

CHLOREP Handbook

Edition 8

December 2023



The Chlorine Institute, 1300 Wilson Boulevard, Ste. 525, Arlington, VA 22209

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1. INTRODUCTION

1.1 SCOPE

The Chlorine Emergency Plan (CHLOREP) Handbook provides guidelines for CHLOREP Team organization and operations for chlorine emergency response, including responsibilities and expectations. All Chlorine Institute (CI or the Institute) member companies that ship/distribute chlorine are required to provide CHLOREP Teams for mutual aid response to chlorine emergencies within their designated sectors. Other CI members, such as chlorine users, may also agree to commit CHLOREP Teams to the mutual aid network. In addition, CI verifies emergency response contractors (CHLOREP Contractors) to supplement responses to chlorine emergencies.

1.2 CHLORINE INSTITUTE STEWARDSHIP PROGRAM

The Chlorine Institute (CI or the Institute) exists to support the chlor-alkali industry in advancing safe, secure, environmentally compatible, and sustainable production, distribution, and use of its mission chemicals¹.

Institute members are committed to adopting CI's safety and stewardship initiatives, including CI 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 ACRONYMS

In this pamphlet, the following meanings apply, unless otherwise noted:

ANIQ	Asociacion de la Industria Quimica en Mexico (National Association of the Chemical Industry in Mexico).
CANUTEC	Canadian Transport Emergency Centre operated by Transport Canada in Ottawa, Ontario
Carrier	A common, contract or private carrier
CFR	The U.S. Code of Federal Regulations
CHEMTREC	The Chemical Transportation Emergency Center operated by the American Chemistry Council in Falls Church, VA
CHLOREP	Chlorine Emergency Plan

¹ CI's mission chemicals: chlorine, sodium and potassium hydroxides, sodium hypochlorite, the distribution of vinyl chloride monomer (VCM), and the distribution and use of hydrogen chloride.

CHLOREP Contractor	An emergency response contractor having special expertise in responding to chlorine emergencies and is verified at a Level 2 or Level 3 capability by the Institute (see Section 2.2.4 for details)
CHLOREP Team	A group consisting of a Team Leader and one or more team members to respond to a chlorine emergency
CERCLA	U.S. Comprehensive Environmental Response, Compensation, and Liability Act of 1980
Company CHLOREP Coordinator	The person responsible for the coordination of all of a Participant's CHLOREP Teams
DOT	The U.S. Department of Transportation
Emergency	An incident involving chlorine which creates a potential or actual public hazard
Emergency Caller	The person at the scene of an emergency who makes the initial call to an Emergency Response Call Center
Emergency Contact	The person(s) that answer(s) the 24-hour emergency telephone number maintained by each CHLOREP Team
Emergency Response Call Center	CHEMTREC in the United States or CANUTEC in Canada
EPA	The U.S. Environmental Protection Agency
ERG	Emergency Response Guidebook (published by U.S. DOT, Transport Canada, and Mexican Secretariat of Infrastructure, Communications and Transportation)
FEMA	The U.S. Federal Emergency Management Agency
HAZWOPER	The OSHA standard in 29 CFR 1910.120 concerning the method for managing hazardous materials incidents
MEDTREC	The Medical Treatment Emergency Communications providing medical emergency response support for emergency calls into CHEMTREC involving chemical exposure
NFPA	National Fire Protection Association
OSHA	U.S. Occupational Safety and Health Administration

Participant	A company which, by signing the CHLOREP Participation Agreement (Attachment II), undertakes providing one or more CHLOREP Teams for a chlorine emergency in their designated sector
Public Official	Any official of federal, state, provincial, or local governments having responsibility for public safety with respect to an emergency
Public Relations Assistant	Company representative who handles relations with the press to provide accurate information relative to the chlorine emergency
Primary CHLOREP Team	The CHLOREP Team within a sector that has been designated the primary response group to be notified when a chlorine emergency occurs within a sector and to provide assistance, as needed. One Primary Team is assigned to each sector.
SARA	“Superfund Amendments and Reauthorization Act of 1986” (40 CFR Parts 300-373, Subchapter J - Superfund, Emergency Planning, and Community Right-to-Know Programs)
Secondary CHLOREP Team	A supportive CHLOREP Team that is listed as a secondary line of response when a chlorine emergency occurs within a sector. This Team will be contacted if a Primary Team is unable to respond to or requires assistance at a chlorine emergency.
SETIQ	Sistema de Emergencia para la Transportacion de la Industria Quimica operado por la Asociacion de la Industria Quimica (ANIQ) en Mexico. (Transport Emergency System for the Chemical Industry operated by the National Association of the Chemical Industry in Mexico).
Sheltering in Place	To take shelter indoors with windows and doors tightly closed and all air intake devices, such as air conditioners and fireplaces, are shutoff/closed
Team Leader	The person in charge of a CHLOREP Team
TC	Transport Canada
USCG	The U.S. Coast Guard

1.4 DISCLAIMER

The information in this document 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 modification or additional procedure. The user should be aware that changing technology or regulations may require a change in the recommendations herein. Appropriate steps should not be confused with federal, state, provincial, municipal or insurance requirements, or with national safety codes.

1.5 APPROVAL

The Institute's Emergency Preparedness Issue Team approved Edition 8 of this CHLOREP Handbook on December 1, 2023. Edition 8 takes effect as of this approval date.

1.6 REVISIONS

Suggestions for revision should be directed to the Institute's Vice President of Transportation and Emergency Preparedness.

1.6.1 Significant Revisions in Edition 8

Significant revisions in Edition 8 include:

- Updates that are specifically applicable to the operation of CHLOREP in Mexico (throughout);
- Updated U.S. & Canada Sector Map and New Mexico Sector Map (Appendix I);
- Inclusion of guidance on handling orphaned chlorine containers (Appendix IV); and
- Minor updates throughout.

1.7 REPRODUCTION

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

2. **GENERAL**

2.1 CHLOREP HISTORY & MISSION

In 1931, CI compiled a detailed record of all accidents involving the transportation of chlorine, dating back to 1909, and continued to periodically update this record of known accidents. Once this record of chlorine emergencies was developed, CI had

a basis on which to assess the industry's safety efforts. Out of this came an informal, and perhaps unique, program: Any chlorine producer, upon request, would rush necessary emergency equipment and personnel to the scene of a chlorine emergency to prevent or control any gas release, even if the shipment did not originate with the responder.

This mutual aid system, which functioned since the 1930s, was formalized in 1972 as the Chlorine Emergency Plan (CHLOREP). CHLOREP exists to:

1. Prepare and educate participants to assure effective emergency response preparedness, prevention and mitigation of chlorine incidents; and
2. Ensure timely and professional response to all chlorine incidents.

The CHLOREP network is made up of emergency response teams from all chlorine facilities in the U.S. and Canada that ship chlorine, as well as some chlorine users and verified emergency response contractors. To ensure that the CHLOREP mission is achieved, there is a large focus on the training of CHLOREP personnel in the proper response to incidents involving a potential or actual chlorine release. The CHLOREP Handbook has been developed to serve as a guide for the organization of these response teams. Since its creation, to advance the mission further, CHLOREP and the individual CHLOREP Teams work with various government and community groups to provide assistance and training in chlorine emergency response.

The primary scope of CHLOREP response is for chlorine emergencies in transportation and at smaller end-user facilities. Participating CHLOREP Teams are not expected to provide mutual aid response assistance for other chemicals.

2.2 CHLOREP NETWORK ORGANIZATION

2.2.1 CHLOREP Sectors

The CHLOREP emergency response mutual aid network is divided into 26 sectors across the United States, Canada, and Mexico, which aids in an organized and expedited response. Each sector has a Primary CHLOREP Team and one or more Secondary CHLOREP Teams that are available 24/7 to provide a rapid and effective response to chlorine emergencies. See Appendix I for the current CHLOREP Sector Map (as of the approval date of this Handbook). This map is periodically updated based on changes in CHLOREP participation. The most current CHLOREP Sector Map can be found on the CI website.

2.2.2 Primary CHLOREP Teams

A Primary CHLOREP Team is a CHLOREP Team within a sector that receives calls from the Emergency Response Call Center to provide assistance in a chlorine emergency within its sector. This Team will immediately call the Emergency Caller and determine the type of assistance and response required for the emergency. Response may simply include providing technical assistance by

phone. However, more significant situations may require the CHLOREP Team to dispatch to the emergency scene.

The Primary Team may call upon a Secondary Team within its sector or CHLOREP Contractor to assist in the response depending on the location and/or containers involved. The Primary Team Leader will be responsible for submitting a Post-Emergency Critique to the Institute (see Section 16).

In Mexico, the Emergency Response Call Center (SETIQ) will contact the official authorities (Civil Protection) and the partners that can support the emergency, typically including at least the shipper. If that is the case and the shipper is not the Primary Team of that sector, the shipper may call the Primary Team or a Secondary Team within the sector to assist with its chlorine emergency, as needed.

A Primary Team is typically located at a chlorine producing plant unless one is not located within the sector. In that case, the Primary Team may be located at a chlorine user facility or chlorine re-packaging facility.

2.2.3 Secondary CHLOREP Teams

A Secondary CHLOREP Team is a CHLOREP Team that provides additional support within its designated sector as needed and when called upon in a chlorine emergency depending on the location and/or containers involved.

2.2.4 CHLOREP Contractors

CI verifies emergency response contractors (CHLOREP Contractors) to supplement responses to chlorine emergencies. CHLOREP Contractors have extensive experience in responding to significant hazardous materials incidents, including chlorine emergencies, and are verified as having Level 2 or Level 3 capabilities. The basic difference between Level 2 and Level 3 contractor capabilities are:

- Level 2 – Capability to provide response to a chlorine leak from a small container (i.e., cylinder or ton container) or minor release from a tank car.
- Level 3 – Level 2 capabilities plus special handling and field transfer capabilities for severely or potentially damaged bulk chlorine containers (i.e., cargo tanks and tank cars), which have the potential for high impact consequences to the public and/or environment that would require immediate response.

The capabilities of these CHLOREP Contractors are verified on a periodic basis by CI for them to remain as available participants in the CHLOREP network. The CHLOREP Contractor verification program description and requirements are maintained in separate documentation, which is available on the CI website.

2.3 CHLOREP TEAMS & CONTRACTORS LIST

The current list of CHLOREP Teams and Contractors (as of the approval date of Edition 8 of this Handbook) is below. Refer to the CHLOREP Sector Map in Appendix I for reference. This list, in addition to other details including emergency numbers, Team Leader contact information and Team capabilities, is periodically updated (separate to this Handbook) to ensure the most up-to-date information is maintained and provided to the Participants and Emergency Response Call Centers. The most current list can be found on the CI website (called CHLOREP Sector Contacts & Capabilities): <https://www.chlorineinstitute.org/emergency-preparedness/chlorep/sector-operations/>

2.3.1 CHLOREP Teams

Sector 1 <i>Florida</i>		
Primary (for railcars)	Occidental Chemical Corporation	Geismar, LA
Primary (for all other)	Allied Universal	Miami, FL
Secondary	Allied Universal	Tampa, FL
	Brenntag USA	Orlando, FL
	JCI Jones Chemical, Inc.	Jacksonville, FL
Sector 3 <i>Alabama, Georgia, South Carolina</i>		
Primary	Occidental Chemical Corporation	Geismar, LA
Secondary	Allied Universal	Brunswick, GA
	Harcros Chemicals	Mobile, AL
	Harcros Chemicals	Muscle Shoals, AL
Sector 4 <i>Connecticut, Massachusetts, New Jersey, New York, Pennsylvania (East – See Appendix I), Rhode Island</i>		
Primary	Kuehne Chemical	South Kearny, NJ
Secondary	JCI Jones Chemical	Caledonia, NY
	JCI Jones Chemical	Warwick, NY
Sector 5 <i>Ohio, Pennsylvania (NW – See Appendix I)</i>		
Primary	ASHTA Chemicals	Ashtabula, OH

Secondary	JCI Jones Chemical	Barberton, OH
	Univar USA	Cincinnati, OH

Sector 6 *North Carolina, Tennessee*

Primary	JCI Jones Chemical	Charlotte, NC
Secondary	Brenntag USA	Chattanooga, TN
	Harcros Chemicals	Memphis, TN
	Harcros Chemicals	Thomasville, NC

Sector 7 *Delaware, District of Columbia, Maryland, Pennsylvania (SW – See Appendix I), Virginia, West Virginia*

Primary	Westlake Chemicals Corporation	New Martinsville, WV
Secondary	Brenntag USA	St. Albans, WV
	JCI Jones Chemical	Milford, VA

Sector 8 *Michigan*

Primary	Dow Chemical Company	Midland, MI
Secondary	JCI Jones Chemical	Riverview, MI

Sector 9 *Illinois, Indiana, Kentucky*

Primary	Westlake Chemicals Corporation	Calvert City, KY
Secondary	Alexander Chemical	Kingsbury, IN
	Brenntag USA	Terre Haute, IN
	Brenntag USA	Henderson, KY
	JCI Jones Chemical	Beech Grove, IN
	Rowell Chemical	Willow Springs, IL

Sector 10 *Louisiana (East – See Appendix I), Mississippi*

Primary	Dow Chemical Company	Plaquemine, LA
Secondary	Brenntag USA	St. Gabriel, LA
	DPC Enterprises	Reserve, LA

Harcros Chemicals	Vicksburg, MS
Occidental Chemical Corporation	Taft, LA
Occidental Chemical Corporation	Convent, LA
Westlake Chemicals Corporation	Plaquemine, LA

Sector 11
Minnesota, North Dakota, South Dakota, Wisconsin

Primary	ERCO Worldwide	Port Edwards, WI
Secondary	Hawkins, Inc.	Minneapolis, MN

Sector 12
Colorado, Iowa, Kansas, Missouri, Nebraska, Wyoming

Primary	Occidental Chemical Corporation	Wichita, KS
Secondary	DPC Industries	Hudson, CO
	DPC Enterprises	Festus, MO
	DPC Industries	Bellevue, NE

Sector 13
Arkansas, Louisiana (West – See Appendix I)

Primary	Westlake Chemicals Corporation	Lake Charles, LA
Secondary	Harcros Chemicals	Little Rock, AR

Sector 14
New Mexico, Oklahoma, Texas

Primary	Occidental Chemical Corporation	Battleground, TX
Secondary	Brenntag USA	Nowata, OK
	Brenntag USA	Port of Catoosa, OK
	Brenntag USA	Sand Springs, OK
	Brenntag USA	Houston, TX
	Dow Chemical Company	Freeport, TX
	DPC Industries	Albuquerque, NM
	DPC Industries	Cleburne, TX

DXI Industries

Houston, TX

Occidental Chemical
Corporation

Ingleside, TX

Sector 15*Arizona, Nevada, Utah***Primary**Westlake Chemicals
Corporation

New Martinsville, WV

Secondary

Hill Brothers Chemical

Phoenix, AZ

Hill Brothers Chemical

Tucson, AZ

Thatcher Company

Salt Lake City, UT

Sector 16*California***Primary**Westlake Chemicals
Corporation

Longview, WA

Secondary

JCI Jones Chemical

Torrance, CA

Thatcher Company

Stockton, CA

Sector 17*Idaho, Montana, Oregon, Washington***Primary**Westlake Chemicals
Corporation

Longview, WA

Secondary

JCI Jones Chemical

Tacoma, WA

Sector A*New Brunswick, Newfoundland (island), Nova Scotia, Prince Edward Island,
Quebec (SE – See Appendix I)***Primary**

Brenntag Canada

Dartmouth, NS

Secondary

Brenntag Canada

Mt. Pearl, NL

Sector B*Newfoundland (Labrador), Quebec (See Appendix I), Maine***Primary**

Brenntag Canada

Lachine, QC

Sector C*Ontario (S – See Appendix I), Quebec (S – See Appendix I, New Hampshire,
Vermont***Primary**Westlake Chemical
Corporation

Beauharnois, QC

Secondary

Brenntag Canada

Rexdale, ON

Brenntag Canada	Lachine, QC
Brenntag Canada	Mississauga, ON
JCI Jones Chemical	Merrimack, NH

Sector D*Manitoba, Ontario (West – See Appendix I), Saskatchewan*

Primary	ERCO Worldwide	Saskatoon, SK
Secondary	Brenntag Canada	Winnipeg, MB
	Chemtrade Electrochem	Brandon, MB
	ClearTech Industries, Inc.	Saskatoon, SK

Sector F*Alberta, British Columbia*

Primary	Chemtrade Electrochem	North Vancouver, BC
Secondary	Brenntag Canada	Calgary, AB
	Brenntag Canada	Edmonton, AB
	Brenntag Canada	Leduc, AB
	Brenntag Canada	Langley, BC
	ClearTech Industries, Inc.	Port Coquitlam, BC

Sector MX1*Chihuahua, Sinaloa, Sonora, Baja California, Baja California Sur*

Primary	Industria Química del Istmo, S.A. de C.V. (IQUISA / CYDSA)	Hermosillo, SON
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Sector MX2*Coahuila, Nuevo Leon, Tamaulipas, San Luis Potosi, Durango, northern half of Zacatecas (shared with Sector MX3), northern half of Nayarit (shared with Sector MX3)*

Primary	Industria Química del Istmo, S.A. de C.V. (IQUISA)	Garcia (Noreste), NLE
Secondary	ROT Química S.A. de C.V.	El Carmen, NLE
	The Chemours Company	Altamira, TAM

Sector MX3

Michoacan, Colima, Jalisco, Guanajuato, Queretaro, Aguascalientes, southern half of Zacatecas, southern half of Nayarit

Primary	Mexichem Derivados (Orbia / Vestolit)	El Salto, JAL
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Sector MX4

Guerrero, Mexico, Morelos, Puebla, Tlaxcala, Mexico City, Hidalgo, northern half of Veracruz (shared with Sector MX5)

Primary	Industria Quimica del Istmo, S.A. de C.V. (IQUISA)	Santa Clara, MEX
Secondary	Industria Quimica del Istmo, S.A. de C.V. (IQUISA)	Xaloztoc, TLA

Sector MX5

Oaxaca, Chiapas, Yucatán, Quintana Roo, Campeche, Tabasco, southern half of Veracruz

Primary	Petroquimica Mexicana de Vinilo S.A. de C.V. (Orbia / Vestolit)	Coatzacoalcos, VER
Secondary	Industria Quimica del Istmo, S.A. de C.V. (IQUISA)	Coatzacoalcos, VER

2.3.2 CHLOREP Contractors

Level 2**United States**

E3 Environmental Service, LLC	Clinton, MS
Rybak Environmental, LLC	Blaine, MN
West Central Environmental Consultants, Inc.	New Hope, MN

Canada

GFL Environmental, Inc.	Hamilton, ON (formerly Terrapure)
	Saskatoon, SK
Nucor Emergency Hazmat Services	Surrey, BC

QM Environmental	Sherwood Park (Edmonton), AB
	Stoney Creek, ON
RST Industries Limited	St. John, NB
Spartan Response Inc.	Hamilton, ON

Mexico

Hesca Environmental Services LLC	Villagran Mexicanos, GJ
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Level 3

Specialized Professional Services Inc. (SPSI)	Washington, PA (main office)
	Reserve, LA (<i>Level 3 location</i>)
	Lodi, OH (<i>Level 2 location</i>)
	Oregon, OH (<i>Level 2 location</i>)
Specialized Response Solutions (SRS)	Fort Worth, TX
United Professional Services Ltd. (UPS)	Fort Worth, TX

3. CHLOREP TEAM ORGANIZATION

3.1 GENERAL

All Participants in CHLOREP have agreed to provide one or more CHLOREP Teams and a Company CHLOREP Coordinator. In addition, each CHLOREP Team location will also have a designated Emergency Contact.

3.2 CHLOREP TEAM

3.2.1 Team Leader

The CHLOREP Team Leader should be a person with extensive knowledge and experience in chlorine production or handling, trained in chlorine emergency response, and capable of using emergency equipment under adverse conditions which might be encountered at the emergency scene. This individual should be a member of a technical or management group within the Participant's company and must be made available to the company Emergency Contact on a 24/7 basis. The Team Leader typically has numerous years of experience compared to the other Team Members. *Note: In the event of a temporary loss of a Team Leader meeting these criteria, the Participant may choose a contracted individual of similar knowledge and experience (preferably a leader with a CHLOREP Contractor).*

Functions:

- Maintains the CHLOREP Team's written, detailed, up-to-date plan of action.
 - Keeps the most up-to-date CHLOREP Handbook.
 - Ensures that Institute staff has the Team's current emergency phone number and his/her own contact details.
 - Maintains emergency equipment and checklists.
 - Ensures the Team's availability and training.
 - Receives notice of emergency calls from the Emergency Contact (or other) who gives incident details and advises of the name of the Emergency Caller contact information and on-scene telephone numbers.
 - Makes first call to Emergency Caller to obtain additional incident details and provides advice, as appropriate, and remains in contact with the Emergency Caller to periodically provide status of the response until the emergency has concluded.
 - Decides whether the CHLOREP Team is required at the emergency scene. This may be determined in coordination with the on-site contact and/or shipper.
 - Arranges supply of emergency equipment required at the emergency scene.
 - Arranges for transport to and at the emergency scene.
 - Directs the CHLOREP Team to and at the scene of the emergency.
 - Calls the shipper and other parties involved to apprise them of the required response and status, as needed.
 - Calls Emergency Call Center to provide status of the response, as needed.
 - Logs significant details for use in post-emergency reporting.
 - Completes the CHLOREP Post-Emergency Critique (see Section 16) and forwards the same to the Company CHLOREP Coordinator.
-

3.2.2 Team Members

Any CHLOREP Team Members should be persons experienced in chlorine production or handling, trained in chlorine emergency response, and capable of using emergency equipment under adverse conditions which might be encountered at the emergency scene. Team Members might accompany the Team Leader to the emergency scene, depending on the Team Leader's estimate of requirements.

Functions:

The Team Members perform under the direction of the Team Leader. One Team Member may be assigned to perform the functions of the Team Leader in his/her absence.

3.3 COMPANY CHLOREP COORDINATOR

The Company CHLOREP Coordinator should be a person with knowledge and experience in chlorine production or handling. This person should also preferably be trained in chlorine emergency response and capable of using emergency equipment. This individual should be made available to the CHLOREP Team Leader on a 24/7 basis. The Company CHLOREP Coordinator is responsible for coordinating all of a Participant's CHLOREP Teams as outlined in this Handbook. This person may be The Team Leader for one or more of a Participant's CHLOREP Teams. The Company CHLOREP Coordinator also serves as a single point of contact with a Participant for Institute staff, when needed.

3.4 EMERGENCY CONTACT

Each Participant must provide a 24/7 emergency phone number. This number must immediately connect to the Emergency Contact who will receive emergency calls from the Emergency Response Call Center, shippers, customers, carriers, or other suppliers and will immediately relay the call information to the CHLOREP Team Leader. This Emergency Contact might be plant guards, boiler house or process operators, shift foreman, telephone answering service, or a combination of these depending on the time of day and day of the week. It is suggested that emergency phone calls be recorded.

