



THE CHLORINE INSTITUTE

Pamphlet 64

*Emergency Response
Plans for Chlor - Alkali,
Sodium Hypochlorite,
and Hydrogen Chloride
Facilities*

Edition 6 - Revision 1



October 2008



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1. INTRODUCTION

1.1 SCOPE

This publication is intended to give the user the basics of an emergency response plan. Such a plan would be utilized during an accidental release or potential accidental release of chlorine, sodium hydroxide, potassium hydroxide, sodium hypochlorite, anhydrous hydrogen chloride, or hydrochloric acid (collectively referred to in this pamphlet as chlor-alkali products) or in response to a breach in security to minimize the impact of such an incident. This pamphlet does not include all federal, state or local requirements that may be applicable to your facility, nor does it cover other potential emergencies that may arise in a typical chlor-alkali manufacturing facility.

The federal requirements cited in this pamphlet are current as of the date of publication, but users of this pamphlet should recognize that they are subject to change.

1.2 CHLORINE INSTITUTE STEWARDSHIP PROGRAM

The Chlorine Institute, Inc. exists to support the chlor-alkali industry and serve the public by fostering continuous improvements to safety and the protection of human health and the environment connected with the production, distribution and use of chlorine, sodium and potassium hydroxides, and sodium hypochlorite; and the distribution and use of hydrogen chloride. This support extends to giving continued attention to the security of chlorine handling operations.

Chlorine Institute members are committed to adopting CI's safety and stewardship initiatives, including pamphlets, checklists, and incident sharing, that will assist members in achieving measurable improvement. For more information on the Institute's stewardship program, visit CI's website at www.chlorineinstitute.org.

1.3 DEFINITIONS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHLOREP	CHLOREP (CHLORine Emergency Plan) is administered and coordinated by the Chlorine Institute and provides an organized and effective system for responding to chlorine emergencies in the United States and Canada.

Chlor-alkali Product(s)	As used in this pamphlet, this term includes chlorine, sodium hydroxide, potassium hydroxide, sodium hypochlorite, anhydrous hydrogen chloride, and/or hydrochloric acid.
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
Emergency Response Plan (ERP)	An Emergency Response Plan presents the <u>action</u> to be taken by the producer/user, governmental agencies, and the general public to minimize the effect of an accidental chlorine release.
LEPC	Local Emergency Planning Committee
MSDS	Material Safety Data Sheet
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PSM	Process Safety Management
RMP	Risk Management Program

1.4 DISCLAIMER

The information in this pamphlet is drawn from sources believed to be reliable. The Institute and its members, jointly and severally, make no guarantee, and assume no liability, in connection with any of this information. Moreover, it should not be assumed that every acceptable procedure is included, or that special circumstances may not warrant modified or additional procedures. The user should be aware that changing technology or regulations may require changes in the recommendations contained herein. Appropriate steps should be taken to ensure that the information is current when used. These recommendations should not be confused with federal, state, provincial, municipal, or insurance requirements, or with national safety codes.

1.5 RECOMMENDATION

It is the recommendation of the Chlorine Institute that all producers and users of chlor-alkali products have a written emergency response plan and that the plan should be communicated to the area community. The degree of complexity of the ERP will depend on the products handled by the facility, its size, and its proximity to populated areas.

1.6 APPROVAL

The Health, Environmental, Safety & Security Issue Team approved Edition 6, Revision 1 of this pamphlet on October 28, 2008.

1.7 REVISIONS

Suggestions for revisions should be directed to the Secretary of the Institute.

1.7.1 Significant Revisions in Current Edition

Changes have been made to Sections 2.4 and 2.5 in response to recommendations made by the U.S. Chemical Safety Board.

1.8 REPRODUCTION

The contents of this pamphlet are not to be copied for publication, in whole or in part, without prior Institute permission.

2. ORGANIZATIONAL PLANNING

2.1 INTRODUCTION

The necessity for an Emergency Response Plan (ERP) becomes evident when one considers the hazardous properties of chlor-alkali products. Prevention of injuries and impact on the local environment are key considerations of an ERP. Having trained personnel at all facilities handling chlorine and first responders within the community are vital elements of any plan.

The Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 (40 CFR 355, Reference 5.1.1 requires all facilities in the United States that meet the minimum threshold inventory quantities for extremely hazardous substances to have an adequate plan to deal with emergencies. The threshold planning quantity for chlor-alkali chemicals is shown in Table 1.

Table 1. EPCRA Threshold Planning Quantities for Chlor-Alkali Chemicals

<u>Chemical</u>	<u>Quantity (pounds)</u>
Chlorine	100
Sodium hydroxide	-
Potassium hydroxide	-
Sodium hypochlorite	-
Hydrogen chloride (gas only)	500

OSHA's Process Safety Management rule (Reference 5.1.2, 29 CFR 1910.119) and EPA's Risk Management Program rule (Reference 5.1.1, 40 CFR 68) also require facilities with processes covered under these regulations to have emergency response plans.

The development of an ERP must be given sufficient priority by management to insure that the safe and effective handling of such emergencies will be provided for. It is fundamental to the success of an ERP that all elements outlined in this pamphlet be included. However, the degree of detail is dependent on the size of the facility and the potential for exposure both internal and to the general public.

To the question, "When does one start planning for emergencies?" the answer is, "before the need arises." The Chlorine Institute recommends that each facility handling chlor-alkali products has a written Emergency Response Plan both to: (1) protect its employees, the surrounding community, and the general public; and, (2) comply with the law. The best time to incorporate the elements of a comprehensive ERP is during the design stage of new facilities or facilities undergoing modification. The potential dangers of chlorine within the facility and to the general public, and the perceived dangers by the public make it imperative that an ERP be completed prior to the start-up of all new units.

2.2 PURPOSE OF EMERGENCY RESPONSE PLANNING

The purpose of an ERP is to prevent or minimize injuries, lessen the impact on the general public, provide guidance to personnel who will have to respond to emergencies, and minimize equipment and property damage.

2.3 MANAGEMENT'S ROLE FOR DEVELOPING THE EMERGENCY RESPONSE PLAN (ERP)

The responsibility for the development of the ERP lies with the management of the facility. Points for management to consider include:

- a. Insuring that the ERP meets the facility's needs and regulatory requirements;
- b. Providing adequate resources for development, effective use, and maintenance of the plan.
- c. Setting a timetable for completion of the plan;
- d. Establishing a training program for implementation.
- e. Insuring that the ERP can be put into action with the available personnel at the facility during periods when staffing is at the lowest levels; and

- f. Insuring that the ERP is communicated to appropriate outside agencies (e.g., fire, law enforcement, local emergency planning committee).
- g. Providing a system that will monitor the timeliness and effectiveness for: developing the plan; training on the plan; using the plan; and addressing corrections or necessary changes to the plan.

2.4 PLANNING FOR DIFFERENT TYPES OF EMERGENCIES

Since it is impractical to have a separate ERP for every type of emergency, it is important that the ERP be comprehensive. The following potential causes of a chlor-alkali product release should be considered:

- a. Equipment or human failure;

Specific events that have occurred in the past that should be considered for inclusion in a facility ERP are:

1. Chlorine and HCl loading/off-loading hose failure;
 2. Overchlorination of a bleach manufacturing unit;
 3. Overchlorination of a process scrubber;
 4. Piping and equipment mechanical failures; and
 5. Reactive chemical incidents (including chlorine-iron fires, chlorine-hydrogen explosions, and chlorine-titanium fires)
- b. Loss of utilities, i.e., power, steam, water, air, nitrogen;
 - c. Natural disasters, i.e., hurricanes, tornadoes, floods, earthquakes;
 - d. Barge, railroad, truck, container incidents;
 - e. Pipeline incidents inside and outside the plant;
 - f. Bomb threat;
 - g. Civil disturbance; and
 - h. Intentional sabotage.

2.5 SCOPE OF THE EMERGENCY

It is seldom easy to predict the exact scope of an emergency, but all attempts should be made to estimate the size and impact of releases that may be caused by the different types of potential emergencies at the facility. The facility's response to these potential

emergencies should be predetermined. Modeling of the potential chemical release is recommended. CI Pamphlet 74 (Reference 5.2.8) provides examples of typical release quantities and impact zones. The ERP should also address the following scenarios:

- a. Inside a chlor-alkali product facility – controllable by unit personnel;
- b. Inside the overall facility – controllable by plant-wide personnel;
- c. Inside the overall facility – requires additional emergency responders (e.g. Fire Department or Local Emergency Planning Committee (LEPC), and
- d. Outside the overall facility – requires outside emergency responders (e.g. Fire Department, CHLOREP, LEPC).

2.6 PROCEDURE FOR KEEPING AN ERP CURRENT

Keeping the ERP current must be considered as a high priority. Each facility should consider the following:

- a. Annual review of the ERP by persons competent in emergency response;
- b. Review of the ERP whenever the facility is modified;
- c. Updating the ERP whenever there are personnel/organization changes;
- d. Implementing the recommended changes resulting from ERP drills or actual emergencies; and
- e. Periodic personnel training coupled with timely retraining after significant changes to the ERP.

Keeping the ERP current can be facilitated by referring to all responsibilities within the plan by job title and by keeping a separate roster of names and phone numbers readily available.

