by this Agreement has been completed in accordance with the requirements sets forth herein, it shall so advise US EPA in writing that this Agreement is terminated. This Agreement shall thereby be deemed satisfied and terminated unless US EPA gives written notice of disagreement, setting forth the nature of its position including a specific description of what work, document, or other responsibility of the Army has not met the requirements of this Agreement, including the data, information, authority, or other basis therefore.

In the event of a dispute regarding the termination and satisfaction of this Agreement, notwithstanding Section X(D), the Administrator of US EPA, shall submit the dispute to the Director of the Office of Management and Budget pursuant to Executive Order 12088, Section 1-602, and Executive Order 12580, Section 10.

XVIII. FIVE-YEAR REVIEW

If a remedy is selected for the Site which results in any hazardous substances, pollutants, or contaminants remaining on the Site, the Army agrees that US EPA shall, consistent with Section 121(c) of CERCLA, and in accordance with this Agreement, review the remedial action no less often than each five years after the initiation of such Remedial Action to assure that human health and the environment are being protected by the Remedial Action implemented. If upon such review it is determined by US EPA or the State that additional action or modification of the Remedial Action is appropriate in accordance with Section 104 or 106 of CERCLA, such additional action or modification of the Remedial Action shall be implemented pursuant to the provisions of this Agreement.

XIX. EFFECTIVE DATE

The effective date of this Agreement shall be the date on which it is published in the Federal Register.

The Parties may amend this Agreement from time to time. A Party may seek such modification by submitting a concise written request to the signatory on behalf of the other Party. The request shall specify the requested modification and the reason the modification is being requested. In the event of agreement of the Parties, the modification will take effect in accordance with its terms.

EXECUTED AND AGREED TO:

(signature block)

Annex E Public Information
Colorado CSEPP Recovery Plan

I. PURPOSE

A. The purpose of this document is to provide a plan for conducting public information operations within the Pueblo Community during emergency responses and other situations in which multiple organizations need to collaborate to provide timely, useful and accurate information to the public and other stakeholders.

B. "It provides information on activation of the Joint Information System, including a rapid-deployment public information assistance team (colloquially referred to as a "JIS Strike Team" by the Pueblo Risk Communications Network), or a JIC that works within the framework of the National Incident Management System (NIMS) Incident Command System (ICS)."The plan is flexible, scalable and can be adapted for use in a diverse range of responses, ranging from a small, single agency, single-hazard response that lasts a few hours to a large, multiple agency, multi-hazards response or recovery operation that lasts for several weeks or months.

C. Also see the Joint Information System / Joint Information Center Standard Operating Procedure

II. SCOPE

An all-hazards Joint Information System serves as an operating philosophy and organizational construct by which all communication (internal and external) is disseminated. An all-hazards Joint Information Center serves as the location representing various organizations/agencies and is staffed with volunteers from local, state, and federal jurisdictions to coordinate the dissemination of emergency public information. It is the role of those volunteers to utilize their agency resources and schools of knowledge to come together and serve to disseminate emergency information to the public. In providing timely, accurate and coordinated information, the JIS / JIC serves to alleviate information gaps and misinformation during the emergency.

III. ASSUMPTIONS

A. Multiple local, state, and federal agencies may potentially become involved in a Pueblo Community emergency. It is understood the Pueblo Community public information professionals operate under a JIS daily. During any elevated activation of a JIS / JIC each organization should use internal public information/affairs plans to include the constant use of a JIS up to and throughout the declaration of an operational JIC.

B. While the JIC is a single location where the informational needs and demands of the public and media can be met, the overriding concept of the JIC recognizes that each individual will continue to bring expertise from his/her own agency, while receiving the benefits derived from coordinated information. Under the JIS / JIC concept, each agency representative has a commitment to share and coordinate information with all other participating agencies prior to its release to the media and public. At no time should any

agency determine or approve information from outside their purview. The JIC is designed only as a coordination and dissemination point; agency information must be approved prior to reaching the JIC. The primary benefit of this concept is that the public receives accurate, timely, and coordinated emergency information. It is essential that the JIS concept determine communications strategies throughout the emergency and activation of the JIC, as these concepts work simultaneously.

IV. JIC FACILITIES

The JIC is located at 101 W. 10t11 Street, Pueblo CO. News briefings, news conferences, and media work areas have been identified.

V. ACTIVATION

A. Pueblo County is geographically situated in a region where floods, wild land fires and heavy snowfalls have the potential to isolate the community and endanger the citizens. Should an emergency affecting Pueblo County occur as a result of these or similar hazards, the Pueblo County Sheriff's Emergency Services Bureau (ESB) will make the initial decision to activate the JIS / JIC.

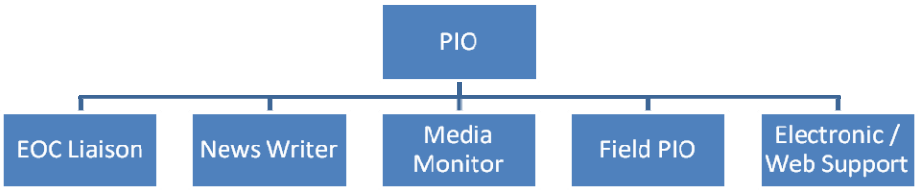
B. In addition to these concerns, the storage of chemical weapons at the U.S. Army Pueblo Chemical Depot, creates the potential for a large scale emergency involving the community. In the event of an emergency involving the chemical weapons stored at U.S. Army Pueblo Chemical Depot (PCD), the PCD PAO or designee will contact the State and County ESB Public Information staff. With concurrence of two of the three jurisdictions (State, County and Depot), the decision to activate the JIS / JIC will be made. The Public Affairs/ Public Information Officers from the DHSEM, ESB and PCD will then initiate their respective JIS / JIC activation procedures.

C. After notification of JIC activation to the Incident Commander (IC), the Operations Center (OC) and the Emergency Operations Center (EOC), announcement of an operational JIC will be communicated via e-mail to local media outlets and appropriate governmental agencies.

VI. JIS-JIC STAFFING LEVELS

Four levels of JIS / JIC operations have been identified. These levels are to be seen as general guidelines rather than strict constructs for JIS / JIC development. There may be instances when JIS / JIC activation may move directly to Level Four or remain at Level One. Although the Stages are numbered chronologically they need not be chronological in implementation. It is the preference, however, that Level Four (JIS Strike Team Activation) remain a significant part of all JIS / JIC activation as it builds the necessary foundation for a successful joint communications capability.

Level 4: **JIS Strike Team**. A 5 person team is activated to support lead agency PIO, at the scene, in the Emergency Operation Center, or virtually. No JIC has been activated. Functional support staffed by members of the Risk Communications Network (RCN).

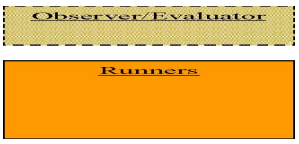


Level 3: **JIC operational with minimal staffing.** JIS Strike Team members transition to become JIC staff. To become operational, the following functions should be staffed.

- ✓ **Lead County PIO**
- ✓ **JIC Coordinator** (operational control)
- ✓ **Gathering & Production Group Lead**
- ✓ **Media Monitoring**
- ✓ **Dissemination Group Lead**
- ✓ **Web / Net Unit** in JIS or JIC
- ✓ **Two Media / Public Phones call takers**
- ✓ **Field Information Group Lead** in JIS or JIC

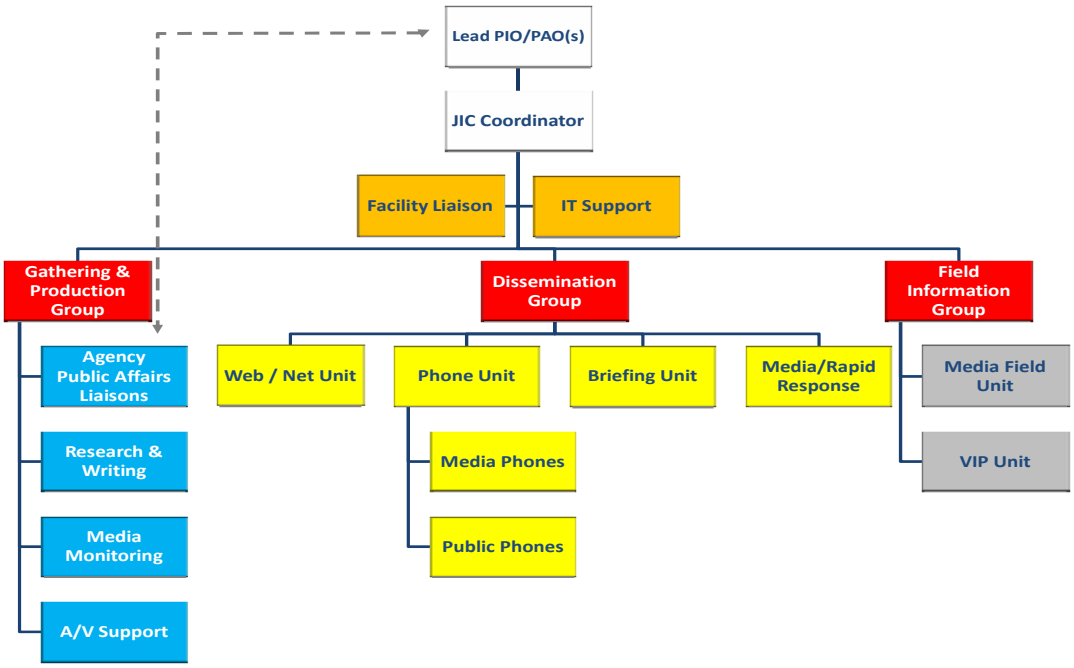
Note in a CSEPP response, staffing should also include:

- ✓ **Depot PAO** in JIS or JIC
- ✓ **State PIO** in JIS or JIC



It is anticipated that participants from many agencies will be integrated into the JIS / JIC staff. The Joint Information Center Coordinator, in consultation with the affected Public Affairs Liaisons, will adjust staffing patterns as the situation develops. JIS / JIC staff may be required to perform additional duties as needed and may assume a role in the JIC that is not as a representative of their agency but a role required to satisfy the needs of public information as a whole.

Level 2: **12-Hour JIC staffing.** All activated Groups and Teams as appropriate are staffed for 12-hour operations. Functions that may be staffed during this level of operation are identified below. JIC operations may expand or contract to suit the situation.



Level 1: **24-hr JIC staffing.** All activated Groups and Teams as appropriate are staffed for 24-hour operations.

VI. CONCEPT OF OPERATIONS

A. JIS / JIC Information Collection, Coordination, and Dissemination

Proper and timely gathering of information is critical. To ensure coordination and proper dissemination of information, participants should follow these guidelines:

1. Each person shall speak for his/her own agency or speak directly from JIS / JIC published materials. Public Affairs Liaisons should gather information from their respective agency and coordinate releasable information with Writers and Gathering and Production Lead, if appropriate, to develop news releases. It is anticipated that each agency represented shall use its own internal approval method prior to releasing information. Unified Public Information under the Incident Command System is the overriding concept for JIC information management during CSEPP Community Emergency JIC activations. Each individual PIO will continue to represent her or his own agency, and at the same time participate in a coordinated public information approach.

2. Any agency represented in the JIC will share independently released information immediately with the JIC to prevent redundancy and to assure the most current information released is available to every member in the JIC. Information released from inside the JIC will be released after coordination with the Dissemination Lead and the JIC Coordinator.

3. Information can be disseminated via news releases, telephone inquiries, news briefings/conferences, or provided via interview. It is our objective to keep news releases short, factual, and to the point. Although not mandatory, it is encouraged that all news releases be on JIC letterhead thereby illustrating a cooperative effort that will discourage the media from repeated individual agency contacts that may hinder command processes.

4. All public information materials will be identified by a time and date title prior to release to allow for easy access to the most recent information. Simultaneous to its distribution, all information will be logged and uploaded to the website status board via Electronic Support Unit.

5. In the event of a U.S. Army Pueblo Chemical Depot emergency, before the JIC is declared operational, news releases concerning depot activities will be prepared and distributed from the depot. Once the JIC is operational, subsequent news releases concerning the depot emergency and Pueblo Community will be coordinated and released via the JIS / JIC.

6. Initial pre-scripted Emergency Alert System (EAS) messages, in English and Spanish, will be sent from the Pueblo County Emergency Services Bureau Emergency Operations Center (EOC).

B. JIS / JIC News Conferences

The JIC Coordinator, Public Affairs Liaisons and Dissemination Lead will schedule news conferences as the situation warrants.

1. A JIS / JIC media advisory with the time and location of the news conference will be issued. Every attempt will be made to ensure adequate notification to media outlets.

2. A spokesperson from each responding agency should be present at the news conference to answer questions. This will also prevent presenters from speaking outside their purview.

3. Before the news conference, presenters will meet briefly to discuss their statements and anticipated questions.

4. A moderator, designated prior to the conference, will give welcoming statements, provide any ground rules for the conference, and introduce the presenters.

5. Each spokesperson may make a statement with updated information from his/her agency, if appropriate.

6. During the conference, any questions to which the answers are not known, or for which the information is not available, will be recorded by the moderator and an answer provided as soon as possible afterward. Follow up answers and information to questions will be provided via email, telephone, or during the next news conference.

7. Presenters may meet after the conference to discuss any follow-up course of action or new responsibilities.

8. News briefings will be recorded by the media monitoring team and may be referred to for areas needing improvement or retained for historical value.

C. JIS / JIC Rumor Control

The JIS / JIC serves as the outlet for public information. In any situation involving the dissemination of information to many people, misinformation and rumors may occur. The call-taker staff will handle and monitor incoming queries, which will assist in rumor control.

1. The JIS / JIC should serve as the primary source of information to the media and public.

2. Media monitoring staff should monitor and record all newspaper, television, radio and internet media coverage. Rumors and misinformation should be recorded and reported immediately to the JIC Coordinator via the appropriate routing form.

3. Call Taker Staff will relay rumors and misinformation to the Dissemination Lead or Lead Call Taker. The Dissemination Lead will inform the JIC Coordinator (and other leads as necessary) of the matter.

4. The JIC Coordinator, Gathering and Production and/or Dissemination Lead(s) will investigate the rumor and decide how to best respond. If appropriate, Public Affairs Liaisons, the EOC or the IC may be consulted to confirm or dispel the information. Response should be timely and can be made with a news release or media briefing. If the misinformation is limited to one media outlet, an interview, personal contact with a reporter, or direct contact with the station itself, is appropriate. These contacts should be documented to ensure accuracy. It is the responsibility of the Media Monitoring team to confirm that the misinformation is retracted.

VII. JIC SECURITY

Access to the JIC Workroom (PIO and Call Taker Room) will be limited to JIC personnel due to space limitations and information sensitivity. Security will have a list of personnel with authorization to enter these areas. The JIC Coordinator or his/her appointee has authority to amend the list.

VIII. JIS / JIC DEACTIVATION

A. The Joint Information Center (JIC) Coordinator, with the concurrence of the participating agencies will decide when to deactivate the JIS / JIC. Deactivation of the JIC does not necessarily mean that the emergency-related JIS will be deactivated at the same time. The JIS / JIC will issue a news release stating that it is no longer operational.

B. Upon deactivation, the JIC Coordinator will:

1. Ensure all equipment and personnel are returned to standby status.

2. Ensure all generated information is collected and retained for future needs.

3. Ensure all electronic communications (websites, blogs and other means) are removed during JIS / JIC deactivation.

4. Update web-blog and social media sites to reflect current status and follow up contacts.

C. Once deactivated, JIC staff will participate in a critique of JIS / JIC operations and submit comments to the JIC Coordinator or appropriate Group Lead. Development and application of the response actions will be addresses by the JIC Coordinator, these may include, but are not limited to;

1. Inoperable equipment

2. Procedural inadequacy

3. Clarity of policies

4. Notification difficulties

5. Other lessons learned

IX. JIS / JIC PLAN DEVELOPMENT AND MAINTENANCE

A. Custodial care of this document lies with Public Information/Affairs Officers from Pueblo County Emergency Services Bureau, Pueblo City-County Health Department the U.S. Army Pueblo Chemical Depot, and the Colorado Division of Homeland Security and Emergency Management.

B. This document shall be reviewed annually, with the lead responsibility for reviews and updates resting with the Pueblo County Sheriff's Office Emergency Services Bureau Public Information Officer.

Annex F Sampling Methodology
Colorado CSEPP Recovery Plan

I. Purpose

The purpose of this Annex is to provide guidance to the Chemical Stockpile Emergency Preparedness Program (CSEPP) communities on how to establish site-specific Recovery Sampling and Analysis Plans (RSAPs). As this guidance uses example and some theoretical information, SPECIFIC DETAILS SHOULD NOT BE CONSTRUED AS ARMY-POSITION / POLICY nor do they take the place or supersedes any RSAP that may be approved by CDPHE pursuant to a clean-up permit or order. A site-specific RSAP must be developed and reviewed by appropriate Army, Federal, State and local representatives and approved by CDPHE, 6 CCR 1007-3, Section 264.1(g)(8)(iii).