The designation of the Emergency Contact must be clearly set forth in each CHLOREP Team plan and kept current. It is critical for the Emergency Contact to be familiar with CHLOREP and the process for activating a CHLOREP Team when emergency calls are received involving chlorine incidents. *Note: It is not acceptable for the Emergency Contact to refuse a chlorine emergency call. The call must be accepted and passed on to the CHLOREP Team Leader to make the appropriate decisions.*

Functions:

- Receives emergency calls at any time.
-

- Completes a CHLOREP Call Report (see Section 4) or similar for the CHLOREP Team's site.
- Relays details of the emergency to the CHLOREP Team Leader.

4. CHLOREP RESPONSIBILITIES AND EXPECTATIONS

4.1 PARTICIPANT RESPONSIBILITIES

In addition to the responsibilities listed in the CHLOREP Mutual Aid Participation Agreement (Appendix II), the Participant should:

- Ensure that the 24-hour Emergency Contact telephone number is current.
- Advise the Institute's responsible staff, in advance, when possible, of any anticipated changes in the status of emergency phone numbers, Team Leader contact details or response capabilities for all CHLOREP Teams.
- Incorporate Emergency Call Center phone numbers into internal CHLOREP procedures.
- Provide a call report form at the Emergency Contact location to enable the Emergency Contact to record all available data about the chlorine emergency. (See the sample CHLOREP Call Report form at the end of this section for an example of the minimum information recommended to collect for call reports.)
- Conspicuously place the applicable Emergency Call Center (CHEMTREC, CANUTEC, or SETIQ) call numbers on shipping papers for use by carriers and customers. Where practical, these phone numbers should be placed on shipping containers to help expedite early communication from remote areas. If displayed elsewhere, it should be clearly noted that these phone numbers are to be utilized for chemical emergencies only.
- Ensure CHLOREP Team Members receive specific training as required in current federal, regional, and/or local statutes, especially the U.S. Occupational Safety and Health Administration (OSHA) emergency response standards (29 CFR 1910.120 and 1910.134), as well as the National Fire Protection Association (NFPA) Standard 472 Chapter 6 (Specialist Employee Category).

4.2 PARTICIPANT EXPECTATIONS

4.2.1 Operational Expectations

Initial Call Decisions

CHLOREP Teams should always be prepared for an emergency response and be available 24 hours per day, 7 days per week. When a Primary CHLOREP Team receives a response call, the Team Leader shall determine the need to provide on-site or remote assistance. If the Team Leader determines that an on-site response is necessary, and his/her Team can provide the timeliest response, the Team must immediately dispatch with the necessary equipment and appropriate number of Team Members.

If the Team Leader determines an on-site response is needed but is not able to provide the timeliest response, the Team Leader may act on the following:

- For incidents involving tank cars, the Team Leader may contact a Secondary CHLOREP Producer Team and request that their CHLOREP Team respond to the incident.
- For incidents involving cylinders or ton containers, the Team Leader may contact a Secondary CHLOREP Packager Team and request that their CHLOREP Team respond to the incident.

A Secondary Team that is contacted should always accept a request for response, unless the Secondary Team Leader determines that his/her Team does not have the appropriate equipment, number of responders or expertise necessary to respond.

Use of CHLOREP Contractor

The Primary Team Leader may choose to contact a CHLOREP Contractor in such cases as the following:

- When an incident is considered a Level 3 (significant, imminent danger) and is necessary;
- When a Secondary Team is requested to respond but is unable to due to lack of resources and no other Secondary Teams are available; or
- When an incident is in a remote location and the timeliest response would be that of a CHLOREP contractor.

It is imperative that the Primary Team Leader contact the Incident Commander (or other on-site contact) to ensure a hazmat emergency response contractor has not already been called to respond to the incident. If one has not already provided response assistance, the Primary Team Leader should consult the shipper/owner (if not their own company) in the decision to use a CHLOREP Contractor. When an emergency response contractor is used, the shipper/owner of the container is typically financially responsible for the contractor's services.

4.2.2 Training Expectations

CHLOREP Teams shall maintain adequately trained personnel who are knowledgeable and experienced in the handling of chlorine. While chlorine-specific training content may be defined by the company, Section 5 contains a list

of minimum recommended training criteria for Team Members. Compliance with OSHA 29 CFR 1910.120 and 1910.134, as well as NFPA 472 Chapter 6, as they relate to chlorine handling, is strongly recommended. Team Leaders should document training achieved by each Team Member regarding all elements of Section 5.

Training may differ between companies and/or Team locations. If particular items from Section 5 are not included in the company's training program, valid reasoning should be documented. It is also acceptable for CHLOREP Teams to include additional items to the list from Section 6 as they find it beneficial in preparing and training for a CHLOREP response. As described in Section 5, participation in periodic drills, as defined by the Team's company, is strongly recommended.

It is recommended that CHLOREP Team Members participate in a comprehensive (approximately 40 hours) training program at a minimum of every five years. To satisfy this recommendation, Participants are encouraged to be represented annually at CI's CHLOREP Team Training, or equivalent as defined by their Company CHLOREP Coordinator. This representation could be achieved by attending as students or participating as instructors. This should be done in a manner that enables individual CHLOREP Team Member representation on a regular basis as determined by the Company CHLOREP Coordinator.

4.2.3 Equipment Expectations

CHLOREP Teams should consider having the equipment items listed in Section 7 on hand at their facility. All equipment may not be necessary for a response but should be readily accessible when needed. Teams should keep a log of emergency response equipment inventory to determine the equipment necessary to perform a specific response. Emergency response equipment should be well-maintained to ensure it remains in good condition and ready for use in a response at any time.

4.2.4 Active Participation Expectations

To ensure open communication and efficiency of the CHLOREP network, it is recommended that CHLOREP Team Members, particularly the Team Leader(s) and Company CHLOREP Coordinator, remain active participants in CHLOREP-related activities conducted by the Institute. Such activities may include:

- Biannual CHLOREP Leadership Calls;
- CI Annual and Fall Meetings;
- Annual CHLOREP Team Training; and
- CI-sponsored TRANSAER training events.

Participation through these means provides opportunities for relationship building and sharing of response experiences amongst all CHLOREP Teams, which in turn results in a more effective CHLOREP network.

4.2.5 Community Outreach Expectations

Section 14 contains general guidelines for keeping the public informed during a chlorine incident. Although it is important for the public to understand how they are affected during a chlorine release, it is helpful for the public to have some knowledge of chlorine and a CHLOREP Team's facility before an incident occurs.

CHLOREP Teams should become active in their communities to build relationships with local responders, hazmat teams, local businesses, and the media. This can be done through involvement in community events or through issuing announcements, which provide the public with information about the general function of a Team's facility and the benefits and effects of safely handling chlorine. Another option is for a Team to individually contact groups in the community to deliver important information related to the safe handling of chlorine. CI's Chlorine Release Fact Sheet and relevant pamphlets (see Section 18) are available on CI's website for such purposes.

Periodically, when possible, CHLOREP Teams should train collaboratively with local emergency responders. This type of outreach may be best determined based on a Team's available resources and the company's policy.

CHLOREP Teams and Team leaders may be requested to participate in other events, such as local CI-sponsored TRANSCAER® training events, technical conferences, or training sessions sponsored by associations other than CI. If resources and time are available, CHLOREP Teams are encouraged to participate in such events in order to build relationships with responders within their sectors.

The ideas discussed in Section 14 are some recommendations for a CHLOREP Team to reach out to its community. There are different methods of outreach; therefore, Teams should determine the plan best suited for their facility. When a Team participates in community outreach, the Team Leader or Company CHLOREP Coordinator should notify CI staff so outreach efforts can be documented and shared with other CI members.

4.3 ORPHANED CHLORINE CONTAINERS

Sometimes a call will come into the Emergency Response Call Center and/or the Institute involving old cylinders or ton containers (often referred to as "orphaned" chlorine containers) that have been discovered at a site, typically abandoned industrial sites, after some time. The containers may or may not be leaking. If the container is not leaking, it should still be treated as a typical chlorine emergency call. If the Emergency Response Call Center receives the call, they will follow the protocol as outlined in Section 8.

Institute staff will follow these steps when a call is received:

- If the caller can identify the owner of the container(s), CI staff will contact the owner's closest CHLOREP Team and give them the information concerning the event and the on-site contact.

- If the owner of the container(s) is not immediately obvious or the identified owner has gone out of business, CI will contact the closest CHLOREP Team and put them in touch with the on-site contact.

The CHLOREP Team should remain in touch with the on-site contact until the issue has been resolved. If there is a problem contacting the owner of the container(s) or deciding who the owner is, the CHLOREP Team may need to show up on-site to remove the container(s). On-site responders have regulations for removing hazardous material containers within a certain amount of time of being discovered, and they may not have the time to continue waiting for contact with the owner. Removing the container(s) as soon as possible will help prevent a potential release of the material.

There are various types of situations involving orphaned chlorine containers, so they are determined on a case-by-case basis. Guidance for CHLOREP Teams in safely handling these calls can be found in Appendix IV. Contact CI staff if you have any questions or problems resolving the issue.

CHLOREP Call Report

Date: _____ **Call Report No.:** _____

Time (on/off): _____ **CHLOREP Case No.:** _____

Emergency Dispatch Agency: _____

Emergency Caller Information

Name: _____

Title: _____

Organization: _____

Call Back Location: _____
(City, COUNTY, State or Province)

Call Back Telephone: _____

Incident

Type of Accident: _____

Time: _____

Details/Injuries: _____

Container Type & Quantity

Cylinder/Ton Container:

Tank Truck/Tank Car/Barge:

Shipper

Carrier (Name & Type):

Rail Car No.:

Truck/Trailer No.:

Barge No.:

Action Already Taken

Police, Fire, Civil Defense called:

Chlorine Shipper Called:

Location

City, County, State, Province:

(if other than caller location)

Hwy. No/Distance-Direct From:

Weather/Temperature:

Populated/Open Area:

Terrain (flat/hill/etc.):

Nearest Airfield:

How to get to scene:

Emergency Dispatcher advised that action is underway.

Date:

Time:

AM/PM

Remarks:

Company:

Team Location:

Reported By

Name(s) Emergency Contact:

Team Leader:

5. CHLOREP TEAM PLANNING AND TRAINING

5.1 GENERAL

Participants in CHLOREP should, as a minimum, utilize the guidance and regulations in the following concerning levels of training for personnel in emergency response situations:

29 CFR 1910.120	OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard
29 CFR 1910.134	OSHA Respiratory Protection Standard
NFPA 472	NFPA Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents (Chapter 6, Specialist Employee Category)

For CHLOREP Teams to remain competent in the handling of chlorine as a member of the CHLOREP network, training in accordance with OSHA 29 CFR 1910.120 and 1910.134 should include techniques and material specific to chlorine response as part of the initial and annual refresher worker training. The training should also include competencies in accordance with NFPA 472 Chapter 6 as they relate to chlorine.

5.2 CHLOREP TEAM MEMBER TRAINING

5.2.1 Chlorine-Specific Emergency Response Training

All CHLOREP Team Members should be persons with experience and detailed knowledge of chlorine properties and handling. Emphasis should be placed on hands-on training and experience, where applicable. The format and content of training may be defined by company policy. It is recommended that Team Members, at a minimum, receive Technician level training as required by 29 CFR 1910.120. It is also recommended that Team Members receive approximately 40 hours of chlorine-specific training, including a combination of classroom and hands-on training, at a minimum of every five years. Available training, which CI offers, can be found in Section 6. Quarterly drills are also strongly recommended to frequently check awareness of emergency procedures.

The following is a list of items Participants, at a minimum, should include in their CHLOREP Team training programs:

- Familiarity with the CHLOREP network organization and how CHLOREP Teams are activated;
 - Familiarity with the CHLOREP Handbook, including Team responsibilities and protocols;
-

- Understanding of chlorine chemical and physical properties, health effects, and first aid treatment;
 - Understanding of construction details of chlorine containers;
 - Understanding of chlorine container damage assessment;
 - Application of Chlorine Institute Emergency Kits “A,” “B,” and “C;”
 - Application of cylinder recovery vessel (referred to as a salvage cylinder in DOT regulations);
 - Additional methods of chlorine leak mitigation, such as transfer methods, and chlorine disposal procedures;
 - Use of other emergency equipment (as noted in Section 7), such as chlorine monitoring equipment;
 - Understanding of reactivity of chlorine with other chemicals (see CI Pamphlet 164);
 - Understanding chlorine dispersion and public protective action criteria, such as knowing when to use evacuation versus shelter-in-place (see DOT’s Emergency Response Guidebook (ERG));
 - Understanding precautions regarding the disturbance of containers;
 - Familiarity with cleanup and decon procedures;
 - Use of self-contained breathing apparatus (SCBA), including recharging SCBA cylinders, etc.;
 - Use of other personal protective equipment (PPE) (see CI Pamphlet 65);
 - Familiarity with applicable emergency response related regulations, such as those noted in Section 5.1;
 - Familiarity with relevant environmental regulations;
 - Familiarity with the Incident Command System (see Appendix III);
 - Understanding of an incident management process (see Appendix III)
 - Know how to prepare a comprehensive workplan (see Appendix III);
 - Problem evaluation and solving;
-

- Responsibilities of transportation companies, federal agencies, local agencies (police, fire, etc.) in an emergency; and
- Public relations.

5.2.2 Local Training

It is recommended that CHLOREP Teams participate in drills with local emergency responders in conjunction with the local emergency planning committees (LEPCs). Such drills will enhance CHLOREP Teams' awareness of the ability to work with local area emergency responders.

5.3 EMERGENCY CONTACT TRAINING

Emergency Contact personnel must be thoroughly familiar with the process for chlorine emergency calls and activation of a CHLOREP Team response. Procedures should be periodically reviewed with the CHLOREP Team Leader. The Emergency Contact should also be very familiar with completing a CHLOREP Call Report or similar (see the end of Section 4).

5.4 PUBLIC RELATIONS ASSISTANT

Participants should designate a Public Relations Assistant in the event one is needed during a CHLOREP Team response. The Public Relations Assistant should:

- Regularly review relevant sections of the CHLOREP Handbook, including being completely familiar with those sections of the Handbook dealing with Emergency Call Centers, local and federal agencies, and other emergency organizations.
- CI Pamphlet 1 and CI's Chlorine Release Fact Sheet;
- Be trained in the use of communications tools; and
- Be familiar with their company's public relations policies.

5.5 EMERGENCY TRANSPORTATION

5.5.1 Transportation to the Emergency

Each CHLOREP Team Leader or Company CHLOREP Coordinator should plan and record available means of transportation for CHLOREP Team Members and equipment to possible emergency sites. The type of transport used will depend on distance, terrain, weather and season, severity of the incident, the size of Team and amount of equipment to be taken, and of course, what type of transport is available. The following are transportation options that may be considered:

- Emergency-Service Transportation: Available helicopters, short take-off and landing (STOL) planes, boats or other transportation that could be borrowed from emergency service organizations (Civil Defense, Coast Guard, State Highway Patrol, Air National Guard, Civil Air Patrol, etc.).
- Company-Owned Vehicles: Cars, planes, trucks, boats.
- Private Vehicles: As with company-owned vehicles.
- Leased Vehicles: Cars, trucks, planes.
- Commercial Transportation: Airlines, trains, buses.

5.5.2 Transportation at the emergency

If commercial transportation or aircraft is used, some means of transport will be required at the site. This might be arranged for by the Company CHLOREP Coordinator while the CHLOREP Team is en route, or by the pilot of a chartered private plane during the flight.

Individual Team plans should include phone numbers and detailed instructions on means of obtaining transport. Company transportation personnel involved in these plans should be advised if changes are made.

6. AVAILABLE TRAINING MATERIALS

6.1 INSTITUTE PUBLICATIONS

The following are CI publications that are relevant to chlorine handling and emergency response. CHLOREP Team Members should be familiar with the content in these publications.

Pamphlet 1	<i>Chlorine Basics</i>
Pamphlet 6	<i>Piping Systems for Dry Chlorine</i>
Pamphlet 17	<i>Packaging Plant Safety and Operational Guidelines</i>
Pamphlet 49	<i>Recommended Practices for Handling Chlorine Bulk Highway Transports</i>
Pamphlet 57	<i>Emergency Shutoff Systems for Bulk Transfer of Chlorine</i>
Pamphlet 63	<i>First Aid, Medical Management/Surveillance and Occupational Hygiene Monitoring Practices for Chlorine</i>
Pamphlet 64	<i>Emergency Response Plans for Chlor-Alkali, Sodium Hypochlorite and Hydrogen Chloride Facilities</i>
Pamphlet 65	<i>Personal Protective Equipment for Chlor-Alkali Chemicals</i>

Pamphlet 66	<i>Recommended Practices for Handling Chlorine Tank Cars</i>
Pamphlet 73	<i>Atmospheric Monitoring Equipment for Chlorine</i>
Pamphlet 95	<i>Gaskets for Chlorine Service</i>
Pamphlet 155	<i>Water and Wastewater Operators Chlorine Handbook</i>
Pamphlet 164	<i>Reactivity and Compatibility of Chlorine and Sodium Hydroxide with Various Materials</i>
Pamphlet 166	<i>Angle Valve Guidelines for Chlorine Bulk Transportation</i>
Pamphlet 168	<i>Guidelines for Dual Valve Systems for Bulk Chlorine Transport</i>
Instruction Booklet (IB/A)	<i>Chlorine Institute Emergency Kit “A” for 100-LB and 150-LB Chlorine Cylinders</i>
Instruction Booklet (IB/B)	<i>Chlorine Institute Emergency Kit “B” for Chlorine Ton Containers</i>
Instruction Booklet (IB/C)	<i>Chlorine Institute Emergency Kit “C” for Chlorine Tank Cars and Tank Trucks</i>
Instruction Booklet (IB/RV)	<i>Chlorine Institute Recovery Vessel for 100-LB and 150-LB Chlorine Cylinders</i>
A-Video	<i>How to Use the Chlorine Institute Emergency Kit “A” for 100-LB and 150-LB Chlorine Cylinders</i>
B-Video	<i>How to Use the Chlorine Institute Emergency Kit “B” for Chlorine Ton Containers</i>
C-Video	<i>How to Use the Chlorine Institute Emergency Kit “C” for Chlorine Tank Cars and Tank Trucks</i>
CST-Video	<i>Chlorine Safety Tour: A Training Guide for Chlorine Emergency Response</i>
FR-Video	<i>Chlorine Emergencies: An Overview for First Responders</i>
JRCL2-Video	<i>Jack Rabbit: Chlorine Properties</i>
H-Video	<i>First Response to Chlorine Exposures</i>
Wall Chart (WC-1)	<i>Handling Chlorine Cylinders and Ton Containers</i>
Fact Sheet	<i>Chlorine Release Fact Sheet</i>

The latest editions of CI publications may be obtained at www.chlorineinstitute.org.

6.2 INSTITUTE-SPONSORED TRAINING OPPORTUNITIES

CI sponsors numerous emergency response training events every year, including:

- Annual CHLOREP Team Training;
- Triennial Advanced CHLOREP Training;
- Various TRANSCAER Rail Safety & Hazmat Emergency Response Training throughout North America; and
- Emergency response webinars.

Additional details on emergency response training available at any time can be found on CI's website: <https://www.chlorineinstitute.org/emergency-preparedness/emergency-preparedness-overview/>

6.3 ADDITIONAL INSTITUTE RESOURCES

Additional training resources are available through CI's website, including:

- CHLOREP Team Training presentations and CI-Sponsored TRANSCAER training presentations (member login required):
<https://www.chlorineinstitute.org/members-only/documents/epit/>
- Online learning videos and corresponding instructor presentation slides from webinars previously provided by CI:
<https://www.chlorineinstitute.org/emergency-preparedness/emergency-response-resources/>

Appendix III of this Handbook also provides detailed guidance on CHLOREP Team incident management. Appendix III includes background information and guidelines for tactical management of chlorine incidents and coordination with government agencies and other parties at the incident scene as part of the Unified Command and Incident Command Structure. It is recommended that CHLOREP Team members are familiar with this guidance.

6.4 RELEVANT REGULATIONS AND STANDARDS

CHLOREP Team Members should be familiar and trained on relevant hazardous materials and emergency response regulations. The following should be considered:

29 CFR 1910.120	OSHA HAZWOPER Standard
29 CFR 1910.134	OSHA Respiratory Protection Standard

40 CFR 300-373	EPA Superfund, Emergency Planning and Community Right-to-Know Regulations
49 CFR 106-190	DOT Hazardous Materials Regulations (HMR)
NFPA 472	NFPA Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents (Chapter 6, Specialist Employee Category)

7. CHLOREP TEAM EQUIPMENT

It is recommended that Primary CHLOREP Teams have the equipment listed in this section maintained on-hand and readily accessible. If it is not feasible to have certain equipment on hand, the Primary Team should identify where that equipment can be accessed in an expedited manner, when needed. It is suggested that Secondary CHLOREP Teams have the listed equipment, that is appropriate for their response capabilities, maintained on-hand or identify where certain equipment that is not on-hand can be accessed.

It is unlikely that all of these items would be required in a single emergency. Records should be kept on the weights of heavy items so an estimate can be made of the total poundage of equipment being transported to the emergency scene, especially when a small private plan is to be used.

7.1 SAFETY AND HEALTH EQUIPMENT

The following list are minimum recommendations for safety and health equipment that should be maintained by a CHLOREP Team:

- Personal protective equipment (PPE):
 - appropriate chemical protective suits (typically enhanced Level B);
 - chemical goggles
 - hard hats;
 - gloves;
 - rubber footwear;
 - cold weather gear, if applicable;
 - self-contained breathing apparatus (SCBA) – Provision for extra air supply, filling hoses and adapters (4500 psi versus 2216 psi).

Note: Because of existing air travel restrictions on carrying filled gas cylinders on commercial aircraft, arrangements should be made to pick up required air supply prior to arrival at the scene of the incident.
- First Aid Kit
- Equipment for atmospheric monitoring for chlorine

Refer to 29 CFR 1910.120 and CI Pamphlet 65 for more detailed guidance on selecting appropriate PPE.

7.2 CHLORINE INSTITUTE EMERGENCY KITS AND RELATED EQUIPMENT

CHLOREP Teams should have Chlorine Institute Emergency Kits “A,” “B,” and “C” on hand in preparation for responding to chlorine cylinder, ton container, tank truck and tank car emergencies. Instruction booklets should be included in each kit and the guidance included should be followed with regard to maintenance of the emergency kits.

The following is a list of additional chlorine-specific equipment that may be needed in a chlorine emergency:

- Adapter for cylinder valve, with hose or copper tubing
- 5-30% aqua ammonia solution (commercial strength is typically sufficient) in polyethylene bottle
- Cable seal cutter
- Cylinder and/or ton container valve
- Fusible plugs for cylinder and ton container and valves
- Chlorine compatible gaskets for various chlorine container valves
- Chlorine compatible hoses
- Hose clamps (stainless steel, various sizes and lengths to 3 ft. (“BAND-IT”))
- Outlet plug for tank truck / tank car angle valve
- pH paper
- Pipe nipples (1/4”, 1/2”, 1” diameter (various lengths))
- Pressure gauge and fittings (0-400 psig)
- Studs and nuts for tank truck / tank car valves
- Tapered hardwood plugs
- Additional adapters for other than standard valves
- Clamping device for stripped valve stem

Because, on some occasions, a CHLOREP Team may not have an emergency kit available, a record should be kept of the locations of nearby kits. Ascertain, in advance, that kits are complete and in good shape.