3. **PLANNING FOR HANDLING THE EMERGENCY**

3.1 INTRODUCTION

The intent of this section is to present the aspects of emergency response that must be planned for in the event of a significant chlor-alkali product release. This information is outlined into several key categories:

- a. Emergency response personnel:
 1. Responsibilities;

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2. Selection;
 3. Training; and
 4. Audits, drills, and drill critiques.
- b. Incident command
 - c. Internal communication
 - d. External communications
 - e. Emergency response equipment
 - f. Post release mitigation
 - g. Evacuation and/or sheltering and accounting of personnel
 - h. First aid/medical services
 - i. Utilities considerations

In addition, the facility should have procedures in place to respond to emergencies other than a chlor-alkali product release.

3.2 EMERGENCY RESPONSE PERSONNEL

(This section refers to people inside the plant or facility. See Section 4 for community or outside agencies.)

3.2.1 Responsibilities

The responsibilities for each emergency response team member should be specifically defined to include the following:

- a. The types of emergencies to which the team member will respond;
- b. The role each member will be expected to play during the emergency, (i.e. spill assessment, spill control, communications, first aid, etc.);
- c. To whom each team member reports in the event of an emergency;
- d. Considerations for who will respond to emergency situations, (i.e. operator, supervisor); and
- e. Provisions for notification, access routes, and plant entry.

3.2.2 Selection

The selection of emergency response personnel is important to the development of the ERP in that the capabilities and availability of the assigned personnel will be reflected in the execution of the plan.

- a. Consider who will be assigned responsibilities during days, nights, and weekends;
- b. Plan for substitutes during vacations or absences;
- c. Consider use of personnel from other work areas; and
- d. Consider the capabilities and limitations of each person being considered for a position, (e.g., use of respiratory equipment, personnel rescue, process equipment shutdown, etc.).

3.2.3 Training

- a. Utilizing the Written Emergency Response Plan

The ERP should include a clear definition of roles and responsibilities of each position.

Some facilities have found it helpful to include the following items as part of their emergency response plans:

1. A list of "do's and don'ts" to act as a quick reference guide;
 2. Pocket cards or booklets listing the most important duties and information;
 3. Checklists for actions to be taken;
 4. Telephone lists for all personnel/agencies to be notified; and
 5. Access to personnel certified in first aid and CPR training.
- b. Orientation and training of personnel should be part of the ERP and should address the following key areas:
 1. Assignment of training responsibilities;
 2. Timetable or schedule for the training; include: start date, number of sessions held, and a target completion date;
 3. List of all materials needed - classroom training aids such as copies of the ERP and any associated checklists, diagrams, safety data on chlor-alkali products, (e.g., MSDS), clearly detailed maps showing the location of hazardous materials, emergency response and safety equipment, and rally points;

4. Yearly ERP refresher training is typical of a facility handling chlor-alkali products;
5. Documentation of all training; include: a list of personnel trained, date training completed, materials/subjects covered, and a means to verify that training was successful (e.g., verbal or written test results, documentation that trainee successfully demonstrated proficiency in the information being presented); and
6. Training should be in accordance with federal, state and local statutes, and OSHA prescribed training requirements for emergency responders (29 CFR 1910.120, Reference 5.1.2).

3.2.4 Audits and Drills

Two effective ways to determine the adequacy of an ERP training program are through the use of audits and drills. Audits should be performed periodically with various emergency response teams or members to test their knowledge of duties, communication needs, and equipment, as well as periodic auditing on actual use of the equipment. Drills should be conducted to test the participant's reactions and effectiveness in implementing the ERP as well as to test the actual mechanics of the plan. There are basically three types of drills: the full-scale drill, the in-plant drill, and the table-top drill.

Consideration should be given to conducting full-scale drills at least once a year. Consider including the following:

- a. While planning the drill, involve outside emergency response agencies, near-plant neighbors, and the potentially affected community
- b. To make the drill more realistic, during the drill involve outside agencies, management personnel, and off-shift personnel,

Periodic in-plant drills should use different simulated events and involve as many of the various crews as possible. These drills should be conducted similarly to full-scale drills except that outside emergency response services and the community are typically not involved.

Table-top drills also should be conducted periodically to test the ability of the emergency response crews to analyze an event, communicate effectively to other emergency response personnel, and respond to staged problems. This type of drill is usually conducted with just the supervisors or key members of the emergency response teams, both in-plant personnel and outside agencies.

Following any drill, a critique should be made to assess the effectiveness of the plan and to pinpoint any weaknesses in it or in the training and competency of personnel. It should address the three main parts of the plan:

- a. People
- b. Procedures
- c. Equipment

A written report of the drill should be issued and the ERP should be modified as needed.

3.3 INTERNAL COMMUNICATION

Timeliness and accuracy of communications is paramount in performing effectively at the time of an emergency response event. The following outlines considerations that should be taken when determining communication flow.

3.3.1 In-Plant and Emergency Response Personnel

This group includes people who are directly involved in the implementation of the ERP and those people who could be affected by the emergency. To ensure proper communication, there must be a clear understanding of the following items:

- a. The person and event responsible for initiating the emergency procedures (i.e. operator, supervisor, or plant manager);
- b. The person responsible for the overall coordination (Incident Commander or Emergency Response Coordinator) of the response effort, (i.e., operator, supervisor, plant manager or outside agency official such as the local fire chief);
- c. Notification procedures and information content for in-plant personnel (i.e. consequences and magnitude of the release, climatic conditions such as wind speed, direction, temperature, and characterization (e.g., clear, cloudy, rainy, icy, etc.), and the time sequence of the events); and
- d. Procedures and activation for communication to:
 - 1. Outside emergency services;
 - 2. Management personnel; and
 - 3. Near-plant neighbors/community if necessary (refer to Section 4).

3.3.2 Supervision and Management Personnel

The ERP should include proper communication to management personnel. A common procedure is to have a single person who is responsible for communicating with supervisory and management personnel. The use of a priority list (of whom to contact first) should be considered.

3.3.3 Emergency Response Headquarters

The headquarters serves as the base from which the incident commander operates. The headquarters should be: clear of any potential effects from the event that could jeopardize the response team; readily accessible; and linked with good communication systems to all parties involved. In addition, an alternate location should be selected in the event that the primary site is inaccessible.

3.3.4 Communications Equipment

Various communications equipment and back up systems should be evaluated for each facility. This equipment may include:

- a. Sirens or horns to alert in-plant and off-site personnel;
- b. Coded siren systems to indicate nature and location of emergency;
- c. Flashing lights for improved visual awareness;
- d. Manual or automatic alerting systems;
- e. Existing telephone dialing system;
- f. Special telephone numbers to avoid congestion of incoming calls;
- g. Direct emergency telephone lines;
- h. Mobile/cellular telephones;
- i. Shutdown of telephone system to incoming calls;
- j. Automatic paging system;
- k. Two-way radios;
- l. Public address or intercom systems; and
- m. Megaphones.

A program should be in place to inspect and test all communication equipment.

3.3.5 All Clear Communication

The ERP should specify who has authority to end the emergency response and authorize the All Clear signal and how this communication is to be made.

3.4 EMERGENCY RESPONSE EQUIPMENT

Defined equipment should be identified and maintained for responding to an emergency. The ERP should define: the equipment needed, where the equipment is located, who is responsible for the equipment, training requirements or certifications required for use of the equipment, and maintenance and periodic inspections of the equipment.

3.4.1 Emergency Protection Equipment

The personal protective equipment (PPE) most often used during an emergency is respiratory protection equipment and/or protective clothing. Respiratory protection should be provided for emergency response personnel and other in-plant personnel who need to remain in the affected area.

A release of sodium or potassium hydroxide requires a response quite different from that of a chlorine or hydrogen chloride release. In most releases, the primary danger is direct contact of the chemical to a person's eyes or skin. Appropriate PPE is needed to protect against such an exposure. In severe cases involving spraying of sodium or potassium hydroxide, respiratory protection is needed.

A release of sodium hypochlorite will require a response similar to that of a sodium or potassium hydroxide release unless the solution comes in contact with an acidic material. If contact with acid should occur, chlorine gas may be released and the PPE used will have to protect the eyes, skin, and the respiratory system.

Reference 5.2.6 provides specific Institute PPE recommendations for emergency responders to chlor-alkali products releases. Reference 5.2.7 provides detailed information on all aspects of normal and emergency handling of sodium hypochlorite solutions.

The following respiratory protection equipment should be provided if the incident involves the release of chlorine or hydrogen chloride:

- a. Respirators must be used until the concentration of the released gas is determined to not require respirator use. Respirators with air provided should be used if an individual is required to remain in elevated concentrations of chlorine or hydrogen chloride. These types of respirators include the following:
 1. Self-contained breathing apparatus (SCBAs); and
 2. Air-line breathing apparatus having a smaller escape bottle of air.

If other types of respirators are used, it should be ascertained that the individual will not be exposed to chlorine concentrations in excess of the respirator's design.

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- b. Escape respirators should be provided for personnel that will not respond in the event of a chlorine release, especially in areas where chlorine is produced, stored or handled and can be of the following types:
 1. Hood-type escape respirator with small capacity compressed air feed;
 2. Mouth-bite escape respirator approved for chlorine service; and
 3. Other approved respirators.

All personnel required to wear respiratory protection equipment should be trained and tested annually on its proper use. All respirators, regardless of type, should be inspected periodically as well as before and after each use. Respiratory protection equipment used for emergency response should be inspected monthly and after each use.