II. Application

Specifically, this guidance is presented in the form of a protocol (Section II) that provides the guidance and information necessary to develop and execute an RSAP as required in Department of the Army (DA) Pamphlet (PAM) 50-6. The RSAP itself will ensure that reentry/restoration decisions associated with a Chemical Agent accident/incident (CAI) are determined through appropriate scientifically-based evaluations of public health and the environment. The CSEPP communities can use this protocol as a tool for developing site specific RSAPs. The protocol was written in the outline of an RSAP, however, some key information will need to be filled in by the local CSEPP working groups in order for it to be complete. For purposes of demonstrating how the protocol can be implemented, Section III provides an example of a site-specific RSAP.

III. Background.

In 1988, the CSEPP was established in response to Public Law 99-145 which directed the Department of Defense (DoD) to destroy the stockpile of chemical warfare agents (CWA). The DoD currently stockpiles CWA at eight U.S. Army Installations located throughout the continental United States. With the anticipated increase in CWA activities at the stockpile sites, the CSEPP was started to enhance and prepare local community emergency response units for any CWA accident/incident (CAI) which may occur at these installations. In 1997, CSEPP established the Off Post Monitoring Integrated Product Team (OPMIPT). The OPMIPTs role is to prepare guidance for establishing plans necessary to fulfill CSEPP's mission. One such plan is the RSAP. This plan is to detail the methodologies, analytical/laboratory requirements, and data evaluation approach necessary to allow reentry into CAI areas. In the past, a CAI exercise consisted primarily of the initial response to the release and concluded when the release was contained. Little consideration was given to the after effects of such a release to the surrounding communities and how they would be impacted by CWA contamination. Due to increased awareness resulting from the inception of CSEPP, more emphasis and attention has been placed community preparedness and readiness response to include recovery/reentry activities after a CAI event. The CSEPP community at each of stockpile installations has been tasked to prepare an RSAP specific to their needs/locale. The status of the RSAPs varies at each site. To facilitate the RSAP preparation process, the IPT has tasked the U.S. Army Center for Health Promotion and

Preventive Medicine (USACHPPM) to prepare a protocol from which RSAPs can be developed. The principle behind the development of this protocol was to provide a basis from which RSAPs can be developed based on Army Regulation (AR) 50-6 (references 2 and 3). Currently, the EPA does not specifically regulate CWA nor have they approved any procedures, methods, or cleanup standards specific for CWA, although several states now require CWA wastes to manage as hazardous wastes. The DA has various procedures in place for decontamination and disposal (AR & DA PAM 385-61, references 4 and 5). Currently, the DA Steering Committee for Standards in Emergency Response, Remediation, Restoration, and Demilitarization of Chemical Warfare Material (SCS) is reevaluating existing procedures and refining the guidance to include specific concentration levels for screening various environmental media.

IV. Other Guidance / Reference Sources.

In addition to this protocol, other existing CSEPP guidance on reentry / recovery issues should be referred to when developing an RSAP.

A. Identifying Sample Locations.

1. Selection schemes. Sample locations will be determined using a combination of the three following sampling schemes:

2. A systematic grid approach (search sampling) (reference 12) will be used to determine specific sample locations across the impacted area. Soil samples will be collected at each grid coordinate 100 feet.

3. A statistical approach will be used to determine the number of wipe, water, and air samples that are to be collected from within each active grid (reference 13).

4. A biased sampling approach will be used to collect miscellaneous samples throughout the impacted area to address key populations and/or land areas of concern (as described in Section 8b) that could potentially be exposed (as determined in Section 7) as well as to address specific findings (e.g. dead animals and wilted plants outside of the immediate release area) and unusual areas (e.g. gullies, forests, ponds) that the model cannot account for within the impacted area.

B. Site Selection Process.

1. The area located within the immediate response zone (IRZ) will overlaid with a grid (Figure 1). This can be accomplished using the global imaging system (GIS). Sample maps can be prepared prior to the CAI to allow easy application of an appropriate grid.

2. Implementation of Grid Areas. Based on the deposition models, the grid areas that have been impacted by CWA will require sampling. The deposition area should be completely surrounded by grid vertices which fall outside this area. Grid vertices located within 0.5 miles of the deposition should be sampled to include the areas within the grid acting as a buffer zone. Grids located within the IPZ which require

sampling of any sort are designated as 'active.' From within the active grid areas, air, wipe, water, soil and miscellaneous samples will be collected. It may be necessary to extend sampling activities into other grid areas thereby making them active. If samples collected on the outer fringe of the grid area are positive for CWA, the grid will be expanded outward until active grids fully encompass this 'hot spot.' Rumors or field reports of CWA presence outside the grid area will require review. Based upon review, these may be determined to be coincidental to the CAI. If, however, they are deemed valid, the grid area which has been identified will hence become active until sample results prove otherwise.

3. Grid Zones. Plumes of CWA will initially be a 'compact mass' when released. As the plume moves further from the release point, the CWA will become more evenly distributed covering a much larger area. The zones closer to the release point should be expected to have higher levels of CWA deposition. Chemical warfare agents deposited in the zones furthest from the release point will, for the most part, be more evenly distributed. Hence, sampling efforts closer to the release point will be more intensified. The CWA deposition will occur over a much smaller area and will not be as evenly distributed or dispersed. Identification of the 'hot spots' will be more crucial due the expected higher concentrations of CWA. Zones further away will be sampled less extensively. The CWA deposition will cover a larger area and be more evenly dispersed. The identification of an 'impacted area' is more critical. The IRZ was divided into four zones - A, B, C, and D. The Zone A radius will be 0-0.5 miles (0-805 meters), zone B 0.5-1.5 miles (805-2414 meters), zone C 1.5-3.5 miles (2414-5632 meters), and zone D 3.5-9.5 miles (5632-15288 meters) (Figures 2 and 3). In the event that deposition were predicted outside the IRZ, the Zone D grid system should be extended out until the area has been incorporated into the grid system. The density or number of samples collected will vary within these zones. The closer he zone is to the initial release site, the greater the number of samples or from a statistical standpoint the less room for error. Zone D will encompass the outer fringes of the deposition area where CWA concentrations would be expected to be the lowest.

4. Soils. The number of soil samples that will be collected will be dependent on the zone from which the samples are to be collected. The IRZ having been divided into four zones will be subdivided into triangular grids to identify specific sample points. The distribution of CWA deposited will vary the greatest nearer the initial release point. As one moves away from the release point, CWA will be more evenly deposited over a greater area. Hence, the sampling grids will be smaller nearer the release point. Table 1 lists the grid sizes for each zone. The grid sizes were selected to ensure that the chance of missing CWA is minimized. Plumes will distribute CWA typically in a semielliptical pattern over a large area. The length and width of the plume will vary with the environmental conditions and CAI. Hence, the size of the grid will determine the likelihood of finding various CWA deposition 'hot spots' (reference 12). Table 1 also lists the confidence level for detecting and 'hot spot' with the listed dimensions. 'Hot spots' of smaller dimensions may also be detected with the listed grid sizes. However, the confidence level for finding smaller areas of deposition decreases with their respective size.

Table 1. Sampling Grid Dimensions.

Area	Grid Size (meters)	Deposition Area (meters) [1]	Confidence Level (%) [2]
Zone A	201	301 x 160	90
Zone B	402	602 x 321	90
Zone C	805	1203 x 642	90
Zone D	1609	2406 x 1284	90

1 - Deposition area is defined as an elliptical hot spot with the long axis being 75% and the short axis being 40% of the grid length (reference 12).
2 - Confidence Level, likelihood of sampling efforts to identify deposition area of given size.

5. Wipes. The number of wipe sample locations will be dependent on the number of building structures located within each of the four zones. This number will be based on proportions. This is an estimation of the percentage (proportion) of the population which possess or does not possess some given property (reference 13). In this case, we are concerned whether or not any CWA contamination exists and, if so, how much. The number of sample locations within each of the zones is determined using the proportions calculation. Several variables exist within this equation. The values of the sevariables dictate or translate into acceptable error. The more conservative they are the less chance for the sampling to be inadequate. The variables used are listed in Table 2. For example purposes, 100 structures were assumed per area. Table 2 displays the number of locations that would need to be sampled to properly assess the CWA contamination (if any) with the given assumptions. Equation 1 is used to determine the number of sites to sample:

$$n = [N (Z^2_{1-\forall/2}/)^2)P(1-p)]/[(N-1)+(Z^2_{1-\forall 2}/)^2)P(1-p)] \quad (1)$$

n = sample size (fractions rounded up)
N = Population Size
P = population proportion (assumed worst case = 0.5)
p = sample proportion (assumed worst case = 0.5)
) = amount of error (precision) allowed in p estimate of P; error = /P-p/
$\forall$ = probability allowed that error will exceed) (confidence level)
$Z_{1-\forall/2}$ = standardized normal deviate for an area totaling " at the tails

Table 2. Zone Wipe Sample Locations Determination.

Area	Grid Size (meters)	$\forall$ (%)	) (unitless)	Structures Sampled within Zone(%)
Zone A	201	95	0.10	50
Zone B	402	95	0.20	20
Zone C	805	90	0.20	15
Zone D	1609	80	0.20	10

Based on these values, 50% of the structures will be sampled in zone A, 20% in zone B, 15% in zone C, and 10% in zone D. For sampling purposes, all structures regardless of their size are equal for counting purposes. Two wipes sample should be collected per structure. One sample will be collected outside of the structure, and the second wipe should be collected inside the structure. These should be collected from smooth surfaces which are considered nonporous such as glass, kitchen countertops (tile), and/or exposed metal. Wipe samples collected from porous materials may underestimate CWA surface concentrations due to absorption. Samples collected from materials other than glass or metal may be dissolved by the collection solvent when trying to collect samples. Outside samples should be collected from surfaces that face the direction the plume originated. Indoor samples should be collected from area located near open windows, ventilation ducts, door cracks, etc. Samples nearer the floor and in rooms where children might spend the most time would be ideal. Vehicles located at households and commercial stores should be considered as an extension of the structure, hence a potential sampling point (both indoor and outdoor).

6. Air. The number of air samples to be collected will be dependent on the number buildings and structures, as were the wipes. The sample technique that was used for determining the number of wipe samples should be used to determine the number of air samples that are to be collected using Equation 1. In this case though, the population number (N) to be used is the number of structures that were to be wipe sampled. Table 3 details air sampling requirements based on the wipe sampling requirements listed in Table 2.

Table 3. Air Sample Size Determination.

Area	Grid Size (meters)	∀ (%)	) (unitless)	Structures Wipe Sampled within Zone (%)	Structures Air Sampled within Zone (%)*
Zone A	201	95	0.10	50	25
Zone B	402	95	0.20	20	10
Zone C	805	90	0.20	15	7.5
Zone D	1609	80	0.20	10	5

* - Structures selected for air sampling should be from those which were wipe sampled.

7. Surface Water. Surface water sites that will be sampled will be determined in the same manner as wipes using Equation (1). Based on these numbers and what zones are involved, some percentage will be sampled. The number of samples to be collected at these sites will be dependent on the size of the site and the type of water it is, lentic or lotic. Each grid that a surface water site extends into will count as 1 site. A river passing through 20 grid areas would be 20 sites. For each lotic water site, samples should be collected downstream this distance equaling approximately 5 times the width of the waterway. This will approximate surface water transportation of CWA away from the deposition area to areas potentially outside the impacted grid area. Table 4 provides examples for water sample site determination and location.

Table 4. Surface Water Site Sample Determination.

Examples	# of Grids Found In (Total Sites)	Type of Water	Potential Number of Samples	Width of Waterway (meters)	Distance Downstream Samples are to be Collected from Each Site (meters)
River	20	lotic	20	305	1524
Stream	5	lotic	5	1.5	7.6
Pond	2	lentic	2	N/A	N/A
Marsh	6	lentic	6	N/A	N/A

8. Miscellaneous. The number and types of miscellaneous samples will be dependent on a variety of things (terrain, field reports, sensitive populations, crops, etc.) When and where to take these will be dependent on their proximity to the release and location within the sample grid system.

   (a) Terrain. Unique terrain features such as gullies, ditches, and valleys which may serve as vapor collection points or conduits for plume passage should be sampled. Field reports which indicate the passage or presence of CWA should be reviewed. Reports coming from outside the sample grid should be immediately investigated to determine whether the grid should be active or incorporated into the grid system itself. This is crucial since the computer model is only a prediction.

   (b) Sensitive Populations. Sensitive populations (day care centers, hospitals, schools, etc.) should all be located within and immediately around the IRZ. When these locations are within a grid requiring sampling, these locations should be identified as one of the sample points. Sensitive populations located outside of the activated grids may be considered for additional sampling if located near the buffer zone or further downwind outside of the predicted plume deposition area. In these instances we are purposefully biasing are sampling to those populations with the greatest risk.

   (c) Biological. Biological samples (agricultural products, wildlife, etc.) will be collected as needed. Animals which are dead or behaving out of the ordinary and plants which are discolored or wilted should be considered for sampling. The primary purpose of this type of sampling is to clear areas of CWA deposition identify potential ‘hot spots.’ Deposition areas which are identified as commercial agricultural areas will not be sampled with the intention of clearing the material for resell and human/animal consumption. Scheduled sampling efforts may ultimately satisfy this requirement; however, the site manager will not make this determination. Health and safety officials will evaluate the ‘complete’ release event and make the final determination.

C. Sample Collection.

1. Soil. Soil samples are to collected from within "100 feet of the grid coordinate. Grid points can be found using an Enhanced Precision Lightweight Global Positioning Satellite (GPS) Receiver (EPLGR). This will allow field personnel to identify sample locations to within "5 feet. When selecting the specific sample point, the site should

be free / devoid of superficial matter such as leaves, twigs, or any other organic matter, open bare ground being ideal. Any organic matter in the sample may adversely affect laboratory analyses. Soil samples are collected using a stainless steel scoop or spatula. Using the scoop or spatula, scrape and collect surface soil to a depth of no more than 1 inch. Place the sample directly in the sample container. Collect a sufficient sample such that there is no head space in the jar. Then, tightly close and label the container. Table 5 lists sample collection requirements. Do not collect and mix the sample prior to placing in the sample jar. Mixing may release CWA from the sample skewing sample results to the low side.

Table 5. Sample Collection Requirements.

Media	Container	Volume Required	Preservation	Maximum Holding Time (days)
Soil	4 oz glass bottle with Teflon™ lined cap	2 x 100 g	4 °C	7
Wipe	40 mL glass bottle with Teflon™ lined cap	2 x 1 Wipe [A]	4 °C	7
Water	100 mL amber glass bottle with Teflon™ lined cap	4 x 100 mL	pH < 2, 4 °C	ASAP
Air	Air Bubbler	TBD	4 °C	ASAP
Biological	CWA Impermeable Plastic Bag	N/A	< 0 °C	14

A - Collection solvent: Methanol
References 14, 15, and 16.

2. Wipes. Wipe samples are collected using an acrylic swab soaked with collection solvent (see Table 5). Using tongs, the swab is swiped across a 10 cm by 10 cm area using an up-and-down motion (reference 17). The swab is then swiped across the area using a side-to-side motion and is then placed in a 40-mL vial, sealed, and sent to the laboratory for analysis. The area to be swiped is typically measured using a pre-cut template of the required sample dimensions. Suggested wipe sampling points are listed in Table 6. Wipe samples should not be collected from an area that was sampled previously. If multiple samples are required from one location, these should be collected from adjacent areas.

Table 6. Suggested Wipe Sample Locations

Locations
Automobile Windshields
Window Panes
Kitchen/Bathroom Sinks/Bathtubs
Kitchen/Bathroom Countertops (Tile Only)

3. Air. Air samples will be collected by trained, certified technicians. The methods to be used are prescribed in DA PAM 385-61 (reference 5).

4. Surface Water. There are two types of surface water - lentic (slow moving) and lotic (fast moving). As such, there are two separate collection procedures. Surface water samples may be collected in two forms. Obviously, water can be the sample media collected. The other means for evaluating surface water would be the collection of sediment samples.

   (a) Lentic Sites. Water samples collected at lentic water sites should be collected from shallow water areas located at the edges of the site. The sample container should be lowered into the water to allow water to flow into the sample container with as little disruption to the site as possible. The shallow areas of the site should be less turbulent (convection currents) then the deeper areas of the site and may extend the half life ($t_{1/2}$) of the CWA. With less mixing, CWA and their breakdown components may stratify concentrating in various layers. By sampling at the edge, we should be sampling the most accessible and likely layer.

   (b) Lotic Sites. For lotic sites, water or sediment samples can be collected. Water samples should be collected in the same manner as lentic water samples, at shallow, 'calm' locations along the water. In lieu of water, sediment samples can be collected. These should be collected at the same locations as would a water sample. Using a scoop, sediment from along the edge of the water line should be collected to a depth of no more than 1 inch until sufficient sample has been collected to fill the sample container. Sediment samples should not be mixed prior to filling the sample container.

5. Miscellaneous. Miscellaneous samples will probably fall under one of the above categories for collection purposes. Some exceptions might be snow and biological materials such as leaves, insects, fish, etc. Though these types of samples may be desirable for certain assessment purposes, be aware that analytical capabilities may be particularly limited. In addition - there are no standard criteria/methodologies for assessing the 'significance' of risk to or from of these types of 'special media' and if attainable -these results will generally require a very detailed risk assessment. Such samples should only be taken if deemed absolutely necessary (to answer key public health concerns).