7.3 RELEVANT PRINTED OR ELECTRONIC MATERIALS

The following is a list of relevant materials that should be kept on hand in printed version or quickly accessible electronically (such as on a mobile phone):

- CHLOREP Handbook (also available in the CHLOREP mobile app);
 - SDS for chlorine (available copies should be available for distribution, if needed);
 - Team member training certificates;
 - CI's Chlorine Release Fact Sheet;
-

- Relevant CI Pamphlets, particularly Pamphlet 1, Pamphlet 63, and CI Pamphlet 65 (also available through the CHLOREP mobile app); and
- Emergency Response Guidelines (ERG) (also available as a mobile app and updated every four years).

7.4 ADDITIONAL TOOLS AND SUPPLIES

The following is a list of tools and supplies that may also be useful when responding to a chlorine emergency:

Chisels	Extension bar
Hacksaw (12" with extra blades)	Heavy duty clear plastic sheeting
Hammers (claw, ball peen, sledge)	Paste (PTFE)
Pen knife	Pinch bars
Pipe fittings (elbows, couplings, plugs, caps, etc.)	Pliers (needle noes, side-cutting, slip-joint)
Reducer (2"x1" for caustic tank car)	Rope (manila, polypropylene)
Screwdrivers (assorted)	Sliding T-bar handle
Stud remover ($\frac{1}{2}$ " – $\frac{3}{4}$ ")	Tape (chemical resistant duct, pipe (PTFE), plastic)
Tubing cutter	Wrenches (10", 18")
Wrenches, sockets (various sizes)	

7.5 MISCELLANEOUS

The following is a list of miscellaneous supplies and materials that may be useful when responding to a chlorine emergency:

Binoculars	Camera
Cloth rags	Electric lantern
Equipment carrying cases	Flashlights and spare batteries
Highway flares	Labels
Logbook	Loud hailer (transistorized megaphone)
Paper towels	Money
Phone (cellular, consider satellite)	Pens
Portable radio transmitters-receivers	Placards
Soap (waterless for hands)	Seals (tamper-detection)

Recording device (audio, visual)	Tags
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8. EMERGENCY RESPONSE CALL CENTERS & CHLOREP TEAM ACTIVATION

8.1 GENERAL

Any carrier, customer, or civil authority having a chlorine emergency can be put in contact with an appropriate CHLOREP Team by phoning the following commonly used Emergency Response Call Centers (phone numbers and other details provided in Section 17):

- CHEMTREC in the United States (also available for other countries); and
- CANUTEC in Canada.

Since CHEMTREC and CANUTEC operate on a 24/7 basis, they are able to provide prompt initial advice to personnel at the scene. CI staff periodically updates CHLOREP Team contact information, including emergency numbers, and provides those updates to CHEMTREC and CANUTEC.

8.2 CHEMTREC PROTOCOL FOR CHLORINE EMERGENCIES

The following is the typical protocol whenever CHEMTREC receives a call about a chlorine emergency involving chlorine containers, regardless of whether or not the container is leaking.

NOTE: If the Emergency Caller is calling about an event involving a chlorine package owned by Olin Corporation, the CHEMTREC dispatcher should follow typical CHEMTREC emergency call protocols and *NOT* activate CHLOREP response (as agreed to by Olin).

- The CHEMTREC dispatcher will inform the Emergency Caller, as well as the shipper, that he/she will be contacting a CHLOREP Team within their sector to provide immediate advice and/or assistance with the emergency (briefly explaining the purpose of CHLOREP, if needed).
- Based on the sector in which the emergency is located, the appropriate Primary CHLOREP Team will be immediately notified first before any other party, even before the shipper, to ensure the timeliest response. The CHEMTREC dispatcher will provide the on-site contact information, any known details of the incident, and the shipper's name. CHEMTREC will typically call the shipper next to inform it of the incident details. The CHEMTREC dispatcher should also provide the CHLOREP Team with contact details for the shipper, and vice versa, to help ensure timely and effective communication directly between the two parties.

- The Primary CHLOREP Team Leader will immediately call the on-site Emergency Caller. If necessary, the Primary CHLOREP Team will contact a Secondary Team to assist in the response. **NOTE:** *If the Primary Team accidentally receives a call from CHEMTREC regarding an emergency involving a chlorine package owned by Olin Corporation, the Primary Team should cease to follow through with assistance (as agreed to by Olin).*
- The Primary CHLOREP Team Leader typically will call the CHEMTREC dispatcher back to inform him/her of the status of the response;
- Responsible CI staff will be included on all CHEMTREC incident report distributions involving a chlorine emergency. The Primary Team Leader may also be provided the incident report.
- If CHEMTREC receives a call from Hawaii, Alaska, or any other country besides the U.S. or Canada, the dispatcher may provide contact information for the verified CHLOREP Level 3 Contractors to the Emergency Caller to request assistance.

If a CHLOREP Team is mistakenly called for a chlorine emergency, i.e., the Team is not the Primary Team for the associated sector, the Team called should advise CHEMTREC of the appropriate Primary CHLOREP Team to call.

If a Primary CHLOREP Producer Team is notified of a chlorine emergency involving a cylinder or ton container but is not equipped to respond to such emergencies, that Primary Team Leader, not CHEMTREC, is responsible for contacting a Secondary CHLOREP packager Team to request assistance.

8.3 CANUTEC PROTOCOL FOR CHLORINE EMERGENCIES

In Canada, the 24-hour emergency phone number found on the consignor's shipping document should be called for assistance. In some cases, chlorine shipments are subject to the consignor's Emergency Response Assistance Plan (ERAP), which is a requirement of the Transportation of Dangerous Goods Regulations. For those specific shipments, emergency response procedures are driven by the ERAP.

In all cases, CANUTEC may be contacted for advice related to the incident, such as technical information, safety information, emergency response guidance, etc. CANUTEC may also provide contact information of the appropriate CHLOREP Team, as required.

8.4 PROTOCOL FOR CHLORINE EMERGENCIES IN MEXICO

In Mexico, hazardous materials emergencies are often called into the Transportation Emergency System for the Chemical Industry (a.k.a., Sistema de Emergencia para la Transportación de la Industria Química (SETIQ)), which has a network of official authorities (Civil Protection), local authorities, local responders, hazardous materials shippers, and carriers available to respond to those

emergencies. SETIQ is operated by the National Association of the Chemical Industry in Mexico (a.k.a., Asociacion Nacional de la Industria Quimica (ANIQ)). Currently, the Institute does not have a formal agreement with SETIQ to activate CHLOREP or somehow be involved in a CHLOREP activation. Rather, if a Mexican CHLOREP Participant is notified by SETIQ or other organization regarding an emergency involving their chlorine package, the Mexican CHLOREP Participant may call upon another CHLOREP Participant in Mexico for assistance, if needed and as listed in Section 2.3.1. The Mexican CHLOREP Participants may also call upon Mexican CHLOREP Contractors, if needed and as listed in Section 2.3.2.

9. COORDINATION WITH GOVERNMENT AGENCIES

9.1 U.S. AGENCIES

The following are highlights of the U.S. National Oil & Hazardous Substance Pollution Contingency Plan to alert CHLOREP Teams to the possibility of working with the federal On-Scene Coordinator.

9.1.1 Federal On-Scene Coordinator

The National Oil & Hazardous Substances Pollution Contingency Plan (the PCP) applies to discharges of oil in navigable water, adjoining shorelines, water of the contiguous zone and of the exclusive economic zone, and releases of hazardous substances into the environment which may present an imminent and substantial danger to public health or welfare (see 40 CFR 300.3 for details).

If the incident is governed by the PCP, an On-Scene-Coordinator (OSC) will be designated to contact the person in charge at the accident scene. The OSC will be an EPA representative on the inland zone and Coast Guard representative on coastal waters and for Great Lakes waters, ports and harbors.

The OSC determines the status of the local response and monitors the situation to determine whether or how much federal involvement is necessary. The OSC may ask the CHLOREP Team for a recommended response to a chlorine emergency. However, if the OSC does not agree as a whole, or in part, with the recommended response, he/she will take command and determine the actual response steps to be taken.

In the event of a discharge which involves a substantial threat to the public health or welfare of the environment (e.g., a chlorine release), the appropriate federal response team will also be alerted (see 40 CFR 300.110 and 300.115 for details).

9.1.2 Regional EPA/USCG Contacts

Regional federal plans that the OSC will operate under and are available from the EPA Regional Office if on the inland zone or USCG District Office (Marine Safety or Captain or the Port) if on coastal or Great Lakes waters (see 40 CFR 300.120 for details).

9.1.3 Coordination with Other U.S. Agencies and Emergency Response Groups

Title III of EPA's Superfund Amendments and Reauthorization Act of 1986 (SARA) requires the establishment of, or coordination with, the following agencies and their involvement in emergency planning, emergency response, and the reporting requirements subsequent to a chemical release in the environment:

- Various federal, state and local government agencies;
- State emergency response commission;
- Emergency planning district; and
- Local Emergency Planning Committee (LEPC).

Depending on the type and conditions of an incident, additional federal agencies may become involved, such as DOT, OSHA, FEMA, U.S. Chemical Safety & Investigation Board (for significant facility incidents), or National Transportation Safety Board (for significant transportation incidents).

9.2 CANADIAN AND MEXICAN GOVERNMENT AGENCIES

Canada and Mexico may have different federal, state, provincial or local agencies that may become involved in a hazardous materials emergency. For example, Transport Canada may become involved in a "dangerous goods" transportation incident in Canada. It is prudent of the CHLOREP Teams in Canada and Mexico to be familiar with the roles the various agencies may take and how the CHLOREP Team could coordinate with those agencies.

9.3 OSHA HAZWOPER STANDARD

CHLOREP Teams responding to a chlorine incident need to be aware of the Incident Command System (ICS), as established by the National Incident Management System (NIMS), and OSHA's hazardous materials response requirements prescribed by 29 CFR 1910.120. The Teams should be prepared, if requested, to provide the necessary documentation relating to the qualifications of the Team, such as training certificates. Management of the Participants providing CHLOREP Teams need to evaluate these regulations and determine the classification of and training requirements for their team members. See Appendix III for more guidance on managing an incident as it relates to OSHA requirements.

While Participants in Canada and Mexico are not required to abide by OSHA's regulations, the Incident Command System is recognized by the United Nations and has become a best practice worldwide. Therefore, it would be beneficial for Canadian and Mexican CHLOREP Participants to be familiar with the ICS and OSHA standards.

10. CROSS-BORDER EMERGENCY RESPONSE

10.1 GENERAL

The purpose of this section is to provide guidance to CHLOREP Teams in planning for the effective and timely crossing of the U.S.-Canadian border or U.S.-Mexican border for responding to chlorine emergencies. In the event of a chlorine emergency, it may be necessary for CHLOREP Teams to enter another country to aid in the response. This has particularly become more common with the extension of the North American rail network and chlorine producers exporting or importing between the different countries.

As in any response to an emergency, arrival on scene in a timely manner with the proper equipment may be critical in the successful outcome of the event. To avoid delays and expedite a border clearance, planning is necessary to ensure time is not needlessly lost satisfying the needs of the custom and immigration authorities.

Immigration authorities regulate the cross-border passage of personnel and customs authorities regulate the passage of equipment. Planning should take into account that CHLOREP Teams must pass through their own country's immigration and customs when returning after the response is completed.

Because each response is different and the requirements of each border crossing station may be different, this section can only provide general guidance. It is the responsibility of individual CHLOREP Teams to ensure all necessary information is gathered and appropriate planning is complete.

Your company's usual customs and immigration brokers may be a source of information and assistance in planning for a cross-border response.

10.2 PRIOR TO THE EMERGENCY

The following is a list of items to consider when preparing for crossing a country border prior to an emergency:

- All CHLOREP Team Members must have a valid passport and, if required, a valid visa.
 - Have readily available customs and immigration border crossing information, such as a 24-hour phone number for all expected ports of entry.
 - Meeting the authorities for the borders which the Team expects to cross. Explain the CHLOREP program and the need for an expeditious crossing of the border in an emergency. Find out what will be needed to cross the border in response to an emergency incident. Obtain the name of a senior authority at the crossing and maintain contact with this individual on a regular basis. If possible, obtain correspondence from the senior official that can be used during an actual border crossing. Determine if there will be costs associated with the crossing.
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- Obtain a CHLOREP support letter from the Institute, if needed.
- Prepare a detailed equipment list, including all equipment that may be used. During the actual response, this list will be modified to include only the equipment being taken to the emergency scene.
- Discuss customs and immigration issues with the charter airline that may be used to travel to the emergency scene. Generally, the charter company will contact customs and immigration authorities in advance of arrival and arrange for clearance at the destination port. The destination airport must have a Customs and Immigration office.

10.3 DURING AN EMERGENCY

The following is a list of items to consider when crossing the border en route to an emergency:

- Have the CHLOREP Team Leader or Company CHLOREP Coordinator notify the port director at the port of entry that the CHLOREP Team intends to cross the border to respond to a chlorine emergency. Provide the CHLOREP Team's expected arrival time and the names of the CHLOREP Team members with birth dates and birth places. Determine if there will be costs associated with the crossing.
 - Provide the port of entry a written "request for assistance" from an appropriate authority. This could include a request for assistance from the On-Scene Incident Commander, authorities local to the emergency, CHEMTREC, CANUTEC, SETIQ, the carrier company, or the shipper involved in the incident. If an authority such as the port director has been notified of the pending arrival of the CHLOREP Team, provide the name of the authority to the CHLOREP Team that will be crossing the border.
 - Each CHLOREP Team Member should carry an information package that includes:
 - Certificate of Training;
 - Company-Provided Picture ID;
 - Certificate of Medical Fitness;
 - Respiratory Fit Test Certificate; and
 - Passport.
 - Have an equipment list that exactly matches the equipment being brought across the border. Indicate any equipment that may be left at the incident scene, such as a pressure relief device, angle valve or an emergency capping kit. Information on where this equipment was manufactured can be helpful.
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Once proper clearance into the country of response has been obtained, CHLOREP Team Members should proceed to the emergency scene without further delay.

10.4 USE OF A CHLOREP CONTRACTOR

A CHLOREP Team may determine that it is more effective or efficient to hire a CHLOREP Contractor for cross-border emergencies. The decision to use a CHLOREP Contractor is based on a CHLOREP Team's particular circumstances and needs. If a CHLOREP Team plans to ever use a CHLOREP Contractor for cross-border response, it is critical for the Team to ensure the Contractor is prepared for crossing the border at any time they may be called upon.

11. **INITIAL CALL TO EMERGENCY SCENE**

11.1 GENERAL

The CHLOREP Team Leader, in addition to providing technical advice, must guide those at the scene so that they take necessary action, but do not over or under react to what has happened and what may occur.

11.2 CHECKLIST FOR INITIAL CALL

- 1) Place the call – Call number provided for the emergency scene and ask for the Emergency Caller or new contact if caller is unavailable.
 - 2) Identify yourself – Give your name, company, city, telephone number, state you are from a chlorine emergency response team and any other pertinent details.
 - 3) State the purpose of your call – One example – “We have been advised that an emergency involving chlorine has been reported from your location. We are prepared to assist.”
 - a. In the U.S., determine if CHEMTREC has been advised. If not, recommend they be notified.
 - b. In Canada, determine if CANUTEC has been advised. If not, recommend they be notified if it is necessary for the particular incident.
 - c. In Mexico, determine if SETIQ has been advised. If not, recommend they be notified if it is necessary for the particular incident.
 - 4) Description of containers and damage – Get a brief description of the chlorine containers involved in the emergency and the extent of damages.
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Be sure to distinguish between cylinders and ton containers, when applicable.

- 5) Determine if the container is leaking – Determine if the chlorine container is actively leaking. Advise of how to minimize the leak (see Section 11.3.3 below). Consider wind direction and speed, weather conditions, size of the container, and the population density when providing advice. **Advise whether evacuation should be considered.**
- 6) Determine if fire is present or threatening (see Section 11.3.3) – Suggest the following:
 - a. Leaking containers – Do not place water on the containers.
 - b. Non-leaking containers – Move container, if possible. If not possible, keep containers cool by placing water on them **but advising to not put water directly on the leak.**
- 7) CHLOREP Team dispatch – Quickly decide if action is needed to be taken at the scene and by the CHLOREP Team. The CHLOREP Team Leader and the individual in charge at the emergency scene will jointly decide whether the services of a Team will be required. The shipper may also be involved in the decision for dispatching the CHLOREP Team. If in doubt, dispatch the CHLOREP Team immediately.
- 8) Determine exact location – Determine the exact location of the emergency and how to reach the scene. Advise the Emergency Caller that a CHLOREP Team is en route. It is important to ask for specific route directions to the scene.
- 9) Answer questions – Answer any questions the Emergency Caller may have (see Sections 11.3.1 through 11.3.4).
- 10) Advise of Changes – Ask the Emergency Caller to call and advise if any changes in the emergency situation occur and to call if any further questions arise. Request alternate local phone number at or near the scene.

11.3 CHLORINE DATA

If deemed necessary, the following paragraphs (Sections 11.3.1 – 11.3.3) are written in a manner that can be read over the phone to the Emergency Caller.

11.3.1 Chlorine Hazards and Public Protection

- Chlorine gas is a respiratory irritant. Inhaling the gas in relatively low concentrations causes coughing, tears, a runny nose and breathing difficulties.
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- Chlorine has a distinctive, bleach-like odor and is detected easily by smell at very low concentrations.
- No one would voluntarily remain in an area where chlorine concentrations are severely irritating or dangerous.
- Health effects of chlorine inhalation at various levels include:

Less than 1 ppm	Threshold of odor perception for the average person
3 – 5 ppm	Slight irritation of the nose and upper respiratory tract
5 – 8 ppm	Irritation to the respiratory tract and eyes
15 – 20 ppm	Immediate severe irritation of the respiratory tract, intense coughing and choking
30 ppm	Shortness of breath, chest pains, and possibly nausea and vomiting
40 – 60 ppm	Development of chemical bronchitis and fluid in the lungs, which may occur after several hours, and chemical pneumonia may occur several days later
Prolonged exposure above 50 ppm	Unconsciousness and possibly

- The yellow-green color of chlorine gas when it is present in significant concentrations provides another warning signal.
- If the chlorine source involved in an emergency is large, and chlorine is escaping in more than trace quantities, downwind evacuation or “Sheltering in Place” must be considered. Local authorities should make this decision and implement public protective actions. If there is no leak, but only a potential for leak, it is usually enough to alert nearby persons to be ready for evacuation if and when the warning is given. Special considerations should be given to evacuation of hospitals, nursing homes, schools, etc.

11.3.2 How to Treat Those Exposed to Chlorine

If a caller asks for details on treatment of people exposed by a chlorine leak, read from or provide CI Pamphlet 63 for first aid and medical management guidance.

11.3.3 How to Prevent or Minimize Chlorine Leaks

If the caller asks for details regarding preventing or minimizing a chlorine leak, the following could be a typical response:

“If a container is leaking liquid chlorine, the chlorine will almost immediately expand into a gas covering the area with a white frost. This will show the approximate location of the leak. If possible, turn the container so that the leak is in the gas phase to minimize the amount of chlorine released.

“If a leaking container is connected to a consuming process, the pressure in the container can be reduced by releasing **gas** into the consuming process. Pressure can also be reduced by releasing the **gas** into absorbing liquids like solutions of soda ash, caustic soda or other alkaline materials. *(If caller wants more detail, read (or email) Section 13.5)*

“If fire is present or threatened, it is preferable that any chlorine container be moved away from the site of the fire. If a non-leaking container cannot be moved, it should be kept cool by placing water on it. **IF THE CONTAINER IS LEAKING, DO NOT PLACE WATER ON DIRECTLY ON THE LEAK**, because when chlorine and water react, acids are formed that will corrode the container and will rapidly make the leak worse. However, where several containers are involved and some are leaking, it may be prudent to use water to prevent rupture of the containers.

“Though chlorine itself will not burn, there are a few exceptional situations in which chlorine supports the combustion of other materials, such as finely powdered metals, hydrocarbons and alcohols, for example. Since chlorine and steel will ignite around 480°F, never use a cutting torch or other source of high heat on a tank or pipe that contains chlorine. Such high temperatures could cause a chlorine fire, destroying the steel structure, and releasing the remaining chlorine.”

11.3.4 Chlorine Container Details

The following is a list of chlorine containers and pertinent details that can be shared with the Emergency Caller or other on-site contact.

CHLORINE NET WEIGHT	APPROXIMATE GROSS LOADED WEIGHT	APPROXIMATE DIMENSIONS	PRESSURE RELIEF DEVICE	EMERGENCY KIT
CYLINDERS 100-150 lbs.	160-290 lbs.	10" dia x 5' high	One fusible plug on the valve (melt between 158- 160°F)	A
TON CONTAINERS 2,000 lbs.	3,600 lbs.	30" dia. X 6-1/2' long melting around 160°F	Six fusible plugs, one on each valve (melt between 158-160°F)	B

CHLORINE NET WEIGHT	APPROXIMATE GROSS LOADED WEIGHT	APPROXIMATE DIMENSIONS	PRESSURE RELIEF DEVICE	EMERGENCY KIT
TANK CARS 90 tons	130-143 tons	45'-48' long 10'8" max. width 15'6" max. height above rail	One safety relief valve (start-to- discharge pressure of 375 PSIG)	C
TANK TRUCKS 16-22 tons	30-38 tons	45'-60' long 10' max. width 12' max. height	One safety relief valve (start-to- discharge pressure of 225 PSIG)	C

12. ACTION AT THE EMERGENCY SCENE

12.1 INITIAL ACTION

Upon arrival at the emergency scene, the CHLOREP Team Leader should contact the person in charge (Incident Commander) and, with approval, make an immediate assessment of the situation in order to establish any need for changing advice that was given earlier prior to the Team's arrival. The Team Leader needs to establish whether or not a leak is present, determine its severity, and evaluate whether or not a leak may develop.

Initial action should involve discussions with other concerned personnel, including government agencies, to provide expertise in handling the emergency, e.g., preventing damage to the container during abnormal handling. Keep in mind that the Incident Commander, often the top police or fire official initially on scene, is in charge of the emergency and ultimately makes the decisions about the response. Establishing a good relationship with this person is critical to ensure the CHLOREP Team is allowed to perform the appropriate response to the chlorine emergency.

There are emergency situations that may involve chlorine tank cars that are on a train with tank cars carrying other commodities. Concerns about potential reactivity of chlorine with other commodities will impact decisions. See CI Pamphlet 164 for guidance on reactivity and compatibility with chlorine. Especially when a major fire is present at the scene and there is inadequate data on which to assess risk of explosion or other hazardous conditions by these other cars, the Team Leader should consider recommending evacuation of the area within a radius of ½ mile. When better information becomes available, the initial action may be modified accordingly.