Appropriate personal protective equipment should be provided and be readily accessible to all emergency response personnel (Reference 5.2.6). The following types should be considered:

- a. Chemical protective clothing and suits;
- b. Gloves;
- c. Boots;
- d. Goggles;
- e. Face shields;
- f. Hard hats;
- g. Hoods; and
- h. Safety glasses.

3.4.2 Tools

Tools for emergency response personnel should be provided at designated locations. These may include:

- a. Hand tools;
- b. Flashlights;
- c. Emergency kits for chlorine container, depending on the type container used at the facility (References 5.2.1, 5.2.2, 5.2.3, and 5.2.4);

- d. Portable chlorine or hydrogen chloride monitor;
- e. Diking or absorbent materials adequate to contain or clean up liquid spills;
- f. Equipment to recover/transfer liquid spills; and
- g. Neutralization chemicals for liquid spills.

A complete list and location of the tools should be included in the ERP. These tools should be inspected periodically and personnel should be trained in their proper use.

3.4.3 Building Ventilation/Isolation

Consideration should be given to steps that can be taken to minimize the impact that a release can have on a building's occupants in the design and operation of building ventilation system. These include:

- a. Providing elevated air intakes to buildings;
- b. Providing outside air intake cutoffs for buildings;
- c. Providing building pressurization;
- d. Closing doors and windows during an emergency;
- e. Making occupants aware that chlorine is heavier in air and will tend to accumulate at the floor area and/or lower levels of a building. Hydrogen chloride is slightly heavier than air and, to a lesser extent, it may accumulate at lower levels.
- f. Providing air filtration equipment to remove chlorine and/or hydrogen chloride from air make-up.
- g. Providing chlorine and/or hydrogen chloride monitors where occupants may seek shelter in the event of a chlorine and/or hydrogen chloride release.

3.4.4 Wind Direction Indication

Wind direction indicators mounted in strategic locations throughout the facility and visible at all times are highly beneficial in helping personnel respond to the emergency.

3.4.5 Transportation Equipment

Each facility should evaluate its need for emergency response transportation equipment. Consider transportation for:

- a. First aid purposes;

- b. Control and repair of the release;
- c. Air sampling purposes;
- d. Evacuation; and
- e. Traffic diversion.

These uses should be coordinated with local emergency response agencies to determine what they will provide and what each facility will provide. This equipment should be maintained to ensure reliable operation.

3.4.6 Air Sampling/Modeling

In the event of a chlorine and/or hydrogen chloride release, consideration should be given to conducting ground level air sampling and/or computer modeling to determine the extent of the release.

- a. Portable sampling and monitoring instruments exist that can directly read chlorine and/or hydrogen chloride concentration.
- b. Computer software exists that can perform calculations and effectively model the areas likely affected during a chlorine and/or hydrogen chloride release.
- c. Reference 5.2.8 provides information to estimate the area affected by a chlorine release.

Consideration should be given to the installation of permanent monitoring devices to allow for early detection and rapid response to abnormal levels of chlorine and/or hydrogen chloride (Reference 5.2.9).

3.5 POST RELEASE MITIGATION

Authorization for the corrective action up to and including equipment shutdown should be clearly defined so that prompt action can be taken when necessary. Procedures must be established for what equipment is shutdown, how it is to be shutdown, and how units can be isolated. Personnel should be knowledgeable about techniques that can be beneficial in mitigating the effects of a chlorine and/or hydrogen chloride release. (Reference 5.3.1)

3.6 EVACUATION/SHELTERING/ACCOUNTING/RESCUE

It is beyond the scope of the pamphlet to discuss whether a facility should use evacuation or sheltering as the primary means of protection of plant personnel. Each facility should assess the advantages and disadvantages of each option and decide which is preferable.

3.6.1 Evacuation

Procedures should be developed for all personnel in the plant who are to be evacuated during an emergency. Escape respiratory protection equipment should be provided to these people. Specific assembly areas should be pre-assigned along with alternate locations so that all personnel evacuating have a designated site to go to, depending on the location of the emergency and wind direction. All in-plant personnel should be trained on evacuation procedures including the concept of going cross-wind during a release.

3.6.2 Sheltering

Procedures should be developed for all in plant personnel who are to be sheltered. Sheltering measures include closing off all ventilation, doors, and windows, and subsequent confining of the personnel for the duration of the event. (See Appendix 6.2 for more information concerning sheltering-in-place.)

3.6.3 Accounting for Personnel

There should be a procedure that accounts for all people in the facility at the time of the emergency. This procedure often involves the development of a log of all visitors to the facility and the assignment of accountability of subordinates by assigned personnel.

3.6.4 Rescue

Consideration should be given to developing and training of rescue teams. These teams should be properly equipped with safety communication equipment. The teams should be trained in equipment and trained to always work in pairs so they can assist one another in difficult situations.

Employees should not enter atmosphere immediately dangerous to life or health (IDLH) without proper respiratory equipment [References 5.1.2 (29 CFR 1910.120) and 5.2.6] and without trained, properly equipped backup personnel available for rescue.

3.7 FIRST AID/MEDICAL SERVICES

Procedures should be developed for the proper treatment of injured including on-site treatment or treatment at an emergency medical facility. (Reference 5.2.5)

3.8 UTILITIES CONSIDERATION

An evaluation should be made to determine what impact a loss of utilities would have on the functioning of the emergency response plan. Consideration should be given to the following items:

- a. Provision for alternate power supply such as an on-site generator;
- b. Automatic emergency lighting for key areas such as stairways, doorways, safety equipment locations, and the emergency response headquarters;

- c. Availability of safety showers and eyewash stations;
- d. Impact that an air loss would have on process control equipment; and
- e. Availability of chlorine and/or hydrogen chloride scrubbing/neutralizing equipment during a power, air, or water supply failure.

3.9 RESPONSES TO EMERGENCIES OTHER THAN A CHLOR-ALKALI PRODUCT RELEASE

The facility should have procedures established to handle emergencies that could occur, other than a chlor-alkali product release. Some such causes include the weather (e.g., flood, tornado, hurricane, lightning strike, and winter storm), an earthquake, an erupting volcano, a bomb threat, a civil disturbance, and a breach in security, a fire, a chemical release other than a chlor-alkali product, an explosion, or injury (ies) to personnel.

Appendix A provides as an example an emergency response due to a bomb threat.

3.10 RECOVERY NEEDS

A written plan should exist that addresses the needs of the community and facility after the emergency is over. The following should be considered in preparing the plan:

3.10.1 Community

- a. The need to medically evaluate the emergency responders;
- b. The need to identify damage and unsafe conditions requiring immediate attention or isolation;
- c. The need to document levels of exposure and contamination;
- d. The need to critique the effectiveness of the emergency response organization and the timeliness of the effort; and
- e. The need to critique the effectiveness of the actions taken at the scene and the emergency response equipment.

3.10.2 Facility

- a. Assign information gathering responsibilities for the post incident analysis and critique.
- b. Verify that the contractors used for clean up and recovery are trained per Reference 5.1.2, 29 CFR 1910.120.
- c. Characterize and properly dispose of any materials (water, PPE, etc.) generated during the response and any subsequent cleanup.

3.11 BREACH IN SECURITY

Since the events of September 11, 2001, the United States has become more aware of the need to prevent a breach in security from occurring. References 5.2.12 and 5.3.2 provide guidance on measures facilities can take to prevent against a breach in security. If there is a breach in security by terrorists, in addition to potentially causing a chemical release or inflicting material property damage, employees need to be made aware that their lives can be at risk due to violence done by terrorists. The facility should have a plan in place for employees to follow in the event of a breach in security by a terrorist group.

4. **PLANNING FOR COORDINATION WITH OUTSIDE AGENCIES**

4.1 COORDINATION WITH FEDERAL, STATE, OR LOCAL EMERGENCY GROUPS

In the United States, all Federal, State and Local governing bodies are required to meet statutory requirements of EPCRA (Reference 5.1.1, 40 CFR 355), the objective being a higher degree of preparedness to deal with incidents involving extremely hazardous materials. For example, EPCRA established the mechanism to create Local Emergency Planning Committees (LEPC). Many aspects of emergency response, especially direct interaction with the public, will be handled through various local agencies such as the fire department, law enforcement departments, health department, and/or Coast Guard. Therefore, prior planning and coordination is necessary. In some cases where fast action is needed, it may become the facility's responsibility to work directly with the public to insure its safety.

In addition to EPCRA cited above, facilities in the United States are covered by the Occupational Safety and Health Act and may be covered by the EPA's Risk Management Program (RMP) regulation (Reference 5.1.1, 40 CFR Part 68) which requires incident prevention programs as well as emergency response planning. OSHA regulations

(Reference 5.1.2) prescribe such items as emergency action plans (29 CFR 1910.38); Process Safety Management (PSM) (29 CFR 1910.119); hazardous waste operations and emergency response (29 CFR 1910.120); respiratory protection (29 CFR 1910.134); medical services and first aid (29 CFR 1910.151); and hazard communications (29 CFR 1910.1200). The threshold quantities for chlor-alkali products are shown in Table 2.

