

Hazardous Material Accident- Chlorine Leak from Train Car

TABLETOP EXERCISE **JULY 17, 2008**



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INTRODUCTION

Purpose

This exercise gives participants an opportunity to evaluate current response concepts, plans, and capabilities for a response to a train accident with chemical release in Nebraska. The exercise will focus on key local emergency responder coordination, critical decisions, and the integration of external assets necessary to minimize the psychological effects of a natural disaster.

Scope

This exercise emphasizes the role of assets from within Department of Health and Human Services, regional behavioral health entities, and volunteer organizations in response to the potential consequences of a natural disaster. **Processes and decision making are more important than minute details.**

Design Objectives

Exercise design objectives are focused on improving understanding of a response concept, identifying opportunities or problems, and/or achieving a change in attitude. The exercise will focus on the following design objectives:

- 1. Chain of command.** *Identify and reinforce chain of command and control issues to ensure NIMS/ICS Compliance.*
- 2. Response Protocols.** *Identify and clarify response protocols for behavioral health personnel.*
- 3. Service Delivery.** *Identify strategies for service delivery during community recovery.*
- 4. Resource Identification.** *Identify required resources needed to provide behavioral health services to victims and responders.*
- 5. Coordinating partners and agencies.** *Identify coordinating agencies and partners in disaster response.*

Exercise Structure

This will be a multimedia facilitated Tabletop Exercise (TTX). Players will respond to the following scenario modules:

- Introduction (Start of Scenario)
- Module 1-Initial On-Scene Response
- Module 2- Displacement/Hospital Capabilities
- Module 3- Ongoing Provision of Services

Exercise Format

Each module begins with a situation briefing or update presented to the plenum. Following each module briefing, players, who have been organized into groups according to behavioral health regions, and will discuss key issues within their group.

Following each situation update, players will participate in a caucus period to review the module, and discuss the suggested questions at the end of each module as well as the response issues relevant to their group. At the end of the facilitated discussion, exercise facilitators will highlight key elements of each response phase.

Roles and Responsibilities

Players respond to the situation presented based on expert knowledge of response procedures, current plans and procedures, and insights derived from training and experience.

Facilitators provide situation updates and moderate discussions. They also provide additional information or resolve questions as required. State Behavioral Health representatives will also assist with facilitation as Subject Matter Experts (SME) during the tabletop exercise.

Assumptions and Artificialities

In any exercise, a number of assumptions and artificialities may be necessary to complete play in the time allotted. During the exercise, the following apply:

- The scenario is plausible, and events occur as they are presented.
- There are no “hidden agendas” or trick questions.
- All players receive information at the same time.

Exercise Rules

There is no “textbook” or perfect solution. Varying viewpoints, even disagreements, are expected. This is intended to be a safe, open, stress-free environment.

- Respond based on your knowledge of current plans and capabilities (i.e., you may use only existing assets) and insights derived from training and experience.
- Your organization’s positions or policies do not limit you. Make your best decision based on the circumstances presented.
- Decisions are not precedent-setting and may not reflect your organization’s final position on a given issue. This is an opportunity to discuss and present multiple options and possible solutions.
- Issue identification is not as valuable as suggestions and recommended actions that could improve response and preparedness efforts. Problem-solving efforts should be the focus.
- Assume cooperation and support from other responders and agencies.
- The situation updates, written material, and resources are the basis for discussion. There are no situational injects.

Additional Resources

During the exercise, you may need some specific information to assist you in making a decision. The appendices to this Situation Manual (SITMAN) contain additional information you may use in your discussion. As you participate, draw on your experience and knowledge of how Federal, State, and local agencies work together in an emergency response situation.

EXERCISE SCHEDULE

NOTE: *The exercise schedule should be tailored to reflect the exercise designed by the exercise planning team in accordance with the needs of your community. Modules, breaks, lunches, or other events may be removed or added as needed.*

[1245]	Registration
[1300]	Welcome and Introductions
[1315]	Overview of Chlorine Gas
[1330]	Introduction (Start of Scenario) Situation Briefing Group Discussion Facilitated Discussion
[1415]	Module 1 Situation Briefing Group Discussion Facilitated Discussion
[1500]	Module 2 Situation Briefing Group Discussion Facilitated Discussion
[1530]	Module 3 Situation Briefing Group Discussion Facilitated Discussion
[1600]	Review and Conclusion
[1630]	Closing Comments

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Background – Understanding Chlorine Gas