12.2 CHLORINE LEAK MITIGATION

If a chlorine leak is discovered or confirmed, the following actions may be considered:

- If liquid chlorine is leaking from a container, the quantity of chlorine leaking can be significantly reduced by altering the position of the container so that the leak is coming from the top of the container and only gas is escaping.
 - Before considering application of a Chlorine Emergency Kit, determine if the leak can be stopped by other means. Often leaks can be stopped simply by closing valves or tightening valve plugs or bolts.
 - The appropriate Chlorine Emergency Kit may be used, if suitable, either to stop the leak completely or to contain the leaking chlorine so that it can be routed away from the area via hose or pipe to some system of disposal. Important: Do not apply a capping hood on the pressure relief device (PRD) of any container, including the fusible plug on a cylinder or ton container, which is exposed to fire. Before capping a PRD, the pressure of the container must be checked. The container pressure must be in the normal range and not approaching the PRD's start-to-discharge pressure. Capping a PRD is only to be done after giving consideration to all possible conditions and consequences. After a PRD has been capped, the pressure of the container must be monitored regularly.
 - If possible, determine the pressure on the leaking container. Reduce the pressure when possible by methods outlined below.
 - Pressure in the leaking container may be reduced by transferring gas to an empty cylinder, ton container or tank car or to a system using caustic soda, soda ash or some other alkali reactant to scrub the excess pressure (see Section 13).
 - If the emergency occurs at a consumer's plant, it may be possible to utilize the entire chlorine content of the container in the consumer's process. If not, it may be possible to depressurize the tank by transferring gas into the consuming process.
 - It may be possible, with proper approval, to transport the leaking container to some area where the leak can be tolerated, at least until equipment to stop the leak or dispose of the chlorine can be obtained (see Section 12.3).
 - If a pool of liquid chlorine has collected in a ditch or tank dike, the rate of chlorine vaporization caused by wind or solar radiation can be reduced by application of aqueous foam. Two foams are known to have been used to hydrate the liquid chlorine surface: 3M VAPORSHIELD-AC and CHUBB NATIONAL FOAM AFFF/ATC. The foams must be applied at a 50:1
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expansion ratio to prevent adding excess water to the chlorine. Do not spray the foam directly on the liquid chlorine but allow it to flow indirectly over the surface of the liquid. Re-application of the foam will be necessary as it breaks down or is blown off by the wind.

- Application of caustic soda will increase the evaporation rate of chlorine from a liquid pool considerably. Dry soda ash can be used to neutralize the chlorine. However, a small amount of water is needed to start the reaction and the chlorine evolution rate will increase during neutralization.
- In most cases, WATER SHOULD NOT BE SPRAYED ON THE CHLORINE CONTAINERS. However, in the event of a fire, water can be sprayed on the containers to keep the chlorine cool to avoid rapid increase in temperature and/or release rate. If this is done, care must be taken NOT TO SPRAY WATER ON THE POINT OF LEAKAGE OR ONTO A POOL OF LIQUID CHLORINE, as this will worsen the leak by accelerating the rate of chlorine release and cause corrosion damage to containers.

12.3 TRANSPORTATION OF DAMAGED CONTAINERS

When a chlorine container has been involved in an incident, often a decision needs to be made about whether to move the container.

A function of the CHLOREP Team Leader will be to give the authorities and carrier supervisors on the scene his/her best estimate of the situation from a safety and technical viewpoint. He/She should firmly voice any objections and seek assistance, as necessary, if he/she feels action is planned that would increase the hazard.

If the container is leaking, the only reason for transporting it would be to get it to a less congested area where an emission would cause less risk or hazard. However, before attempting to move the container, every reasonable effort should be made to determine the condition of the container, as moving it may cause a larger release.

If the leak has been stopped or the damaged container has been emptied, the railroad or other transport company is responsible for issuance of authorization to move the container. When not by rail, other authorities will likely have to be consulted.

12.4 ARRIVAL OF THE CHLORINE SHIPPER

If personnel from the shipper (producer or packager) of the chlorine container involved arrive on the scene, the CHLOREP Team Leader should confer with the shipper's representatives as to which, if any, emergency activities will be continued by his/her Team, and which by the shipper. The Incident Commander should be involved in this process.

13. DISPOSAL OF CHLORINE

13.1 GENERAL

After a leak has been contained and the emergency is under control, disposition of the chlorine must be considered. The specific condition will dictate requirements; however, the primary factor in deciding the means of disposal is public safety. Several possible methods are listed below, but these should not be regarded as the only possibilities.

13.2 USING THE CHLORINE

If the Emergency occurs at a consumer's plant, it is recommended to use the contents of the tank in the consuming process.

13.3 RETURNING THE CONTAINER

If the emergency occurs in transit and the container is safe for transportation, secure the container and return it to a shipper's plant. This is usually the safest method, providing the container can be made safe for transport. However, special shipping arrangements may be required:

Emergency Kit	U.S. Regulations* (DOT – PHMSA & FRA)	Canadian Regulations (Transport Canada)
Salvage Cylinder (Recovery Vessel)	Authorized per 49 CFR 173.3(d)	Authorized per CSA B340 Clause 6.4
Kit "A"	Authorized per 49 CFR 173.3(e)(1)	Apply for Temporary Certificate
Kit "B"	Authorized per 49 CFR 173.3(e)(2)	Authorized per CAN/CGSB 43.149-2023 Section 9.1.1.1
Kit "C"	Apply for one-time movement approval from FRA <ul style="list-style-type: none"> • <i>Certain low risk conditions require notification only per HMG-127</i> • <i>All others require application per HMG-127</i> 	<ul style="list-style-type: none"> • Certain low risk conditions authorized per CAN/CGSB 43.147-2023 Section 11.3. • All others apply for Temporary Certificate
*In Mexico, U.S. regulations are typically followed for transporting a chlorine container with an emergency kit applied to a destination for disposal.		

In the case of a container on board a ship or barge in Canada, the Canadian Coast Guard must be contacted and Ports Canada, if in a port.

13.4 TRANSFERRING CHLORINE

Due to the potential for additional hazards, lack of proper equipment and extended length of time involved, it is not desirable to transfer the contents of a chlorine container in the field unless it's absolutely necessary.

With severely damaged tank cars or cargo tanks, it may be necessary to transfer the chlorine to another chlorine container. CI has procedures available to CHLOREP Level 3 Contractors for transferring liquid chlorine in the field. These should be reviewed and adapted for the circumstances involved in the situation at hand.

13.5 ABSORPTION IN ALKALINE SOLUTION

It may be possible to absorb the chlorine in a solution of caustic soda or soda ash. Use a hose or pipe to conduct the chlorine gas to the solution, which may be made up in any convenient tank. The depth of the solution in the vessel may vary depending on the rate of chlorine discharge and the size of the chlorine bubbles. A minimum depth of six feet should be considered. The potential for backflow, or "suck back," into the chlorine container should be reviewed. If "suck back" is a probability, then the use of vacuum breakers, air entrance points or other means should be considered. Never immerse a chlorine container in the alkaline solution.

Recommended Alkaline Solutions for Absorbing Chlorine

CHLORINE CONTAINER CAPACITY	20 WEIGHT % CAUSTIC SODA SOLUTION		10 WEIGHT % SODA ASH SOLUTION	
lb (net)	100% NaOH Water		100% Na₂CO₃ Water	
	lb	gal	lb	gal
100	135	65	359	390
150	203	98	538	585
2000	2708	1300	7176	7800

CAUTION: When absorbing chlorine in an alkaline solution, the resultant heat of reaction must be considered. There is a need to monitor the resultant temperature rise. Caustic solutions can cause burns to personnel.

14. **KEEPING THE PUBLIC INFORMED**

14.1 GENERAL

Company guidelines may exist for individual CHLOREP Teams concerning their interaction with the media and public, which should be followed if available. Typically, a Participant will designate a Public Relations Assistant to handle

interactions with the media or public so that the CHLOREP Team Members can focus on the actual response. Cooperation with local reporters is essential to communicate important information to the surrounding community. A Public Information Officer (PIO), as identified by the Incident Command System, will also likely be at the scene. The PIO will be the lead when interacting with the media at an emergency but may ask for technical assistance from the CHLOREP Team.

This section provides general guidelines, as a suggestion, for informing the public about a chlorine release. Many people believe that the less said to the media, the better it is for themselves and for their companies. A CHLOREP Team's company and Public Relations Assistant will determine the best course of action and level of information that is appropriate to share with the public depending on the conditions and significance of the chlorine release.

Bear in mind that stories for print or broadcast will be prepared with or without your input. It is unlikely that you would be the primary media contact. However, information that a Participant provides may be critical to help ensure that the public is informed through news coverage that is fair, factual and accurate. A Participant's cooperation with reporters also can help cast the industry and the CHLOREP program in a favorable light. If denied access to the facts, reporters will base their coverage on the "best available information;" without expert input, and hearsay/rumors may be the best information at reporters' disposal. Remember, reporters cannot be faulted for using such information unless they are given access to something better.

14.2 ACTIVITIES AT THE EMERGENCY SCENE

14.2.1 Make Local Contacts

The CHLOREP Team Leader should check in with the top police and fire officials at the emergency scene and tell them that his/her Team wants to keep all appropriate persons up-to-date on what is happening. When a CHLOREP Team Leader is asked for his/her name and employer, a suggested response is: "I'm (first and last name) and I represent the Chlorine Institute's CHLOREP program. I'm a member of the Chlorine Emergency Team at the (company name) plant in (plant town). Offer to handle local officials' questions on chlorine.

14.2.2 Chlorine Release Fact Sheet

The Chlorine Release Fact Sheet is a public information sheet developed by CI that includes information on the properties and characteristics of chlorine, warning signs of a release, effects of chlorine gas exposure, and what to do in case of a chlorine release. This fact sheet is intended to give the public some general knowledge about chlorine and what to do in case of a chlorine emergency. The Chlorine Release Fact Sheet is available to Institute members through the Institute's website. Keep a supply in emergency kits for use at emergency scenes.

14.2.3 Chlorine Effects on Health and the Environment

Various CI resources, including some of those noted in Section 6, provide information describing chlorine's acute and chronic health effects, as well as effects on the environment, first aid for chlorine inhalation, getting help during an emergency, and avoiding chlorine exposure at home. The CHLOREP Team and Public Relations Assistant should be familiar with this information in advance of an emergency in case of questions.

14.2.4 Prepared Statement or Media Information Card

A prepared statement or media information card should contain basic information on the Chlorine Institute, the North American chlor-alkali industry and CHLOREP. It should also give the name and phone numbers of a 24-hour-a-day media contact at the Participant's company if the Public Relations Assistant is not already on-scene. Keep several copies of this inside the emergency kits for use at incidents.

14.2.5 Talking with the Press

Refer all Press Questions to the Public Information Officer (PIO), as identified in the Incident Command System. The CHLOREP Team Leader should provide information and support to the PIO, as necessary.

Some key points to keep in mind when providing information and support to the designated PIO include:

- Remember that tight deadlines are an integral part of media coverage.
 - When describing an incident, explain the CHLOREP program, the cooperative role the CHLOREP Team is playing with the local officials to resolve an emergency, and the importance of chlorine to society. Use lay language (as if the event was being described to a neighbor who knows nothing about chlorine).
 - Reporters may ask questions that may be repetitious or even silly, so be courteous, patient and responsive.
 - Do not talk "off the record." If something shouldn't be printed or broadcast, it should not be said. Be cautious when summoned to the phone. Assume that any reporter is recording the conversation. Comments could even be broadcasted live.
 - Don't release names of injured persons; refer reporters to appropriate public or medical officials at the scene. Do not make monetary damages estimates; leave those to insurance adjusters.
 - If the incident is such a magnitude that it results in a flood of media inquiries, it may be best that the PIO hold a formalized press conference
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(a decision made with the Incident Commander). If so, assist the PIO as necessary when requested.

15. CHLOREP RESPONSE TO CRIMINAL/TERRORIST INCIDENTS

15.1 GENERAL

As a result of terrorist attacks on September 11, 2001, and subsequent threats, the safety and security of chlorine and other hazardous materials in transit has gained a much higher profile. A CHLOREP Team responding to the scene of any chlorine incident should be aware of the safety and security issues involved with response to a potential or suspected criminal or terrorist incident. Any scene of a chlorine incident could potentially be a disaster scene, a hazardous materials scene, and a crime scene – simultaneously.

Response functions at a hazardous materials scene, whether caused by an accident or by a criminal/terrorist incident (a deliberate act) remain fairly consistent. Special consideration should be given when assessing the scene and administering control of the scene as they relate to criminal/terrorist-caused incidents.

15.2 SCENE SIZE-UP AND HAZARD ASSESSMENT

At the scene of a potential criminal/terrorist act involving chemicals, it is critical to be alert to clues, surroundings and events. Some considerations are:

- Types and potential targets of criminal/terrorist activity
 - Location (symbolic, historical targets, controversial businesses, infrastructure systems, assemblages like sporting events, etc.)
 - Type of event (explosions and/or incendiaries, use of firearms)
 - Timing of the event (symbolic dates or anniversaries)
- On-scene warning signs
 - Suspicious things – objects that don't belong
 - Suspicious people – strange behavior, repeated sightings over time, repeated sightings at different locations
 - Suspicious feelings – recognize and use your instincts
- Multiple events
 - Consider that one event may be an attempt to influence another event's outcome
 - Secondary devices – targeting responders

If a CHLOREP Team Member observes anything suspicious that could indicate a criminal or terrorist attack, the local authorities should be contacted immediately. Training on reporting suspicious activity is available for free. One known training is provided by the Nationwide Suspicious Activity Reporting (SAR) Initiative (NSI) at: <https://nsi.ncirc.gov/hsptregistration/fire-ems>.

15.3 SCENE CONTROL

Securing the area of a criminal/terrorist attack is very important to protect responders, mount an effective response and to maximize the preservation of evidence. Local responders will typically be responsible for controlling the scene, but if the CHLOREP Team is on-site before local responders, they may need to assist in initiating scene control. The following are some considerations:

- Scene control and establishing a secure perimeter are critical
 - Controlling access to the scene is more difficult and more important at a site of criminal/terrorist act
 - Communication should be controlled and monitored for both safety and security
 - Control zones should be aggressively maintained
- Stabilize the crime scene and maximizing evidence preservation are key concerns for law enforcement officials and must be incorporated into incident objectives and tactical plans
 - Document, and if possible, take pictures of the scene prior to moving anything.
 - Responders may become witnesses and may be subject to extensive and multiple interviews

If possible, keep responders in the area to a minimum, to avoid disturbing evidence.

15.4 RESPONSE OBJECTIVES

In an event caused by a criminal/terrorist, other local, state and federal agencies may be rapidly involved, such as the U.S. Federal Bureau of Investigation (FBI) (or equivalent in Canada and Mexico). Similar to hazardous materials incidents, it becomes critical to establish a unified command with clearly defined incident objectives. Unified Command authority may be shared or transferred during the incident, which could result in changes to the priority of objectives. However, responder safety should remain the highest importance. CHLOREP Teams should give law enforcement and other authorities the utmost respect and assist in the response, as requested, to ensure public safety as it relates to the chlorine release and possible exposure

16. **POST-EMERGENCY CRITIQUE**

16.1 GENERAL

When a chlorine incident has been called into CHEMTREC, a call report is generated and sent to several recipients, including responsible CI staff of the incident. CI staff will then request the CHLOREP Team Leader involved in the incident to complete and submit a Post-Emergency Critique. If a CHLOREP Team

becomes involved in a chlorine incident that was not called into CHEMTREC, the Team Leader should notify CI staff of the event and submit the Post-Emergency Critique. In Canada and Mexico, CANUTEC and SETIQ do not generate call reports that are shared with CI staff like CHEMTREC does, so CHLOREP Team Leaders involved in a chlorine incident should notify CI staff of the event and submit the Post-Emergency Critique.

CHLOREP activation includes all incidents where the CHLOREP Team was contacted. It includes responses whether the Team was notified by an Emergency Call Center, such as CHEMTREC, or was directly notified by those involved in the incident. A CHLOREP Team is considered to be activated even if there was no dispatch to the scene, if there was no chlorine leak, or if only telephone advice was given.

The CHLOREP Team Leader should complete all applicable parts of the Post-Emergency Critique after any and all CHLOREP activations. Please be as thorough as possible when filling out the Critique. CI staff will compile the information and produce data that will be presented periodically to CI's Emergency Preparedness Issue Team (EPIT) and shared with CHLOREP Teams. If sharing information related to a significant emergency response is deemed critical, the information will be sanitized and distributed to all CHLOREP Teams as soon as possible.

The EPIT will analyze the incident data in order to improve responses, as well as CI guidance and training. The information also enables CHLOREP Teams to learn from the experiences, positive or negative, of other Teams.

16.2 COMPLETING THE POST-EMERGENCY CRITIQUE

CI's Post-Emergency Critique Form can be accessed, completed, and submitted through:

- CI's website: <https://www.chlorineinstitute.org/emergency-preparedness/chloreps/sector-operations/>
- CHLOREP mobile app (contact CI staff to request access for downloading the app)

A Post-Emergency Critique should be completed and submitted to CI staff as soon as practicable, usually within one week, after a CHLOREP incident. The following are general instructions for completing the critique:

- Complete one copy of the form for each incident/activation.
 - Accurately complete as many entries on the form as applicable. When necessary, provide estimated answers. If information is unknown, so indicate.
 - In the narrative sections, please be as descriptive as possible.
-

- For significant or unique incidents, email (separate from the critique form) pictures to CI staff, if possible.
- Teams are requested to provide the report in a timely manner after the incident has occurred. Incidents with major consequences or significant media coverage should be reported as soon as possible.
- Do not report an incident by phone, **EXCEPT** if there is a major event which may have immediate repercussions for other companies or associations. In such instances, a verbal report as complete and as accurate as possible should be made to CI staff (703-894-4140). CI staff will request the Team Leader to complete a critique subsequent to the event.

17. EMERGENCY RESPONSE RESOURCE PHONE NUMBERS

CHLOREP Teams should save national emergency phone numbers, as well as relevant state/provincial emergency and local phone numbers in which the Team is located, in a location that is readily accessible during a response.

The following are useful national phone numbers to keep on hand (numbers are answered 24 hours per day, unless otherwise noted):

ORGANIZATION

PHONE NUMBER(S)

CHEMTREC

American Chemistry Council
2900 Fairview Park Drive
Falls Church, VA 22042

1-800-424-9300 (toll free within U.S.)

1-703-741-5500

Collect calls are accepted.

CANUTEC

Transport Canada
330 Sparks Street, Office 1415
Place de Ville, Tower C
Ottawa, Ontario K1A 0N5

1-888-226-8832 (toll free)

1-613-996-6666

Collect calls are accepted.

The Chlorine Institute

1300 Wilson Blvd., Suite 525
Arlington, VA 22209

1-703-894-4140 (office hours)

Bureau of Explosives (BOE)

Transportation Technology Center, Inc.
55500 DOT Rd.
Pueblo, CO 81001

1-719-584-0750 (office hours)

ORGANIZATION**PHONE NUMBER(S)**

National Response Center (NRC)
 U.S. Department of Homeland Security
 c/o U.S. Coast Guard
 Stop 7581
 2100 2nd Street, SW
 Washington, DC 20593

1-800-424-8802 (toll free)

SETIQ
 Asociacion Nacional de la Industria
 Quimica
 Av. Insurgentes Sur 1070
 Insurgentes San Borja, Benito Juarez
 03100
 Ciudad Mexico

1-800-002-1400 (toll free)
 55-5559-1588

18. REFERENCES**18.1 INSTITUTE PUBLICATIONS**

The following publications are specifically referenced in the CHLOREP Handbook. The latest editions of CI publications may be obtained at www.chlorineinstitute.org.

<u>Publication ID</u>	<u>Publication Title</u>
Pamphlet 1	<i>Chlorine Basics</i>
Pamphlet 6	<i>Piping Systems for Dry Chlorine</i>
Pamphlet 17	<i>Packaging Plant Safety and Operational Guidelines</i>
Pamphlet 49	<i>Recommended Practices for Handling Chlorine Bulk Highway Transports</i>
Pamphlet 57	<i>Emergency Shutoff Systems for Bulk Transfer of Chlorine</i>
Pamphlet 63	<i>First Aid, Medical Management/Surveillance and Occupational Hygiene Monitoring Practices for Chlorine</i>
Pamphlet 64	<i>Emergency Response Plans for Chlor-Alkali, Sodium Hypochlorite and Hydrogen Chloride Facilities</i>
Pamphlet 65	<i>Personal Protective Equipment for Chlor-Alkali Chemicals</i>
Pamphlet 66	<i>Recommended Practices for Handling Chlorine Tank Cars</i>
Pamphlet 73	<i>Atmospheric Monitoring Equipment for Chlorine</i>
Pamphlet 95	<i>Gaskets for Chlorine Service</i>

Pamphlet 155	<i>Water and Wastewater Operators Chlorine Handbook</i>
Pamphlet 164	<i>Reactivity and Compatibility of Chlorine and Sodium Hydroxide with Various Materials</i>
Pamphlet 166	<i>Angle Valve Guidelines for Chlorine Bulk Transportation</i>
Pamphlet 168	<i>Guidelines for Dual Valve Systems for Bulk Chlorine Transport</i>
Instruction Booklet (IB/A)	<i>Chlorine Institute Emergency Kit "A" for 100-LB and 150-LB Chlorine Cylinders</i>
Instruction Booklet (IB/B)	<i>Chlorine Institute Emergency Kit "B" for Chlorine Ton Containers</i>
Instruction Booklet (IB/C)	<i>Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks</i>
Instruction Booklet (IB/RV)	<i>Chlorine Institute Recovery Vessel for 100-LB and 150-LB Chlorine Cylinders</i>
A-Video	<i>How to Use the Chlorine Institute Emergency Kit "A" for 100-LB and 150-LB Chlorine Cylinders</i>
B-Video	<i>How to Use the Chlorine Institute Emergency Kit "B" for Chlorine Ton Containers</i>
C-Video	<i>How to Use the Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks</i>
CST-Video	<i>Chlorine Safety Tour: A Training Guide for Chlorine Emergency Response</i>
FR-Video	<i>Chlorine Emergencies: An Overview for First Responders</i>
JRCL2-Video	<i>Jack Rabbit: Chlorine Properties</i>
H-Video	<i>First Response to Chlorine Exposures</i>
Wall Chart (WC-1)	<i>Handling Chlorine Cylinders and Ton Containers</i>
Fact Sheet	<i>Chlorine Release Fact Sheet</i>

18.2 DOT REGULATIONS

18.2.1 *Code of Federal Regulations*. Title 49. Chapter 1. Parts 190-192 & 195. Office of the Federal Register National Archives and Records Administration. U.S. Government Printing Office: Washington, DC, (revised annually).

18.2.2 *One-Time Movement Approval Procedures*, Rev. 4; HMG-127; Office of Railroad Safety, Hazardous Materials Division, Federal Railroad Administration, U.S. Department of Transportation: Washington, DC, **2014**.

18.3 OSHA REGULATIONS

18.3.1 *Hazardous Waste Operations and Emergency Response. Code of Federal Regulations*. Title 29. Part 1910. Office of the Federal Register National Archives and Records Administration. U.S. Government Printing Office: Washington, DC, (revised annually).