Table 2. PSM and RMP Threshold Quantities for Chlor-Alkali Chemicals

<u>Chemical</u>	<u>PSM Threshold Quantity (pounds)</u>	<u>RMP Threshold Quantity (pounds)</u>
Chlorine	1,500	2,500
Sodium hydroxide	-	-
Potassium hydroxide	-	-
Sodium Hypochlorite	-	-
Hydrogen chloride	5,000	5,000
Hydrochloric acid (as 100%)	5,000	5,000

4.2 PLANNING PRIOR TO AN INCIDENT

Primary Contact - A good primary contact for ER planning purposes is your LEPC. If an LEPC does not exist, start one where appropriate. Review your facility ER plan with your LEPC and use this opportunity to integrate your ER plan into the community ER plan.

Training - Identify and implement training of outside agency people where it is appropriate. Planners and responders need to be familiar with your facility and operations. This may be necessary because of the unique equipment and processes that exist in your facility.

Drills - Consider conducting a drill at least once per year. Involve outside emergency response agencies, near-plant industrial neighbors and potentially affected community in the planning.

Industrial Coordination - Where multiple industrial companies exist in an area, consider combining each facility ER plan with the community ER plan. In this way the overall industrial, agency, community ER plan will be more effective.

4.3 MAJOR EMERGENCY CONTROL

For the purposes of this section, a major emergency is defined as any condition that is beyond the capability of the facility to control and that could extend beyond the facility boundaries thus impacting the surrounding community.

- a. Control within the facility's boundaries generally will be by the facility's personnel. One exception could be fire fighting, since many sites do not have large fire fighting capabilities.
- b. Control outside the facility's boundaries generally will be handled by the local agencies.

4.4 EMERGENCY RESPONSE AGENCIES

Local agencies provide a capable resource for dealing with emergencies. As part of your ERP, the following should be considered.

- a. Alert emergency organizations immediately and place on standby. Have them help before a minor situation becomes a major emergency.

Examples of emergency organizations include LEPCs, law enforcement, fire departments, hospitals, utility emergency units, and health departments.

- b. Include local emergency responders in tours of your facility. Items that might be covered in the tour include a review of your emergency response plan, emergency response equipment, and the on site capabilities of the facility. Facility layout and the basics of your operations should also be reviewed.

4.4.1 Traffic Control

Traffic Control is an important part of emergency response and involves working with law enforcement agencies in limiting access to certain areas and designating road blocks and alternate routes. In some cases it may be necessary for plant personnel to handle traffic diversion until the law enforcement agencies arrive. The plan should cover the following areas:

- a. Predesignating road blocks and alternate routes;
- b. Designating an individual to work with law enforcement agencies during an emergency;
- c. Providing for the monitoring of wind speed, direction and other weather conditions and providing needed information to traffic control personnel;
- d. Keeping the facility entrance clear;
- e. Keeping railroad crossings clear;

- f. Supplying equipment (e.g., reflective vests, flashlights) for employees directing traffic; and
- g. Providing alternate route for incoming employees in case of congested traffic; consider identification cards for emergency crew.

4.4.2 Notification/Evacuation/Sheltering

The need for local notifications, evacuations and shelter in place happen quickly in an emergency. An evacuation and/or sheltering plan should be developed with the local authorities before an incident happens. Local authorities know populations and potential evacuation routes best. They also have appropriate authority to enforce these cases.

- a. Consider all wind directions, not just the prevailing case.
- b. Plan routes and traffic control for evacuations.
- c. Shelter in place requires rapid notification and response. Plan notification methods and provide training to residents.
- d. Special consideration must be given to sensitive populations such as senior citizens, schools, hospitals, etc.

Once it has been determined an event has the potential to become a major emergency, the impact on the community and the need to evacuate or shelter-in-place potentially affected residents must be quickly evaluated.

- a. Some ways to determine the need to evacuate or shelter include air sampling and dispersion estimates (see Section 3.4.6).
- b. Consideration should be given to the possibility of wind shifts.
- c. Evacuation or sheltering usually is best managed by the local authorities and must be carried-out quickly.

4.4.3 Other External Agencies/Contacts

Facilities should provide information to others who need it. For example; industrial neighbors; Coast Guard (when a facility is located on a navigable waterway); the railroad (when next to a railroad mainline or freight yard). When developing detailed plans, these organizations should be involved.

4.5 MEDICAL

Facilities should be prepared to provide medical assistance as needed.

- a. Assistance can come from a facility's own medical resources, employees trained in first aid and cardiopulmonary resuscitation (CPR), fire and law enforcement officials, paramedics, doctors and local hospitals.
- b. Make contacts with your local medical providers and provide information on treating chlorine inhalation including a copy of the MSDS.
- c. Have an appropriate number of individuals within the organization trained in first aid and CPR.

MSDSs should be consulted concerning information on first aid and medical management to personnel exposed to a specific chlor-alkali product. These should also be provided to medical personnel actually involved in emergency treatment if possible. References 5.2.5 and 5.2.10 provide additional such information to personnel exposed to chlorine.

4.6 COMMUNICATIONS

Internal and external communications are critical during an emergency. Procedures should be set up so that there is only one point of communication (with designated back up) with outside agencies. Continual updates on emergency status are important. Examples of typical communication methods/devices are as follows:

- a. Direct lines to law enforcement agencies, fire departments and local emergency planning committees;
- b. Siren systems - facility's or public;
- c. Radio stations;
- d. Hand held radios;
- e. Automatic telephone calling systems; and
- f. Emergency dial number (911 or other).

4.7 COMMUNICATING WITH THE MEDIA AND THE GENERAL PUBLIC

This section provides guidance for communicating with the news media, and communicating with the general public.

4.7.1 Communicating with the News Media

To assure current and accurate information is provided to the news media and subsequently to the public via the media, the following practices are suggested:

In advance:

- a. Prepare media background information on chlorine.
- b. Develop model/sample press statement.
- c. Establish location for media activity.
- d. Train individual(s) to interact with the media.
- e. Establish a working relationship with the local media.

During an emergency:

- a. Escort media representatives to previously established media area.
- b. Have the trained individual remain with media representatives.
- c. Provide information/prepared statement as soon as possible.
- d. Advise the media regarding periodic updates and follow through on any commitments.
- e. Be prepared to handle requests for photographs and TV pictures.

Following an emergency:

- a. Advise that the emergency has ended.
- b. Provide facts on any injuries, community impact, and cause (if known) in a media brief and/or formal press release. Be prepared to answer the following questions:
 1. What prevention measures and approaches did the facility have in place? What new measures have been identified that are needed?
 2. What is the accident history of the facility?
 3. Does the facility have equipment to detect a release?
 4. What type of emergency response equipment does the facility and community have on the site/area?
 5. What type of training is available for the employees with respect to handling emergencies?

6. What routes are used by the facility to ship and transfer hazardous materials?
 7. Was the facility required to report anything under current government regulations? If yes, what did you report and when?
- c. Provide opportunity/contact for follow-up after investigation is complete.
 - d. Escort media representatives from facility.

4.7.2 Communicating with the General Public

The news media generally will provide information to the public. Accurate, concise and prompt information to the media is important.

- a. Consider using radio and television stations to provide prompt information on the emergency.
- b. Communicate with employees so they know what to tell their friends and neighbors.
- c. Following the emergency, consider communicating the facts through the following media:
 1. Public meetings;
 2. Direct mail;
 3. Local media (newspaper, radio, or television).

4.8 EMPLOYEE RELATIONS

Injured employees need prompt appropriate medical care. Their families should be notified of their condition quickly and before news releases if at all possible. Consideration should also be given to the families of uninjured employees since news releases will spread concern throughout the community.

4.8.1 Families of Injured

Consider the following for families of the injured:

- a. Having a designated company official notify them promptly;
- b. Being prepared to assist families with transportation needs; and
- c. Being prepared to give employees and their families post injury emotional and physical assistance.

4.8.2 Others

For others, consider the following:

- a. Developing a procedure to control telephone calls

Examples:

1. Control out-going and limit incoming calls.
 2. Consider the use of "emergency use only" telephone numbers to be given to key employees and emergency groups.
- b. Notifying nearby industrial neighbors; and
 - c. Informing all employees of what happened and corrective measures taken as soon as practicable after the incident.

4.9 REPORTING REQUIREMENTS (UNITED STATES)

Chlorine, sodium hydroxide, potassium hydroxide and hydrogen chloride are listed on the Comprehensive Environmental Response and Liability Act of 1980 (CERCLA) (40 CFR 302) List of Hazardous Substances and Reportable Quantities (Reference 5.1.1).

United States law requires immediate notification of a release equal to or in excess of the reportable quantity. The reportable quantity for these materials is as follows:

<u>Chemical</u>	<u>Reportable Quantity (pounds)</u>
Chlorine	10
Sodium hydroxide	1,000
Potassium hydroxide	1,000
Sodium hypochlorite	100
Hydrogen chloride	5,000
Hydrochloric acid (as 100%)	5,000

Should a reportable release occur, the law requires these agencies be notified:

- a. National Response Center (1-800-424-8802);

- b. State Emergency Response Commission; and
- c. Local Emergency Planning Committee.

In addition state and local laws may require reporting to the appropriate state and/or local environmental agencies.

While the laws/regulations do not require direct notification of the Coast Guard, many facilities have found it mutually beneficial to directly notify the Coast Guard regarding releases that might affect the use of a waterway.