   (a) Biological. Sampling for biological material (e.g. birds, insects, small mammals, leafy plants) will for the most part simply be collecting the specimen and placing it within a sample container. Preferably, samples are collected using tongs or some other grabbing device and placed in a CWA impermeable bag. The bag should be sealed with a minimal amount of headspace and then immediately iced to prevent any further degradation due to biological or microbial activities.

(b) Snow. For some stockpile sites, there is a strong possibility that the CAI may occur when snow is present or being deposited on the surface. In this event, soil and wipe sampling may be rendered unnecessary since the surfaces that would normally be sampled would be covered. Is this event, rather than collect soil or wipe samples, snow samples are to be collected in their place. If the CAI occurs during a snow event with no previous snow deposition, snow cores with a 3 inch diameter should be collected. If the depth of the snow is insufficient, additional cores should be collected until the sample container is full. If snow was present prior to the CAI, collect snow from the top 2 inches (or less) until the sample container is full.

(c) Extreme Climatic Conditions. In the event of a CAI which is caused by an extreme climatic condition such as a tornado, hurricane, rainstorm, etc., sampling activities will initially be limited to Zone A of the grid system. If field reports indicate the presence of CWA outside of Zone A, and depending on the number of field reports, those grids can either be incorporated into the sampling scheme or, if sufficient field reports are confirmed, Zone B become activated. Models for air dispersion and soil deposition will not be able to accurately model these events. The sampling approach for these types of CAI will be a wait and see, with limited sampling unless until otherwise indicated.

(d) Collection Priorities. The priority in which samples are collected and analyzed for CWA presence will be dictated by human health considerations (emergency evacuation), CWA confirmation, and area reentry. Table 7 lists the recommended priority. Initially, the boundaries of release should be confirmed followed by the clearing of emergency evacuation routes. This should then be followed with the sampling of confirmed/suspect field reports of CWA outside the grid boundary. From this point, sampling should be conducted such that the grid collapses upon itself. Identified 'hot spots' will be left for further evaluation upon the completion of the recovery sampling efforts. This sequence of priorities will allow for the most expedient 'clearing' of zones for general reentry.

Table 7. Recommended Sample Collection Priority.

Priority
Deposition Area Perimeter (Outer Grid Vertices)
Emergency Evacuation Routes/Areas (Required samples, all matrices)
Field Reports of CWA Outside Initial Active Area
Wipes
Deposition Area Interior (Inner Grid Points)
Air Samples
Surface Water
Wastes

Note: The priority in which miscellaneous samples will be collected will be dependent on the matrix and location of the site to be sampled. The site manager will prioritize these samples.

(e) Field Quality Assurance/Quality Control (QA/QC) Procedures. Field splits and duplicates should be taken to ensure sampling and laboratory quality

control. These QA/QC samples should be collected in addition to the scheduled samples. The number of collected should equate to approximately 7 percent of the total number samples collected for both splits and duplicates. Field splits and duplicates will not be collected for biological samples such as animal carcasses. These should be further defined within the quality assurance project plan.

(1) Field Splits. Split samples are collected by dividing the sample in half. These halves are then submitted as two distinct analyses. Split samples results can be used to evaluate sample collection technique. Note: Split samples are not collected for wipe samples.
(2) Field Duplicates. Duplicate samples are collected by sampling two locations which are immediately adjacent to one another. Duplicate sample results can be used to evaluate the homogeneity/distribution of contaminants within the given media.

(f) Data Quality Objectives (DQO). The DQO define whether sampling efforts have adequately identified and addressed necessary questions and concerns. In essence, the primary goal of sampling is to determine whether or not CWA/breakdown components are present at a concentration of predetermined significance ('significance' meaning of potential health concern). This 'significance' is based on the statistical parameters and degree of 'confidence' described above. The statistical DQOs should be determined and documented in the RSAP before sampling is implemented. Once QA/QC on both field and laboratory activities have been evaluated, any suspect analytical data will be evaluated on a case by case basis in order to determine whether the data should be qualified, the original samples should be reanalyzed, or, in some cases, the site re-sampled. Once all 'valid' data is identified, the DQOs described in here and in the RSAP must be 'checked' to ensure that enough sample data was still available to achieve the desires confidence level. In essence, this will be a pass/fail excercise. Data from each grid will be evaluated for QA/QC performance and compared against current health-based screening levels (HBESL) (reference 7). Grid areas which are 'positive' (results above HBESLs) or questionable data will consider 'hot spots' remain active and quarantined for further evaluation. Results for grid areas where all analytical data fall below HBESL and and pass QA/QC review will be reviewed areas with sound data will be forwarded to the site manager for review and consideration for deactivation of the grid.

V. Analytical / Laboratory Requirements

A. Analytical Methodologies. Analytical laboratories will not be directed to which method(s) they should use. Rather, detection limit goals for CWA and associated breakdown compounds will be given. Table 8 lists the detection limit goals. These are based on the most conservative HBESLs established for chemical agents (reference 7). Tables 9 and 10 identify the key CWA breakdown components associated with each chemical agent and the associated detection limit goals for those breakdown compounds (also based on information and HBESLs described in reference 19). In the likely event that the selected laboratories do not have methods in place for the various matrices, an evaluation of the

'best' methods available (to include assessing alternative laboratory services) must be performed. To facilitate this process, the U.S. Army is currently compiling a "Compendium of Analytical Methods for Military Chemical Agents and Associated Compounds" (reference 18). When completed, laboratories/activities which need to identify procedures for specific CWA and/or breakdown components can search the compendium in order to preclude developing an already existing method or ascertain whether a method exists as all. In certain cases, it may be identified that these very conservative 'goals' cannot be met by any attainable laboratory support. In other cases, very limited support (only a few samples) may be reasonably analyzed to such levels. This is particularly important to identify before a CAI occurs so that appropriate negotiations and decisions can occur regarding 'acceptable' goals and numbers of samples.

Table 8. Analytical Detection Limits -Goals for Stockpile CWA in Various Environmental Media.

Media	GB	VX	HD	L	Notes
Soil/Sediment/Biologicals (mg/kg)	0.75	0.025	0.15	3.8	
Water (:g/L)	0.36	0.011	$2.1x10^{-5}$	1.8	
Air (mg/m^3)	$1.5x10^{-6}$	$1.5x10^{-6}$	$5x10^{-5}$	0.0015	
Wipe (:g/100cm^2)	0.075	0.0022	$1.7x10^{-4}$	0.37	

References 7 and 19.

Table 9. Selected Key Breakdown Products of Chemical Agents.

Abbreviation	Name	Parent Compound
TDG	Thiodiglycol	Sulfur Mustard
MPA	Methylphosphonic Acid	GB, VX
EMPA	Ethyl Methylphosphonic Acid	VX
IMPA	Isopropyl Methylphosphonic Acid	GB
EA2192	S-(2-diisopropylaminoethyl)methylphosphonic Acid	VX
Lewisite Oxide	2-Chlorovinyl Arsenous Oxide	Lewisite
Arsenic	Inorganic Arsenic	Lewisite

Notes: Compounds selection was determined using reference 20.

Table 10. Analytical Detection Limits Goals for Selected - Breakdown Components of CWA in Various Environmental Media.

Media	TDG	MPA	EMPA	IMPA	EA2192	Lewisite Oxide	Arsenic
Soil/Sediment/ Biological (mg/kg)	50 [A]	500 [A]	50 [A]	200 [A]	0.01[B]	7.7[C]	0.38[D]
Water (:g/L)	10 [A]	100 [A]	10 [A]	50 [A]	0.010 [B]	3.7[C]	190[E]
Air (mg/m^3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wipe (:g/100cm^2)	10 [A]	100 [A]	10 [A]	50 [A]	0.05 [B]	0.75[C]	in development

A - reference 15
B - reference 16
C - reference 7
D - reference 21
E - reference 22

B. Quality Assurance/Quality Control. Quality Assurance and quality control are a means of monitoring and assessing the quality of the data. These assess the ability of the laboratory to perform prescribed methodologies and whether the methods themselves accurately measure contaminant concentrations in the specific environmental media (soil, wipes, air, surface water, biological, snow). By assessing the laboratories and methodologies they use, the data that is generated will be easier to defend if challenged in any way. The laboratories which are contacted in preparation of the sampling plan should include their Quality Assurance Manual (QAM) or Quality Assurance Project Plan (QAPjP) as an appendix in the sampling plan. The QAPjP should detail the Quality Assurance Program within the laboratory. Table 11 lists some of the specific components of the program. Details for their preparation can be found in the EPA Requirements for "Quality Assurance Project Plans" (reference 23). A second/independent laboratory should be used to analyze field duplicate samples at a rate of 5% of the total samples taken. The sample points selected for collection of field duplicates should be determined randomly. The QAPjP will define the QA/QC parameters used for assessing the quality of data generated from a single lab and for comparing data between multiple laboratories for precision, accuracy, representativeness, completeness, and comparability (PARCC). Before used in a site evaluation, analytical data will first be assessed using the PARCCs listed within the QAPjP. This will establish the validity of the data and determine whether or not any of the data is suspect.

Table 11. Components of a Quality Assurance Manual/Program.

QAM/QAPjP Sections

Quality Assurance Policy
Data Quality Objectives for Each Method
Chain-of-Custody (CoC) Procedures
Preventive Maintenance Schedules/Documentation
Data Management (reduction, validation, review, reports)
Instrument Calibration Procedures
Corrective Action Procedures
Performance/System Audits
PARCC - precision, accuracy, representativeness, completeness, & comparability
Quality Control Procedures

VI. Field Activities - Specific Procedures And Responsibilities

A. Schedule. The time lines for execution of a sampling plan will be entirely dependent on the size of the CAI, location of the stockpile site, and the number of field and laboratory personnel utilized. Essentially, sites located in remote areas will require fewer samples to be collected primarily due to the lower population density in those areas. This results in fewer wipe and air samples. More populated areas will require a higher number of wipes and air samples. Ideally, an RSAP for a 'small' release could be implemented and executed in several days, a 'large' release in one week. Again, time lines will vary due to population densities. The bottleneck for any CAI operation will be the laboratory. Environmental samples can only be processed (extracted and analyzed) so fast. This is due to the time required for extracting the CWA/byproducts from the matrix, the time required to analyze the extracts, and to the maintenance and quality control procedures needed to ensure accurate analyses. Hence, sampling activities may be completed long before all analyses are complete. Sample collection prioritization should include prioritization of analyses in order to facilitate the deactivation of grid areas.

B. Responsibilities. The site manager and field technicians will be responsible for placing the samples in the sample containers. The site manager will ensure that the samples are properly labeled, preserved, stored, and shipped to the laboratory. He will also be responsible for ensuring the proper CoC is maintained. The field technician will be responsible for obtaining the samples and decontaminating any non-disposable sampling equipment. The order of sampling will be determined by the site manager as dictated by field reports and sampling priorities as outlined in the Collection Priorities Section.

C. Sample Handling and Management. Field personnel will place all samples for laboratory analyses in containers at the sample site. Labels will be affixed with a sample identification number, date and time sampled, and with the name of the field personnel collecting the sample using an indelible pen. The sample numbering scheme should identify the grid point or grid from which the sample was collected as well as identify the location within the grid from the where the sample was collected (e.g. W0240001, wipe sample number 1 from grid 24). Samples will be placed into coolers filled with ice to maintain a temperature of 4"2 EC. Field personnel will record appropriate field observations in a permanently bound field notebook. All samples will be shipped directly to the laboratories for analyses.

D. Record Keeping. Detailed notes will be maintained by the site manager and field technicians. This will include sample locations (as determined by the EPLGR), sample identification number, date and time collected as well as any other relevant observations (i.e. dead animals, discoloration, residue). An inventory of samples should accompany each cooler of samples delivered to the laboratory with any other appropriate instructions.

E. Chain-of-Custody. Chain-of-Custody starts in the field. Once samples are collected, a detailed paper trail will be established documenting who and when individuals who had possession or controlled access to the samples. This will be maintained from the time of collection until all analyses have been completed. A CoC program is necessary to control access to the samples in order to ensure that samples are not tampered with by persons unknown and that the samples are properly stored and handled during the recovery operation. A CoC standing operating procedure should be written and included in the QAPjP.

F. Resources. In order to implement the RSAP effectively, necessary resources will need to be coordinated ahead of time. The QAPjP will identify the laboratory requirements for the anticipated sample load and expected turn-around-times (TAT). In order to meet the TAT, samples will need to be collected quickly and efficiently. Sample personnel and equipment will need to programed. The time needed to collect one sample will be approximately 15-30 minutes (10-15 minutes for collection: 10-15 minutes for locating and identifying the sample point). Based on the likely scenario and approximate collection time, the number of sample teams and supporting equipment needed can be programmed.

G. Decontamination Procedures. One or more excursion zones should be set up for persons exiting active cells. Entry and exit of active areas should be strictly controlled. At these exit points, a decontamination line should be established, whereby, all persons exiting the active area are thoroughly decontaminated using standard U.S. Army procedures as detailed in the site specific Site Safety and Health Plan. Personnel who collect samples may, as a result of sampling activities, become contaminated themselves. Equipment used to collect samples may also be contaminated due to having been in direct contact with the sample. All sampling equipment and personal protective equipment (PPE) used in the collection of samples should be collected and turned over to the U.S. Army for proper treatment and/or disposal. Personnel should not attempt self decontamination while in the field.

H. Waste Management and Disposal. All materials used to collect samples should be disposable, if possible. This will include both PPE and sample collection equipment. This will minimize the need for decontamination of items and significantly reduce the amount of decontamination solution and rinsate that is generated. Once used, all PPE and disposable sampling equipment will be stored in agent-tight containers. If after all sample analyses have been complete none of the samples indicate the presence of CWA, all wastes generated during collection activities can disposed of in a subtitle D landfill or as general nonhazardous waste Wastes associated with samples which test positive for the

presence of CWA will need to be will be turned over to U.S. Army officials for proper disposal.

VII. Data Evaluation

Once the quality and acceptability of the data have been determined, the data is evaluated against pre-established chemical agent HBESLs (reference 7). Screening levels or Preliminary Remediation Goals (PRGs) have also established for various industrial contaminants to including arsenic, in soil (references 21) and water (reference 22). Through use of the same EPA health risk modeling methodologies and currently DA-Office of the Surgeon General approved toxicological reference doses (reference 24), the DA [has] established HBESLs for chemical agents and key breakdown products of concern. The HBESLs are established for various types of situations such as contamination in a residential area (where children may be exposed) or in an area where only adult workers may be exposed. Ideally, site-specific health risk assessments should be used to determine the actual degree of significant health impacts. However, use of the HBESLs and associated guidance provided in reference 7 will facilitate initial baseline screening determinations regarding action or no-further action (to include detailed assessment, management controls, and /or remedial efforts). The site-evaluation may initially focus on use of the conservative numbers presented in reference 7 but consultation with the USACHPPM, Environmental Health Risk Assessment (HRA) and Risk Communication Program is required (reference 25), commercial 410-671-2953 (DSN 584-2953) to ensure appropriateness of the HRA determinations.

VIII. Other Project Management Requirements

A. Organizational Roles and Coordination. Should changes be necessary to the RSAP once field sampling activities have been initiated a process of change should be identified, particularly identifying who has what decision authorities, etc. For example, Table 7 details a recommended order for prioritizing sample and analyses activities. Events in the field or specific stockpile site characteristics may dictate that the specific samples be processed outside of the given recommendation. On these occasions, the site manager has the sole authority for altering or implementing an alternate prioritization scheme

B. Supplies. At a minimum, the quantity of sampling and PPE supplies maintained should be sufficient to supply a response to the most likely scenarios. If a CAI were to occur which would require additional supplies, these will be obtained from one or more of the other stockpile sites. Some of the items which will be required have expiration dates, these typically being chemicals. Therefore, those items should be inspected and replaced when necessary. Otherwise, expired supplies may adversely impact analytical results possibly resulting in false positive/negatives necessitating that sites be resampled.

C. Site Safety and Health Plan. A Site Safety and Health Plan (SSHP) should be prepared in conjunction with the RSAP. The SSHP will delineate the responsibilities of individuals present during the execution of the RSAP and will also identify all potential hazards (biological, chemical, and physical) associated with the execution of the RSAP. Other items which should be addressed within the SSHP are personnel protective equipment,

decontamination procedures, personnel training, site control measures, and emergency procedures (rendering first aid, who to notify, etc.).

D. Data Interpretation and Release. All analytical data and related conclusions and recommendation will only be released with the approval of the site manager. Based on the information generated from the sampling activities, the site manager will determine when an active grid area can be deactivated. And if necessary, designate which active grids will be quarantined until a more site specific health risk assessment can be completed. Current HBESL will be used to determine which active grids are to be deactivated or quarantined. Areas which are quarantined will be evaluated for the level of reentry which will be allowed.

E. Decision Documentation. A detailed account of information and specific actions and decisions should be maintained throughout the entire recovery operation. This documentation will detail the why's and when's of decisions made. It may be in the format of a continuously updated document or a compilation of notes, memos, etc. This should include how the field reports are handled, how the various active grid areas are deactivated / quarantined, and sample prioritization. This will facilitate any after action review board investigations/inquiries that will follow any CAI event and serve to improve the process in the unlikely event of additional CAIs. The site manager maintains the sole responsibility for preparing the required documentation.