18.4 EPA REGULATIONS

18.4.1 *National Oil & Hazardous Substances Pollution Contingency Plan. Code of Federal Regulations*. Title 40. Part 300. Office of the Federal Register National Archives and Records Administration. U.S. Government Printing Office: Washington, DC, (revised annually).

18.5 CANADIAN REGULATIONS

18.5.1 *Canadian Transportation of Dangerous Goods Act and Regulations*; Transport Canada: Ottawa, Ontario, 2009. Website: <http://www.tc.gc.ca/tdg>.

18.5.2 Containers for Transport of Dangerous Goods by Rail, a CGSB Standard (CAN/CGSB 43.147-2023); Canadian General Standards Board (CGSB): Ottawa, Ontario, **2023**. Website: <https://publications.gc.ca/site/eng/9.921126/publication.html>

18.5.3 Ton Containers for the Transportation of Dangerous Goods, a CGSB Standard (CAN/CGSB 43.149-2023); Canadian General Standards Board (CGSB): Ottawa, Ontario, **2023**. Website: <https://publications.gc.ca/site/eng/9.921713/publication.html>

18.6 MEXICAN REGULATIONS & STANDARDS

18.6.1 *Official Mexican Standards*; Mexican Secretariat of Infrastructure, Communications, and Transportation: Mexico City, Mexico: <https://www.gob.mx/sct>

18.7 NFPA STANDARDS

18.7.1 *Standard for Competence of Responders to hazardous materials/Weapons of Mass Destruction Incidents*. NFPA Standard 472. National Fire Protection Association: Quincy, MA, **2018**.

18.8 OTHER RESOURCES

18.8.1 *Emergency Response Guidebook (ERG)*; **2020**. Pipeline and Hazardous Materials Safety Administration (U.S. Department of Transportation): Washington, DC. Website: <https://www.phmsa.dot.gov/hazmat/erg/emergency-response->

[guidebook-erg](https://tc.canada.ca/en/dangerous-goods/canutec/2020-emergency-response-guidebook); Transport Canada: Ottawa, Ontario. Website: <https://tc.canada.ca/en/dangerous-goods/canutec/2020-emergency-response-guidebook>; and Mexican Secretariat of Infrastructure, Communications, and Transportation: Mexico City, Mexico: <https://www.gob.mx/sct>

APPENDIX I: CHLOREP SECTOR MAP

The following maps are included in this appendix:

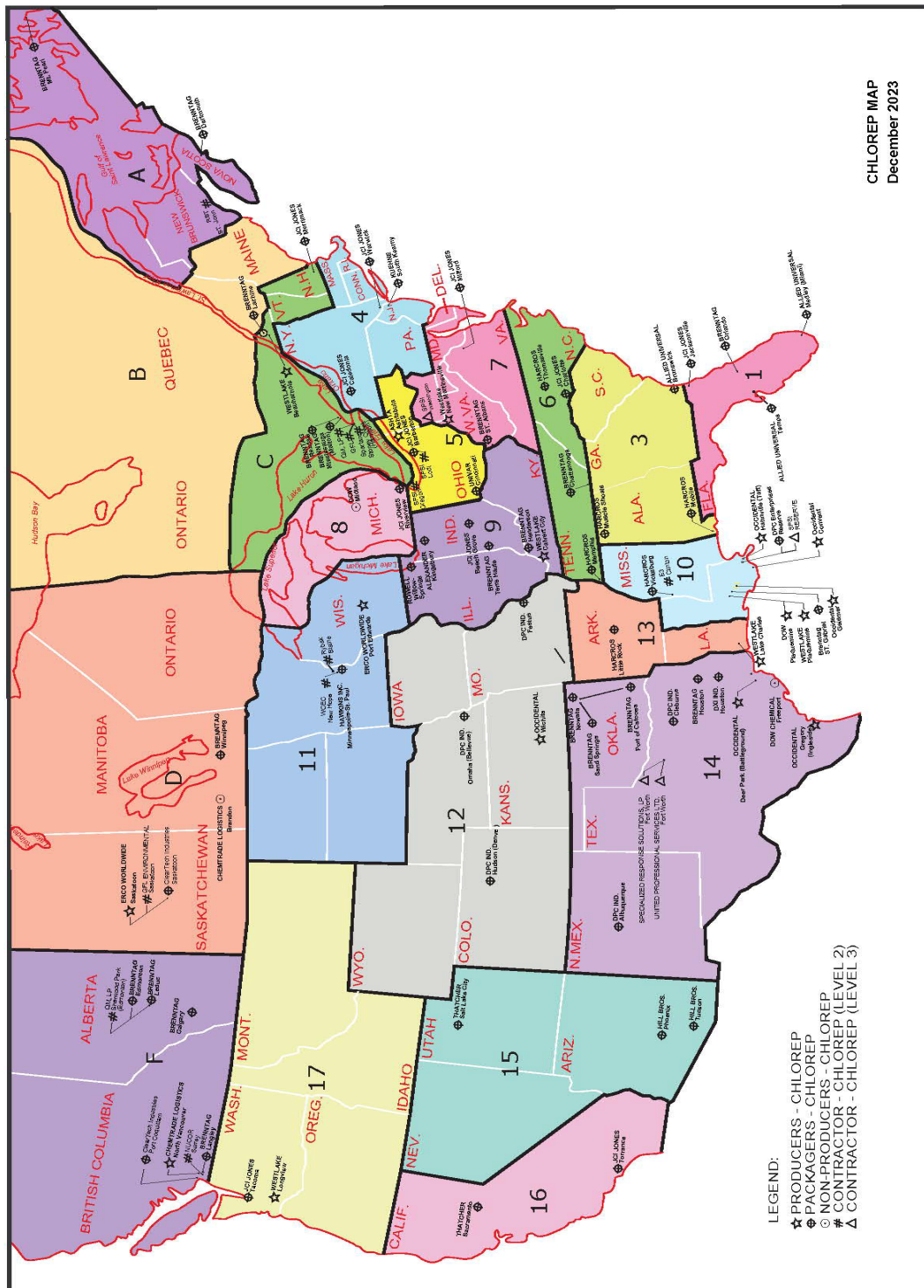
U.S. & Canada CHLOREP Sector Map

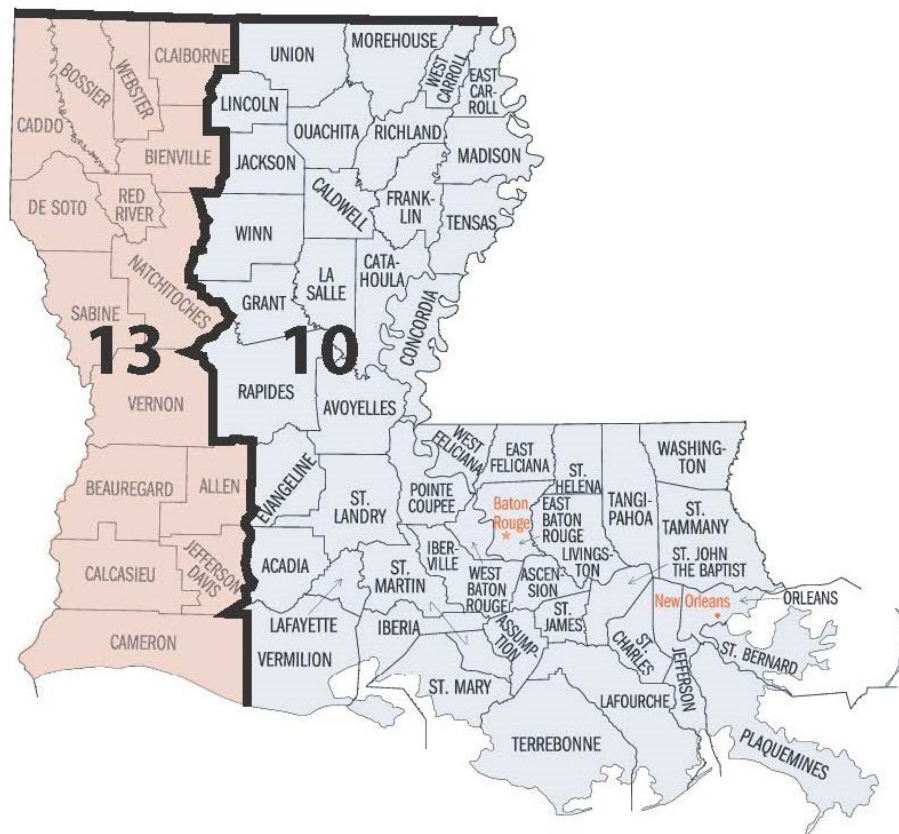
Focused view of Louisiana CHLOREP Sector boundaries

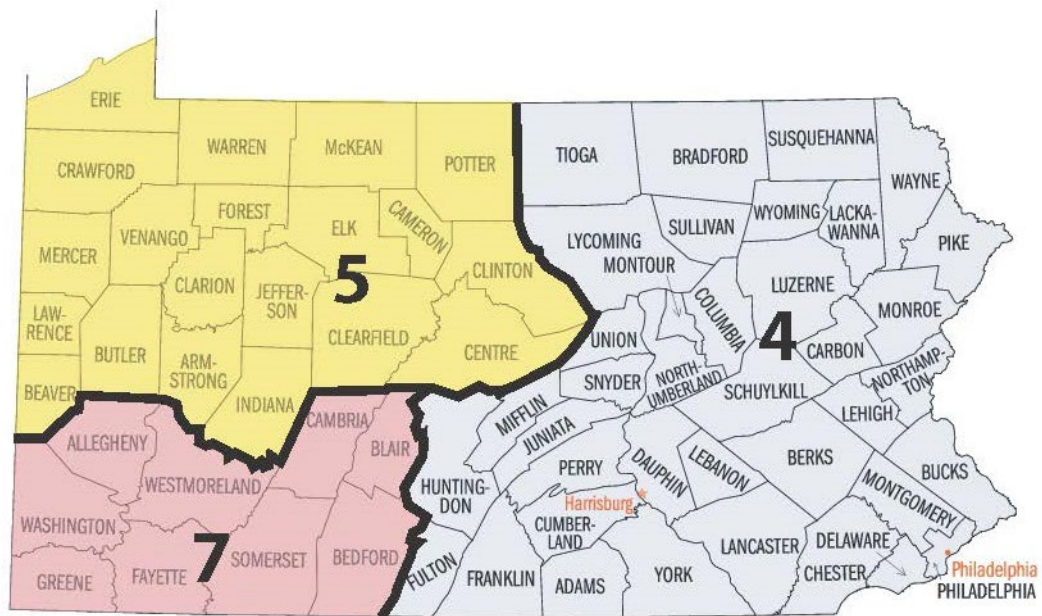
Focused view of Pennsylvania CHLOREP Sector boundaries

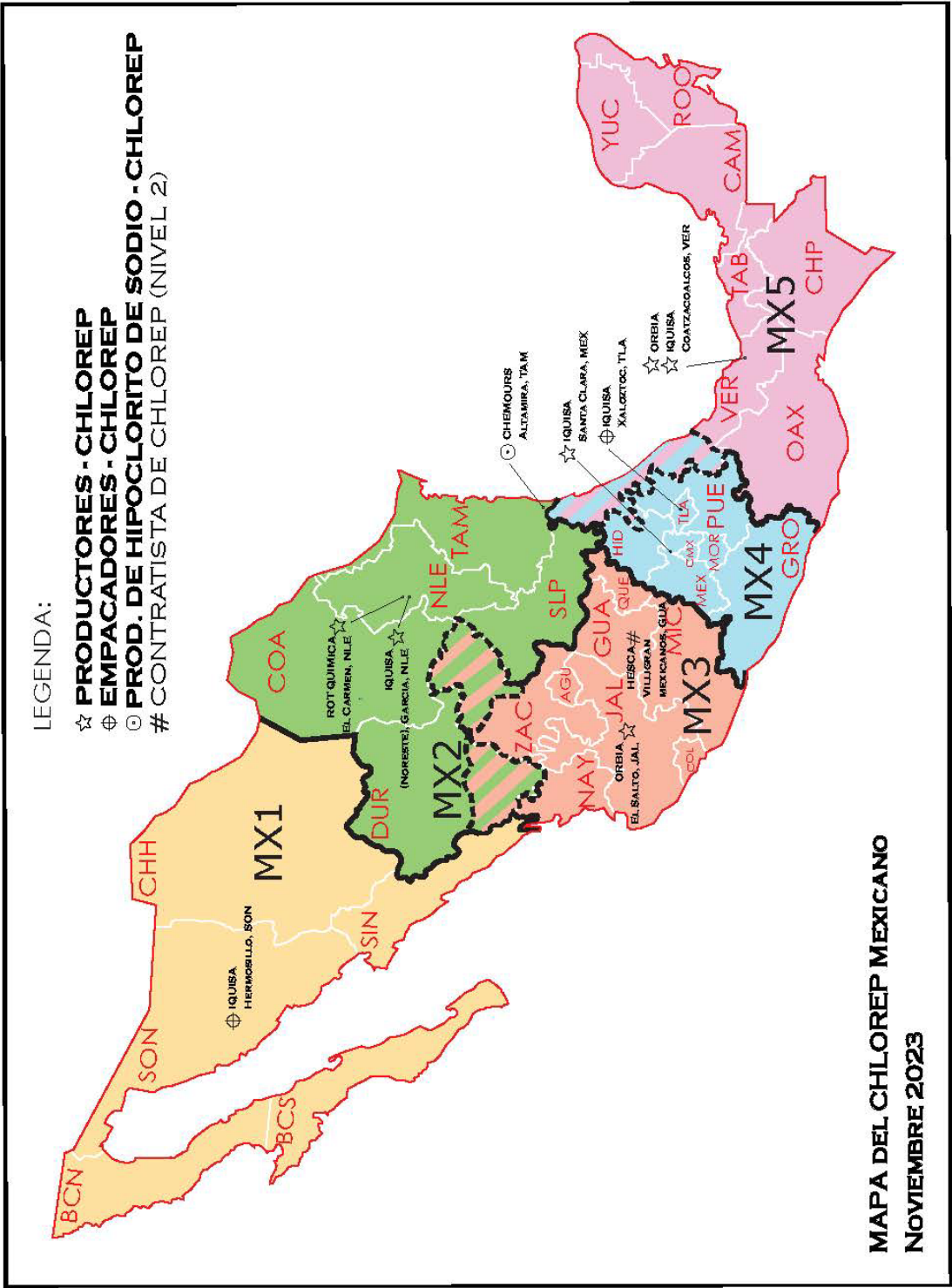
Mexico CHLOREP Sector Map

*The CHLOREP Sector Maps may also be downloaded through the CI website
(<https://www.chlorineinstitute.org/emergency-preparedness/chlorep/sector-operations/>).*









APPENDIX II: CHLORINE EMERGENCY PLAN (CHLOREP) MUTUAL AID PARTICIPATION AGREEMENT

1. INTRODUCTION

1.1. History

For decades, the members of The Chlorine Institute (CI or the Institute) have carried out a voluntary program of aid in chlorine emergencies occurring during transportation or at user locations. The aid had typically been supplied by the nearest capable chlorine producer regardless of producer-customer relations.

1.2. Purpose

Formalized in 1972, the Chlorine Emergency Plan (CHLOREP) is an industry-wide program established by the Institute to improve the speed and effectiveness of response to chlorine emergencies. CHLOREP was initially established in the U.S. and Canada, but more recently established in Mexico in 2023 (with the publication of Edition 8 of the CHLOREP Handbook). The primary purpose of CHLOREP is to minimize the risk of injury arising from the actual or potential leakage of chlorine during emergencies occurring in the course of transportation, at chlorine distribution points, or at chlorine user locations.

CHLOREP has three primary objectives:

- a) To provide technical advice from qualified persons to personnel at the scene of an emergency.
- b) To provide a means for contacting chlorine producers, packagers, and some larger users able to help in an emergency; and
- c) To provide, if necessary, emergency assistance at the scene of such an emergency

1.3. Organization

To meet these objectives, the Institute enlists the cooperation of those knowledgeable in the handling and transportation of chlorine to provide the personnel, equipment and expertise for the prompt and effective control of chlorine emergencies and to assist police, fire and other authorities in the event of emergencies in transportation, at chlorine distribution points or at chlorine user locations. CHLOREP will be operated as a public service by The Chlorine Institute and the Participants.

1.4. CHLOREP Handbook

The CHLOREP Handbook, maintained by CI's Emergency Preparedness Issue Team, provides guidelines for CHLOREP Team organization and operations for chlorine emergency response, including responsibilities and expectations as they pertain to Participants' agreed upon commitment to the CHLOREP mutual aid network. Participants, particularly the Company CHLOREP Coordinator and the

CHLOREP Team Leader(s), are strongly encouraged to review the CHLOREP Handbook in its entirety to become familiar with its contents.

2. **DEFINITIONS**

ANIQ	Asociacion de la Industria Quimica en Mexico (National Association of the Chemical Industry in Mexico).
CANUTEC	Canadian Transport Emergency Centre operated by Transport Canada in Ottawa, Ontario
Carrier	A common, contract or private carrier
CHEMTREC	The Chemical Transportation Emergency Center operated by the American Chemistry Council in Falls Church, VA
CHLOREP	Chlorine Emergency Plan
CHLOREP Team	A team designated in accord with Section 3.5
CHLOREP Contractor	An emergency response contractor having special expertise in responding to chlorine emergencies and is verified at a Level 2 or Level 3 capability by the Institute (see CHLOREP Handbook Section 2.2.4 for details)
Company CHLOREP Coordinator	The person responsible for the coordination of all of a Participant's Chlorine Emergency Groups
DOT	The U.S. Department of Transportation
Emergency	An incident involving chlorine which creates a potential or actual public hazard
Emergency Caller	The person at the scene of an emergency who makes the initial call to an Emergency Response Call Center
Emergency Contact	The person(s) that answer(s) the 24-hour emergency telephone number maintained by each Chlorine Emergency Group
Emergency Preparedness Issue Team	The committee designated in accord with Section 3.2
Emergency Response Call Center	CHEMTREC in the United States or CANUTEC in Canada

ERG	Emergency Response Guidebook (published by U.S. DOT, Transport Canada, and Mexican Secretariat of Infrastructure, Communications and Transportation)
NFPA	National Fire Protection Association
OSHA	U.S. Occupational Safety and Health Administration
Participant	A company which, by signing the CHLOREP Mutual Aid Participation Agreement, undertakes providing one or more Chlorine Emergency Response Groups for a chlorine emergency in their designated sector
Public Official	Any official of federal, state, provincial, or local governments having responsibility for public safety with respect to an emergency
Primary CHLOREP Team	The CHLOREP Team within a sector that has been designated the primary response group to be notified when a chlorine emergency occurs within a sector and to provide assistance, as needed. One Primary Team is assigned to each sector.
Secondary CHLOREP Team	A supportive CHLOREP Team that is listed as a secondary line of response when a chlorine emergency occurs within a sector. This Team will be contacted if a Primary Team is unable to respond to or requires assistance at a chlorine emergency.
SETIQ	Sistema de Emergencia para la Transportacion de la Industria Quimica operado por la Asociacion de la Industria Quimica (ANIQ) en Mexico. (Transport Emergency System for the Chemical Industry operated by the National Association of the Chemical Industry in Mexico).
Team Leader	The person in charge of a CHLOREP Team

3. **ORGANIZATION**

3.1. **Participation**

Participants in CHLOREP shall be those knowledgeable in the handling and transportation of chlorine who have agreed to participate as described in Section 10. All Institute members that ship/distribute chlorine are required to provide at least one CHLOREP Team for mutual aid response to chlorine emergencies within

their designated sectors. Other CI members, such as chlorine users, may also agree to commit CHLOREP Teams to the mutual aid network. In addition, CI verifies emergency response contractors (CHLOREP Contractors) to supplement responses to chlorine emergencies.

3.2. Operation

The operation of CHLOREP is guided by the Institute's Emergency Preparedness Issue Team. The Issue Team shall report to the Board of Directors of the Institute. Every Participant shall be entitled to representation on the Issue Team or one of the established Issue Team's working Task Groups. A CI staff coordinator shall be designated by the President of the Institute. The responsible CI staff will coordinate response arrangements among the mutual aid Participants, as well as the Emergency Response Call Centers, as appropriate, performing the administrative work incidental to the operation of CHLOREP.

3.3. Emergency Response Call Center

In the U.S., CHLOREP will utilize CHEMTREC as the Emergency Response Call Center. CHEMTREC operates 24 hours daily. In Canada, CHLOREP may utilize CANUTEC as the Emergency Response Call Center. While a formal agreement is not currently in place, CHLOREP may utilize SETIQ in Mexico when appropriate. The Institute will develop, maintain and furnish to Emergency Response Call Centers current copies of the CHLOREP Handbook and location guide (separate from the Handbook and will be updated more frequently) showing the location of all Chlorine Emergency Groups and the associated emergency telephone numbers.

3.4. Emergency Response

Each Participant must provide one or more CHLOREP Teams, with a Team Leader assigned to each Team, and a Company CHLOREP Coordinator. In addition, each CHLOREP Team location will also have a designated Emergency Contact to whom the request for assistance is directed through the 24-hour emergency number.

The functions of these CHLOREP Teams are to:

- 1) Receive emergency calls on a 24-hour basis from the Emergency Response Call Center or directly from CI staff, consumers or carriers;
- 2) Provide the Emergency Caller with advice; and
- 3) Make available one or more skilled, suitably equipped CHLOREP Teams for dispatch to chlorine emergencies.

It is critical that all personnel involved in the CHLOREP Teams, as well as the Emergency Contact, are familiar with the purpose of CHLOREP and the protocol when a call is received to provide assistance in a chlorine emergency. *Note: In the event of a temporary loss of a Team Leader meeting this criteria, the Participant may choose a contracted individual of similar knowledge and experience (preferably a leader with a CHLOREP Contractor).*

3.5. CHLOREP Team Expectations

3.5.1. Operational

CHLOREP Teams should always be prepared for a chlorine emergency response and be available 24 hours per day, 7 days per week, regardless of whether or not they are the shipper of the chlorine package. When a Primary CHLOREP Team receives a response call, the Team Leader shall determine the need to provide on-site or remote assistance. If the Primary CHLOREP Team cannot respond or requires further assistance, the Team Leader must call a Secondary CHLOREP Team or CHLOREP Contractor, as applicable. The Primary CHLOREP Team Leader will notify the Emergency Response Call Center with updates, as appropriate. It is recommended that CHLOREP Teams maintain close working relationships and awareness of Team capabilities by participating in CI-facilitated calls, meetings, and training as it pertains to CHLOREP and chlorine emergency response.

3.5.2. Training and Equipment

CHLOREP Teams shall maintain adequately trained personnel who are knowledgeable and experienced in the handling of chlorine. CHLOREP Handbook Section 5 contains a list of minimum recommended training criteria for CHLOREP Team Members. Compliance with OSHA 29 CFR 1910.120 and 1910.134, as well as NFPA 472 Chapter 6, as they relate to chlorine handling is strongly recommended. CHLOREP Teams should also consider having the equipment items listed in CHLOREP Handbook Section 7 readily accessible at their facility.