In most cases, the initial report will be by telephone for expediency. A follow up written report is also required. It is suggested that the following information be given during the telephone report:

- a. Name of company involved;
- b. Name of caller;
- c. Plant location;
- d. Chemical released (if chlorine or hydrogen chloride, state that it is on the Extremely Hazardous Substances List);
- e. Date, time and duration of release;
- f. Release quantity estimate;
- g. Information as to whether or not the release is continuing or has been stopped;
- h. The medium or media into which the release occurred (air, water, land);
- i. Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention for exposed individuals. (Health Hazard Data and First Aid information from the current Material Safety Data Sheet may be utilized);
- j. Proper precautions to take as a result of the release, including evacuation/sheltering;
- k. Wind speed and direction; and
- l. Name and telephone number of person to contact for further information.

If any agency notified has emergency response capabilities and/or responsibilities, it should also be informed of any assistance needed. (See Section 4.3).

A written follow-up emergency notice is required as soon as practicable after a reportable release. This document should:

- a. Set forth and update the verbal information given previously;
- b. Discuss actions taken to respond to and contain the release;
- c. Discuss any known or anticipated acute or chronic health risks associated with the release; and
- d. Where appropriate, give advice regarding medical attention for exposed individuals.

It is also suggested, but not required, that the final report list cause and corrective actions, with a timetable if appropriate. If the report is mailed, it is recommended it be sent certified, return receipt requested.

4.9.1 Federal Reporting Requirements

In addition to reporting to the National Response Center, the State Emergency Response Commission, and the Local Emergency Planning Committee, certain facilities are required to make annual reports of emissions of hazardous substances per the requirements of 40 CFR 372 (Reference 5.1.1).

4.9.2 State Reporting Requirements

Varies from state to state, but usually includes:

- a. State Emergency Response Commission. Immediate notification required;
- b. State Environmental Department or environmentally responsible agency. This may be more than one agency. Reporting time limits vary; and
- c. State Police. Reporting time limits vary.

4.9.3 Local Reporting Requirements

Varies considerably depending on exact location, but usually includes:

- a. Local Emergency Planning Committee. Immediate notification required.
- b. Town or city leadership groups. Reporting time limits vary.
- c. Local police or sheriff. Reporting time limits vary.
- d. Local fire department(s). Reporting time limits vary.
- e. Local Health Department. Reporting time limits vary.

5. REFERENCES

5.1 CODE OF FEDERAL REGULATIONS

- 5.1.1 Title 40, Various Parts.
- 5.1.2 Title 29. Part 1910. Various Sections. (Occupational Safety and Health Standards).

5.2 CHLORINE INSTITUTE PUBLICATIONS

- 5.2.1 Instruction Booklet: Chlorine Institute Emergency Kit "A" for 100-lb. and 150-lb. Chlorine Cylinders, ed. 10; IB/A; The Chlorine Institute Inc., Arlington, VA, **2003**.
- 5.2.2 Instruction Booklet: Chlorine Institute Emergency Kit "B" for Chlorine Ton Containers, ed. 9; IB/B; The Chlorine Institute, Inc., Arlington, VA, **2003**.
- 5.2.3 Instruction Booklet: Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks, ed. 8; IB/C; The Chlorine Institute Inc., Arlington, VA, **2006**.
- 5.2.4 Instruction Booklet: CI Recovery Vessel for 100-lb. and 150-lb. Chlorine Cylinders, ed. 1; IB/RV; The Chlorine Institute Inc., Arlington, VA.
- 5.2.5 First Aid, Medical Management/ Surveillance and Occupational Hygiene Monitoring Practices for Chlorine, ed. 7; Pamphlet 63; The Chlorine Institute Inc., Arlington, VA, **2003**.
- 5.2.6 Personal Protective Equipment for Chlor-Alkali Chemicals, ed. 4; Pamphlet 65; The Chlorine Institute Inc., Arlington, VA, 2007.
- 5.2.7 Sodium Hypochlorite Manual, ed. 2, rev.1; Pamphlet 96; The Chlorine Institute Inc., Arlington, VA, 2006.
- 5.2.8 Guidance On Complying With EPA Requirements Under The Clean Air Act By Estimating The Area Affected By A Chlorine Release, ed. 4, rev. 1; Pamphlet 74; The Chlorine Institute Inc., Arlington, VA, **2006**.
- 5.2.9 Atmospheric Monitoring Equipment for Chlorine, ed. 7; Pamphlet 73; The Chlorine Institute Inc., Arlington, VA, 2003.
- 5.2.10 Health Effects from Short-term Chlorine Exposure; Video. H-VIDEO; The Chlorine Institute, Inc., Arlington, VA, 2006.
- 5.2.11 Guidance Document: Risk Management Plans for Hydrogen Chloride, ed. 1; Pamphlet 161; The Chlorine Institute Inc., Arlington, VA, 1998.

5.2.12 Site Security Guidance for Chlorine Facilities; The Chlorine Institute Inc.,
<http://cl2.files.cms-plus.com/SiteSecurityGuidanceForChlorineFacilities.pdf>, 2002.

5.3 OTHER REFERENCES

5.3.1 Prugh, R.W.; Johnson, R.W. Guidelines for Vapor Release Mitigation; Center for Chemical Process Safety of The American Institute of Chemical Engineers: New York, NY, 1988. [This book is now out of print, but is frequently available on the web in used condition.]

5.3.2 Site Security Guidelines for the U.S. Chemical Industry: American Chemistry Council, Chlorine Institute, and Synthetic Organic Chemical Manufacturers Association, <http://www.chlorineinstitute.org/Files/PDFs/SecurityguidanceACC1.pdf>, 2001.

6. APPENDICES

6.1 EXAMPLE EMERGENCY RESPONSE PLAN

6.1.1 Background Information

The ABC Chemical Company is a fictitious chlorine repackaging plant located in Cityville, Any State. This repackager buys chlorine in 90 ton railroad tank cars and repackages the material into one ton containers. ABC Chemical Company has four packaging operations in the mid-western United States. Relevant facts pertaining to the Cityville facility are as follows:

a. Staffing (Organization Chart Attached):

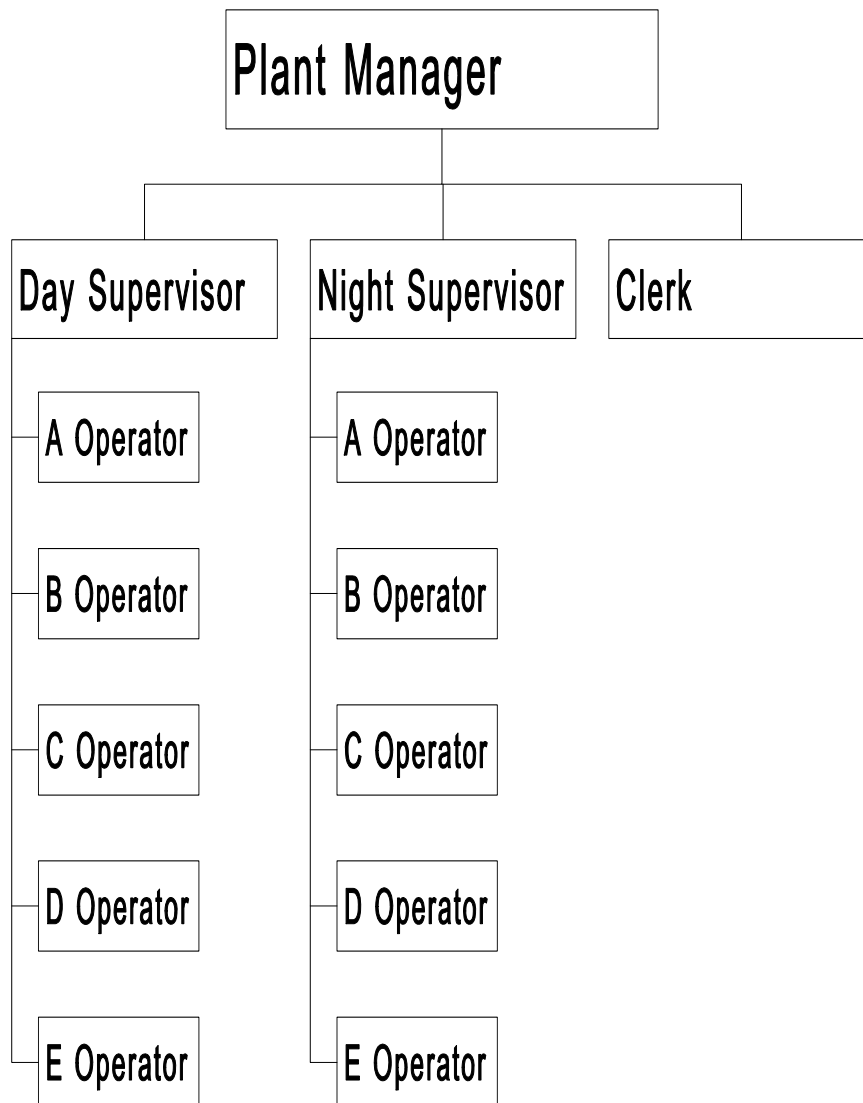
1. Manager
2. Two Supervisors
3. One Clerk
4. Ten wage-roll employees

b. Operations:

1. Repackages chlorine during two 8-hour shifts, Monday -Friday (7am - 11pm).
2. Has two combination safety shower and eyewash stations.
3. Has a first-aid facility capable of administering oxygen.
4. Has two employees qualified to provide first aid on each shift.
5. When not operated, the facility is locked and protected by an industrial type chain link fence.
6. Has no emergency back-up electrical supply.
7. Has back-up battery-operated emergency lighting.
8. Is located in a small industrial park with three neighbors.
9. Two neighbors operate Monday - Friday (7am - 5pm).
10. The third neighbor operates 24 hours a day Monday - Friday.