F. Risk Communication. Risk communication will be vital to keeping the public informed of the progress of the recovery efforts as well as in explaining how or why certain approaches were taken with regards to sampling. The Installation Commander will ultimately be responsible for keeping the public informed. This should include discussion on why samples were collected at specific sites and not others, how models work, HBESLs and what they mean, and how active, quarantined, and deactivated grid areas are defined. Specific assistance on training and consultative assistance on Risk Communication can be acquired by contacting the USACHPPM Environmental HRA and Risk Communication Program (commercial 410-671-2953).

IX. Example Site Incident and RSAP Information

A. Introduction. The release scenario detailed in the 'Pine Bluff CSEPP Exercise 1997' (reference 6) will be used as an example in the demonstration of the use of the protocol. In this scenario, 2,232 VX, M55 rockets are consumed in an igloo fire over the course of several hours. All agent is either consumed or released. The plume from the fire/agent release moves south. This scenario has been described as a 'worst of the worst' rather than as a likely scenario.

B. Site Description. In this scenario, the D2PC model (reference 9) indicated the VX plume traveled south of the installation for over of 30 miles. The GapCap model determined that VX deposition occurred over an area extending several miles. The deposition area impacted IRZ zones A and H. The outskirts of the town of Whitehall fall within the deposition area. Located within these areas are upwards of 10,000 persons and several thousand building structures. Houses are typically one-story family homes with small business intermixed at various locations. Within these areas are approximately 20

sensitive populations (schools, hospitals, day care facilities, etc.). There are also approximately 15 water locations within the deposition area. The largest of these measuring about 61 m by 152 m. The entire area is moderately covered with ground vegetation and trees. There is one major stream (Caney Bayou) whose course passes through the deposition area. The Arkansas River and several small lakes (Tulley and Yellow) are located to the east of Pine Bluff Arsenal, but are located outside the modeled deposition area. The lakes are situated on a bluff overlooking the Arkansas River flood plain. There are no major ravines or valleys which would significantly alter or direct wind flow.

C. Sample Summary. Figure 4 depicts the grid areas which would be considered active based on the above scenario. Figures 5-8 demonstrates the process on how the process might evolve as sampling/analysis progressed. Figure 5 shows the activated grids without the plume. As time progresses, outer grids are deactivated effectively beginning the collapse of the 'bubble" (Figure 6). Also displayed are activated grids outside the immediately impacted area. Field reports indicated possible CWA passage warranted activation and hence sampling of these areas. Figure 7 displays further collapse of the bubble. Finally, all activated grid areas have been sampled leaving behind only those areas ('hot spots') which yielded analytical results above the screening guidelines (Figure 8). Table 13 lists the approximate number of wipe, air, water, and miscellaneous samples that are to be collected in each of the four zones. The number of soil samples was determined by roughly overlying the grid with the modeled deposition area. The number of grid vertices within the deposition area and grid vertices located within 805 meters of the deposition area were counted. The number of wipe samples was determined using equation (1) and 1990 census data for IRZ areas A and H. The number of households from these given IRZ areas were determined using an estimate of the total areas of A and H which fell within the deposition and buffer zones. Air samples were determined by simply taking 50 % of the total number of buildings/structures which were to be sampled. Water and sediment sites were determined by reviewing U.S. Geographical Survey (USGS) maps for water features located within the deposition and buffer zones. The number of miscellaneous samples was merely an estimate. A more thorough review where the number of buildings/structures and water locations are identified for each specific grid or zone would generate more accurate numbers.

Table: Approximate Number of Environmental Samples per Zone.

Zone	Soil	Wipes	Air	Water	Miscellaneous
A	61	20	5	3	25 Total for All Zones
B	28	50	13	3	
C	21	102	26	3	
D	24	414	104	3	
Total	134	586	148	12	25

Note: All sensitive populations located within the grid areas would be wipe sampled. Additional wipe samples could be collected at sensitive population locations in non-impacted areas via miscellaneous sampling.

D. Implementation. The individual CSEPP stockpile sites will be responsible for several items within this protocol necessary to transform it into a complete Sampling and Analysis Plan SAP). The estimated time for completion of the RSAP is 9 months. Once completed, each stockpile site should seek approval of the RSAP and QAPjP from the State and Regional EPA offices. The RSAP and QAPjP should be reviewed and updated on a yearly basis in order to reflect changes in the local communities, CWA maintained, analytical methodology advances, and changes with the HBESLs.

1. Scenarios. 'Likely' scenarios will need to be developed to facilitate sample supply acquisition and laboratory selection. Using these scenarios, recovery operation teams will be better prepared for what to expect with regards to sampling activities. The grids which would be activated under the mostly likely scenarios should be reviewed in order to determine the number of soil, wipe, air, and water samples that could be potentially collected. This will require a thorough count of the building/structure and water locations within the likely scenario grid areas. These will provide a basis from which an estimate on the number of samples that will be collected and hence the amount sampling supplies that should be maintained. Estimated time to complete: 1 month.

2. Topography. Distinct geological or surface features which may impact or direct the flow of plumes should be identified (mountain ranges, hills, canyons, forests, cities, etc.). This would include identifying surface water features. These should be restricted to rivers, major streams, reservoirs, lakes, commercial activities, and recreational points. These points need to be identified in order to determine which grid areas contain surface water locations. Geological and surface features are identified as possible miscellaneous sample locations. Estimated time to complete: 1 month.

3. Grid Overlay. Using the recommended grid sizes or site specific preferences as determined by the each CSEPP working group, the IRZ will need to be overlaid with a grid. As stated, the sizes of the grid used will determine the level of confidence for detecting/finding a deposition area of an unknown size. The model used to predict both the plume and deposition may change in the future. Use of these should not affect the use of a grid overlay. Future models may predict plumes and deposition patterns unlike the 'cigar' shaped predictions illustrated here. Rather, pockets of grid areas may be activated based on these more 'accurate' models. Estimated time to complete: 1 month.

4. Buildings. The most recent census should be used to approximate the number of buildings/structures located within the grid areas. Known new construction of special buildings such as schools, day care facilities, and retirement communities should also be included. These numbers will facilitate recovery operations for determining the number of samples to take per grid area, if ever required. These will also to serve to give a better estimate of the amount of sampling supplies required to have on hand and what capabilities the laboratory will need to maintain. Estimated time to complete: 2 months.

5. Laboratory. The laboratories which will be conducting the analyses will need to be determined. The selection of a laboratory should be dependent on their being able to handle the specific samples loads associated with the 'likely scenarios.' It will also be dependent on their ability to perform the necessary methodologies associated with the matrices anticipated and the detection limits goals. Estimated time to complete: 5 months.

6. Quality Assurance Project Plan. The laboratories which are selected in preparation of a CAI should be responsible for the preparation of the QAPjP. The contents of the QAPjP will pertain primarily to laboratory operations and should be prepared in accordance with EPA guidelines. Hence, they will be most familiar with their own operations and procedures. Estimated time to complete: 9 months.

7. Supplies. Sampling supplies will need to be stockpiled in preparation for a CAI. The quantity kept on hand should be sufficient for use with the likely scenarios. In the event that additional supplies are needed in a CAI crisis, supplies should be obtained from one or more of the other stockpile sites. Some of the items which will be required have limited shelf lives and/or may deteriorate over time. Hence, these items should be replaced at frequencies such that these items usable at all times. Estimated time to complete: 5 months.

Annex G: Technical Contacts
Colorado CSEPP Recovery Plan

Telephone numbers and websites for selected federal government and national private organizations are listed below.

Organization	**Contact Information**
Agency for Toxic Substances and Disease Registry (ATSDR)	Information (888) 422-8737 or (404) 498-0110 Emergency: (404) 498-0120 http://www.atsdr.cdc.gov/
Centers for Disease Control and Prevention (CDC)	Phone: ((770) 488-7100 http://www.cdc.gov
– National Center for Environmental Health	Phone: (770) 488-7100 http://www.cdc.gov/nceh/
– National Institute for Occupational Safety and Health	Phone: (800) 356-4674 http://www.cdc.gov/niosh/homepage.html
– On-Scene Coordinator	NRC: (800) 424-8802 request Region VIII EPA OSC Duty Officer contact PCD regarding technical assistance. 303-312-6510
– Environmental Protection Agency (EPA)	RCRA/Superfund/EPCRA information center: (800) 424-9346 or (703) 412-9810 http://www.epa.gov
– Chemical Emergency Preparedness and Prevention Office	http://www.epa.gov/ceppo/
National Institute for Chemical Studies	(304) 346-6264 http://www.nicsinfo.org/
National Fire Protection Association	(617) 770-3000 http://www.nfpa.org
National Response Center (spill reporting)	Emergency hotline: (800) 424 8802 http://www.nrc.uscg.mil/index.htm
Occupational Safety and Health Administration	(800) 321-OSHA (6742) http://www.osha-slc.gov/index.html

Annex H Acronyms
Colorado CSEPP Recovery Plan

ANL	Argonne National Laboratory
AR	Army Regulation
ARC	American Red Cross
ATSDR	Agency for Toxic Substances and Disease Registry (of HHS)
CAI	Chemical Accident or Incident
CAIRA	Chemical Accident or Incident Response and Assistance
CAM	Chemical Agent Monitor
CCPHD	City-County of Pueblo Health Department
CDA	Colorado Department of Agriculture
CDC	Centers for Disease Control and Prevention
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CFR	Code of Federal Regulations
CHWA	Colorado Hazardous Waste Act
CHWR	Colorado Hazardous Waste Regulations
CMA	Chemical Materials Agency
COC	chain-of-custody
COVOAD	Colorado Voluntary Organizations Active in Disaster
CRS	Colorado Revised Statutes
CSDP	Chemical Stockpile Disposal Program
CSEPP	Chemical Stockpile Emergency Preparedness Program
CWA	Chemical Warfare Agent
D2PC	An Army computer dispersion model for hazard estimation
DA	U.S. Department of the Army
DAC	Disaster Assistance Center
DA Pam	U.S. Department of the Army Pamphlet
DHSEM	Division of Homeland Security and Emergency Management
DERP	Defense Environmental Restoration Program
DHHS	U.S. Department of Health and Human Services
DHS	U.S. Department of Homeland Security
DMA	Disaster Mitigation Act of 2000
DODI	U.S. Department of Defense Instruction
DSMOA	Defense-State Memorandum of Agreement
EAS	Emergency Alert System
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
EMT	Emergency Medical Team
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act

EPZ Emergency Planning Zone

FDA U.S. Food and Drug Administration
FEMA Federal Emergency Management Agency
FR Federal Register

GPL General Population Limit

H Sulfur Mustard (blister agent)
HD Distilled Sulfur Mustard (blister agent)
HMWMD Hazardous Materials and Waste Management Division
HT Mustard-T Mixture (a blister agent)

IC Incident Commander
IC Installation Commander
ICS Incident Command System
IDLH Immediately Dangerous to Life and Health
IPT Integrated Process Team
IRP Installation Restoration Program
IRZ Immediate Response Zone

JIC Joint Information Center
JIS Joint Information System

L Lewisite (blister agent)

MCA Military Claims Act
MCE Maximum Credible Event
MINICAMs Miniature Chemical Agent Monitors
MOA Memorandum of Agreement
MOU Memorandum of Understanding

NCP National Contingency Plan
NEPA National Environmental Policy Act
NIMS National Incident Management System
NIOSH National Institute of Occupational Safety and Health
NRC National Response Center
NRF National Response Framework
NRT National Response Team

OC Operations Center
OSC On-Scene Coordinator
OSC/RPM On-Scene Coordinator/Remedial Project Manager
OSHA U.S. Occupational Safety and Health Administration

PAD Protective Action Decision
PAPR Powered Air-Purifying Respirator
PAR Protective Action Recommendation

PCA Personnel Claims Act
PCAPP Pueblo Chemical Agent Destruction Pilot Plant
PCD Pueblo Chemical Depot
PIO Public Information Officer
PL Public Law
PMCD Program Manager Chemical Demilitarization
POC Point Of Contact
PPE Personal Protective Equipment
PRG Preliminary Remediation Goal

QA/QC Quality Assurance / Quality Control

RBC Risk-Based Concentration
RCRA Resource Conservation and Recovery Act
RDTE Research, Development, Testing and Evaluation
RfD Reference Dose
RI/FS Remedial Investigation and Feasibility Study
ROD Record of Decision
RPM Remedial Project Manager
RSAP Recovery Sampling and Analysis Plan
RTAP Real-Time Analytical Platform

SCBA Self-Contained Breathing Apparatus
SSL Soil Screening Level
STEL Short-Term Excursion Level

TEU Technical Escort Unit

ug Micrograms
USACE U.S. Army Corps of Engineers
USACHPPM U.S. Army Center for Health Promotion and Preventive Medicine
USARCS U.S. Army Claims Service
USC U.S. Code
US EPA U.S. Environmental Protection Agency

VX Nerve Agent

WAP Waste Analysis Plan
WPL Worker Population Limit

1% lethality dosage
Maximum dosage at which a healthy adult exposed has a 1% chance of dying.
See also: dosage, no deaths dosage, no effects dosage

Absorption
The penetration of a substance into or through another substance or medium. The uptake and entry of a substance through intact skin, eyes, or linings of the body (i.e., ingestion or once the substance has entered the lungs). **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional).
Glossary of Terms for Chemical Agents and Chemical Defense Equipment. USACHPPM, 1994.
See also: adsorption

Access
Close physical proximity to a chemical agent, container, or munition under circumstances that could provide an opportunity to acquire, release, tamper with, damage, or come in direct contact with the chemical agent. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Access control
All activities accomplished for the purpose of controlling entry of persons into a restricted area (i.e., preventing the public from entering an accident site, sheltered or evacuated areas and permitting emergency workers with essential missions to enter the area). **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

The prevention of unauthorized entry into a specific area by using road barriers and traffic control. The access-controlled area may be established to control and monitor a restricted area that may have undergone agent contamination. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: access

Access control point
A location staffed to restrict the entry of unauthorized personnel into a risk area. Access control is normally performed just outside of the risk area. It involves the deployment of vehicles, barricades, or other measures to deny access to a particular area. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: access, traffic control point

Accident assessment
The evaluation of the nature, severity, and impact of an accident. In CSEPP, the Army will be primarily responsible for accident assessment. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: preliminary assessment

Accountability
The obligation to keep accurate records of property, documents, or funds. Accountability is concerned primarily with records and does not necessarily imply actual possession.

See also: custody

Action level
A concentration designated in Title 29, Code of Federal Regulations, Part 1910 (29 CFR 1910) for a specific substance, calculated as an 8-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance. [Note: For many substances the action level is one-half the permissible exposure limit (PEL).] **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: permissible exposure limit, short-term public emergency guidance level

Action log
A record of actions taken by an agency during an emergency response.

Activation
A process by which a facility is brought up to emergency mode from a normal mode of operation. Activation is complete when the facility is usable for emergency response operations. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Activity
A related set of chemical agent operations performed on-post. Information on the activity is expected to be transferred periodically to off-post agencies in a work plan. For example, the operation of maintenance could include activities such as load, transport, and inspect.
See also: daily work plan

Adsorption
The adhesion of a substance to the surface of another solid or liquid (not to be confused with absorption). **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: absorption

Adverse effect
A biochemical change, functional impairment, or pathological lesion that impairs performance and reduces the ability of the organism to respond to additional challenges. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Adverse effect level (AEL)
An exposure level at which there are statistically or biologically significant increases in frequency or severity of deleterious effects between the exposed population and its appropriate control group. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: adverse effect

Aerosol
Airborne solid or liquid substances classified as dusts, fumes, smokes, mists, and fogs according to their physical nature, particle size, and method of generation. Particle size may vary from 100 micrometers (m) to 0.01 m in diameter. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: liquid droplets, vapor

Agent area
A physical location where entry and exit are restricted and controlled; where agents are manufactured, processed, packaged, repackaged, demilitarized, released, handled, stored, used, or disposed of. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: restricted area or zone

Agent operating area
That portion of the agent area where workers are actively conducting agent operations. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: agent area

Airborne exposure limits (AEL)
Allowable concentrations in the air for occupational and general population exposures. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: ceiling limit, permissible exposure limit, threshold limit value

Alert
Stimulation of one or more of the senses, usually those of hearing and/or sight. **Source:** Jacobs Engineering Group. *Emergency Response Concept Plan for the Chemical Stockpile Disposal Program*. Jacobs Engineering Group, 1987.
See also: notification

Alerting of personnel
Personnel are notified through transmission of a signal or message via telephone, radio, or other means of a possible chemical accident or incident that requires that they report or may have to report for emergency duty. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: alert

Antidote
A remedy to counteract the effects of agent. The Mark I Nerve Agent Antidote Kit (NAAK) contains an injectable drug to counteract the effects of nerve agent exposure. Injections may be repeated at 5- to 20-minute intervals until three injections are given without the advice of a physician. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Any substance or other agent that inhibits or counteracts the effects of a poison. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: chemical-unique materials

Applicable requirements (from the National Contingency Plan)
Those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CAI site.