3.5.3. Community Outreach

CHLOREP Teams should become active in their communities to build relationships with local responders, hazmat teams, local businesses and the media. It is helpful for the public to have some knowledge of chlorine and a Team's facility before an incident occurs. CI's Chlorine Release Fact Sheet is available through the Chlorine Institute for such purposes. There are different methods of outreach; therefore, Teams should determine the plan best suited for their facility.

4. EMERGENCY NOTIFICATION

4.1. Initial Communication

Prompt communications are essential for timely control of a chlorine emergency. While most chlorine suppliers give consumers their own emergency contact numbers, any carrier, customer, or civil authority having a chlorine emergency can be put in contact with an appropriate CHLOREP Team by phoning CHEMTREC, CANUTEC, or CI staff.

4.2. Emergency Response Call Center

Where expert advice or help at the scene of a chlorine emergency appears necessary, CHEMTREC will function as the Emergency Response Call Center in

the U.S. In Canada and Mexico, CANUTEC and SETIQ may be used. Since these call centers operate on a 24-hour, 7-day week basis, they are able to provide prompt initial advice to personnel at the scene.

In such cases involving CHEMTREC, the Center will enter the pertinent information on an appropriate incident report, determine the Primary CHLOREP Team using the location guide and telephone its Emergency Contact. Primary CHLOREP Teams are responsible to ensure they can be reached at all times. However, in the event the Primary CHLOREP Team cannot be reached, a Secondary CHLOREP Team will be contacted.

In such cases involving CANUTEC, the Center can provide expert advice, give necessary contact information and/or participate on a call, initiated by the Emergency Caller, with the appropriate CHLOREP Team.

In such cases in Mexico, the Institute does not currently have a formal agreement with SETIQ to activate CHLOREP or somehow be involved in a CHLOREP activation. Rather, if a Mexican CHLOREP Participant is notified by SETIQ or other organization regarding an emergency involving their chlorine package, the Mexican CHLOREP Participant may call upon another CHLOREP Participant or Contractor in Mexico for assistance.

Emergency Response Call Center procedures are covered in further detail in the CHLOREP Handbook Section 8.

5. RESPONSIVE ACTION

5.1. Prior to Sending a Team

The Emergency Contact, upon notification of an emergency by the Emergency Response Call Center, or from any other source, will immediately notify the CHLOREP Team Leader or his/her alternate. *Note: It is not acceptable for the Emergency Contact to refuse a chlorine emergency call. The call must be accepted and passed on to the CHLOREP Team Leader to make the appropriate decisions.*

The Team Leader will telephone the Emergency Caller or other contact information provided. After discussion with the Emergency Caller, the Team Leader will give advice for immediate action and discuss with the Emergency Caller whether or not a CHLOREP Team is needed at the scene. If the Team Leader decides that expert help is needed on-site, an appropriate CHLOREP Team will proceed to the scene using its pre-planned procedures in selection of personnel, equipment, and transportation.

5.2. Action at Scene of Emergency

5.2.1. Upon Arrival

Upon arrival at the scene, the CHLOREP Team will establish contact with those in charge and proceed to take such action as the Team Leader deems appropriate under the circumstances in helping to control the chlorine emergency. See CHLOREP Handbook Section 12 for further details.

5.2.2. Medical Needs

The Team Leader should be prepared to make available pertinent first aid and medical treatment information. The following are good CI resources to provide:

- Chlorine Release Fact Sheet;
- Pamphlet 1, *Chlorine Basics*; and
- Pamphlet 63, *First Aid, Medical Management/Surveillance and Occupational Hygiene Monitoring Practices for Chlorine*.

5.2.3. Return Home

When the emergency is over, the Team Leader will return home and prepare the necessary reports.

5.3. Discretion of CHLOREP Team

In the discharge of its duties, the CHLOREP Team will conduct its activities in so far as is feasible in accordance with procedures in the CHLOREP Handbook. However, notwithstanding any other provisions of this Agreement, the Team Leader of a CHLOREP Team shall not be obliged to handle any emergency or to perform any activities which is considered to be impractical or for which the Team is not properly prepared or equipped.

6. **POST-EMERGENCY CRITIQUE**

An accurate critique of the emergency can be an important aid to improve CHLOREP. The Team Leader should complete CI's Post-Emergency Critique and submit it in a timely manner to CI staff (see CHLOREP Handbook Section 16). This is a confidential report to the Institute and is not intended for distribution other than to the submitting CHLOREP Participants. However, information collected from these reports will be consolidated in an anonymous manner and presented to the Emergency Preparedness Issue Team for analysis in an effort to continually improve CHLOREP. The consolidated information will also be shared with CHLOREP Teams and Contractors, as appropriate.

7. **WAIVER**

Each Participant shall waive any right or recourse it may have against the Institute and its employees arising out of the operation of CHLOREP by the Institute.

8. **FUNDING AND COSTS**

8.1. Administrative Costs

Costs involved in the administration of CHLOREP will be funded by the Institute.

8.2. Team Operations

The shipper of the chlorine package involved in an emergency will reimburse the employer of a CHLOREP Team for its cost of transportation, material and labor incurred in performing its services, if requested. If circumstances warrant, the chlorine shipper may seek contribution from any carrier, consumer, public warehouseman or other person involved in the emergency.

The Institute President is able to authorize limited funding for response to an orphaned container for which the owner of the package cannot be determined. Any amount exceeding the limit would require the approval of the Institute's Executive Committee. Such authorization should be sought in advance.

9. **PUBLIC INFORMATION**

The Institute staff, under the direction of the Emergency Preparedness Issue Team, will carry out a nation-wide public information program directed to chlorine manufacturers, packagers, carriers, warehousemen, wholesalers, users of chlorine, as well as police, fire and rescue officials and the general public informing them of the existence of CHLOREP, including its nature, purpose and general features and instructing them how to seek assistance in case of a chlorine emergency. CHLOREP Participants are also strongly recommended to inform their customers, carriers, and local responders about CHLOREP.

10. **CHLOREP PARTICIPATION**

10.1. Participation

Companies having personnel knowledgeable in the handling and transportation of chlorine, including all CI member shippers/distributors of chlorine, agreeing to participate in CHLOREP by furnishing one or more CHLOREP Teams shall sign the CHLOREP Mutual Aid Participation Agreement (Attachment A).

10.2. Emergency Response Call Centers

An agreement is in place between the Institute and certain Emergency Response Call Centers, namely CHEMTREC and CANUTEC, to provide cooperation with respect to relevant actions of CHEMTREC and CANUTEC. While a formal agreement is not currently in place with SETIQ, the Institute is willing to cooperate with SETIQ with respect to its relevant actions, as appropriate. In signing this Agreement, the Participant authorizes Institute staff to provide the Emergency Response Call Centers with appropriate emergency phone numbers and other contact information for the Participant's CHLOREP Team(s).

10.3. Withdrawal

Any Participant may withdraw entirely as a company or may withdraw certain locations from CHLOREP by giving written notice to the Institute of the Participant's intention to withdraw on a CHLOREP Withdrawal Notice (Attachment B). If coverage by a Primary Team(s) is impacted by this withdrawal, notice of no

less than 60 days prior to the effective date of the withdrawal is required. All other withdrawals require notice of no less than 30 days.

If such withdrawal results in other significant effects to any other obligation or liability of such Participant arising under the operation of CHLOREP prior to the effective date of such withdrawal, the Institute may require more advanced notice. If a Participant that ships/distributes chlorine withdraws entirely, it may impact the Participant's membership status with the Institute. This may also require the Participant to pay financial restitution for any resulting program and administrative burdens. These withdrawal scenarios will be worked out on a case-by-case basis.



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ATTACHMENT A
CHLOREP MUTUAL AID PARTICIPATION AGREEMENT

1. The undersigned organization agrees to be a Participant, effective _____ 20____, in the Chlorine Emergency Plan (CHLOREP) [by furnishing one (or more) Chlorine Emergency Group (s)], subject to the provisions of the Agreement dated December 1, 2023, and the sector coverage as shown on the CHLOREP Sector Maps dated December 2023 (U.S. & Canada) or November 2023 (Mexico).

2. The undersigned Participant Chlorine Emergency Group(s) will be maintained at the following locations. These locations will be able to receive emergency calls on a 24-hour basis at the telephone number listed. *(add lines as needed)*

	Phone:
	Phone:
	Phone:
	Phone:

3. _____ is designated as the Company CHLOREP Coordinator for the undersigned Participant, with the understanding that this designation may be changed at any time. Any notices in connection with CHLOREP shall be sent to his/her attention.

4. The undersigned Participant will promptly advise the Vice President of Transportation & Emergency Preparedness of the Institute in writing of any change in the Participant's Chlorine Emergency Group information, including Company CHLOREP Coordinator (name/phone number), CHLOREP Team Leader(s) (name/phone number), and Group locations or phone numbers.

5. The undersigned Participant hereby waives any right or recourse it may have against The Chlorine Institute and its employees arising out of the operation of CHLOREP by the Institute.

Very truly yours,

Date: _____	Company: _____
	By: _____
	Authorized Participant Representative

Accepted,

Date: _____	By: _____
	VP, Transportation & Emergency Preparedness The Chlorine Institute



THE CHLORINE INSTITUTE
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ATTACHMENT B
CHLOREP WITHDRAWAL NOTICE

The undersigned Participant hereby gives notice of its withdrawal from the Chlorine Emergency Plan (CHLOREP) Mutual Aid Agreement in accord with §10.3 at the locations noted below. If Participant is withdrawing all locations, please specify as such with the list of locations.

This withdrawal shall be effective:

_____ days from your receipt of this letter; or
_____ (insert specified date).

If withdrawing all Participant locations (acknowledge with an "X" as appropriate):

_____ Participant acknowledges this may impact its eligibility for CI membership.
_____ Participant wishes to not receive future CHLOREP assistance in emergencies involving its chlorine containers. By choosing this, Participant absolves the Institute or other CHLOREP Participants of any liabilities that may result from assistance not be providing by CHLOREP.

Very truly yours,

Date _____ Company _____

By _____
Participant Authorized Representative

Accepted,

Date _____ By _____
Vice President, Transportation & Emergency Preparedness
The Chlorine Institute

APPENDIX III – CHLOREP TEAM INCIDENT MANAGEMENT GUIDANCE DOCUMENT

CHLOREP Handbook

Appendix III

CHLOREP Team Incident Management Guidance Document



Edition 8
November 2023

OBJECTIVE: To provide CHLOREP Team members with background information and guidance on the tactical management of chlorine incidents and coordination with government agencies and other parties on scene at an incident.

While CHLOREP Participants in Canada and Mexico are not required to abide by U.S. OSHA's regulations, the Incident Command System (ICS) is recognized by the United Nations and has become a best practice worldwide. Therefore, it is recommended that Canadian and Mexican CHLOREP Teams and CHLOREP Contractors become familiar with the ICS and OSHA standards and set up their emergency response processes accordingly. Note that some personnel titles/roles in the ICS may be named differently in Canada or Mexico.

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1. BACKGROUND INFORMATION

1.1 WHAT IS THE INCIDENT COMMAND SYSTEM

The Incident Command System (ICS) is an organized system of roles, responsibilities and procedures for the command and control of emergency operations. It is a procedure-driven system based upon the same business and organizational management principles which govern organizations on a daily basis.

The National Incident Management System (NIMS) is often cited as a baseline incident management organization which is used by both federal, state and local government organizations, as well as many private sector organizations throughout the United States. While NIMS provides the basic framework, most industrial organizations use a modified version of the Incident Command System which reflects the unique operating principles of the chemical industry and the need to work within a unified command structure with public safety/government agencies.

1.2 OSHA 29 CFR §1910.120 (HAZWOPER) REQUIREMENTS

1.2.1 Incident Command System Requirements

OSHA 29 CFR §1910.120 (q)(3)(i) requires the use of an Incident Command System for handling emergency response operations involving hazardous substances. OSHA recognizes NIMS as a bonified Incident Command System. Chlorine Emergency Plan (i.e., CHLOREP) Teams should have their own Incident Commander and Safety Officer assigned based upon (1) company guidelines, (2) local operating requirements and (3) integration with local and regional emergency response agencies.

1.2.2 Designation of the Incident Commander

OSHA has stated that the “senior official” (i.e., Incident Commander or On-Scene Incident Commander) at an emergency response is the most senior, trained official on the site who has responsibility for controlling the operations at the site.

The Incident Commander must be thoroughly trained to assume these responsibilities and is not automatically authorized to perform these activities by virtue of the person’s normal key day to day position. A Plant Manager or other senior plant management would not automatically be recognized as the On-Scene Incident Commander on the basis of being the senior company representative at the emergency scene.

Individuals who would be expected to assume the duties of the On-Scene incident Commander must be clearly spelled out within the Emergency Response Plan. Examples of personnel serving as the On-Scene Incident Commander could include the following:

- Shift Supervisor (facility emergency)
 - Municipal Fire Chief
-

- CHLOREP Leader

1.2.3 Incident Command System Training Requirements

Incident Commanders who will assume control of the incident scene shall receive at least 24 hours of training equal to the First Responder – Operations level. In addition, the employer must certify that the Incident Commander has competency in the following areas:

- Know and be able to implement the local Incident Command System;
- Know how to implement the employer's Emergency Response Plan;
- Understand the hazards and risks associated with working in chemical protective clothing;
- Know of the respective state Emergency Response Plan and of the Federal Emergency Response Team; and
- Know and understand the importance of decontamination procedures.

Personnel serving as the On-Scene Incident Commander must either be provided with annual refresher training to maintain their competencies or shall demonstrate competency in those areas of least yearly.

2. ICS ON-SCENE GUIDELINES

2.1 PRINCIPLES OF UNIFIED COMMAND

Most chlorine incidents are small in nature and are resolved through the application of a single, highly focused response organization. However, when multiple government organizations/agencies exist with the authority to launch simultaneous and potentially divergent response operations, the effectiveness of the overall emergency response effort may be compromised. The Unified Command concept is designed to address this issue.

Unified Command brings together the "Incident Commanders" of each major organization involved in response operations. At a significant chlorine incident, this can include a representative of the shipper, carrier or the CHLOREP Team Leader, the "local" Incident Commander (usually a fire chief or police officer), the state On-Scene Coordinator (SOSC – usually a representative of the state environmental agency, state police or emergency management agency), and the Federal On-Scene Coordinator (FOSC – in the U.S., an EPA or USCG representative depending upon the incident location). Additional federal, state and local agencies or other necessary parties (such as railroad personnel for a derailment) may also be part of the Unified Command depending on the specific incident.

The primary responsibilities of the Unified Incident Commanders are to:

- Establishing incident objectives and priorities;
-

- Review and approve the Incident Action Plan (IAP) designed to address objectives and priorities (more details can be found in Section 5 and Attachment A to Appendix III); and
- Resolve organizational conflicts

These responsibilities are typically implemented through the conduct of periodic, higher focused Unified Command meetings with attendance normally limited to the Unified Command members. The primary role of the CHLOREP Team is to manage on-scene chlorine-related response operations, while the role of government agency Unified Command representatives is to fulfill their legal responsibilities (i.e., direct and/or monitor response operations).

Depending upon the scope, nature and location of the incident, government agency representatives (e.g., USCG, EPA) working within the Incident Command organization may serve in one or more of the following roles:

- *Monitors.* Personnel assigned to observe the actions taken by the shipper and/or CHLOREP Team to ensure it is acting in a manner consistent with the directives of the Unified Command. A monitor serves as the “eyes and ears” for the agency On-Scene Coordinator (i.e., FOSC, SOSC).
- *Integrated Resources.* Personnel assigned by an agency On-Scene Coordinator to serve as a member of the Incident Management Team. For example, the CHLOREP Team Leader may serve as the Operations Section Chief, while an EPA representative may serve as the Safety Officer.
- *Advisors.* Personnel assigned to provide advice to one or more members of the Unified Command and/or response personnel.
- *Managers.* Personnel assigned to assume a position on the Incident Management Team and manage the actions of all subordinate personnel. Although not common, this action may occur when the agency believes that the responsible party is doing an inadequate job in one or more functional areas.

Agency personnel may assume more than one role simultaneously, or their role may change during the course of response operations. The role of agency personnel should be determined by their respective On-Scene Coordinator; the agency OSC should provide the CHLOREP Team Leader with clear guidance on the role (s) to be assumed by agency personnel.

2.2 CHLOREP TEAM ARRIVAL ON-SCENE

2.2.1 CHLOREP Team Role within ICS

The role of the CHLOREP Team within the ICS organization will vary, based upon the nature and location of the incident, local knowledge and application of ICS, and the presence of other public safety hazmat response teams on-scene. Within NIMS, hazmat response operations are assigned to the Operations Section and will function as either an ICS Hazmat Group or Branch. These terms are defined as follows:

- Group – ICS organizational level having functional responsibilities. For CHLOREP Team purposes, a Group is under the command of a Group Supervisor and is organizationally between the branch and unit level.

NOTE: In some areas, the term “Division” may also be used. Under NIIMS, both Groups and Divisions are at the same organizational level; however, Division refers to a geographic area of responsibility (e.g., North Division), while Group refers to a functional area of responsibility (e.g., Hazmat Group, Medical Group).

- Branch – ICS organizational level having functional or geographic responsibility for major segments of incident operations. A branch is under the command of a Branch Director and is organizationally between the section and division/ group level.

In some areas, the term “sector” may also be used in lieu of group or branch.

Not all incidents are considered to be a major emergency. They can be categorized based on their severity and the resources necessary to mitigate the release. The following can be definitions to consider for the different incident levels¹:

- **Level I – Potential Emergency Conditions:** An incident or threat of a release which can be controlled by the first responder. It does not require evacuation beyond the involved structure or immediate outside area. The incident is confined to a small area and poses no immediate threat to life and property.

Resources: Essentially a local level response with notification of the appropriate local, state, and federal agencies. Required resources may include fire department, emergency medical services (EMS), law enforcement, public information officer (PIO), Emergency Call Centers (i.e., CHEMTREC, CANUTEC, or SETIQ), and/or the U.S. National Response Center (operated by the USCG).

Example: An incident in which chlorine containers are present but there is no damage to the container or chlorine release.

- **Level II – Limited Emergency Conditions:** An incident involving a greater hazard or larger area than Level I which poses a potential threat to life and property. It may require a limited protective action of the surrounding area.

Resources: Requires resources beyond the capabilities of the initial local response personnel. The emergency may require mutual aid response and resources from other local and state organizations. Resources may include all Level I resources, hazmat response teams, Public Works Department, Red Cross, regional emergency management staff, state police, and/or public utilities.

Example: A chlorine leak due to valve failure on a cylinder or ton container with minor release at a water treatment facility.

¹ Hazard Materials, Managing the Incident, 3rd Edition; Gregory G. Noll, Michael S. Hildebrand, and James Yvorra, 2005, Red Hat Publishing Company, Inc.

- **Level III – Full Emergency Conditions:** An incident involving a severe hazard or a large area which poses an extreme threat to life and property and may require large-scale protective action.

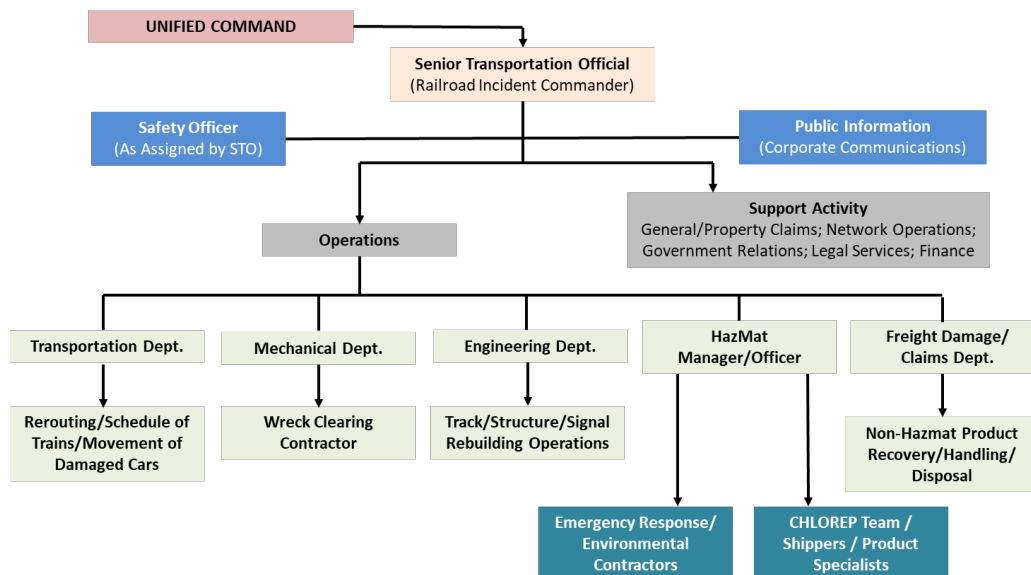
Resources: Requires resources beyond those available in the community. The emergency may require the resources and expertise of regional, state, federal, and private organizations. Resources may include all Level I and II agencies, mutual aid fire, law enforcement, and EMS, state emergency management staff, state Department of Environmental Resources, state Department of Health, Environmental Protection Agency (EPA), U.S. Coast Guard, and/or Federal Emergency Management Agency (FEMA).

Example: A major train derailment with chlorine release with a migrating chlorine vapor cloud from chlorine production facility.

The CHLOREP Team will normally function as an ICS Group for Level I and some Level II incidents, and as an ICS Branch for most Level II and all Level III incidents.

The CHLOREP Team would be responsible for chlorine-related operations which occur at an incident. The CHLOREP Team Leader should determine which hazmat functions will be the responsibility of CHLOREP Team members. If the CHLOREP Team is the only Hazmat Response Team (HMRT) on-site, the CHLOREP Team Leader will likely function as the Hazmat Group Supervisor within the ICS structure. If Unified Command is in place and additional agency HMRTs are on scene, the hazmat functions may be shared.

For derailments, the CHLOREP Team would likely operate within the railroad's ICS and report to the railroad's Hazmat Officer under the Operations Group. The following shows an example of a railroad ICS structure.



2.2.2 CHLOREP Team Assessment of ICS in Place

Upon arrival on-scene, the CHLOREP Team Leader should determine if (1) an ICS is in place, and (2) who is functioning as the On-Scene Incident Commander. If an Incident Command Post (ICP) has not yet been established, efforts should be made to have one set-up.

The CHLOREP Team Leader will typically be faced with two types of ICS scenarios:

- 1) ICS organization has been established and is operational. In this scenario, the CHLOREP Team Leader should meet with the On-Scene Incident Commander so that CHLOREP Team resources can be effectively integrated into the ICS organization.

For example, in most metropolitan areas, local fire or law enforcement agencies will have command of the overall incident. CHLOREP Team resources will either (1) operate in a Unified Command structure with the “local” Incident Commander, (2) be integrated into the local ICS organization within the Operations Section, or (3) serve as a technical advisor to the “local” Incident Commander.

- 2) No ICS organization is in place. In this scenario, the CHLOREP Team Leader should assist “local” responders in establishing an ICS organization. It should be emphasized that overall command of the incident should rest with the “local” agencies, the CHLOREP Team resources are there to assist in the control and mitigation of the incident and should be integrated into the ICS structure.