11. There is a residential subdivision of some 50 homes about 1/2 mile northeast of the plant.
12. Has five (5) Self-Contained Breathing Apparatus with five (5) replacement bottles located at designated areas per the map mounted in the clerk's office.
13. The following emergency/protective equipment is available:
 - a. One "C" Kit;
 - b. One "B" Kit;
 - c. Miscellaneous Tools; and
 - d. Flashlights, rubber gloves, goggles, and hard hats for all personnel.
14. The facility is located in a county of some 200,000 people.

Organizational Chart Cityville Plant



EMERGENCY RESPONSE PLAN

ABC Chemical Company

Cityville Plant

This prototype plan is presented as a guidance document to assist facilities in developing and maintaining an Emergency Response Plan. In this prototype plan, the facility has pre-determined its actions regarding internal and external communications, and regarding frequency of training. Another facility may determine different course of actions and still be consistent with the recommendations of this pamphlet.

Phone List			
Plant Personnel			
Title	Name	Home Phone	Cell Phone
Plant Manager	John Smith	555-1122	555-7894
Day Shift Supervisor	Wilma Reynolds	555-5579	555-7895
Evening Shift Supervisor	Dave Jacobs	555-1729	555-7896
Clerk	Tammy Edwards	555-7526	
Day Shift Operators			
A	Tom Miles	555-6217	
B	Mike James	555-9874	
C	Mary Roberts	555-8645	
D	Brian McNicoll	555-6823	
E	Bill Daniel	555-6186	
Night Shift Operators			
A	Mike Rizzo	555-1495	
B	Pat Garza	555-9845	
C	Sandy Davies	555-3796	
D	Donald Hines	555-5671	
E	Roger Suggs	555-6718	
ABC Corporate Personnel			
Title	Name	Home Number	Office Number
President	Michael Roberts	1-606-555-1211	1-606-555-1100
Vice President	Sancha Roso	1-606-555-1817	1-606-555-1100
Regulatory Contacts			
National Response Center (NRC)		1-800-424-8802	
Local Emergency Planning Committee (LEPC)		555-2211	

Phone List (Continued)	
Regulatory Contacts (Continued)	
Regional Air Pollution Control Commission	1-617-555-8800
State Police	911
County Sheriff	911
Cityville Fire District C	911
Other Contacts	
CHEMTREC/CHLOREP	1-800-424-9300
Cityville Community Hospital	555-3600
Neighboring Plants	
Sandy Manufacturing	555-6700
Alliance Glass	555-4388
Reliable Fabricators	555-6111

CITYVILLE PLANT**1. PURPOSE**

The purpose of the Emergency Response Plan (ERP) is to effectively respond to a chlorine or sodium hydroxide release to minimize injuries, lessen the impact in the community, minimize plant damage, and provide guidance to local emergency response personnel.

2. TYPES OF EMERGENCY**a. Chlorine Release**

In the event of an equipment or human failure, potential sources for a chlorine release include:

1. Chlorine tank car;
2. Tank car unloading and transfer line; or
3. One ton chlorine container.

b. Sodium Hydroxide Release

In the event of an equipment or human failure, potential sources for a sodium hydroxide release include:

1. Sodium hydroxide tank truck;
2. Tank truck unloading and transfer line; or
3. Sodium hydroxide storage tank and associated piping.

At this facility, the loss of any utilities including electricity will not increase the potential for a chlorine or sodium hydroxide release.

3. SCOPE

The scope of this plan includes:

- a. A chlorine or sodium hydroxide release contained within the plant facilities and controllable by plant personnel and equipment.
- b. A chlorine release affecting or with the potential to affect the area surrounding the facility; such a release would require outside assistance.

An emergency caused by the release of sodium hydroxides should be within the capability of the plant to respond. The primary concerns should be to prevent the exposure of emergency responders to direct contact of the sodium hydroxide and to prevent or minimize the effects of the release from doing environmental damage to any receiving water stream.

4. PLANNING FOR HANDLING THE EMERGENCY

Responsibility:

The Plant Manager is ultimately responsible for the implementation of the plan. He is responsible for keeping the plan current and insuring that all employees are properly trained.

Activity	Responsibility		
	Day Shift	Night Shift	Other Times
Initiating the emergency response plan	any employee	any employee	call duty supervisor
Overall coordination	supervisor	supervisor	call duty supervisor
Inside communications	supervisor	supervisor	call duty supervisor
Outside communications	supervisor	supervisor	call duty supervisor
First aid/rescue	B & C operators	B & C operators	call duty supervisor
Phone answering	clerk	any available employee	call duty supervisor
Agency notification	ranking on-site supervisor	ranking on-site supervisor	ranking on-site supervisor
Emergency repair	D & E operators	D & E operators	as assigned
Employee accounting	B operator	B operator	not applicable
Visitor accounting	clerk	not applicable	not applicable

4.1 Alarm

The ERP is initiated by any employee sounding any of the emergency response alarms. There are four strategically placed alarm buttons around the facility, any of which sound the two tone electronic emergency response alarms. This alarm system will sound for about five minutes if activated during a power failure.

4.2 Assembly Area

Primary Clerk's Office

Secondary - Rear Gate

Upon hearing the alarm, each employee is to secure his job and report to the primary assembly area (Clerk's office). If inaccessible, he should report to the secondary assembly area (rear gate) and the office is to be closed off. As part of securing the job, any fans operating in the warehouse are to be shutoff. Each employee should be aware of any chlorine release and should note the wind direction (observe the wind sock on the outside roof of the warehouse). Walk crosswind or stay upwind of any chlorine release.

The clerk will account for any visitors by checking the sign-in log maintained in the office. B Operator will account for all employees. In the absence of the B Operator, the C Operator will perform this task. If anyone is not accounted for, the supervisor is to be immediately advised. In the absence of the Supervisor, the A Operator will be notified.

4.3 Overall Emergency Response Coordination

The shift supervisor is the responsible overall emergency response coordinator. Responsibilities include the following:

a. Determine the need for a rescue team.

The rescue team consists of Operators B and C with Operator A serving as back up. It is the policy of this facility to certify these employees in the Red Cross First Aid Program. Rescue team members must wear self-contained breathing apparatus (SCBA) before entering an area.

b. Determine the need for an emergency repair team.

The emergency repair team consists of Operators D and E, with Operator A serving as back up.

- c. Determine the need for outside assistance and/or notification.

As overall emergency response coordinator, the shift supervisor is authorized to notify directly or through delegation, the appropriate outside agencies/neighbors. These may include the fire department, police (sheriff) department, Local Emergency Planning Committee (LEPC), industrial or residential neighbors, and anyone else who might provide assistance in responding to the emergency or who might be affected by it.

- d. Contact additional plant personnel to assist in the response.

The plant manager and the off-shift supervisor are to be contacted as soon as practical to assist in the response. If there is no answer at the home phone, call that person's pager number. When someone is reached, have that person contact the other. That person can also be used to contact any needed non-supervisory personnel.

- e. The A Operator is designated back up to the shift supervisor and is responsible for performing all the duties in the event of the unavailability of the supervisor.

4.4 Phone Answering

During the day shift, the telephone will be staffed by the clerk. During the evening shift, it will be staffed by any available employee. Any requests from the media are to be referred to the emergency response coordinator. If that person is unavailable, take the person's name, organization, and phone number. Persons assigned to answering the phone are not authorized to discuss the incident with the media or with any other callers except people involved with the emergency response. Simply state "We have had an emergency. We are responding to it now (or it is now ended). Someone from this facility will return your call as soon as possible if you will give me your name, organization, and phone number. I am not authorized to give you any information." Give your name if asked.

4.5 Non-Work Hours Procedures

The plant is not staffed during the 11 p.m. - 7 a.m. period, weekends, or holidays. It is the policy of the plant to have all tank cars and ton containers disconnected and secured during these periods. During non-working hours, all gates and building entrances should be closed and locked. A call-duty supervisor is to inspect the plant once a day during weekends and holidays. He is authorized to initiate the emergency response plan during these periods.

If the call-duty supervisor receives a call from a neighbor regarding a plant problem, he is authorized to initiate the emergency response plan.

The call-duty supervisor will use his own discretion in seeking additional help. In no event is he to enter an area containing fugitive chlorine unless there is another employee with him and appropriate respiratory protection is worn.

4.6 Outside Assistance

The overall emergency response coordinator will meet or will delegate an available person to meet at the front gate and escort any outside responders notified by the coordinator to assist in the response. If the front gate is not accessible, the responders should be met at the public road upwind of the release.

4.7 Media Inquiry

Media inquiries should be handled, as time permits, by the emergency response coordinator or other supervisory personnel. Arriving media representatives should be allowed to wait in the clerk's office, if accessible. No one other than plant employees and emergency responders are allowed access to the plant at anytime during the emergency without prior authorization.