PROPERTIES AND APPEARANCE

Chlorine is a member of the family of elements known as halogens (other members are fluorine, bromine, iodine, and astatine, which is radioactive and very rare). A yellowish-greenish gas that is 2.45 times heavier than air and slightly soluble in water, chlorine does not exist in the elemental form, but in molecular form. The chemical symbol for chlorine is Cl, but when it is generated, it exists as the diatomic molecule, Cl². Like many other gases, chlorine is usually liquified for transportation and storage. This is done for economic reasons, since you can get much more material into a given volume as a liquid rather than as a gas or vapor. For instance, chlorine produces 457 cubic feet of gas for every cubic foot of liquid. This means, that you can store or transport 457 times more chlorine as a liquid than as a gas. Liquid chlorine (like the gas) has a greenish-yellow tint. . Whenever liquid chlorine is exposed to air, it begins to boil away since its boiling point is about -30°F. The chemical properties of chlorine make it an oxidizer, a corrosive, and an irritant (as DOT might classify it) or toxic (as IMO classifies it with a 2.3 designation at the bottom of a DOT placard). All these features make chlorine a highly reactive material, which is the reason that chlorine is so important to industry. Chlorine is used in the manufacture of a great variety of chemicals and materials, such as bleaches, plastics, rubber, dyes and pigments, pulp, paper, refrigerant gases, fire extinguishing agents, disinfectants, and in the production and/or processing of innumerable specific organic and inorganic chemicals. Chlorine may also be found in large quantities at water treatment and sewage treatment plants. Chlorinated hydrocarbons (which means that chlorine has been chemically attached to a hydrocarbon by substituting it for a hydrogen atom) are very valuable to industry as solvents, de-greasers, and other important commercial uses. Chlorine may be found in any industrial plant that manufactures these materials. Chlorine may also be known as bertholite, and may sometimes be referred to as molecular chlorine or liquid chlorine.

IDENTIFICATION

Chlorine containers can be identified by the use of the Department of Transportation (DOT) nonflammable gas placard with the UN designation 1017 in the center of the placard or next to the placard. Its Standard Transportation Commodity Code (STCC) number is 4904120, and its National Fire Protection Association (NFPA) rating (704) is 3-0-0-OXY. DOT required labels are non-flammable gas and poison.

HAZARDS

Chemical actions and reactions

Although chlorine does not burn, which is the reason for the DOT designation as a non-flammable gas, like oxygen Chlorine supports combustion. Chlorine is almost as efficient an oxidizer as oxygen. This means that any ordinary combustible or flammable

material may become explosive when mixed with chlorine. Therefore, all combustible materials, particularly organic substances, and all powdered metals and many metal compounds must be kept separated from chlorine. If chlorine is released anywhere near a fire incident, efforts must be made to keep the chlorine gas from reaching the fire. Chlorine will intensify the fire to the point where no ordinary firefighting effort will be able to control it, similar to the addition of pure oxygen to the fire. The fact that gaseous chlorine is so heavy (2.45 times as heavy as air) means that the gas "hangs together" and flows along the ground, seeking low spots in the terrain. These areas are extremely dangerous because of the concentration of chlorine. This hazard can exist quite far from the initial incident, and, depending on the size of the release, evacuation distances downwind may have to be extended one to two miles or more.

INTRODUCTION

The local school district of Smallville, Nebraska (population 1100) held a board meeting on Wednesday July 16, 2008 voting to do away with the district bus service to cut spending costs for the upcoming school year. This is a rural community and the majority of the students live outside of the Smallville city limits. This decision did not sit well with some of the residents.

A local resident and farmer who has two children enrolled at the elementary school is very disgruntled. He has decided to demonstrate his frustration and anger towards the school board by driving his tractor onto the railway crossing, parking it, disabling the starter, and leaving it unattended.

The Burlington Northern/Santa Fe Railway crosses Main Street in downtown Smallville. A freight train is traveling in a southwest direction, and is slowing its rate of speed as it nears the rail switch near the downtown area. Smallville has a large number of freight trains traveling through the city daily.

The weather is beautiful today; the temperature is 74 degrees with light winds (5mph) from out of the west. As the freight train enters the town, the engineer spots the tractor parked perpendicular on the tracks at the crossing. The engineer applies the emergency brakes, but cannot stop the heavy loaded train in time. The result is a thunderous collision with the tractor derailing the train in the middle of town.

The conductor quickly exits the train, and identifies a derailment of numerous cars. He identifies a strong odor that resembles chlorine. Without delay, he notifies the engineer of a four-car derailment with hazardous chemical release and activates the railroad emergency response plan. The engineer quickly notifies the chief railroad dispatcher of the incident by radio. The engineer grabs essential cargo manifests and his Material Safety Data Sheet binder (containing information on hazardous materials), and both individuals quickly exit the train for safety. Receiving communications of the derailment, dispatch notifies emergency response teams for deployment to the event.

Notification isn't necessary for those who hear the thunderous crash. Four individuals from Smallville Rural Volunteer Fire Department are first to respond. They report a greenish/yellow low-lying fog over the area. The initial scene survey of the event indicates that one of the tank cars is leaking. The placard on the tank car indicates the number 1017. The leaking tank car has come to rest on its side near the railroad depot. Another one of the derailed boxcars contained a load of sand, which has spilled across the roadway blocking access to the area.