Planning is essential in order for CHLOREP Team members to determine the scope and operations of the various emergency response organizations within their respective region.

2.3 THE PUBLIC INFORMATION OFFICER

The Public Information Officer (PIO) is responsible for coordinating the collection and release of information to the public. At small and minor chlorine incidents, the CHLOREP Team’s company will likely assign a public relations point of contact (POC) per the company’s emergency response plan to serve as the Public Information Officer of the incident. The CHLOREP Team’s company PIO should be the only person to release information to the media, if/when appropriate, and follow the company’s public relations policies when sharing information with the media.

At most Level II and all Level III incidents there will be PIO’s from the respective government agencies involved. It is critical that the CHLOREP Team’s company PIO coordinates all public and media relations efforts within the ICS organization. Failure to do so can lead to each organization providing different information to the public. Only the designated ICS PIOs are authorized to release information to the media. All requests for information or interviews should be referred to them so as to maintain consistency and accuracy.

The PIO is typically responsible for the following tasks:

- Assemble and prepare news, information, bulletins, and press releases, and release information to the public or media.
- Establish communications with all ICS players, facility representatives and government agencies, and assure uniformity of all messages.
- Attend incident briefings and meetings to update public information releases.
- Arrange meetings between the media and incident personnel as directed by the Incident Commander.

3. SITE SAFETY GUIDELINES

3.1 SITE SAFETY PLAN

A site safety plan is required under OSHA 29 CFR §1910.120 (b) as a mechanism for assuring the health and safety of personnel operating at clean-up and hazardous waste site operations. Although a written site safety plan is not required under OSHA 1910.120 (q) for emergency response operations, site safety must always be an integral element of on-scene response operations. Standard Operating Procedures (SOPs) and checklists should be used as a tool to both verify and document that safety elements are addressed during the course of the emergency.

3.2 SITE SAFETY PROCEDURES

The following should be considered for all operations within the hot zone:

- Minimize the number of personnel operating in the contaminated area. Entry into the hot zone should be restricted to trained personnel or individuals possessing particular knowledge of the problem or situation, under monitored conditions.
 - All personnel shall be in the appropriate type and level of personal protective equipment (PPE) as approved by the On-Scene Safety Officer. The CHLOREP Team Leader should ensure that the Team members have the appropriate PPE on.
 - Prior to donning PPE at hazmat emergencies, personnel shall remove personal belongings (i.e., wallets, watches, jewelry, etc.), as necessary. These items should be secured, as necessary.
 - All reconnaissance and entry operations shall be conducted utilizing a minimum of two personnel each; a primary entry team (radio designation of Entry One) and a back-up entry team (radio designation of Entry Two). Entry Team Two should remain at the perimeter of the hot zone or at a location where they can observe Entry Team One and quickly access their location in the event of an emergency.
 - Prior to entry into the hot zone, all entry teams should receive a briefing by the CHLOREP Team Leader, On-Scene Safety Officer, or ICS designee. The briefing should include expected operating conditions, objectives of the entry operation, control techniques and procedures, decontamination operations, and any other pertinent emergency procedures as the situation warrants.
-

- The maximum working times for operations shall be determined by environmental conditions and type of respiratory protection selected, as follows:
 - 30-minute SCBA – 15-minute working time
 - 60-minute SCBA – 30-minute working time
- Airline hose unit with back-up air capability (as determined by the CHLOREP Team Leader and the On-Scene Safety Officer).
- The On-Scene Safety Officer should be in radio communications with the entry and back-up teams, and if possible, have an unobstructed view of their locations.
- Ensure that all tasks and responsibilities are identified before attempting entry. If necessary, practice unfamiliar operations prior to entry.
- All personnel on the scene should remain alert for a CHLOREP Team member potentially in distress while in PPE. Ensure that everyone knows the emergency evacuation signals.
- Prohibit drinking, smoking and any other practices which increase the possibility of hand-to-mouth transfer in all contaminated areas. Follow decontamination and personal cleanliness practices before eating, drinking or smoking after leaving the contaminated area.

3.3 HAZARD CONTROL ZONES

The following hazard control zones will be established by the On-Scene Safety Officer at all incidents. The shape and dimensions of the hazard control zones shall depend upon such factors as the size and nature of the release (liquid vs. vapor, instantaneous vs. continuous release), chemical concentrations present and related health exposure values, wind direction and velocity, surrounding topography and/or adjacent exposures, etc.

3.3.1 Hot Zone (Restricted, High Hazard Area)

Immediate hazard area surrounding the problem/release site, which extends far enough to prevent adverse effects from hazmat releases to personnel outside of the zone. Only to be entered by a minimum of two hazardous materials-trained personnel or individuals possessing particular knowledge of the problem or situation, under monitored conditions. During both entry and reconnaissance operations, a back-up team (minimum of two personnel) with appropriate protection will be stationed at the edge of the hot zone or in a location where they can quickly gain access to the entry team in an emergency situation.

DANGER: Only those individuals directly involved in the emergency response effort and wearing the proper level of PPE shall be allowed access into the hot zone.

3.3.2 Warm Zone (Limited Access Area, Decontamination Zone)

Area surrounding the hot zone and bounded by the cold zone where entry support and decontamination operations take place. It includes a corridor with access control points to assist in reducing the spread of contamination. Entry is restricted to emergency

response personnel, as well as anyone specifically assigned by the ICS Safety Officer or designee. Individuals entering the warm zone must be wearing appropriate personal protective clothing.

3.3.3 Cold Zone (Support Area)

Area surrounding the warm zone which presents no hazard to emergency response personnel and equipment. Reserved for emergency services functions only, such as the Incident Command Post (ICP) and other support functions deemed necessary to control the incident. Support personnel without the proper level of PPE shall be limited to only the cold zone.

The outer boundary of the hazard control zones will be the fire/security lines that should be established at major emergencies and tightly controlled. Personnel not directly involved in the management of the emergency should not have access to the cold zone under most circumstances.

3.4 ACTION LEVELS AND GUIDELINES

3.4.1 Exposure Terminology

Air monitoring operations are critical to the establishment of hazard control zones. The following is a list of exposure value terms and corresponding governing body that are referred to later in this section.

Governing Body	Exposure Term	Exposure Acronym
OSHA	Permissible Exposure Limit	PEL
ACGIH (<i>American Conference of Governmental Industrial Hygienists</i>)	Threshold Limit Value	TLV
NIOSH (<i>National Institute for Occupational Safety & Health</i>)	Recommended Exposure Level	REL
NIOSH	Immediately Dangerous to Life & Health	IDLH
EPA	Acute Exposure Guideline Level	AEGL

OSHA and ACGIH use different time-weighted exposure levels in conjunction with the PEL and TLV exposure levels since the impact of exposure is dependent upon the concentration of the hazardous substance and the length of time the person is exposed to a particular concentration. OSHA's and ACGIH's time-weighted levels are as follows:

Time-Weight Average	TWA	Time-weighted average exposure concentration for a conventional 8-hr. workday and 40-hr. work week.
Short-Term Exposure Term	STEL	15-minute time-weighted average that should not be exceeded at any time during a workday, even if the 8-hr. TWA is within the PEL-TWA or TLV-TWA.

Ceiling Exposure Value	C	The exposure limit that shall at no time be exceeded.
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NIOSH's IDLH is a commonly used exposure level used in responses. The IDLH is an atmospheric concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere. The reason the IDLH is used in responses is to ensure the responders can escape in the event of a failure of their respiratory protection. It also provides a maximum level above which only a highly reliable breathing apparatus, which provides maximum work protection, is permitted.

3.4.2 Using Exposure and Other Safety Levels During Response

Initial monitoring efforts should be directed towards determining if IDLH concentrations are present. Decisions regarding protective clothing recommendations, establishing control zones, and evaluating any related public protective actions should be based upon the following parameters:

- 1) *Flammability* – If dealing with a confined space or indoor release, the IDLH/action level is 10% of the lower explosive limit (LEL). If dealing with an open-air release, the initial action level is 20% of the LEL.
- 2) *Oxygen* – An IDLH oxygen deficient atmosphere is 19.5% oxygen or lower, while an oxygen-enriched atmosphere contains 23.5% oxygen or higher. In evaluating an oxygen deficient atmosphere, consider that the level of available oxygen may be influenced by contaminants, which are present.
- 3) *Toxicity* – **This is the primary safety and health concern with chlorine.** Control zones can be established for chlorine using the following guidelines:

		OSHA Value	NIOSH Value
Hot Zone / Warm Zone Line	Above	PEL-STEL: 1 ppm	TLV-STEL: 0.4 ppm
Warm Zone / Cold Zone Line	Less Than	PET-TWA: 0.5 ppm	TLV-TWA: 0.1 ppm

OSHA provides a required maximum allowable value, while NIOSH provides additional, often more conservative, recommended values. When there is a discrepancy between the two values, The Chlorine Institute recommends using the lower values when monitoring for chlorine during a response.

4. EMERGENCY RESPONSE MEDICAL GUIDELINES

4.1 EMERGENCY MEDICAL SUPPORT & SURVEILLANCE REQUIREMENTS

As required by OSHA 29 CFR §1910.120(b)(3), a responding company's comprehensive work plan must outline the medical surveillance program described in OSHA 29 CFR

§1910.120(f), which provides general medical surveillance requirements. OSHA 29 CFR §1910.120(q)(9) also outlines a company's requirements for medical surveillance and consultation of its emergency response personnel as part of the emergency response program. Based on these requirements, members of a CHLOREP Team must receive a medical examination:

- Prior to being assigned to the team;
- At least once every year, unless the attending physical believes a longer interval is appropriate (but not longer than every two years);
- At termination of employment or reassignment to an area where the employee would not otherwise be covered these requirements (if the employee has not had an examine within the last six months);
- As soon as possible upon notification by the team member that he/she has developed signs or symptoms of exposure or injury resulting from response to an emergency; and
- At more frequent times if the attending physician determines it is necessary.

At emergency scenes, OSHA 29 CFR §1910.120(q)(3)(vi) requires that "Back-up personnel shall be standing by with equipment ready to provide assistance or rescue. Qualified basic life support personnel, as a minimum, shall also be standing by with medical equipment and a transportation capability." The level of emergency medical support may be influenced by the nature of the incident, risks involved, tasks to be performed, and the intensity and/or duration of the tasks.

4.2 MEDICAL MONITORING AT THE EMERGENCY SCENE

4.2.1 Medical Monitoring Objectives

Medical monitoring may be defined as an on-going, systematic evaluation of individuals at risk of suffering adverse effects of exposure to heat, stress or hazardous materials as a result of working at a hazardous materials emergency. The objectives of medical monitoring are:

- Obtain baseline vital signs;
- Identify and preclude from participation individuals who are at increased risk to sustain either injury or illness, and/or who may increase the risks to others; and
- Facilitate the early recognition and treatment of personnel with adverse physiological and/or emotional responses.

Pre- and post-entry medical monitoring should be required at virtually every incident. Medical monitoring provides baseline vital signs of all entry personnel, and identifies, evaluates and eliminates those individuals who are suffering from the effects of heat stress or hazmat exposure. CHLOREP Teams should evaluate personnel according to appropriate baseline measurements established by their company. Medical monitoring is to be performed by a medically trained individual approved by the Safety Officer. This

may include a CET member with documented medical training (e.g., First Responder, Emergency Medical Technician, Registered Nurse, etc.), or on-scene public safety EMS personnel.

A CHLOREP Team may be asked to provide technical assistance to emergency medical support personnel in the development and analysis of EMS-related data and information specific to the incident. This information may include signs and symptoms of exposure, medical treatment procedures, antidote information, patient handling guidelines, transportation recommendations, and medical resource requirements. CI's Pamphlet 63, *First Aid, Medical Management/Surveillance and Occupational Hygiene Monitoring Practices for Chlorine*, and CI's video (H-Video) "First Response to Chlorine Exposures"² can be provided to the medical personnel for a better understanding of appropriate treatment to chlorine exposure.

4.2.2 Medical Monitoring Exam

CHLOREP Team members involved in a response can expect to undergo medical monitoring, as discussed above. Components of the pre-entry exam typically include evaluation of the following:

- Vital signs, including blood pressure, pulse, and respiratory rate;
- Skin condition, with an emphasis on rashes, lesions and open sores or wounds;
- Mental status (alert and oriented to time, location and person); and
- Recent medical history, including medications, alcohol consumption, any new medical treatment or diagnosis within the last 2 weeks, and symptoms of fever, nausea, diarrhea, vomiting or coughing within the past 72 hours.

Components of the post-entry exam typically include evaluation of the following:

- Any signs of symptoms of chemical exposures heat stress or cardiovascular collapse;
- Vital signs, including blood pressure, pulse, and respiratory rate;
- Skin condition, with an emphasis on rashes, lesions and open sores or wounds;
- Mental status (alert and oriented to time, location and person); and
- Hydration, including providing plenty of water or electrolyte mixes to replenish body fluids.

Some fire service and public safety hazmat response teams (HMRT) perform additional medical monitoring checks. These agencies may also require that an advanced life

² CI's publications can be accessed through CI's online bookstore (<https://bookstore.chlorineinstitute.org/>). The H-Video is brief (12 minutes) and is available in English and Spanish.

support (ALS/paramedic) unit provide stand-by EMS support. Additional medical monitoring checks by these personnel may include the following:

- Body Temperature, which is critical to watch for rapidly rising body temperature in the case of impending heat stroke;
- Eye movement;
- Body weight (a weight loss of six (6) or more pounds can indicate that an individual is a possible candidate for dehydration complications);
- Lung sounds, including wheezing, unequal breath sounds, etc.;
- Ten (10) second EKG rhythm strip; and/or
- Pre-hydration with 8 to 16 ounces of fluids (water and electrolytes).

Medical evaluators should recognize that vital signs may be elevated as a result of stress, excitement, environment conditions, the type of operation, and the level of risk.

4.3 EMERGENCY INCIDENT REHABILITATION

The On-Scene Incident Commander and/or CHLOREP Team Leader should consider the circumstances of the incident and make adequate provisions early in the incident for the rest and rehabilitation of all personnel operating at the scene. This is particularly critical for long duration emergencies, as well as operations in extremely cold or hot/humid environments. Rehabilitation responsibilities may be assigned to either medical personnel or to a separate individual(s).

A rehabilitation area should be provided for responding personnel and meet the following parameters:

- Be in a location which provides physical rest by allowing the body to recuperate from the hazards and demands of the emergency. It should also be located to allow for prompt re-entry back into the emergency operation upon complete rehabilitation.
- Located in a safe area within the Cold Zone so that personnel can remove their protective clothing and be afforded mental rest from the stress and pressure of the emergency operation. It should also be easily accessible by EMS units.
- Provide suitable protection from the prevailing environmental conditions. During hot weather, it should be located in a cool, shaded area. In cold weather, it should be in warm, dry area. In addition, it should be free of vehicle exhaust fumes.
- Be large enough to accommodate multiple crews, based upon the size of the incident.

Various guidance exists for heat stress monitoring and rehab periods while wearing chemical protective clothing at a hazmat emergency. One known source is the U.S. Fire

Administration's (an entity of FEMA) "Emergency Incident Rehabilitation" guidelines, which can be found online: <http://www.iaff.org/hs/eirp/files/USFA-IAFF%20Emergency%20Incident%20Rehabilitation%20Manual%202010.pdf>.

4.4 EMERGENCY MEDICAL DECONTAMINATION

4.4.1 Possible Medical Decontamination Scenarios

Emergency medical decon may need to be administered in several scenarios. These situations would include:

- 1) *Individuals are chemically contaminated within a hazardous environment but are ambulatory and can move under their own power.*

These individuals should be directed into an "area of refuge" within the Hot Zone if decon operations have not been established. An area of refuge is defined as an area within the Hot Zone where exposed or contaminated personnel are protected from further contact and/or exposure; it is a "holding area" where personnel are controlled until they can be safely decontaminated or treated. In some situations, these individuals may be able to move to a safety shower or hose line and initiate personal decon measures.

- 2) *An individual is not mobile within a hazardous environment and must be rescued.*

Rescue operations should only be attempted by trained and properly equipped personnel. The injured party should be removed from the hazardous environment by rescue personnel using appropriate PPE. Rescue personnel should minimize the amount of emergency care performed in the contaminated area. Keep the patient's airway open and immobilize the cervical spine if there is any indication of injury to that area.

Once the victim is removed from the hazardous environment, emergency medical decontamination and patient care can be initiated. Basic points that should be considered are listed under Medical Decontamination Guidelines.

- 3) *An emergency responder is injured during entry operations; this individual may be either ambulatory or may need to be rescued.*

Under HAZWOPER requirements, a back-up team should be in-place to conduct the rescue of the injured entry member. In addition, the decon site should have been established prior to entry operations. Therefore, the primary concern is to safely remove the injured emergency responder from the Hot Zone to the decon area and initiate decon operations.

4.4.2 Medical Decontamination Guidelines

Basic points that should be considered when assessing emergency medical decontamination and patient care are as follows:

- 1) Following removal of the patient to the Warm Zone, basic care and decontamination can begin. Maintain the airway. All ERT and EMS personnel

involved in the operation must be wearing proper protective clothing. For emergency medical personnel, this would include disposable or limited use chemical coveralls with a hood, a face mask and/or eye protection, and double gloves.

- 2) Carefully remove and isolate contaminated clothing jewelry, and shoes. Save all contaminated articles that are removed from the patient, place them in separate plastic bags, and mark them with the individual's name.
- 3) Brush any solid or particle contaminants off the skin as gently and completely as possible before washing to reduce the chance of reaction with water. Blot heavy liquid contaminants from the body before washing to reduce the chance of dilution or increased absorption. Exercise caution not to cause any skin damage.
- 4) Always protect the eyes. Brush/wash any contaminants outward away from the eyes. Some ERT's place goggles on the victim to provide additional eye protection during this phase.
- 5) Once any visible product is removed and gross decon is completed, rinse and wash the person. Soaps which are used for patients decon should be mild and non-abrasive. Tincture of green soap is desirable because of its slightly alkaline nature that approximates the body's pH level. Its alcohol based also helps to remove hydrocarbons and solvents from the skin. If green soap is not available, any mild liquid soap such as dishwashing detergent will work. Never use decon solutions on the skin, as they may cause burns and further injury.

Begin decontamination at the head and face to allow for proper airway control and respiratory support. Clean areas of gross contamination and soft tissue damage (e.g., burns, bruises, lacerations, etc) next. Care must be taken not to flush contaminants into wounds. Carefully wash and rinse wound areas from the center out. After decon, cover areas of soft tissue damage with a water-occlusive dressing or a plastic wrap to prevent secondary contamination.

Once all wound areas are clean, the remainder of the body can then be decontaminated. Pay special attention to ear and nose cavities, hair, nail beds, and skin folds. Soft brushes and sponges may be used. Be careful not to abrade the skin and use extra caution over bruised or broken skin areas.

- 6) Rinse the patient with large quantities of water. Use low water pressure and a gentle spray to avoid aggravating any soft tissue damage. Try to control all runoff, but do not delay treatment in life-threatening situations if confinement measures are not immediately available.

CAUTION: Use warm water to provide for patient comfort and reduce the potential for hypothermia. If warm water is not available, cold water can be used, but it will increase the change of hypothermia. **NEVER USE HOT WATER!**

- 7) Under ideal circumstances, the patient should be fully decontaminated prior to transportation to a medical facility. In most cases, this will eliminate the chance of secondary contamination of both emergency medical personnel and hospital staff. However, when dealing with emergencies involving multiple injuries or

secondary and tertiary problems, total commitment may not be focused solely on patient decon.

DANGER: Advise both the local Emergency Medical Services (EMS) unit and the receiving hospital when handling a chemical contaminated patient.

Specific first aid and medical management guidelines for chlorine exposure can be referenced in CI's Pamphlet 63, *First Aid, Medical Management/Surveillance and Occupational Hygiene Monitoring Practices for Chlorine*, and CI's video (H-Video) "First Response to Chlorine Exposures".³

5. INCIDENT MANAGEMENT WORKPLANS

Good organization and a systematic approach to the emergency is the single most important factor in ensuring that CHLOREP Team members and the public are protected and that a chlorine emergency is resolved quickly and effectively. OSHA 29 CFR §1910.120(b)(3) simply requires a comprehensive workplan. However, there are numerous methods of achieving this requirement. CHLOREP Teams can choose any preferred method they feel best suits their needs for managing incident response and achieving compliance with the OSHA standard.

Two well-known methods used for incident management and response include:

- Site-Specific Health and Safety Plan (HASP); and
- NIMS Incident Action Plan.

These plans are often used in conjunction to provide comprehensive information on an incident. Attachment A provides a sample Site-Specific HASP based on a hypothetical incident and includes a sample Incident Action and Work Plan. Attachment B provides a blank template of the Site-Specific HASP which can be used by CHLOREP Teams and reformatted, as needed. These samples were developed with the intent of achieving the requirements of OSHA 29 CFR §1910.120(b)(3), OSHA 29 CFR §1910.120(b)(4)(ii), and NIMS Incident Action Planning guidelines. If a CHLOREP Team chooses to use these methods, they should review the samples thoroughly and ensure they meet the Team's needs in achieving compliance with the OSHA standard.

The following includes additional resources known to be used for incident management:

- Eight Step Incident Management Procedure®, developed by Hildebrand and Noll Associates, Inc. (summarized in Attachment C); and
- The D.E.C.I.D.E. process, conceptualized and published by Ludwig Benner, Jr. in a paper titled "D.E.C.I.D.E. in Hazardous Materials Emergencies" in 1973 while working for the National Transportation Safety Board.

³ CI's publications can be accessed through CI's online bookstore (<https://bookstore.chlorineinstitute.org/>). The H-Video is brief (12 minutes) and is available in English and Spanish.