Army protective action recommendation
Protective action recommendation provided by the Army to an organization legally responsible for making a protective action decision. A PAR associated with the current work plan is expected to be provided by the chemical stockpile installation to the off-post emergency management organizations. A PAR is also expected to be provided by the chemical stockpile installation during a response to a chemical accident or incident.
See also: protective action decision-making, protective action recommendation

Atmospheric stability (low level)
This is a relative classification of the mixing of the air near the surface. This mixing has been measured as a standard deviation of wind direction changes or, in a more direct way, as the difference in air temperature at two reference heights (temperature gradient between 1/2 and 4 meters). Low stability is associated with smaller downwind hazard distances. **Source:** Whitacre, C. Glenvil, et. al. *Personal Computer Program for Chemical Hazard Prediction (D2PC)*. Chemical Research, Development and Engineering Center, 1987.
See also: Pasquill stability

Augmentation force
Additional personnel (or units) organized, trained, armed, equipped, and capable of assisting initial forces as required.

Backup communications system
The communications system used when the primary system is incapable of handling traffic or is inoperative. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: communications system, primary communications system

Baseline
The original plan or design, plus or minus changes made as a result of changes in scope. It is the standard against which performance is judged.

Blister agent
A chemical (such as sulfur mustard) that produces local irritation and damage to the skin and mucous membranes that progresses in severity to fluid-filled blisters on skin. This chemical can cause damage by exposure to liquid or vapor inhalation (IH). It can also produce damage to the respiratory tract. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: nerve agent, vesicant agent

Buddy-aid
For nerve agent, the administration of a chemical agent antidote to a person exhibiting symptoms of severe nerve agent poisoning when that person is unable to administer self-aid. For all agents, the removal of gross contamination from a person, when they are unable to remove the agent themselves.
See also: antidote, decontamination, self-aid

Buffer zone
As used by the Federal Emergency Management Agency (FEMA) and the US Environmental Protection Agency (USEPA), an area adjacent to a restricted zone which residents may return to, but where protective measures are recommended to reduce dose or exposure. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Casualty
Any person who is lost to the organization by reason of having been declared dead, wounded, injured, diseased, interned, captured, retained, missing, missing in action, beleaguered, besieged, or detained. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Ceiling limit
An airborne concentration of a substance that should not be exceeded. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: airborne exposure limit, permissible exposure limit, threshold limit value

Ceiling value
Normally refers to the maximum exposure concentration at any time, for any duration. Practically, it may be an average value over the minimum time required to detect the specified concentration. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Certifying official
For military and Department of the Army (DA) civilian personnel, the immediate commander (or, if civil service, the director) who is responsible for the operation or security, or both, of chemical weapons or materiel. If the commander or director is a colonel or a GM/GS-15, or above, he or she may delegate subordinates to act as organization-certifying officials. Such designees should be supervisors who can feasibly maintain sufficient contact to continually evaluate personnel. For Army contractor personnel, the Army official so designated in the contract is the certifying official. The certifying official validates that personnel considered for assignment to chemical surety duties meet the qualification requirements of the Chemical Personnel Reliability Program. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: chemical surety, personnel reliability program

ChE50
The dosage producing 50 percent cholinesterase (ChE) inhibition in the given population. (Note that the ChE50 is not a dosage that produces this effect in 50 percent of the given population.) **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: dosage, cholinesterase

Chemical accident/incident (CAI)
Chemical events involving chemical surety materiel. A chemical accident refers to a chemical event resulting from non-deliberate acts where safety is of primary concern. A chemical incident refers to a chemical event resulting from deliberate acts (terrorism or criminal), where security is of concern. **Source:** Department of the Army.

Chemical Accident/Incident Response and Assistance (CAIRA) Plan
A federal plan that defines the federal response at an Army installation which is the emergency response to and recovery from a chemical event. This plan must be coordinated carefully with local and state plans. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Chemical agent
A chemical substance intended for use in military operations to kill, seriously injure, or incapacitate people through its physiological effects. Included are blood, nerve, choking, blister, and incapacitating

agents. Excluded are riot control agents, chemical herbicides, and smoke and flame materials. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Chemical agent casualty
A person who has been affected sufficiently by a chemical agent to prevent or seriously degrade the ability to function normally. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

An individual who has been affected sufficiently by a chemical agent to prevent or seriously degrade his or her ability to carry out the mission. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Chemical agent monitor (CAM)
This item is used to detect chemical agent vapors and provide a readout of the relative concentration of the vapor present. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional).
Glossary of Terms for Chemical Agents and Chemical Defense Equipment. USACHPPM, 1994.

Chemical event
A term that applies to the following: a. Chemical agent leaks of munitions in the chemical agent stockpile. b. Discovery of an actual or suspected chemical agent munition or container that may require emergency transportation and/or disposal. c. Any release of chemical agent to the environment outside of closed systems, facilities, or devices greater than established US Army Surgeon General 8-hour time weighted average Airborne Exposure Limits, or release resulting in personnel exhibiting clinical signs or symptoms of chemical agent exposure. d. Any exposure or release of agent that does not exceed established US Army Surgeon General Airborne Exposure Limits, but nonetheless is receiving media attention. e. Any deliberate release of chemical agent resulting from a terrorist or criminal act. f. Loss of chemical surety materiel (other than deliberate destruction by approved, authorized laboratory and demilitarization processes, including training expenditures).

Chemical event emergency notification system
A joint (depot/off-post) system of emergency notification of chemical events for off-post response. If a release of chemical agents happens, immediate action must be taken to notify and protect personnel in the predicted hazard area. The criteria to make notification will be based on predicted dosage and distances. The predicted downwind distance of the chemical agent no effect dosage will be the specific criteria used. The system consists of a minimum of three surety emergency levels and one nonsurety event level. For emergency response purposes these levels will be identified as nonsurety emergency, limited area emergency, post only emergency, and community emergency.
See also: chemical event notification level, notification, protective action decision-making

Chemical event notification level
One of four levels used to communicate the extent of a chemical accident or incident from on-post to off-post authorities. The four levels are: non-surety emergency, limited area emergency, post only emergency, and community emergency.

Chemical Hazard Warning System (CHAWS)
An electronic system for retrieving meteorological data from remote sensors.
See also: Handar, meteorological tower

Chemical limited area or limited area

The area immediately surrounding one or more exclusion areas. Normally, the area between the boundaries of the exclusion areas and the perimeter boundary. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Chemical operation
A specific action performed on the chemical stockpile. Each operation has an associated set of accidents or incidents that are considered feasible. Several operations constitute one chemical activity. A chemical operation can be described by the following characteristics (this is not an exhaustive list): name of agent, munition, and quantity of agent/munitions involved. Specific instances of chemical operations may include information on start/end times, location of operation, number of workers involved, and related accidents or incidents.
See also: activity, daily work plan

Chemical stockpile
Unitary chemical weapons stored by the US Army at eight storage sites in the continental US and at Johnston Atoll in the Pacific Ocean.

Chemical Stockpile Disposal Program (CSDP)
The congressionally mandated program that requires the Army to dispose of all its unitary chemical agents. The preferred mode of disposition is on-post incineration. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Chemical Stockpile Emergency Preparedness Program (CSEPP)
A joint DA/FEMA program to oversee and assist in the development of adequate emergency response plans and capabilities for all jurisdictions that might be affected by a chemical release associated with CSDP activities. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Chemical surety
Those controls, procedures, and actions that contribute to the safety, security, and reliability of chemical agents and their associated weapon systems throughout their life cycle without degrading operational performance.

Chemical surety materiel
Chemical agents and their associated weapons systems, or storage and shipping containers that are either adopted or being considered for military use.

All lethal and incapacitating chemical agents and their related weapon systems, including binary munitions and their critical components, that are either adopted or considered for military use. Excluded are riot control agents, defoliants, incendiaries, smoke, and flame. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Chemical-unique materials
Those specific materials and equipment which would be required primarily in response to a chemical accident or incident, such as antidotes to chemical agents and decontamination chemicals.
Source: Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: decontamination

Cholinesterase (ChE)
An enzyme that catalyzes the hydrolysis of acetocholine to choline (a vitamin) and acetic acid. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Command and control
Management of emergency functions through leadership and use of authority. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review,Change 1*. Argonne National Laboratory, 1994.

Communication system
The assemblage of personnel and equipment, including, but not limited to, radio, telephone, and facsimile communication machines. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Community emergency
Events are likely to occur or have occurred that involve agent release with chemical effects beyond the installation boundary. This level will be declared when the predicted chemical agent no effects dosage extends beyond the installation boundary.
See also: chemical event notification level, limited area emergency, non-surety emergency, post only emergency

Comprehensive Cooperative Agreement (CCA)
An agreement whereby FEMA provides funds and technical assistance; in return, the State accomplishes mutually negotiated and agreed-upon work objectives. The CCA is the primary mechanism for delivering FEMA-supported resources to States. **Source:** Federal Emergency Management Agency. *A Federal Emergency Management Agency Guide to the Comprehensive Cooperation Agreement*. FEMA, 1991.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
A law that deals with hazardous substance releases into the environment and the cleanup of hazardous waste sites. This act was amended by SARA in 1986. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Computer-Aided Management of Emergency Operations (CAMEO)
A public-domain decision support software system developed by the National Oceanic and Atmospheric Administration (NOAA) specifically for use by fire departments. CAMEO has telecommunications and air diffusion modeling capabilities. It also contains Material Safety Data Sheets for 2629 substances. **Source:** Feldman, D. and Dobson, J. *Decision Making Technical Support for the US Army's Chemical Stockpile Disposal Program: Enhancing Command, Control, and Computer Operations at Aberdeen Proving Ground and Pine Bluff Arsenal*. Oak Ridge National Laboratory, 1990.

Concentration
This is the quantity of a vapor or aerosol suspended in a volume of air. **Source:** Whitacre, C. Glenvil, et. al. *Personal Computer Program for Chemical Hazard Prediction (D2PC)*. Chemical Research, Development and Engineering Center, 1987.
See also: dosage, dose

Concept of operations
Describes the system of personnel, facilities, and communications through which jurisdictions or installations are able to plan, manage, and exercise to meet emergency management goals. It lists the major players involved, the relationship of the players to each other, and the responsibilities assigned to

each player under each emergency management phase. It is important to specify whether the coordination of various players is through direct control by a specific agency, through Mutual Aid Agreements, or through legislative or administrative rules. The concept of operations should include a broad concept of how operations will be managed, resourced, and conducted. For example, the Army's system is organized along the principles of centralized control and decentralized execution.

Congregate care facility
A facility for providing emergency lodging and care for people made temporarily homeless by an emergency. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Contaminated persons
Persons who have chemical agent on themselves or their clothing. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Contamination
Any deposit, adsorption, or absorption of radioactive, biological, or chemical substances on and by structures, areas, personnel, objects, soil, and water. Food and/or water made unfit for human or animal consumption by the presence of radioactive, biological, or chemical substances. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Coordination
Active involvement of staff and response agencies in decision-making to integrate available resources and implement the CSEPP response plans. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

CSEPP Memorandum of Understanding
The written agreement (August 1988) whereby the Army and Federal Emergency Management Agency have agreed to collaborate on the emergency preparedness aspects of the Chemical Stockpile Disposal Program. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: memorandum of understanding

CSEPP Organization
Army, state, county, or local agencies directly responsible for protecting life and property from the effects of a chemical accident or incident involving the US stockpile of unitary chemical weapons.

CSEPP site
The jurisdictions comprising an Army chemical stockpile installation where chemical stockpile munitions are stored, the surrounding counties and cities within the immediate response and protective action zones, and any states which include all or part of the emergency planning zones.

CSEPP site personnel
Emergency management and other personnel involved in planning for and response to chemical accidents or incidents at a CSEPP site.

Custody

Responsibility for the control, transfer, and movement of, and access to, chemical surety materiel. Custody may or may not include accountability.
See also: accountability

Daily work plan
A list of planned activities dealing with chemical weapons. These activities will be carried out by the Army chemical stockpile installation or chemical demilitarization facility. Information contained in the daily work plan is expected to include: description of the activity, agent and munitions involved, number of persons in the work team, and the start and stop time.

Deadly force
That force a person uses with the purpose of causing, or which the person knows, or should know, will create a substantial risk of causing death or serious bodily harm. .

Decision matrix
A device designed to organize protective action strategies using such factors as release characteristics, meteorological conditions, population characteristics, and affected geographic areas. **Source:** Oak Ridge National Laboratory. *Functional Requirements for the Chemical Stockpile Emergency Preparedness Program Automated Emergency Management Information System*. ORNL, 1992.
See also: protective action, scenario table

Decontamination
The process of decreasing the amount of chemical agent on any person, object, or area by absorbing, neutralizing, destroying, ventilating, or removing chemical agents.

Decreasing the amount of chemical agent on any person, object, or area by absorbing, neutralizing, destroying, ventilating, or moving chemical agents. Decontamination procedures are critical during:
a) Response phase, to eliminate direct and immediate threats to human life.
b) Recovery phase, to eliminate indirect and less immediate threats to human life (such as cross-contamination). **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: contamination

Demilitarization
The mutilation, destruction, or neutralization of chemical surety materiel, rendering it harmless and ineffectual for military purposes.

Dermal exposure
Exposure to or by absorption through the skin. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: percutaneous exposure

Detection
Discovery of the presence of a chemical agent. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: monitoring, sampling

Detection limit
Analytical capability based on the amount of the sample and the sensitivity of the analytical method. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Dilute solutions
Chemical agents that have been reduced in strength (less than neat) by admixture (dilution).
See also: RDTE dilute solution

Disabled persons
Individuals who, due to a physical or mental impairment, may require assistance with protective actions. For example, residents who are blind, non-ambulatory, frail, or dependent on life-support systems may require assistance from others (and special equipment) in order to evacuate. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: special populations

Disaster
An occurrence of a severity and magnitude that normally results in deaths, injuries, and property damage and that cannot be managed through the routine procedures and resources of government. It usually develops suddenly and unexpectedly and requires immediate, coordinated, and effective response by multiple government and private sector organizations to meet human needs and speed recovery.
Source: Federal Emergency Management Agency. *Objectives for Local Emergency Management*. FEMA Civil Preparedness Guide 1-8, 1984.
See also: emergency

Discrete receptor
A location of specific interest for dispersion modeling.

Dosage
Dosage is the integration of concentration in mg/m3 and time in minutes, also referred to as Ct.
This is a mathematical concept that makes a useful exposure index to vapors and small aerosols that can be absorbed by inhalation. When the dosage is multiplied by a breathing rate and retention efficiency, the result is an inhaled dose. **Source:** Whitacre, C. Glenvil, et. al. *Personal Computer Program for Chemical Hazard Prediction (D2PC)*. Chemical Research, Development and Engineering Center, 1987.
The amount of substance administered (or received) per body weight. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: dose, mg-min/m3, concentration, time-weighted average

Dose
Dose is the quantity of a substance ingested into the body or placed on the body surface or clothing.
Source: Whitacre, C. Glenvil, et. al. *Personal Computer Program for Chemical Hazard Prediction (D2PC)*. Chemical Research, Development and Engineering Center, 1987.

The amount of agent or energy that is taken into or absorbed by the body; the amount of substance, radiation, or energy absorbed in a unit volume, an organ, or an individual. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: dosage, percutaneous exposure

Dry deposition
The process of removal of chemicals from the atmosphere by the deposition of chemicals on the ground, vegetation, or other surfaces. In essence, the particle or gas molecule hits the surface and sticks for a time period.

Deposition onto surfaces by settling out of particles, as opposed to droplets (liquid); also by absorption from the vapor phase. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: wet deposition

Emergency
A disaster occurrence or a situation which seriously threatens loss of life and damage to property. It usually develops suddenly and unexpectedly and demands immediate, coordinated, and effective response by government and private sector organizations to protect lives and limit damage to property. **Source:** Federal Emergency Management Agency. *Objectives for Local Emergency Management,* Civil Preparedness Guide 1-5, FEMA, 1984.
See also: disaster

Emergency Alert System (EAS)
A proposed replacement for the emergency broadcast system, which will include more means of communication, improved technology, and streamlined procedures. **Source:** Emergency Communications Administration, Federal Communications Commission. *Report and Further Notice of Proposed Rule Making: Amendment of Part 73, Subpart G of the Commission's Rules Regarding the Emergency Broadcast System, FCC 94-288*. Federal Communications Commission, 1994.
See also: alert, Emergency Broadcast System

Emergency Broadcast System (EBS)
A federally established network of commercial radio stations that voluntarily provide official emergency instructions or directions to the public during an emergency. Priorities for EBS activation and use are: (1) federal government, (2) local government, and (3) state government. For CSEPP the EBS will provide supplementary alert and notification for the IRZ. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: alert, Emergency Alert System

Emergency disposal
Immediate transportation and disposal of chemical agents or munitions when the senior explosive ordnance disposal person determines the health or safety of any person is clearly endangered. Emergency disposal operations may be conducted free of the prior approval restrictions imposed by Public Laws 91-120, 91-121, 91-441, and AR 50-6.