The train engineer and conductor identify themselves to emergency responders. At this point there appears to be no injuries to the train crew. The disgruntled farmer is nowhere to be found.

MODULE 1 – INITIAL ON-SCENE RESPONSE

Many additional resources are required to handle a situation of this magnitude. Additional volunteer firefighters from Smallville and surrounding communities begin to arrive. The elementary school on Elm Street has called the police department inquiring about the emergency. They are reporting a strong odor at their location. Many of the children are experiencing troubled breathing and have complaints of eye irritation. Road blockage from the sand spill is causing a large backup of traffic off state Hwy 1 eliminating one of the potential evacuation routes. As the front of the school faces the scene, the Fire Chief orders an immediate evacuation of the school through the rear entrance.

The Smallville Fire Chief identifies the chemical substance leaking as chlorine gas. He also notices that one of the tank cars has come to rest on the depot's propane tank. He immediately decides to expand the safety perimeter around the scene when suddenly the propane tank ignites causing an intense fire and explosion. In a split second four of his firefighters disappear in the flaming mushroom cloud. The situation has exponentially become worse. As soon as he can see the extent of the explosion, the Fire Chief sees the elementary school. The front facade of the three story structure has collapsed. Classrooms on the third level are visible among the rubble, peeled open by the explosion. It is not known if any of the children/faculty got out in time.

As events are unfolding quickly, the Nebraska Emergency Management Agency is notified of a major chemical incident. Your Regional Behavioral Health Authority has been following the incident via local news and knows it should respond.

Key Issues

- A behavioral health response will be needed.
- Number of deaths and injuries are currently unknown.
- Safety issues exist – the chlorine gas leak is not contained.

Task

Based on the information provided, you have 20 minutes to consider the issues raised in Module 1. Identify any additional requirements, critical issues, decisions, and/or questions you feel should be addressed at this time.

Review the following questions in their entirety and discuss your group's major concerns at this point in the exercise scenario. Participants are not required to address every question in this section.

1. *What is the Behavioral Health Region's relationship with County Emergency Managers and Public Health Departments?*
2. *Who do you believe will activate Behavioral Health?*
3. After you have been activated by emergency management, what are your next steps?
4. How do you plan to collaborate with CISM, American Red Cross, and other behavioral health partners who are interested in providing response services?
5. How will you assess emerging behavioral health needs?
 - What information do you want volunteers to collect regarding activities and services provided?
6. What are your plans to coordinate with the Medical Response System, local hospitals and the local health department?

MODULE 2

The local hospital has quickly become overwhelmed with school children and local residents with similar symptoms ranging from breathing difficulties to blast related burns and blunt force trauma from the explosion. Their bed capacity is not sufficient enough for the influx of patients they are faced with. Mutual aid arrives at the hospital to transfer several patients to neighboring hospitals. A makeshift morgue has been set up in the hospital parking lot.

The elementary school had evacuated approximately 80% of their students and faculty prior to the explosion, however there are several students and teachers unaccounted for from classes located on the first floor in front of the building.

People who are not exhibiting signs of exposure to the chlorine gas or the explosion at the school continue to arrive at the hospital through the first 48 hours. They are worried they may have been exposed to the gas and contaminated.

The downtown businesses are concerned about the economic impact of this incident. The hospitals, clinics and the public health department are receiving many calls and visits from people complaining of vomiting, shortness of breath and chest pain. The media would like to obtain information on this incident. Half of the town has been displaced

Key Issues

- Town residents have been displaced and are temporarily residing in neighboring towns.
- Stress from the disaster is starting to show on displaced individuals.
- There is concern about the safety of anyone remaining in the town.
- The local hospital is overwhelmed.

Task

*Based on the information provided, you have **20 minutes** to consider the issues raised in Module 2. Remember to identify any additional requirements, critical issues, decisions, and/or questions you feel should be addressed at this time.*

Review the following questions in their entirety and discuss your group's major concerns at this point in the exercise scenario. Participants are not required to address every question in this section.

1. How do you coordinate with any shelters that have been set up?

2. How do you plan to address the issue of spontaneous behavioral health volunteers?

3. How are you going to help citizens deal with the stresses of being in a potentially unsafe situation?

4. How will you monitor fellow staff, outreach workers, volunteers, and emergency workers to ensure they are dealing with the situation and its issues adequately from a behavioral health standpoint?
 - What plans do you have in place to have behavioral health volunteers ensure their physical safety when they respond?

5. What are hospital plans for using behavioral health to help manage surge from friends and family of patients, and psychological casualties?
 - What plans are in place to support hospital staff?