When time permits, the media personnel should be given background information on the involved chemical(s) (e.g., Chlorine Material Safety Data Sheet). When facts are known about the incident and the cause, these should be given to the media. ANY PERSON DISCUSSING THE INCIDENT WITH THE MEDIA MUST NOT SPECULATE AS TO THE CAUSE OF THE INCIDENT. IF THE CAUSE IS KNOWN, SO ADVISE THE MEDIA. IF THE CAUSE IS NOT KNOWN, ADVISE THE MEDIA IT IS UNDER INVESTIGATION. NORMALLY THE QUANTITY OF THE CHEMICAL RELEASED DURING AN INCIDENT IS UNKNOWN UNTIL A THOROUGH INVESTIGATION IS COMPLETE. IF SUCH IS THE CASE, SO ADVISE THE MEDIA.

When dealing with the media remember to be honest, courteous, straight forward, and concerned. Do not speculate. Do not give "off the record" comments.

4.8 Shelter/Evacuation

Even though this facility has worked closely with the LEPC, a decision regarding whether to evacuate or to shelter affected outside persons is a difficult one. Generally for us, even a significant chlorine release is likely to last, at most, 30-40 minutes before it is contained.

Therefore, sheltering in place is the normal mode to be utilized during an emergency. While it is unlikely that this facility could have a chlorine release requiring evacuation, nevertheless, we must be prepared for such an eventuality. If it is anticipated that a release cannot be soon contained or is of a massive quantity, the evacuation option should be utilized.

4.8.1 Residences

Notify the fire department and suggest that sheltering of residences for 1/2 mile be implemented. In accordance with our past discussions with the LEPC, the fire department

will make the necessary notifications in accordance with the previously agreed upon sheltering plan. Residences will be notified to shut windows and close any ventilation system and listen for further advisories.

4.8.2 Neighboring Facilities

The three neighboring facilities are to be directly notified if they are affected or potentially affected. These facilities have pre-established emergency response procedures which have been discussed with this facility's management.

4.8.3 Responsibility

These duties are the responsibility of the overall emergency response coordinator. (Section 4.3). He may choose to delegate some or all of these duties to Operator A.

4.9 CHLOREP - Outside Assistance

In the event we are unable to contain a chlorine tank car or ton container leak, contact the supplier per the phone list in the clerk's office. If assistance cannot be obtained, contact CHLOREP through CHEMTREC at 1-800-424-9300. The problem should be described with the required help needed. Be certain to give your name, phone number, company name, address and other information needed. The emergency response coordinator will make these contacts.

4.10 Emergency Treatment

As part of our response plan, ABC Chemical has pre-authorized the Cityville Community Hospital to treat any person showing up with alleged chlorine (or irritating gas) inhalation from within a 2 mile radius of the plant. We have provided the hospital with medical information concerning chlorine inhalation.

Any injured employee suffering from chlorine inhalation should be sent to the hospital. Any injured employee with possible chemical burns due to contact with sodium hydroxide to the face or eyes, or with anything other than incidental contact to be sent to the hospital. To the extent possible, the employee should be accompanied by another plant employee. Notification to the family should be made as soon as practicable by a supervisor per the plan outlined in the Employee Handbook.

4.11 All Clear

The overall emergency response coordinator is to give the all clear signal when the emergency condition is eliminated. This notification is to be given verbally to all plant employees, any emergency responders, to affected neighbors, and, if involved, the news media.

4.12 Recovery Needs

A written plans kept in the plant manager=s office. This plan addresses communications and activities that may be implemented after the emergency is over. This plan is reviewed annually by the plant manager and the two supervisors.

5. **BOMB THREAT PROCEDURES**

Most bomb threats are received by telephone and many are hoaxes. However, it is important to treat any threat received as serious. It is most important that the person answering the phone try to get as much information from the caller as possible. The bomb threat work sheet which is stationed by the outside phone is to be completed for any such threats (Attachment 1).

The procedure outlined in Figure 1 is to be followed.

Bomb threats received by mail should be taken as credible. There may be sufficient time to evaluate what to do depending what is contained in the letter. Employees should follow the pre-cautionary procedures posted above the postage machine prior to opening the mail.

6. **BREECH IN SECURITY**

This facility has implemented numerous steps to prevent against a breach in security. These steps are discussed in the facility's security plan. In the event of a breach in security, the personnel must make a decision as to the motives of those breaching the facility. Because of the steps taken, it is highly unlikely that a security breach could occur without an well thought out and executed plan by a terrorist group. In such an unlikely event, the police should be called to handle the situation. If the perpetrators are terrorists, they will likely seek to inflict maximum destruction as quickly as possible. In such a situation lives are at risk. Any personnel should attempt to seek outside help via dialing 911 without placing undue additional risk on oneself.

7. **WEATHER THREAT PROCEDURES**

For most severe weather conditions (e.g., hurricane, severe cold), there is ample warning and an agreed upon plan will be decided at the time. In the event of a tornado warning or of

a tornado sighting, all chlorine packaging operations should be stopped by tripping the automatic closure valves. Employees should then seek immediate shelter in the conference room within the change house building.

8. OUTSIDE REGULATORY AGENCY NOTIFICATION

Contact is to be made by the ranking supervisor at the facility.

8.1 Verbal Notification

The law requires that this Facility immediately report any releases of chlorine equal to or greater than ten pounds or of sodium hydroxide equal to or greater than 1,000 pounds to the following agencies:

1. National Response Center;
2. Local Emergency Planning Committee; and
3. State Emergency Planning Commission.

Information should include the following:

1. Chemical released – chlorine or sodium hydroxide;
2. Chlorine or sodium hydroxide is on the Extremely Hazardous Substances List;
3. Estimate quantity released. If not sure, for chlorine simply state, "10 pounds or more"; and for sodium hydroxide simply state, "1,000 pounds or more";
4. Time and duration of the release;
5. The medium or media into which the release occurred;
6. Medical information about the chemical released. Advise that pre-incident plans have been arranged with the LEPC and the Cityville Community Hospital.
7. Evacuation plans if needed;
8. Name and phone number of the person to be contacted for further information.

THE AGENCY NOTIFICATIONS ARE TO BE IMMEDIATELY AFTER THE INCIDENT HAS OCCURRED.

8.2 Written Follow Up

As soon as practicable after the release, a follow-up written notice is to be provided to these agencies following the procedures in the ABC Chemicals Procedure Manual.

8.3 Other Environmental Agency Contacts

It is the policy of this plant to verbally notify the Regional Air Pollution Control Authority as soon as practicable after notifying the required agencies.

8.4 OSHA Notification

In the event of a fatality or multiple hospitalizations, OSHA is to be notified within 48 hours in accordance with OSHA regulations. This notification will be handled per the procedure in the ABC Chemicals Procedures Manual.

9. TRAINING

Annual refresher training for all personnel will be done in the second quarter of each year in accordance with the facility's annual training plan.

10. EXERCISES (DRILLS)

Exercises will be conducted as follows:

- In-Plant: One per quarter
- External: One per year (3rd quarter)

To the extent possible, the external drills should include participation by representatives of the LEPC, the Cityville Fire District C, and the County Sheriff. Our neighboring industrial plants, the Cityville Community Hospital, and other affected external groups should be offered should be invited to participate.

ATTACHMENT 1

BOMB THREAT PHONE CALL - ACTION OUTLINE

Time Call Received _____ Time Caller Hung Up _____

Exact words of person placing call _____

Questions to Ask:

1. When is bomb going to explode? _____

2. Where is bomb right now? _____

3. What kind of bomb is it? _____

4. What does it look like? _____

5. Why did you place the bomb? _____

Person (receiving) (monitoring) call _____

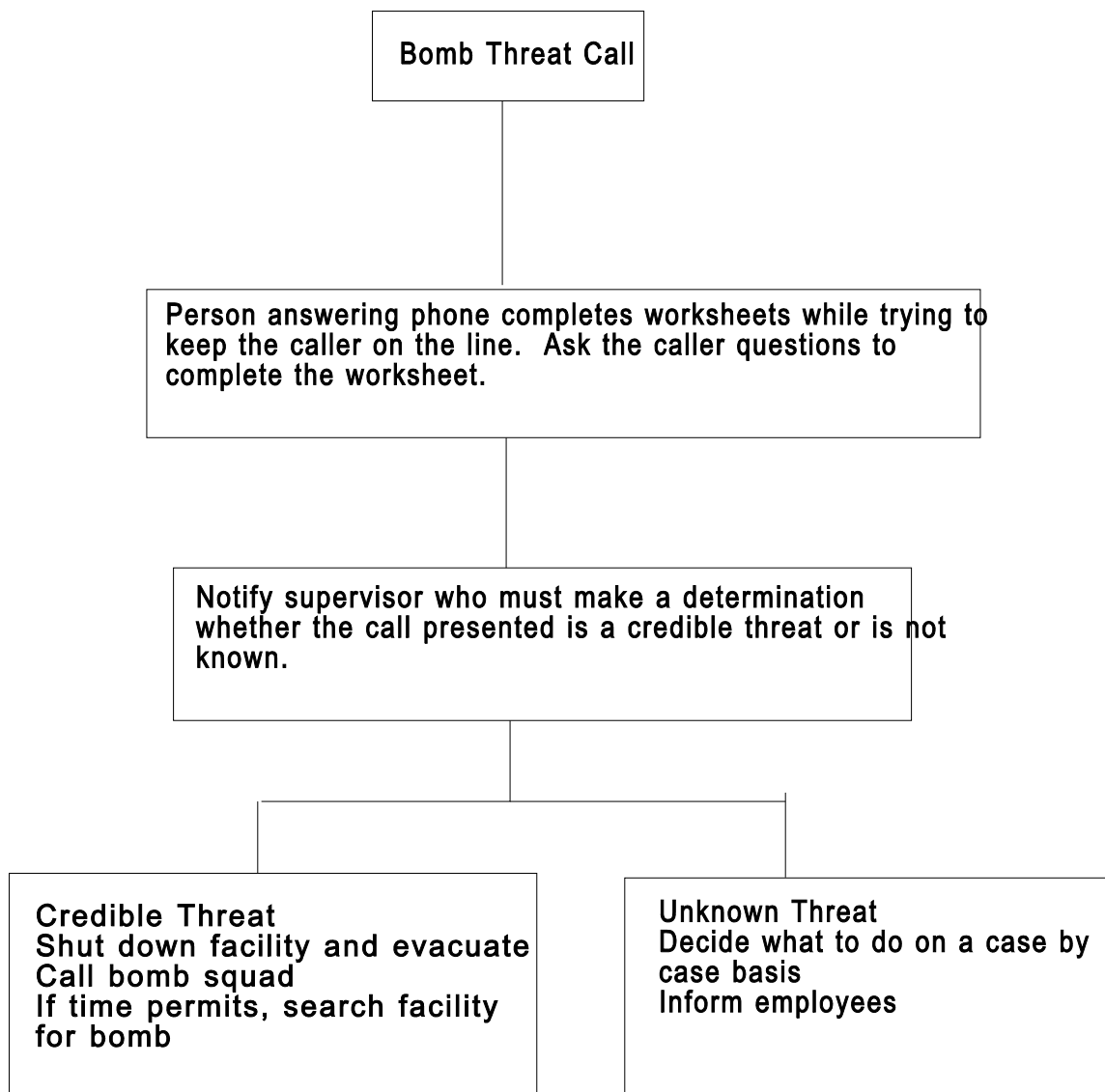
Department: _____ Telephone Number: _____