Emergency exposure guidance level (EEGL)
A concentration of substance in air (as a gas, vapor, or aerosol) that will permit continued performance of specific tasks during rare emergency conditions, lasting for periods of 1 to 24 hours. This should not be used for planned exposures because EEGLs are neither safe nor hygienic. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Emergency facility
Any building, center, room, or set of rooms or mobile units that have been designed and equipped to support emergency operations (e.g., Emergency Operating Center (EOC)). **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: facility, special facility

Emergency information

Material designed to improve knowledge or understanding of an emergency. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Emergency instructions
Instructions for protective actions that should be taken in an emergency. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: notification, protective action decision

Emergency Management Information System (EMIS)
A software system designed for on-post use in the CSEPP. The EMIS was developed by Oak Ridge National Laboratory and Applied Computing Systems, Inc., and includes hazard prediction, mapping, database, status board, and communications functions.
See also: Federal Emergency Management Information System, Integrated Baseline System

Emergency operating center (EOC)
The location or facility where responsible officials gather during an emergency to direct and coordinate emergency operations, to communicate with other jurisdictions and with field emergency forces, and to formulate protective action decisions. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Emergency operations plan (EOP)
An EOP is a document that contains information on actions that may be taken by a governmental jurisdiction to protect people and property in a disaster or disaster-threat situation. It describes actions that may be required for any hazard, natural or technological, including the effects of nuclear war. It details the tasks that are to be carried out by specified organizational elements at projected places and times based on established objectives, assumptions, and a realistic assessment of capabilities.
Source: Federal Emergency Management Agency. *Guide for the Development of State and Local Emergency Operations Plans*. FEMA Civil Preparedness Guide 1-8, 1990.

Emergency phase
As used by the FEMA and the USEPA, the initial phase of response actions, during which actions are taken in response to a threat of release or a release in progress. Short-term protective actions, such as sheltering and evacuation, may be taken during this phase to mitigate the hazard from immediate exposure to the passing plume. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: phase, response

Emergency planning guide (EPG)
A set of location-specific documents being developed to analyze the characteristics of each chemical agent stockpile location that are pertinent to emergency planning and to provide a step by-step guide for preparing site-specific Protective Action Strategy Plans. The EPG will supersede the site-specific ERCPs.
Source: Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: site-specific emergency response concept plan

Emergency planning zone (EPZ)
A geographical area delineated around a potential hazard generator that defines the potential area of impact. Zones facilitate planning for the protection of people during an emergency. **Source:** Department

of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Emergency preparedness plan
See: Emergency Operations Plan.

Emergency response concept plan (ERCP)
The conceptual basis for developing local emergency response programs for the CSDP, developed as a supporting document to the "Final Programmatic Environmental Impact Statement." **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: site-specific emergency response concept plan

Emergency workers
Personnel performing essential missions within the area potentially affected by the chemical agent to protect the health and safety of the public. The term is applicable to first responders to the chemical event site and others engaged in activities such as manning traffic control along evacuation routes, performing emergency medical services and decontamination, driving evacuation and medical response vehicles, and performing fire and rescue activities, including route alerting. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Enhanced shelter-in-place
A protective action that is similar to normal shelter-in-place except that it involves taking shelter in a structure to which weatherization techniques have been applied before the emergency to permanently reduce the rate at which air or chemical agent seeps into the structure. Effectiveness is improved by going into an interior room. The shelter should be opened up or abandoned after the toxic plume has passed. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: expedient shelter-in-place, normal shelter-in-place, pressurized shelter-in-place, shelter-in-place, specialized sheltering

Environment (from the National Contingency Plan)
The navigable waters, the waters of the continuous zone, and the ocean waters of which the natural resources are under the exclusive management authority of the United States under the Magnuson Fishery Conservation and Management Act; and any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States or under the jurisdiction of the United States.

Essential functions
Response activities crucial in a chemical event. They include communications, direction and control of operations, hazard assessment, reception and care of evacuees, and public information. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Evacuation
A protective action that involves leaving an area of risk until the hazard has passed and the area is safe for return. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program*. DA and FEMA, 1994.
See also: protective action, shelter-in-place

Evacuees

All persons leaving the installation and/or the IRZ/PAZ due to a chemical accident or incident. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: population at risk

Evaporation
The change of a liquid into a gas at any temperature below its boiling point. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Exclusion area
The area immediately surrounding one or more receptacles in which chemical agents are contained. Normally, the boundaries of an exclusion area are the walls, floor, and ceiling of a storage structure, secure container or a barrier that establishes the boundary (such as an igloo or a fence). **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Expedient shelter-in-place
A protective action that is similar to normal shelter-in-place except that, after going into the room selected as a shelter at the time of the emergency, the inhabitants take measures to reduce the rate at which air or chemical agent enters the room. Such measures would include taping around doors and windows and covering vents and electrical outlets with plastic. Effectiveness is improved if the room selected as a shelter is an interior room. The shelter should be opened up or abandoned after the plume has passed. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: enhanced shelter-in-place, normal shelter-in-place, pressurized shelter-in-place, shelter-in-place, specialized sheltering

Explosive ordnance disposal (EOD)
The detection, identification, field evaluations, rendering safe, recovery, and final disposal of unexploded explosive ordnance or chemical agent munitions.

Explosive ordnance disposal procedures
Those particular courses or modes of action for access to, recovery, render safe, and final disposal of explosive ordnance or any hazardous materiel associated with an EOD incident.

Exposure
The amount of chemical that enters the body by some route for a specified frequency and duration. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Exposure routes
The major routes of exposure include ingestion, inhalation, and absorption through the skin. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Facility
From the *National Contingency Plan*: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, or any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located, but does not include any consumer product in consumer use or any vessel.

A place built or set aside to provide a special service. **Source:** Barnhart, Clarence L. and Barnhart, Robert K., eds. *The World Book Dictionary*. Doubleday, 1979.
See also: institution

Feasibility study (from the National Contingency Plan)
A study undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the remedial investigation (RI), using data gathered during the RI. The RI data are used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study.
See also: remedial investigation

Federal Emergency Management Information System (FEMIS)
A software system designed for both on- and off-post use for the CSEPP. The FEMIS was developed by Battelle Pacific Northwest National Laboratories. It includes hazard and evacuation models, and a geographic information system. It also includes planning, database, status board, and communications functions.
See also: Emergency Management Information System, Integrated Baseline System

First aid
Any one-time treatment, and any follow-up visit for the observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care. Such one-time treatment, and follow-up visit for observation, or the use of (up to three) atropine sulfate auto injectors (MK-1 nerve agent antidote kit), is considered first aid, even though provided by a physician or registered medical professional personnel.
See also: antidote, medical response team

First Federal official (from the National Contingency Plan)
The first Federal representative of a participating agency of the National Response Team to arrive at the scene of a discharge or a release. This official coordinates activities under the NCP and may initiate, in consultation with the OSC, any necessary actions until the arrival of the predesignated OSC. A state with primary jurisdiction over a site covered by a cooperative agreement will act in the stead of the first Federal official for any incident at the site.
See also: on-scene coordinator

First responder
The first emergency responders to arrive on the scene of an emergency.

Guidance
Information necessary or helpful for the successful completion of a task.

H
Levinstein mustard, CAS registry number 471-03-4. A mixture of 70 percent bis (2-chloroethyl) sulfide and 30 percent sulfur impurities produced by the Levinstein process. Agent H is a vesicant agent.
Source: US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: vesicant agent

Handar
An electronic system for retrieving meteorological data from remote sensors, developed by Handar, Inc.
See also: chemical hazard warning system, meteorological tower

Hazard
A chemical or physical condition that has the potential for causing damage to people, property, or the environment. **Source:** Center for Chemical Process Safety. *Guidelines for Chemical Process Quantitative Risk Analysis*. American Institute of Chemical Engineers, 1989.

Hazard analysis
Identifying the potential hazards associated with, or inherent in, a given process. Qualitative hazard analysis considers events independent of their probability of occurrence. Quantitative hazard analysis considers the relative probability of different catastrophic events. **Source:** Greenberg, Harris R. and Cramer, Joseph J. *Risk Assessment and Risk Management for the Chemical Process Industry*. Van Nostrand Reinhold, 1991.
See also: hazard vulnerability analysis, risk analysis

Hazard probability
The likelihood that an accident will occur. It is based on an assessment of such factors as location, exposure frequency and duration, and affected population. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Hazard severity
An assessment of the worst potential consequence (i.e., degree of bodily injury, occupational illness, health-related performance degradation, or bodily system damage which could occur) prior to implementing recommendations to eliminate or minimize the hazard. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: hazard

Hazard vulnerability analysis (HVA)
A document which identifies how people, property, and structures might be damaged by a disastrous event. A hazard vulnerability analysis considers consequences, where a hazard analysis does not. **Source:** Federal Emergency Management Agency. *Emergency Program Manager: An Orientation to the Position*. FEMA, 1983.
See also: hazard analysis

Hazardous material
Any substance that has been determined by the Occupational Safety and Health Administration (OSHA) as having the potential to cause a physical or health hazard. This is based on its potential for burning, exploding, or otherwise causing an injury to workers or the likelihood that exposure will result in acute or chronic health effects among employees. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

HD
Distilled mustard or bis (2-chloroethyl) sulfide, CAS registry number 505-60-2. Distilled mustard (HD) is mustard (H) that has been purified by washing and vacuum distillation to reduce sulfur impurities. Agent HD is a vesicant agent. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: vesicant agent

Hot line

A line on the ground, upwind of a CAI site, which separates a contaminated area from the contamination-free area, and is used to control entry and egress of personnel to and from the CAI site.

HT
A plant-run mixture of 60 percent HD and 40 percent T plus a variety of sulfur contaminants and impurities. T is bis [2- (2-chloroethylthio) ethyl] ether, CAS registry number 63918-89-8. T is a sulfur, oxygen, and chlorine compound similar in structure to HD. Agent HT is a vesicant agent. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: vesicant agent

Igloo
A reinforced concrete, earth-covered shelter used for storing explosives and munitions. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Immediate Response Zone (IRZ)
The planning zone immediately surrounding each Army installation. Generally it extends to about 10 km (6 miles) from the installation's chemical storage area. At some installations, it extends to about 15 km (9 miles). **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: emergency planning zone, protective action zone, precautionary zone

Immediately dangerous to life or health (IDLH)
The maximum concentration from which, in the event of respiratory failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing (for example, severe eye irritation) or irreversible health effects [(Department of Health and Human Services, National Institute for Occupational Safety and Health (DHHS NIOSH) Publication No. 90-117]. [Respiratory protection and sufficient oxygen to support life (at least 16 percent by volume) are addressed in 29 CFR 1910.134 e(3) and g(5).] **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Impact time
The time at which an area is first affected by a chemical agent release.

Implementing procedure (IP)
A planned sequence of tasks to be performed by emergency personnel in an emergency. Implementing procedures are generally organized by position.
See also: electronic plan

Incapacitating dose
The concentration/dose that renders an individual unable to perform normal activities or tasks. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: dose

Incapacitation
Considered to be "moderate-to-severe"–unless otherwise specified. It may include prostration and convulsions. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Incident Command System (ICS)

The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident. **Source:** Federal Emergency Management Agency. *Exemplary Practices in Emergency Management: The California Firescope Program*. FEMA, 1987.

Industrial chemicals
Chemicals developed or manufactured for use in industrial operations or research, by industry, Government, or the academia. These chemicals are not primarily manufactured for the specific purpose of producing human casualties or rendering equipment, facilities, or areas dangerous for use by man. **Source:** Department of the Army.

Ingestion hazard projections
Projections of hazard to the public from ingesting chemical agents released as the result of a chemical event in the absence of protective actions which occur over a period of time. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: dosage

Initial Response Force (IRF)
An emergency action organization tasked to provide first response to a CAI at an installation assigned a chemical surety mission. Under the command of the installation commander, the IRF is composed of command and control elements and emergency teams capable of providing emergency medical services and initiating those actions necessary to prevent, minimize, or mitigate hazards to public health and safety or to the environment. Depending on the severity of the CAI, the IRF is capable of initiating environmental restoration activities for completion under the installation restoration program.

Integrated Baseline System (IBS)
A software system designed for off-post use in the CSEPP. The IBS was developed by Battelle Pacific Northwest National Laboratories. It includes hazard and evacuation models and database, mapping, planning, and communications functions.
See also: Emergency Management Information System, Federal Emergency Management Information System

Intergovernmental Consultation And Coordination Boards (ICCBs)
The national and local boards composed of federal, state, and local members that provide for information transfer in the Chemical Stockpile Disposal Program. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Joint Information Center (JIC)
A single location where on-post and off-post public information officials gather to collaborate on and coordinate the release of emergency public information. Ideally, the JIC should be located outside of the IRZ. **Adapted from:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: media center

Joint Information System (JIS)
Similar to the joint information center, a joint information system need have no physical facility. Communications are handled by telephone, fax, amateur radio, or other electronic means.

Jurisdiction

The territory over which authority extends. **Source:** Barnhart, Clarence L. and Robert K. Barnhart, eds. *The World Book Dictionary*. Doubleday, 1979.

Key response staff
Those emergency personnel necessary to carry out essential functions in a chemical event. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

L (Lewisite)
A brown or colorless liquid that is part of the chemical stockpile of vesicants. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: vesicant agent

Lead agency (from the National Contingency Plan)
Agency that provides the OSC/RPM to plan and implement response action under the NCP. EPA, the USCG, another Federal agency, or a State (or political subdivision of a State) operating under a contract or cooperative agreement executed by section 104(d)(1) of CERCLA, or designated a Superfund Memorandum of Agreement entered into under Subpart F of the NCP or other agreements may be the lead agency for a response action. In the case of a release of a hazardous substance, pollutant, or contaminant, where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of DOD or DOE, then DOD or DOE will be the lead agency. Where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of a Federal agency other than EPA, the USCG, DOD, or DOE, then that agency will be the lead agency for remedial actions and removal actions other than emergencies. The Federal agency maintains its lead agency responsibilities whether the remedy is selected by the Federal agency for non-NPL sites or by EPA and the Federal agency or by EPA alone under CERCLA section 120. The lead agency will consult with the support agency, if one exists, throughout the response process.

Limited area emergency
Events are likely to occur or have occurred that involve agent release outside engineering controls or approved chemical storage facilities with chemical effects expected to be confined to the chemical limited area. This level will be declared when the predicted chemical agent no effects dosage does not extend beyond the chemical limited area where the event occurred.
See also: chemical event notification level, chemical limited area, community emergency, non-surety emergency, post only emergency

Liquid droplets
Agent particles that are larger than aerosol particles; specifically, over 20 microns in diameter.
See also: aerosol, vapor

Local Emergency Planning Committee (LEPC)
The planning body designated by Superfund Amendments and Reauthorization Act, Title HI legislation as the planning body for preparing local hazardous materials plans. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: National Response Team, Regional Response Team, State Emergency Response Commission

Lowest-Effect Level (LEL)
The lowest exposure level at which there are statistically or biologically significant increases in frequency or severity effects between the exposed population and its appropriate control group. **Source:** US Army

Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: no-observed effects level

Lowest-Observed Adverse Effect Level (LOAEL)
The lowest exposure level at which there are statistically or biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control group. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: adverse effect, no-observed adverse effects level

Mass care center
A facility for providing emergency lodging and care for people made temporarily homeless by an emergency. Essential basic services (feeding, family reunification, etc.) are provided. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: facility, reception center

Maximum Credible Event (MCE)
The worst single event that could occur at any time with maximal release of chemical agent from a munitions, bulk container, or process as a result of an unintended, unplanned, or accidental occurrence. The event must be realistic with reasonable probability of occurrence.
See also: activity, worst-case activity

Maximum protection
The level of protection that Congress requires to be provided to the general public, the environment, and workers involved in the the destruction of chemical agent and munitions. **Source:** Public Law 99-145, *The Department of Defense Authorization Act of 1986*.

Medical response team
Refers to both on- and off-post response teams. On-post, the Medical Response Team (MRT) is led by a physician or physician's assistant and provides: emergency medical triage, treatment, stabilization, and evacuation of victims from the chemical event site to a medical treatment facility. Off-post the medical response team is most likely to be the Emergency Medical Services (EMS) team who will provide the same services. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program*
Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1. Argonne National Laboratory, 1994.
See also: first aid, triage

Memorandum of Agreement (MOA)
Written memorandum of terms of agreement, resembling a contract, but intended as a record only, not to be enforceable by courts. Memorandums of agreement are often used to define relations between government agencies where a contract would be inappropriate. **Source:** Rice, Michael Downey. *Prentice-Hall Dictionary of Business, Finance, and Law*. Prentice-Hall, Inc., 1983.
See also: memorandum of understanding, mutual aid

Memorandum of Understanding (MOU)
[A document] drawn up to commit the parties loosely before the details are agreed on. A memorandum of understanding (MOU) outlines the mutual understanding of the negotiators about their intentions to proceed to an agreement without binding them into an irreversible relationship. **Source:** Kennedy, Gavin. *Field Guide to Negotiation: A Glossary of Essential Terms and Concepts for Today's Manager*. Harvard Business School Press, 1994.

See also: CSEPP memorandum of understanding, memorandum of agreement, mutual aid

Meteorological tower
A tower carrying instruments that measure meteorological values, generally including temperature, wind speed, wind direction, and atmospheric stability.

mg-min/m3
Milligram minutes per cubic meter. It is a product of the concentration of a substance in milligrams per cubic meter times the exposure time in minutes. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: mg/m3

mg/m3
Milligrams per cubic meter. These units are used to measure agent concentration.

Micron
A unit of measurement equal to one-millionth (10-6) of a meter. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Mission
A goal which may be accomplished by performing a series of tasks.