6. How will Behavioral Health assist the Medical Response System, hospitals and public health to inform the community about the operating status of hospitals and triggers for sending a person to the hospital?

7. How can behavioral health responders assist those who experienced emotional stresses from the decontamination process? What processes exist to identify and follow up with these individuals?

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MODULE 3 – ONGOING PROVISION OF SERVICES

One month has passed since the train accident in Smallville, Nebraska. Activities to get the town and people's lives put back together have begun as the town was declared a federal disaster area.

Former residents of Smallville have been relocated to neighboring towns as far as 60 miles away. Some are staying with extended family, and some are living in FEMA funded living units (apartments and rental homes), some of which are overcrowded and minimally adequate. The stress of recovery from the disaster is beginning to show. Along with the grief experienced with the loss of family and friends, residents must navigate a multitude of programs and services. It is hard for some Smallville residents to accept public assistance for the first time. At this time, one suicide attempt has been attributed to the post disaster stress.

Due to evacuation of the town, the local hospital has discontinued service and all personnel have been moved to neighboring towns. The hospital and other local healthcare providers are making plans to reopen in another month.

Your Behavioral Health Region has received an immediate services program crisis counseling grant to do outreach with responders and displaced individuals who are now primarily located in four towns in your region. The regular services program crisis counseling grant is due soon. You must submit a plan to provide ongoing outreach and intervention over the next nine months to help individuals and the community heal from the disaster and move forward. You have also received word that an unmet needs community group has been formed with the aid of FEMA. This group is working in tandem with a newly formed group of volunteer case managers that are operating under the supervision of a paid coordinator through one of the churches.

Key Issues

- Physical recovery of the town has begun.
- Town residents have been displaced and are temporarily residing in neighboring towns.
- Stress from the disaster recovery is starting to show on displaced individuals
- Individuals must navigate a multitude of public assistance programs, and deal with unemployment.
- Hospital services will be returning to town and the hospital and local clinics will be reopening in one month.
- Your Region is tasked with providing behavioral health assistance to individuals, and to simultaneously develop a plan to continue services for nine more months.

Task

*Based on the information provided, you have **20 minutes** to consider the issues raised in Module 3. Remember to identify any additional requirements, critical issues, decisions, and/or questions you feel should be addressed at this time.*

Review the following questions in their entirety and discuss your group's major concerns at this point in the exercise scenario. Participants are not required to address every question in this section.

1. What is the role of behavioral health in hospital evacuation?
 - How do local hospitals plan to use behavioral health in their transition back to the community?

2. Who are the partners you need at the table to coordinate provision of outreach?
 - Which partners can help secure information needed to locate displaced community members?
 - Which partners will you need to coordinate with to prepare a plan to continue outreach services?
 - How do you plan to coordinate with unmet needs groups and newly funded case management services?

3. What is your plan for outreach over the next nine months?
 - What is your staffing plan (how many outreach workers will you need; how many supervisors; data entry and administrative personnel)?
 - What strategies will you use to reach and deliver services to displaced people who may be in several towns?
 - What strategies will you use to reach and deliver services to responders, rescue workers, utility workers, National Guard units and others who may have assisted with response activities?
 - How will you incorporate suicide prevention services into your outreach?

4. How will you be able to use what you have learned from this tabletop exercise to update your Regional Behavioral Health All-Hazards Plan?

APPENDIX 1

Terms of Reference

AAR	After-Action Report
ANG	Air National Guard
ARNG	Army National Guard
CBRNE	Chemical, Biological, Radiological, Nuclear, Explosive
CDC	Centers for Disease Control and Prevention
CISM	Critical Incident Stress Management
DCO	Defense Coordinating Officer
DFO	Disaster Field Office
DMAT	Disaster Medical Assistance Team
DMORT	Disaster Mortuary Operational Response Team
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
ECC	Emergency Coordination Center
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ESF	Emergency Support Function
FBI	Federal Bureau of Investigation
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
HHS	Department of Health and Human Services
IC	Incident Commander
ICS	Incident Command System
JIC	Joint Information Center
JOC	Joint Operations Center
LECC	Local Emergency Communication Center
MACC	Multi-Agency Coordination Center
NEMA	Nebraska Emergency Management Agency
NIMS	National Incident Management System
NRP	National Response Plan

ODP	Office for Domestic Preparedness
PIO	Public Information Officer
POC	Point of Contact
PPE	Personal Protective Equipment
SEOP	Emergency Operations Plan
SITMAN	Situation Manual
SME	Subject Matter Expert
SNS	Strategic National Stockpile
SOG	Special Operating Guidelines
SOP	Standard Operating Procedure
UCS	Unified Command System
USPHS	U.S. Public Health Service
WHO	World Health Organization
WMD	Weapon(s) of Mass Destruction