Home Address: _____

Home Telephone Number: _____

Date _____

Figure 1 Bomb Threat Procedure



6.2 SHELTER-IN-PLACE INFORMATION

In the event of an emergency involving a chlorine release the local authorities must decide quickly what emergency response action to take. The decision to Shelter in Place or evacuate should be preplanned based on many factors. Because of the complexity of the decision making process as well as the uniqueness of each location this appendix does not provide an overall recommendation. Local authorities have the following options:

1. Evacuate the public to a safe location where the concentration of the toxic release will have no impact on human health.
2. Recommend that people in the impacted area to Shelter-in-Place.

The decisions related to chlorine gas releases from producer or user facilities should be pre-planned taking into account these factors:

1. The size and duration of the release.
2. The “quality” of the sheltering locations.
3. The knowledge of the individuals being asked to shelter in place.
4. The time available to take action.
5. The ability of people to evacuate safely.

Facilities should work with the local emergency response organizations to develop emergency response plans.

A brief discussion on these five factors is offered to assist in the planning process.

1. The size and duration of possible release.

Reference 5.2.8 provides guidance on the impact and duration of worst case and alternate release scenarios.

Generally speaking the longer the incident continues the less effective will be the sheltering in place. The concentration inside the building is a function of the concentration outside and the air infiltration rate into the building. Shifting wind directions may allow for longer sheltering in place but this can not be counted on in the planning phase.

2. The “quality” of the sheltering locations.

The “quality” of the sheltering location depends on the air infiltration rate (both forced and natural). This varies widely. General housing and industrial buildings can have air change rates of between one half to four changes per hour. It can be easily measured but is not always easy to predict. In northern climates the houses are

constructed fairly tight in order to reduce heating costs. However, since air conditioning is not generally installed, the windows are kept open in the summer to cool the house. This is also the time when people are sleeping in the residence. With advance warning, the “quality” of the shelter can be vastly improved. A search of the web for “Shelter in Place” brings up many government, non profit, and commercial documents on how to preplan for shelter in place. They discuss how to select and prepare a room to lower the air infiltration rate. The following is an example from the American Red Cross:

<http://www.redcross.org/services/disaster/beprepared/shelterinplace.pdf>

3. The knowledge of the individuals being asked to shelter in place.

Knowledge is essential for effective sheltering in place. The people sheltering must understand how to reduce the air infiltration into their shelter. They must also have effective communication with the local authorities so that they will know when the hazard has passed and they should exit the shelter.

The concentration inside the shelter is a function of the concentration outside and the air infiltration rate. During the incident the concentration inside the shelter will rise to match the concentration outside. (given enough time) Once the incident has passed, the concentration of toxic gases inside the shelter will start to drop but this reduction will be limited by the air infiltration rate.

Good communication will allow notification of the individuals sheltering in place that it is better to leave the shelter.

Running a local training exercise to practice sheltering in place is an excellent way to improve the knowledge of the community. This link provides access to the LEPC information exchange across the US. It contains many examples of Sheltering in Place procedures as well as training aids.

<http://www.lepcinfoexchange.com/vid-dvd>

4. The time available to take action.

The public must have sufficient time to evacuate to a safe area prior to the cloud reaching the area being evacuated. However, often there is little warning of these events. The emergency response team could decide to have a shelter in place strategy for those close to the incident and an evacuation strategy for those further away.

5. The ability of people to evacuate safely.

Evacuations can lead to accidents, traffic jams and no place to shelter when the wind shifts during the evacuation. The evacuation plan will need to consider these factors as well as the congestion in the area.

6.3 BOMB THREAT PROCEDURES

6.3.1 Introduction

This section covers suggested procedures to follow when a bomb threat is received. Facilities should review these procedures as modify them as appropriate to fit individual needs.

Although most bomb threats experienced throughout the country turn out to be hoaxes, any bomb threat should be treated as real until determined otherwise. Because of the serious nature of a bomb threat, this procedure should be included in the ERP along with responses to other types of emergencies as listed in Section 2.4.

Upon receipt of a bomb threat, the Emergency Response Coordinator should be notified.

6.3.2 Receiving a Bomb Threat Call

The person receiving the call should make every effort to obtain as much information as possible from the caller. At the outset of the conversation, an attempt to trace the call should be made by having someone else call the telephone company operator on another phone and report: "This is _____ at the _____ Company, address, and phone number. We are receiving a bomb threat telephone call. Please attempt to trace the call. I will remain on this line if you wish."

A record should be kept of any bomb threat received.

6.3.3 Receiving a Bomb-Threat Letter

Employees opening the mail should be aware of suspicious packages. Letter bombs are not common in the United States but personnel should be aware that such devices exist and can be very small.

6.3.4 Possible Courses of Action and Considerations:

- a. Initiation of the Emergency Response Plan;
- b. Full, partial or non-evacuation of the affected area or plant;
- c. Steps which may be taken to lessen the effect of the blast. These steps may include movement of flammable or explosive material away, repositioning tank cars and tank trucks, and/or shutdown of part or full process;

- d. If detonation time has been stated, serious consideration should be given for personnel evacuation; and
- e. Initiation of bomb search team.

A facility should decide in advance how much discretion should be given to the bomb search team. When procedures are non-discretionary, (e.g. mandatory shutdown and/or evacuation in certain instances), the procedures should be documented.

Major priorities for bomb surveillance include:

- a. Personnel areas (control room, locker rooms);
- b. Chlorine storage and production; and
- c. Utility lines and centers (motor control center, transformer, power lines).

6.4 CHECKLIST

This check list is designed to emphasize major topics for someone who has already read and understood the pamphlet. Taking recommendations from this list without understanding related topics can lead to inappropriate conclusions.

Place a check mark (✓) in the appropriate box below:

Yes	No	N/A		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Does the ERP address emergencies of different scopes?	{2.5}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Does the facility have a procedure for keeping the ERP current?	{2.6}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Are specific responsibilities for each emergency response team member specified?	{3.2.1}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Is periodic training conducted for emergency response team members?	{3.2.3}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Are periodic audits and drills of the ERP conducted?	{3.2.4}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Does the plan specify who is responsible for specific tasks such as initiating the ERP, coordinating the implementation of the ERP, and making necessary notifications?	{3.3.1}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Have primary and backup ERP headquarters been specified?	{3.3.3}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Does the ERP address communication equipment needs?	{3.3.4}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Does the ERP designate who will give, and how, the all clear communication?	{3.3.5}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Does the ERP address emergency response equipment needs?	{3.4}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Does the ERP address post-release mitigation needs?	{3.5}
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Does the ERP address evacuation or sheltering in place, accounting for personnel, and rescue efforts?	{3.6}

- | | | | | |
|--------------------------|--------------------------|--------------------------|---|-------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 13. Does the ERP address first aid and medical services needs? | {3.7} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 14. Does the ERP address utility needs? | {3.8} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15. Does the ERP address responses to emergencies other than a chlorine release? | {3.9} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 16. Does the ERP address recovery needs? | {3.10} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 17. Has the facility addressed security issues? | {3.11} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 18. Has the facility coordinated its ERP with appropriate outside agencies? | {4.1 - 4.5} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 19. Has the facility established procedures for communicating with the general public and the news media? | {4.7} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 20. Has the facility established procedures for communicating with its employees and their families? | {4.8} |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 21. Has the facility established procedures for required communications with various regulatory agencies? | {4.9} |

REMINDER:

Users of this checklist should document exceptions to the recommendations contained in this pamphlet.



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