Mitigation
Activities which actually eliminate or reduce the chance of occurrence or the effects of a disaster. **Source:** Federal Emergency Management Agency. *Emergency Program Manager: An Orientation to the Position*. FEMA, 1983.
See also: phase, preparedness, response, recovery

Mobilize
Messages have been transmitted to emergency personnel to inform them of an emergency situation and to direct them to report to their designated emergency response duty stations. Mobilization and alerting of personnel may occur simultaneously. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Model case
The input and output files associated with one run of a dispersion, evacuation, protective action, or other model.

Monitoring
Checking for the presence and levels of chemical agent. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: detection, sampling

Mustard agent
The vesicant agents (H, HD, and HT) that cause blistering. In sufficient amounts they can be fatal if not quickly removed from exposed skin or if inhaled. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

The chemical Bis(2-choroethyl) sulfide, CAS registry number 505-60-2, in pure form and in the various impure forms that may be found in munitions as well as field, industrial, or laboratory operations. These include Levinstein mustard (H), distilled mustard (HD), and closely related preparations. This standard is not meant to be applied to nitrogen mustards. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: nerve agent, vesicant agent

Mutual aid
An agreement between jurisdictions and/or private entities to provide additional aid or resources to control and mitigate a chemical event. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: memorandum of agreement, memorandum of understanding

National Contingency Plan (NCP)
"The National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR Part 300) prepared by the Environmental Protection Agency to put into effect the response powers and responsibilities created by the Comprehensive Environmental Release, Compensation, and Liability Act and the authorities established by Sect. 311 of the Clean Water Act. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

National defense area
An area established on non-Federal lands located within the United States, its possessions or territories, for the purpose of safeguarding classified defense information, or protecting DOD equipment or material..

National Response Center
A joint Environmental Protection Agency and Coast Guard Communications Center that takes the legally required reports of oil or hazardous substance spills or releases at or above the reportable quantities and communicates these to the predesignated OSC for their action.
See also: Local Emergency Planning Committee, Regional Response Team, State Emergency Response Commission

National Response Team
The group consisting of representatives of 14 government agencies (Department of Defense, Department of Interior, Department of Transportation/Research and Special Programs Administration, Department of Transportation/U.S. Coast Guard, Environmental Protection Agency, Department of Commerce, Federal Emergency Management Agency, Department of State, Department of Agriculture, Department of Justice, Department of Health and Human Services, Department of Labor, Nuclear Regulatory Commission, and Department of Energy) that implements the National Contingency Plan.
Source: Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Nerve agent
The nerve agents (GA, GB, and VX) are lethal, colorless, odorless, and tasteless agents that can be fatal upon skin contact or when inhaled. These agents attack the central nervous system by inhibiting the production of acetylcholinesterase, which is essential for proper operation of the nervous system. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.* Organic esters of phosphoric acid used as a chemical warfare agent because of their extreme toxicity (Tabun-GA, Sarin-GB, Soman-GD, GF, and VX). All are potent inhibitors of the enzyme, acetylcholinesterase, which is

responsible for the degradation of the neurotransmitter, acetylcholine. Symptoms result from excess accumulation of acetylcholine in neuronal synapses or myoneural junctions. Nerve agents are readily absorbed by inhalation and/or through intact skin. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: cholinesterase, mustard agent, vesicant agent

Neutralent
Those materials remaining from the chemical neutralization of agents.
See also: neutralization

Neutralization
The act of altering chemical, physical, and toxicological properties to render the chemical agent ineffective for use as intended. .
See also: decontamination

No deaths dosage
The largest dosage which would result in no fatalities to healthy adults. **Source:** Baronian, Charles, et. al. *Chemical Stockpile Disposal Program Final Programmatic Environmental Impact Statement, Vol. 1 (Sects. 1-8)*. Program Executive Officer, Program Manager for Chemical Demilitarization, 1988.
See also: 1% lethality dosage, dosage, no effects dosage

No effects dosage
A calculated dosage from a chemical agent release below which a toxicity level is not expected to have short-term adverse effects on healthy adults. **Adapted from:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: 1% lethality dosage, dosage, no deaths dosage

No-Observed Adverse Effects Level (NOAEL)
An exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects (to tissue, cells, organs, etc.) between the exposed population and its appropriate control (some effects may be produced at this level, but they are not considered as adverse, nor precursors to specific adverse effects). It is based on the highest exposure without adverse effect. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: adverse effect, lowest-observed adverse effects level

No-Observed Effects Level (NOEL)
An exposure level at which there are no statistically or biologically significant increases in the frequency or severity of any effect (to tissue, cells, organs, etc.) between the exposed population and its appropriate control. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: lowest effects level

Non-surety emergency
Events are likely to occur or have occurred that may be perceived as a chemical surety emergency or that may be of general public interest, but which pose no chemical surety hazard. This includes non-surety material emergencies.
See also: chemical event notification level, community emergency, limited area emergency, post only emergency, surety

Normal Shelter-In-Place

A protective action that involves taking cover in a building, closing all doors and windows, and turning off ventilation systems. Effectiveness is improved by going into an interior room. The shelter should be opened up or abandoned after the toxic plume has passed. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: enhanced shelter-in-place, expedient shelter-in-place, pressurized shelter-in-place, shelter-in-place, specialized sheltering

Notification
Following the alerting phase, information on the nature of the emergency and recommended protective actions is communicated in the notification phase. **Adapted from:** Jacobs Engineering Group. *Emergency Response Concept Plan for the Chemical Stockpile Disposal Program*. Jacobs Engineering Group, 1987.
See also: alert

Offsite
The area surrounding the onsite area. .
See also: off-post, onsite

Off-post
The area surrounding a military installation or facility.
See also: on-post, offsite

Onsite
An area around the scene of a chemical agent under the operational control of the OSC, technical escort officer, or the commander of the Initial Response Force. It includes any area established as a National Defense Area. NOTE: The onsite area may exceed the on-post area, which does not extend beyond the military installation or facility.
See also: offsite, on-post

On-Scene Coordinator (OSC)
The person designated to direct cleanup efforts under the NCP. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

From the *National Contingency Plan:* The Federal official predesignated by EPA or USCG to coordinate and direct Federal responses under subpart D of the NCP, or the official designated by the lead agency to coordinate and direct removal actions under subpart E of the NCP. DOD and DOE are included as OSC under subpart E.

On-post
A military installation or facility.
See also: off-post, onsite

Operations officer
In emergency response, generally the person who manages current operational activities, as opposed to planning activities.

Outside support agencies
Federal agencies such as the Federal Emergency Management Agency, the US Environmental Protection Agency, and any other governmental, quasi-governmental, or private agencies that provide assistance in a chemical event (e.g., American Red Cross, Radio Amateur Civil Emergency Services, laboratories).

Partially participating organization
Organization that will activate and mobilize emergency response personnel during an exercise as specified in the extent of play agreement. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: activation, mobilize

Pasquill stability
Broad categories of atmospheric stability defined in terms of wind speed, sunlight, and cloudiness, representing the effects of thermal stratification in the lower atmosphere.

Key to stability categories

Surface wind speed (m/sec)	***Sunlight***			***Night***	
	Strong	*Moderate*	*Slight*	*Thinly overcast or ≥ 4/8 low cloud*	*≤ 3/8 cloud*
< 2	A	A–B	B	—	—
2–3	A–B	B	C	E	F
3–5	B	B–C	C	D	E
5–6	C	C–D	D	D	D
> 6	C	D	D	D	D

Strong sunlight corresponds to sunny midday in midsummer in England, slight sunlight to similar conditions in midwinter. Night refers to the period from 1 hr before sunset to 1 hr after dawn. The neutral category D should also be used, regardless of wind speed, for overcast conditions during day or night, and for any sky conditions during the hour preceding or following night as defined above. **Source:** Pasquill, F. *Atmospheric Diffusion: The Dispersion of Windborne Material from Industrial and Other Sources, 2nd ed.*. Wiley & Sons, 1974.
See also: atmospheric stability

Percutaneous exposure
The absorption of a contaminant through the unbroken skin. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Permissible exposure limit (PEL)
Time-weighted average concentrations that must not be exceeded during any 8-hour workshift of a 40-hour workweek. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: airborne exposure limit, ceiling limit, threshold limit value

Personal Protective Equipment (PPE)
Chemical protective clothing and respiratory protection to enable responders to conduct activities while protecting themselves from contamination. This equipment should protect the skin, eyes, and respiratory tract of the responders. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Personnel Reliability Program (PRP)
A program within the Army which assesses the reliability and acceptability of individuals working with toxic chemical agents.

Phase
One of the changing states of activity of emergency management. The phases of emergency management are preparedness (also known as readiness), response, recovery, and mitigation.

Plume
Effluent cloud resulting from a continuous source release. **Source:** US Environmental Protection Agency, Federal Emergency Management Agency, US Department of Transportation. *Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances*. EPA, FEMA, DOT, 1987.

Plume/track/hazard track
The geographic representation of the output of a dispersion model.

Population
This refers to a group of items/persons/animals belonging to a well-defined class from which items/ persons/animals are taken for measurement. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Population at risk
The population potentially affected by concentrations of agent. The PAR is calculated by determining the population within the radial distance estimated to be affected by lethal dosages of agent from a release. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Post only emergency
Events are likely to occur or have occurred that involve agent release with chemical effects beyond the chemical limited area. Releases are not expected to present a danger to the off-post public. This level will be declared when the predicted chemical agent no effects dosage extends beyond the chemical limited area but does not extend beyond the installation boundary.
See also: chemical event notification level, community emergency, limited area emergency, non-surety emergency

Precautionary Zone (PZ)
The outermost zone extending beyond the protective action zone. Theoretically, it has no limits. Practically, its furthest point is that beyond which emergency planning for the CSEPP would not be required under most conditions. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: emergency planning zone, immediate response zone, protective action zone

Preliminary assessment (from the National Contingency Plan)
Review of existing information and an off site reconnaissance, if appropriate, to determine if a release may require additional investigation or action. A preliminary assessment may include an on site reconnaissance, if appropriate.
.
See also: accident assessment

Preparedness

Preparedness is the phase of emergency management taken in advance of an emergency. Preparedness activities develop operational capabilities and facilitate an effective response in the event an emergency occurs. Typical preparedness activities include response planning, resource management, training for response personnel, hazard analysis, building and maintaining EOCs, communications, and warning systems. **Source:** FEMA. *Objectives of Local Emergency Management*. CPG 1-5, 1984.
See also: phase, response, recovery, mitigation

Pressurized Shelter-In-Place
A protective action that is similar to normal shelter-in-place except that the infiltration of contaminated air from outside the shelter is effectively prohibited by drawing outside air into the shelter through a filter that removes chemical agent. This filtered air creates a positive pressure in the shelter so that clean air is leaking out instead of contaminated air leaking in. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: enhanced shelter-in-place, expedient shelter-in-place, normal shelter-in-place, shelter-in-place, specialized sheltering

Primary communications system
The communications system designated to carry the bulk of traffic. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: backup communications system, communications system

Program Evaluation And Review Technique (PERT) chart
A chart that represents tasks graphically and indicates task dependencies by showing predecessors and successors, typically by means of boxes and adjoining lines. Also called a network chart.
See also: Gantt chart

Protection factor
The measure of exposure reduction provided by a protective device or shelter. A protection factor of 100 means that the protected exposure is 1/100th of the unprotected exposure. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

With personal protective equipment, it is the ratio of the concentration outside the protective equipment to the concentration inside the protective equipment. Measurement sites are critical for proper determination (e.g., for a protective mask, the measurements inside the mask would be made at a subject's breathing zone, and the measurements outside the mask would be made in a corresponding zone). **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: personal protective equipment

Protective action
An action or measure taken to avoid or reduce exposure to a hazard. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Protective action decision (PAD)
The protective action(s) chosen to be implemented by an emergency management organization.
See also: protective action, protective action recommendation

Protective action decision-making

The process whereby off-post public officials make a selection of one or more actions to protect the threatened population. The Army will make recommendations as part of its accident assessment and off-post notification processes. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: accident assessment, notification, protective action, protective action decision

Protective Action Recommendation (PAR)
Action(s) recommended by the Army to protect the community from the effects of a chemical accident or incident.
See also: protective action, protective action decision

Protective Action Zone (PAZ)
The second planning zone beyond the immediate response zone. Generally it extends to about 21 miles from the installation's chemical storage area, and at some installations it extends further. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: emergency planning zone, immediate response zone, precautionary zone

Public Affairs Officer (PAO)
The Army installation person responsible for public affairs. The PAO is the installation counterpart to the off-post Public Information Officer (PIO). **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Public alert and notification system
The system for obtaining the attention of the public and providing appropriate emergency information. Sirens are the most commonly used public alert devices but frequently are supplemented by tone alert radios, visual warning devices for the hearing impaired, and telephone-based alert/notification systems. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: alert, notification, public alerting

Public alerting
The system for obtaining the attention of the public about a chemical event that may require that they take protective action. Sirens are the most commonly used public alert devices, but they frequently are supplemented by tone alert radios, visual warning devices for the hearing impaired, and telephone-based alert and notification systems. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Public Information Officer (PIO)
The person on the emergency management team who is in charge of public information affairs. The PIO is the counterpart to the on-post Public Affairs Officer (PAO). **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Public outreach
Efforts designed to involve the public in the CSEPP and CSDP decision making processes, to convey accurately the ability of these programs to reduce risk to the public from the chemical stockpile, and to educate the public on their role in the response to a chemical stockpile emergency.

Purcutaneous exposure

Exposure that occurs through the skin. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Push packages
Contingency stocks, maintained at a designated location, for use during a chemical accident or incident at that installation, which may be made available for a chemical accident or incident at other installations. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

A push package is generally a pre-configured shipment that will be automatically sent to the scene of an accident.

RDTE dilute solution
Solution of chemical agents in concentrations and quantities reduced by admixture (dilution) to levels that can be handled with the same precautions associated with hazardous industrial chemicals (acids, bases, or solvents).
See also: dilute solutions

Readiness
During the readiness phase, Army emergency response forces prepare and coordinate appropriate response plans. They also establish organizations to execute plans, train personnel and organizations to the required level of proficiency, evaluate the response organization's ability to execute plans, and educate the public to the potential threat, including emergency response procedures. .

Phase of preparations to deal with an accident or incident. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994. **See also: preparedness, response, recovery, mitigation**

Reception center
There are two primary components of an evacuee support system: reception and mass care. Reception is the process of receiving evacuees, determining their needs (i.e., medical, housing, family reunification, etc.) and assigning them to appropriate resources. The more structured approach calls for evacuees to report to a reception center located on a main evacuation route, have their needs determined and be referred to a mass care center or other appropriate facility. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: facility, mass care center

Recovery
The final phase of the emergency management cycle. Recovery continues until all systems return to normal, or near normal. Short-term recovery returns vital life support systems to minimum operating standards. Long-term recovery from a disaster may go on for years until the entire disaster area is completely redeveloped, either as it was in the past or for entirely new purposes that are less disaster-prone. **Source:** Federal Emergency Management Agency. *Emergency Program Manager: An Orientation to the Position*. FEMA, 1983.

a) The period following the response when immediate threat to human life has passed and general evacuation has ceased. This phase includes:
    1) Recovery phase decontamination, as necessary.
    2) Reentry.
    3) Restoration.

b) Recovery refers to the actions taken to restore an affected area to its pre-emergency condition. Thus, it refers to the process of reducing exposure rates and concentrations in the environment to acceptable levels for unconditional occupancy or use after the emergency phase of an accident or incident. Recovery differs from reentry in that recovery encompasses the effort sand resources needed to return the affected area to its pre-accident condition.

Recovery includes both short- and long-term activities. Short-term recovery returns vital systems to minimum operating standards, seeks to restore critical services to the community, and provides for the basic needs of the public. Long-term recovery focuses on restoring the community to its normal, or improved state of affairs and on returning life to normal or improved levels. The recovery period is also an opportune time to institute mitigation measures, particularly those related to the recent emergency. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: phase, preparedness, response, mitigation

Reentry
The entry of persons into an affected (i.e., contaminated or potentially contaminated) area following a release. The terms "controlled reentry," "restricted reentry," "occupational reentry," and "emergency reentry" refer to the temporary, short-term readmission of persons (primarily emergency workers) into a restricted zone for the purpose of performing specific tasks (such as monitoring teams). The terms "uncontrolled reentry," "unrestricted reentry," and "general reentry" are used in the context of uncontrolled, permanent re-access referring to those provisions leading up to unlimited public access, reoccupation, or use of previously restricted zones after the hazards have been reduced to acceptable levels or have been declared "clean." **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Regional Response Team (RRT)
The representatives of federal agencies and a representative from each state in the federal region. During a response to a major hazardous materials incident involving transportation or a fixed facility, the on-scene coordinator may request that the RRT be convened to provide advice or recommendations in specific issues requiring resolution. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: Local Emergency Planning Committee, National Response Team, State Emergency Response Commission

Release (from the National Contingency Plan)
Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant). For purposes of the NCP, release also means threat of release. Excluded will be any release that results in exposure to persons solely within a workplace, with respect to a claim such persons may assert against the employer of such persons.

Release
Controlled or uncontrolled escape of chemical agent(s) into the environment. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Relevant and appropriate requirements (from the National Contingency Plan)

Those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

Relocation
Temporary or permanent removal of a population or community in response to an emergency or disaster. A protective action in which persons are asked to vacate a contaminated area to avoid chronic exposure from deposited contamination. Relocation is distinguished from evacuation in that during an emergency, the potential for a release exists; in contrast, during the relocation phase, there is no passing plume.
Source: US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: evacuation, protective action

Remedial design (from the National Contingency Plan)
The technical analysis and procedures that follow the selection of remedy for a site and result in a detailed set of plans and specifications for implementation of the remedial action. 1991.

Remedial investigation (from the National Contingency Plan)
A process undertaken by the lead agency to determine the nature and extent of the problem presented by the release. The remedial investigation emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the feasibility study. The RI includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives.
See also: feasibility study

Remedial Project Manager (from the National Contingency Plan)
The official designated by the lead agency to coordinate, monitor, or direct remedial or other response actions under subpart E of the NCP.

Remedy or remedial action (from the National Contingency Plan)
Those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection using dikes, trenches, or ditches, clay cover, neutralization, cleanup of released hazardous substances and associated contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, on site treatment or incineration, provision of alternative water supplies, and any monitoring reasonably required to assure that such actions protect the public health and welfare and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities (including the cost of providing alternative land of equivalent value to an Indian Tribe pursuant to CERCLA section 126(b)) where EPA determines that, alone or in combination with other measures, such relocation is more cost-effective than, and environmentally preferable to, the transportation, storage, treatment, destruction, or secure disposition off site of such hazardous substances, or may otherwise be necessary to protect the public health or welfare. Also included will be off site transport and off site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials. The term also includes enforcement activities related thereto.

Remove or removal (from the National Contingency Plan)

Removal of oil or hazardous substances from the water and shorelines or the taking of such other actions as may be necessary to minimize or mitigate damage to the public health, welfare, or to the environment. As defined by section 101(23) of CERCLA, remove or removal means the cleanup or removal of released hazardous substances from the environment; such actions as may be necessary taken in the event of the threat of release of hazardous substances into the environment; such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances; the disposal of the removed material; or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. This term includes security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 104(b) of CERCLA, and any emergency assistance that may be provided under the Disaster Relief Act of 1974. The term also includes enforcement activities related thereto.

Render safe procedure (from Explosive Ordnance Disposal regulations)
The portion of the explosive ordnance disposal procedure involving the application of special explosive ordnance disposal methods and tools to provide for the interruption of functions or separation of essential components of unexploded explosive ordnance to prevent an unacceptable detonation (AR 75-15). These procedures are to be performed only by properly trained EOD personnel per AR 75-15.

Reportable quantities (from the National Contingency Plan)
For any CERCLA hazardous substance, the reportable quantity is established in table 302.4 of 40 CFR, Part 302, for such substance; for any other substances, the reportable quantity is 1 pound. (For chemical surety agents it is 1 pound.)

Resource provider
Organization providing resources such as buses, drivers, and other personnel to assist with the protection of special populations or school children. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Respond or response (from the National Contingency Plan)
Remove, removal, remedy, or remedial action, including enforcement activities related thereto, as defined by section 101(25) of CERCLA.

Response
Emergency response or responding to emergencies means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses. **Source:** Occupational Safety and Health Administration. "Hazardous Waste Operations and Emergency Response." *Federal Register* 54 (42), 1989.

Response activities are immediate actions taken in response to an actual or potential chemical agent release. This phase includes actions taken to eliminate the source of the release, lifesaving measures for affected personnel, safety measures for potentially affected personnel, and initial security measures taken to preclude the exposure of additional personnel. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

See also: phase, preparedness, readiness, recovery

Restoration
Removal and decontamination of all chemical warfare agents, removal of any rubble, and emergency repair of structures and facilities. These activities will reestablish major utilities and services and will return social and economic activities to near-normal levels. The terms "recovery" and "restoration" have been used in combination to refer to the entire group of activities undertaken to prepare a previously contaminated and restricted area for unlimited reoccupation and/or use by the public. This will include all efforts and resources needed to return an agent-affected area to a condition safe for public access and use. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: recovery

Restricted area or zone
Area subject to protective actions, into which access will be controlled. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

An area with controlled access from which the population has been evacuated or relocated; any area to which access is controlled for the protection of individuals from exposure to contamination from chemical agents. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: access control

Risk
The probability or likelihood of an adverse effect or event (e.g., injury, disease, or death) resulting from the actual use of a substance in the quantity and manner proposed. It is the product of (1) the probability that an adverse effect or event will occur under specific circumstances of exposure and (2) the probability that those specific circumstances of exposure will be realized. In quantitative terms, risk is expressed in values ranging from zero (representing the certainty that harm will not occur) to one (representing the certainty that harm will occur). **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Risk analysis
The development of a quantitative estimate of risk based on engineering evaluation and mathematical techniques for combining estimates of incident consequences and frequencies. **Source:** Center for Chemical Process Safety. *Guidelines for Chemical Process Quantitative Risk Analysis*. American Institute of Chemical Engineers, 1989.
See also: hazard analysis

Risk assessment
The scientific process of evaluating the toxic properties of a chemical and the conditions of human exposure to it, in order to both ascertain the likelihood that exposed humans will be adversely affected, and to characterize the nature of the effects they may experience. It may contain some or all of the following four steps:

a) Hazard Identification–The determination of whether a particular chemical is or is not causally linked to particular health effect(s).

b) Dose-Response Assessment–The determination of the relation between the magnitude of exposure and the probability of occurrence of the health effects in question.

c) Exposure Assessment–The determination of the extent of human exposure.

d) Risk Characterization–The description of the nature and often the magnitude of human risk, including attendant uncertainty.

Source: US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: risk

Route alerting
This is normally a supplement to the public alert system and is a method for alerting people in areas not covered by the primary system or in the event of failure of the primary system. Route alerting is accomplished by emergency personnel in vehicles traveling along assigned roads and delivering emergency instructions with public address systems or by door-to-door notification. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: alert, public alerting

Rumor
Information unconfirmed by an official source. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Sampling
Taking actual physical samples of materials, such as air or soil samples, to be analyzed for chemical agents.
Source: Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: detection, monitoring

Scenario table
A table stored by the Integrated Baseline System (IBS), each of whose entries represents a unique combination of D2PC model case, IDYNEV evacuation case, meteorological conditions, and population pattern. An implementing procedure may be selected for each combination in the table. **Source:** Bailey, et. al. *Integrated Baseline System (IBS) Version 2.0 User Guide*. Pacific Northwest Laboratories, 1993.
See also: decision matrix, electronic plan

Screening
The process of determining whether persons, vehicles, and other belongings are potentially contaminated.
Source: Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: contaminated persons

Secure environment
The condition that exists when chemical surety materiel is protected as specified by applicable physical security criteria as established by appropriate regulations. Failure to provide the minimum physical security required or permitting unauthorized personnel access to chemical surety materiel would cause a condition that constitutes an insecure environment. A person occupying a chemical security position or

who has access to chemical surety materiel and who does not meet the suitability and reliability criteria established by the chemical PRP could cause both an unsafe and an insecure environment.

Self-aid
Administration of a chemical agent antidote to oneself upon experiencing early symptoms of chemical agent poisoning. .
See also: antidote, buddy-aid

Shelter-In-Place (SIP)
A protective action that involves taking cover in a building. Generally, any building suitable for winter habitation will provide some protection with windows and doors closed and heating, ventilation, and air conditioning systems turned off. Effectiveness can be increased by methods such as using an interior room or basement, taping doors and windows, and employing other systems to limit natural ventilation. In CSEPP there are four types of shelter-in-place: normal, expedient, enhanced, and pressurized. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: evacuation, protective action

Short-term exposure
Multiple or continuous exposures occurring over a week or so. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Short-term Public Emergency Guidance Level (SPEGL)
A suitable concentration of a substance in air (as a gas, vapor, or aerosol) for unpredicted, single, short-term, emergency exposure of the general public. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: action level

Site inspection (from the National Contingency Plan)
An on site investigation to determine whether there is a release or potential release and the nature of the associated threats. The purpose is to augment the data collected in the preliminary assessment and to generate, if necessary, sampling and other field data to determine if further action or investigation is appropriate.

Site-specific emergency response concept plan
A concept plan developed for a specific chemical agent stockpile location by applying the concepts and methodologies of the ERCP. Each site-specific concept plan categorizes the chemical events that could occur at that location and examines the topographic, meteorological, and population characteristics of the area to develop proposed EPZ boundaries and identify appropriate protective actions. (See Sect. 9, Item I 1.) **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: emergency planning guide, emergency response concept plan

Size classes of releases (from the National Contingency Plan)
Refers to the following size classifications that are provided as guidance to the OSC for meeting pollution reporting requirements in subpart B of the NCP. The final determination of the appropriate classification of a release will be made by the OSC based on consideration of the particular release (size, location, and impact). a. Minor release means a release of a quantity of hazardous substances, pollutants, or contaminants that poses minimal threat to public health or welfare and the environment. b. Medium release means a release not meeting the criteria for classification as a minor or major release. c. Major

release means a release of any quantity of hazardous substances, pollutants, or contaminants that poses a substantial threat to public health or welfare or the environment or results in significant public concern.

Source term
The quantity and mode of chemical agent release. **Source:** Center for Chemical Process Safety. *Guidelines for Chemical Process Quantitative Risk Analysis*. American Institute of Chemical Engineers, 1989.

Special facility
A facility of particular interest for emergency management, such as a school or hospital.
See also: emergency facility, facility

Special populations
Those individuals or groups that may be institutionalized or have needs that require special consideration in emergencies. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Specialized sheltering
Commercial tents or structures explicitly designed for protection in chemical environments. **Source:** Rogers, et. al. *Evaluating Protective Actions for Chemical Agent Emergencies*. Oak Ridge National Laboratory, 1990.
See also: enhanced shelter-in-place, expedient shelter-in-place, normal shelter-in-place, pressurized shelter-in-place, shelter-in-place spokesperson
An emergency response staff member with the responsibility for delivering emergency public information to the media. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Staging area
An area designated for receiving, storing, and allocating resources. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Standard
Anything taken as a basis of comparison; level or degree of excellence considered as a goal or as adequate; model. **Source:** Barnhart, Clarence L. and Barnhart, Robert K., eds. *The World Book Dictionary*. Doubleday, 1979.

State Emergency Response Commission (SERC)
The state planning group designated by SARA, Title HI legislation as the state coordinating body for hazardous materials activities. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: Local Emergency Planning Committee, National Response Team, Regional Response Team

Status board
A summary of the current situation, used to keep emergency responders up to date. A status board may be written on a wall display, displayed with an overhead projector, or displayed on a computer screen.

Stay time
Allowable time for an emergency worker to be dressed out in personal protective equipment. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises,*

Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1. Argonne National Laboratory, 1994.
See also: personal protective equipment

Superfund Amendments and Reauthorization Act of 1986 (SARA)
Public law that amended CERCLA. Title III of SARA includes detailed provisions for community emergency planning for fixed chemical facilities. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Superfund Memorandum of Agreement (SMOA)
A nonbinding, written document executed by an EPA Regional Administrator and the head of a state agency that may establish the nature and extent of EPA and state interaction during the removal, pre-remedial, remedial, and/or enforcement response process. The SMOA is not a site-specific document although attachments may address specific sites. The SMOA generally defines the role and responsibilities of both the lead and the support agencies.

Superfund state contract
A joint, legally binding agreement between EPA and a state to obtain the necessary assurances before a federal-lead remedial action can begin at a site. In the case of a political subdivision-lead remedial response, a three-party Superfund state contract among EPA, the state, and political subdivision thereof, is required before a political subdivision takes the lead for any phase of remedial response to ensure state involvement pursuant to section 121 (f) (1) of CERCLA. The Superfund state contract may be amended to provide the state's CERCLA section 104 assurances before a political subdivision can take the lead for remedial action.

Task dependency
A relationship between the start or end times of two tasks. These include finish-to-start relationships (one task cannot begin until another is completed), start-to-start relationships (one task cannot begin until another has begun), start-to-finish relationships (one task cannot be completed until another has started), and finish-to-finish relationships (one task cannot be completed until another is completed).
See also: task

Technical escort
Individuals technically qualified and properly equipped to accompany designated materiel, which requires a high degree of safety and security during shipment.

Threshold
The dose or exposure at which a specific effect begins to be produced. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Threshold dose
The smallest amount of toxic substance that can produce the first recognizable injuries (e.g., irritation of the skin, eyes, or nose; miosis). **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Threshold limit value (TLV)
A value that refers to airborne concentrations of substances and represents conditions under which it is believed nearly all workers may be repeatedly exposed day after day, without adverse health. A table of these values and accompanying precautions is published annually by the ACGIH. **Source:** US Army

Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: airborne exposure limit, ceiling limit, permissible exposure limit

Time of impact
The time at which an area is first affected by a chemical agent release.

Time-weighted average
A time-integral of the instantaneous exposure (such as, the cumulative concentration) divided by the length of time for the exposure period. There are basically four methods for estimating time weighted average exposure. Adequate distribution models must be used to represent the exposure to the target populations using all methods. The four methods are: a. Full-period single samples. b. Full-period consecutive samples. c. Partial-period consecutive samples. d. Grab samples.
See also: dosage

Title III
The "Emergency Planning and Community Right-to-Know Act of 1986."" A law that requires the establishment of state and local planning structures (SERCs and LEPCs) for emergency planning for hazardous materials incidents. It requires (1) location site-specific planning around extremely hazardous substances, (2) participation in the planning process by facilities storing or using hazardous substances, and (3) notifications to SERCs and LEPCs of releases of certain hazardous substances. It also provides for mechanisms to provide information on hazardous chemicals to the public. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*

Topologically Integrated Geographic Encoding and Reference Line (TIGER/Line) Data
Extracts of the US Census Bureau's national computer-readable map database. Each TIGER/Line file covers one county, and contains data on line features (roads, rivers, railroad tracks, boundaries, etc.), landmarks (including point landmarks such as schools and area landmarks such as parks), and polygons (such as census blocks). **Source:** US Bureau of the Census. "1992 TIGER/Line Files: Helping You Map Things Out." US Bureau of the Census, 1993.

Toxic Hazard Analysis Model for Industrial Chemicals (THAMIC)
An atmospheric dispersion model developed by Trinity Consultants, Inc.

Toxicity
The capacity of a substance to induce injury. It describes the nature, degree, and extent of undesirable effects. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Traffic control
All activities accomplished for the purpose of facilitating evacuation in vehicles along specific routes.
Source: Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.

Traffic control point (TCP)
A location that is staffed to ensure the continued movement of traffic inside or outside an area of risk. Traffic control is a temporary function to be implemented at points where normal traffic controls are inadequate or where redirection of traffic becomes necessary due to emergency conditions.
Source: Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: access control point, traffic control

Transit-dependent persons
Individuals who do not have their own transportation and must depend on others for transport in the event of an evacuation. Examples of transit-dependent individuals range from those who do not drive due to disability (e.g. blindness) to those who normally rely on public transportation or are simply stuck at home while a family member is out with the car. They may or may not be disabled. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: special populations

Triage
The process of sorting or selection of patients to determine priority of care to be rendered to each. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: medical response team

Two-person concept
A system designed to prohibit access by an individual to CSM by requiring the presence at all times of at least two authorized personnel capable of detecting incorrect or unauthorized procedures with respect to the task being performed. Each person must be familiar with applicable safety and security requirements.

Vapor
The gaseous form of substances that are normally in the solid or liquid state that can be changed to this state by increasing the pressure or decreasing the temperature. These vapors will diffuse. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.
See also: aerosol, liquid droplets

Vesicant
Causing blisters or vesicles. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Vesicant agent
A chemical agent that induces blistering. **Source:** Department of the Army and the Federal Emergency Management Agency. *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. DA and FEMA, 1996.*
See also: nerve agent

Vesication
The process of blistering. **Source:** US Army Center for Health Promotion and Preventive Medicine (Provisional). *Glossary of Terms for Chemical Agents and Chemical Defense Equipment*. USACHPPM, 1994.

Volatility
The rate of evaporation of a substance.

Volunteer
A person who serves without pay. **Source:** Barnhart, Clarence L. and Barnhart, Robert K., eds. *The World Book Dictionary*. Doubleday, 1979.

Warning point

A twenty-four hour designated location where emergency notification(s) would be received. **Source:** Argonne National Laboratory. *Chemical Stockpile Emergency Preparedness Program Exercises, Appendix C: Exercise Objectives, Evaluation Elements, and Points of Review, Change 1*. Argonne National Laboratory, 1994.
See also: notification

Wedge
An angle centered about the downwind bearing. Used to indicate a larger area of concern for emergency planning than that provided by the output of a dispersion model. For example, the D2PC dispersion model assumes that the area surrounding the release is flat and open, and that there will be no changes in wind direction after the release. For this reason, a wedge is often used to account for model limitations.

Wet deposition
The process by which precipitation (such as snow or rain) removes a chemical from the air. Washout occurs when the precipitation falls through the chemical cloud and carries some of the chemical to the ground. Rainout occurs when the chemicals are entrained into a precipitation cloud and then the cloud precipitates out into rain or snow and carries the entrained chemical to the ground. While wet deposition reduces the direct downwind atmospheric hazard, precipitation puts the chemical on the ground where it may present a hazard. Some may evaporate for further cycles of downwind travel.
See also: dry deposition