6. TACTICAL CHLORINE EMERGENCY RESPONSE CONSIDERATIONS

The following includes useful techniques to consider when responding to chlorine releases:

- Control runoff of the liquid chlorine by diking or diverting flowing liquid. Runoff from water contaminated with chlorine may be corrosive or toxic. Prevent spills from entering storm and sewer systems. Absorb with sand, clay soil, dirt, fly ash, cement powder or other non-combustible absorbent materials.
 - If possible, retain runoff in impoundment areas and neutralize with dilute caustic soda or soda ash. Apply neutralizing agents from the outside edge of the spilled liquid and work inward.
 - If the spill or leak is in an outdoor area, use master streams to flood the area downwind of the spill. DO NOT apply water streams directly onto the leak or liquid chlorine which may have pooled on the ground.
 - Conduct regular air monitoring to determine if airborne concentrations of chlorine. **Chlorine is classified as both a poison gas and oxidizer.**
 - If chlorine leaks originate from an outdoor continuous source, such as a piping system, storage vessel, rail tank car, cargo tank, cylinder or one-ton container, initiate offensive tactics to reduce or stop the flow of chlorine if it can be accomplished without undue risk. Options which should be considered include:
 - Isolating the leak by closing valves above and below the leak.
 - Reducing line pressures by partially closing valves or shutting down pumps.
 - Rotating the container, if possible, so that the leak is in the gas phase.
 - Tighten valves, plugs and fasteners with a wrench before using emergency kit capping devices.
 - Plug or patch leaks using Chlorine Institute Kits “A”, “B”, or “C” (if tactic in (d) is not successful in stopping the leak).
 - If previous methods are unsuccessful, transfer the product from the leaking container to a compatible non-leaking container.
 - If a pool of liquid chlorine has collected in a ditch or tank dike, the rate of chlorine vaporization caused by wind or solar radiation can be reduced by the application of an aqueous foam. Foam has been used to hydrate the liquid chlorine surface. The foams must be applied at a 50:1 expansion ratio to avoid adding excess water to the chlorine. Do not spray the foam directly on the liquid chlorine, but allow it to flow indirectly over the liquid surface. Reallocation of the foam will be necessary as it breaks down or is blown off the wind.
-

- After the leak has been contained and the emergency is under control, evaluate options for disposal of the remaining chlorine. Options may include:
 - If the incident occurs at a fixed facility, use the chlorine in the facility process.
 - If the emergency occurs in transit and the container is safe for transportation, return it to the shipper. (NOTE: Depending upon the incident nature and location, special shipping arrangements and approvals may be necessary. Refer to U.S. DOT or Transport Canada regulations and Section 13 of the CHLOREP Handbook).
 - Transfer the product via a nitrogen pad or a compressor.
 - Absorb the chlorine vapors into an alkaline solution.
- Absorption of chlorine in alkaline solutions - It may be possible to absorb the chlorine in a solution of caustic soda or soda ash. Use a hose or a pipe to conduct the chlorine gas to the solution, which may be made up in any convenient tank. The depth of the solution in the vessel may vary depending on the rate of chlorine discharge and the size of chlorine bubbles. A minimum depth of 6 ft. should be considered. The potential for back flow or “suck back” into the chlorine container should be reviewed. If “suck back” is a probability, then the use of vacuum breakers, air entrance points or other means should be considered. Never immerse a chlorine container in the alkaline solution.

Recommended alkaline solutions for absorbing chlorine are listed below:

CHLORINE CONTAINER CAPACITY	20 WEIGHT% CAUSTIC SODA SOLUTION		10 WEIGHT% SODA ASH SOLUTION	
	100% NaOH (lbs.)	Water (gal.)	100% Na ₂ CO ₃ (lbs.)	Water (gal.)
100	135	65	359	390
150	203	98	538	585
2,000	2,708	1,300	7,176	7,800

CAUTION:

- 1) Always add alkali to the water.
- 2) When absorbing chlorine in an alkaline solution, the resultant heat of reaction must be considered. There is a need to monitor the resultant temperature rise. Caustic solutions can cause burns to personnel.

7. POST-EMERGENCY RESPONSE GUIDELINES

7.1 POST-EMERGENCY RESPONSE OPERATIONS

Post-emergency response operations are defined as that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and cleanup of the site has begun. The following are operational guidelines for CHLOREP Teams' consideration:

- If the CHLOREP Team or other emergency responders are in control of the site and a safety/health hazard exists, the emergency situation continues to be in effect. For example, spill cleanup operations which occur while emergency response personnel are managing the incident are considered part of emergency response operations. Once the On-Scene Incident Commander has declared the response activity completed and the immediate threat has been stabilized, any remaining cleanup would be considered a post-emergency response operation.
- If cleanup operations are performed by a group of company employees or contractors not part of the CHLOREP Team which performed the initial response, then this separate group would be considered to be performing post-emergency response operations. Training shall be provided in accordance with OSHA 29 CFR §1910.38(A) – *Emergency Action Plan*, §1910.134 – *Respiratory Protection*, §1910.1200 – *Hazard Communication*, and other health and safety training as required by the tasks to be performed.

If cleanup operations are beyond the scope of duties and training routinely performed by company employees or contractors, the services of a qualified environmental cleanup contractor may be required. Consideration must also be given to situations which may dictate the use of specifically trained and qualified cleanup contractors (e.g., asbestos).

7.2 INVESTIGATIONS OF HAZMAT EMERGENCIES

Personnel may respond and investigate emergencies involving hazardous materials while a health and safety hazard still exists. Incident investigation operations fall within the scope of OSHA 29 CFR §1910.120 – *Hazardous Waste Operations and Emergency Response* and must be coordinated within the on-scene ICS organization.

Unless the leaking package is the financial responsibility of the CHLOREP Team's company, the CHLOREP Team is typically not responsible for the investigation. The investigation team is usually assigned within the ICS organization and/or state or federal investigating agency. However, CHLOREP Team members may be interviewed as the investigation team collects information on the incident.

Emergency responders are the initial "eyes and ears" of the investigation team and should be alert for critical items or evidence during emergency response operations. These may include the position of valves, the location of personnel and equipment, etc. Where possible, photos or video recordings of emergency response operations should be taken and provided to the incident investigation team for analysis and documentation.

ATTACHMENT A – SITE-SPECIFIC HEALTH AND SAFETY PLAN (SAMPLE)

Site Specific Health and Safety Plan (HASP)

Incident Date:	05/01/19
Incident Location:	Behind 1 st Baptist Church @ 125 Railroad Street Jackson, Mississippi
Incident Description:	Derailment Response – Chlorine Tank Cars
Responsible Party (RP):	XYZ Class 1 Railroad Company
Office Address of RP:	500 Main Street Rail Town, USA 00000
Prepared by:	Johnny Hazmat, Agent for CHLOREP Team
Date of Plan Preparation:	05/01/19
Latest Revision Date:	05/02/19

Note 1: The above table of information complies with 29 CFR 1910.120(b)(4)(ii).

Introduction and Applicability/Disclaimer

This document is a site-specific Health and Safety Plan (HASP) that outlines essential information to enhance personnel safety during this emergency response incident. The information contained within this document and any/all of its supporting attachments or appendices shall be maintained on site and accessible to all CHLOREP Team member. This document applies to the response activities of the CHLOREP Team and is not intended to address any other activities being performed by any other agency(s) at this site. This HASP has been prepared for the site-specific conditions, purpose, tasks, dates and CHLOREP Team members. This HASP should be considered as a “living document” and periodically amended and reviewed by the CHLOREP Team member if site conditions and/or work scope change.

Background/Available Information (Assessment of Conditions Presumed)

Chemical(s) Involved:	Chlorine
Container Type(s):	Tank Cars
Number of Containers:	2
Condition of Container(s):	1 upright & not leaking; 1 on its side and leaking from protective housing
Topography (general description of site):	Flat – railroad parallels river
Estimated Temperature (Day High/Night Low):	79/60 (degrees F)
Forecasted Weather:	Sun and Clear Skies for next 3 days
Wind Direction Forecasted:	From SW @ 5 mph (day)/Nights Calm

Note 2: The above table of information complies with 29 CFR 1910.120(b)(4)(ii).

Organizational Structure & Lines of Authority

Position & Personnel	Organization(s)	Reports To
Incident Commander, Chief Doright	Jackson Fire Chief	Elected Officials-Public
Unified Command Group	Jackson Fire Dept. Jackson Police Dept. Mississippi State Police Mississippi DEQ USEPA US Coast Guard XYZ Class 1 Railroad	Elected Officials-Public
Incident Safety Officer, Captain Staysafe	Jackson Fire Dept.	Unified Command Group
Liasion Officer, Deputy Chief Flyonthewall	Jackson Fire Dept.	Unified Command Group
Public Information Officer, Deputy Chief Goodoncamera	Jackson Fire Dept.	Unified Command Group
Operations Sector Officer, Captain Getitdone	Jackson Fire Dept.	Unified Command Group
Planning Sector Officer, Captain Thinkitthrough	Jackson Fire Dept.	Unified Command Group
Finance Section Officer, Railroad Mr/Ms.Spendalot	XYZ Class 1 Railroad	Unified Command Group
Logistics Section Officer, Lieutenant Getstuff	Jackson Fire Dept.	Unified Command Group
Intelligence Section Officer, Deputy Chief Lockemup	Jackson Police Dept.	Unified Command Group
Hazmat/Environmental Operations Division, Railroad Hazmat Manager	XYZ Class 1 Railroad	Operations Sector Officer
CHLOREP Team Leader, Johnny Hazmat	Chlorine Producer X	Hazmat/Environmental Division within Operations Section

Note 3: The above table of information complies with 29 CFR 1910.120(b)(2)(i).

The following Organizational Charts on the next page present two *EXAMPLES* that are not necessarily site-specific, but they do add visual structure perspective for the information contained within the above table. Figure 1 is a broad view of a typical Unified Command Structure. Figure 2 is a typical railroad-specific structure starting with the railroad's Senior Official represented within the Unified Command Group and shows where the CHLOREP Team and CHLOREP Contractors fit in to the overall organizational structure at the site.

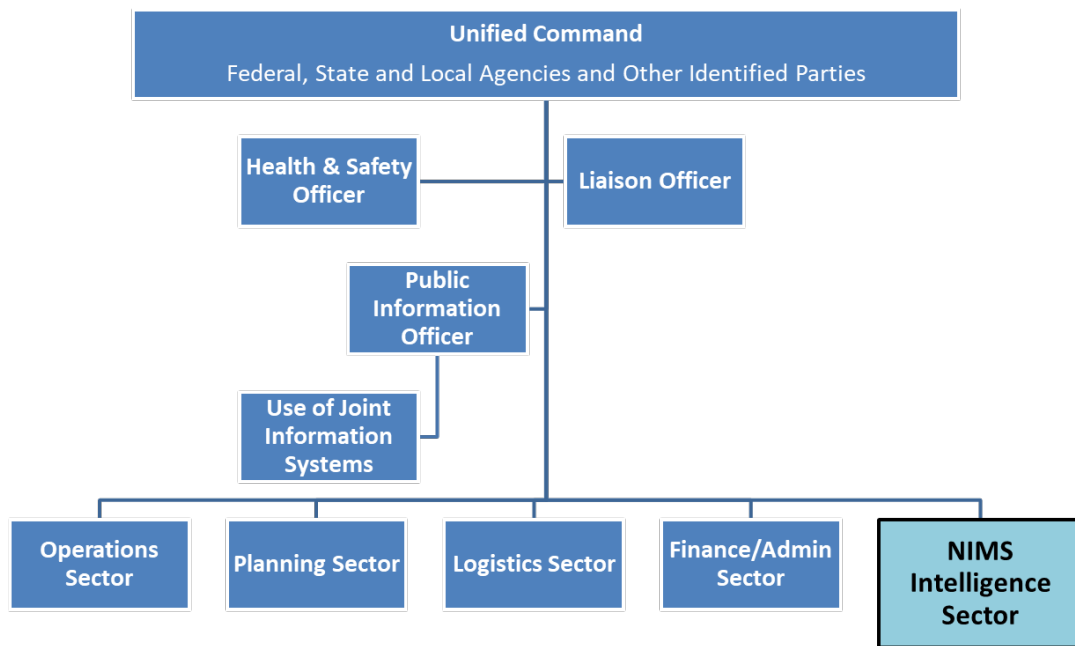
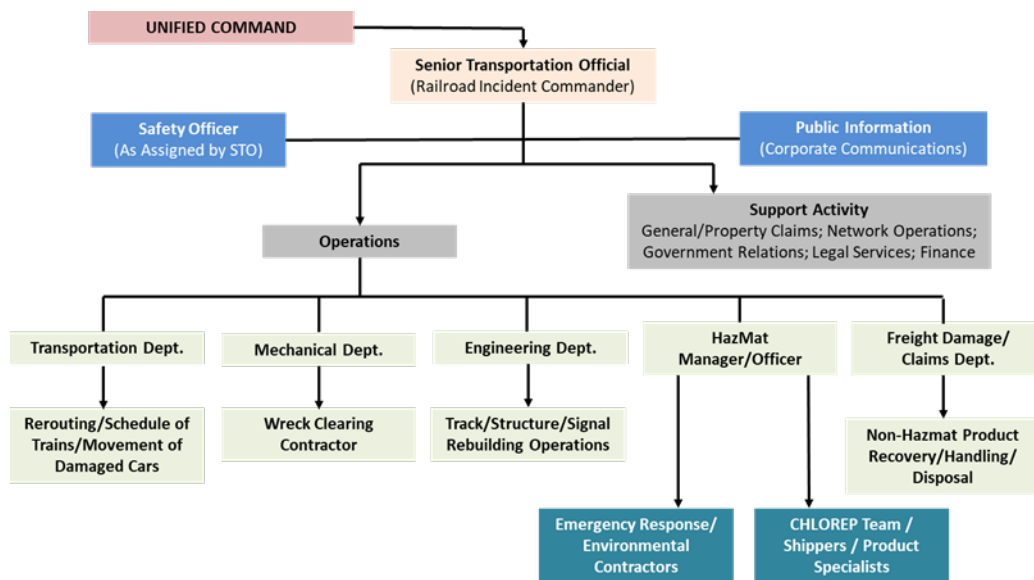


Figure 1
Typical Incident Command Structure



1

Figure 2
Typical Railroad Incident Management Structure

Site Sketch Map (*Not to Scale*)
(Show Reference to North and Hot, Warm, and Cold Zones)

Note 4: The above Site Sketch Map above complies with 29 CFR 1910.120(b)(4)(ii)(F) and 29 CFR 1910.120(d)(1) through (d)(3).

Incident Action and Work Plan

In addition to, and in harmony with, this HASP, an Incident Action and Work Plan has been prepared and is hereby incorporated by reference (included as Appendix A to this HASP). The Incident Action and Work Plan contains objectives, tasks, personnel, and resources. It also includes supporting information such as Standard Operating Procedures, Safety Data Sheets, and other guidance and/or reference documentation.

Note 5: The Incident Action and Work Plan documentation provided within Appendix A of this HASP complies with 29 CFR 1910.120(b)(3), 1920.120(b)(4)(ii), and NIMS Incident Action Planning guidelines.

Risk Analysis (Job Safety Analysis)

Tasks	Risks Associated with Task	PPE & Engineering Controls to Eliminate or Minimize Risks
Air Monitoring	Respiratory exposure to chlorine; Slips, Trips, Falls; Hit by moving traffic or equipment	Air monitoring personnel shall have working air monitoring equipment; they shall have immediate access to APR's and SCBA to don if chlorine concentrations are detected above the OSHA PEL; Use Buddy System to watch out for each other; Stay clear of operating equipment and traffic; use flashlights when working at night.
Leak Stopping	Chlorine exposure; Slips, Trips, Falls; Muscle pull (heavy capping kit handling); Pinch point injury potential when handling capping kit	PPE (suit): Tychem TK (Level A) PPE (respiratory): SCBA PPE (gloves): Viton PPE (boots): Hazmax or Hazproof Use Buddy System to watch out for each other; use wagon, cart, or some other mechanical advantage unit for moving heavy capping kit to work area; keep fingers and hands clear of the bottom of the capping kit can when applying it
Set Up for Field Transfer	Chlorine exposure during initial valve plug removals; Slips, Trips, and Falls.	Set up PPE will be Level D and all personnel will have immediate access to APR's and SCBA units to don during valve plug removals for tank car transfer plumbing if needed; Equipment deployment shall be done in manner to minimize tripping hazards at the work area; 3 points of contact on ladders when climbing; use of ropes and tool bags to raise and lower tools and equipment from tops of tank cars, etc.

Tasks (continued)	Risks Associated with Task (continued)	PPE & Engineering Controls to Eliminate or Minimize Risks
Chlorine Transfer	Chlorine exposure during transfer operations; Slips, Trips, and Falls.	Transfer personnel shall have working air monitoring equipment; they shall be donned in Level D PPE and have immediate access to APR's and SCBA to don if any leak would develop during a transfer; Transfer system shall be dried, purged, leak tested and leak-free prior to transfer initiation; Emergency Shut-off Valves (ESV's) shall be utilized to stop chlorine liquid and vapor flows in the event of a hose or fitting failure; Transfer shall be attended at all times; Use Buddy System to watch out for each other; Keep Others Away...no other operations should be taking place near chlorine transfer work area; use flashlights at night, etc.
Chlorine Transfer Equipment Wrap-up	Chlorine exposure during wrap-up operations; Slips, Trips, and Falls.	Transfer equipment shall be thoroughly cleared, purged, and de-pressurized prior to disconnection; Transfer personnel shall have working air monitoring equipment; they shall be outfitted in Level D PPE for all wrap up operations except during disconnections...personnel shall don APR's or SCBA prior to and during transfer equipment disconnections; Use Buddy System to watch out for each other; Keep Others Away...no other operations should be taking place near chlorine transfer work area; use flashlights at night, etc.
Chlorine Vapor Scrubbing & Car Purging	Chlorine exposure; Sodium Hydroxide exposure; Nitrogen gas exposure; Slips, Trips, Falls; Muscle pull (handling caustic transfer pump, sparging bar, etc.)	Chlorine scrubbing personnel shall have working air monitoring equipment; they shall be donned in Level D PPE for most set up and scrubbing work except for sodium hydroxide handling; Sodium hydroxide handling shall utilize minimum PPE: PPE (suit): Tychem SL PPE (boots): PVC PPE (gloves): PVC PPE (face shield & goggles): PVC Isolation valves, check valves, and block and bleed valves shall be utilized to control chlorine and nitrogen (or dry air) flows and not allow back-feeding scrubbing solutions back into tank car

Tasks (continued)	Risks Associated with Task (continued)	PPE & Engineering Controls to Eliminate or Minimize Risks
Removal of Tank Car Pressure Plate Assembly	Chlorine exposure; Pinch Points; Crushing injury potential during lifting and handling of heavy equipment	Level D PPE will be utilized for this task. Tank car internal atmosphere shall be thoroughly purged and air monitoring data shall confirm that chlorine concentrations are below 1ppm in the car prior to removal of pressure plate assembly; Rigging equipment used shall be inspected and in good condition prior to use; Rigging shall be applied in secure manner so as not to lose the load while suspended; a tag line shall be used to control the pressure plate assembly while suspended.

Note 6: The above JSA & PPE information complies with 29 CFR 1910.120(b)(4)(ii)(a), 1910.120(b)(4)(ii)(c), and 1920.120(g)(3) through (g)(5).

Acknowledgement of Prerequisites

All CHLOREP Team members working at this response participate in a Medical Surveillance Program and their respective physicians have deemed them fit for duty *as required by 29 CFR 1910.120(b)(4)(ii)(D) and 1910.120(f)(1) through 1910.120(f)(8).*

All CHLOREP Team members working at this response have been trained and their respective employer has qualified them to perform the tasks and functions assigned *as required by 29 CFR 1910.120(b)(4)(ii)(B) and 1910.120(e)(2) through 1910.120(e)(9).*

Personnel Monitoring

All CHLOREP Team members will be fit for duty. Certain response activities justify additional personal monitoring for things like chemical exposure, blood pressure, etc.

For this response, no urine sampling or blood testing is required beyond what the CHLOREP Team employer's normal practices are for Medical Monitoring, Substance Abuse Screening, etc. However, if Level A operations are to be performed, baseline blood pressure and post-entry blood pressure evaluations will be performed by on-site qualified individuals. No CHLOREP Team member with high blood pressure should participate in Level A operations. Team members will also undergo post-entry medical evaluation. *This complies with 29 CFR 1910.120(f).*

Communications

The contents of this HASP, as well as the contents of the Incident Action and Work Plan (Appendix A), should be reviewed and acknowledged by all CHLOREP Team members on site. After reviewing this information, which will include an opportunity for questions, clarifications, good faith challenges, etc., personnel will sign on the signature page of this HASP as an acknowledgement of this information and their promise to work safely within the framework of this plan.

Pre-job safety briefings are an important element to ensuring safe performance. The CHLOREP Team shall conduct, at a minimum, a pre-job safety briefing at each shift change prior to beginning work. The

CHLOREP Team shall also conduct a pre-job safety briefing if/when there is a change in the scope of work.

Hand signals may be utilized to communicate with personnel working in various locations at the site. If hand signals are utilized, the following table summarizes some common hand signals that all personnel should be aware of and understand:

Hand Signal	Message - Meaning
Hand(s) Gripping Throat	Out of Air or Cannot Breathe
Grip Partner's Wrist or Waist with Both Hands	Exit Area Immediately
Hands/Arms Raised Over Head	Need Immediate Assistance
Thumbs Up	Okay or Yes
Thumbs Down	Not Okay or No

Two-way radios may be utilized to communicate with personnel working in various locations at the site. If two-way radios are to be utilized, the following table summarizes radio channel assignments and estimated maximum range of signal service:

2-way radios for use	Operational Group	Channel Assigned
Fire Department Radios	Air Monitoring Crew	3
Fire Department Radios	Leak Stopping Crew	1
CHLOREP Team Radios	Chlorine Transfer & Purge Crew	1

Telephone communications should also be established. The following table provides key telephone numbers associated with CHLOREP Team response operations:

Contact	Organization	Phone Number
Johnny Hazmat	CHLOREP Team Leader	xxx-xxx-xxxx
Captain Staysafe	Jackson Fire Dept Incident Safety Officer	xxx-xxx-xxxx
Railroad Hazmat or Environmental Manager Operations Sector or Division	XYZ Class 1 Railroad	xxx-xxx-xxxx

Note 7: This communications section complies with 29 CFR 1910.120(b)(4)(iii) and 1910.120(b)(4)(iv).

Air Monitoring

Chlorine air monitoring equipment shall be utilized in support of this response. The CHLOREP Team air monitoring for this response may include one, or more, of the following air monitoring activities:

Function/Mission	Focus Considerations	Type(s) of Equipment
Community Protection	Determine chlorine concentrations (if any) in neighboring areas to the incident location and document measurements, GPS locations of sample points, times sampled... Intercept populated areas first.	Direct reading instrument with Chlorine Sensor (i.e. MultiRAE, Mx6 iBrid, single gas monitors, etc.) Gastec Colorimetric Tubes (list specific tube & range)

Function/Mission	Focus Considerations	Type(s) of Equipment
Hot Zone & Warm Zone & Cold Zone Delineation	OSHA PEL Focus on Data Interpretation and Zone Boundaries Delineation	Same as Above
Respiratory PPE Determination	OSHA PEL Focus on Data to Guide APR vs SCBA for Crew Respiratory Protection	Same as Above
Work Area Perimeter Monitoring	Collect Non-Detections data to demonstrate that No Chlorine leaked during transfer work	Same as Above

Any direct reading instrument(s) utilized for air monitoring shall be in good work order and calibrated at least as frequently as the manufacturer's guidelines and recommendations. Any colorimetric sample tube(s) utilized with air monitoring shall be within the tube shelf life expectancy (i.e. no use of expired tubes), and the instructions for sampling and data interpretation will be followed.

General PPE and Safety Recommendations for Various Detection Levels

Chlorine (Cl₂) Phases (at any concentration)

Level B Gaseous chlorine

Enhanced Level B Liquid chlorine

(For more details regarding PPE, refer to Section 4 of CI Pamphlet 65, Personal Protective Equipment for Chlor-Alkali chemicals.)

Oxygen (O₂)

Concentration

Action Taken

< 19.5% Oxygen

19.5% to 23.5% Oxygen

>23.5% Oxygen

Leave area. Re-enter only with supplied air.

Work may continue. Investigate changes from 21%

Work must stop. Ventilate area before returning.

Flammability (LEL)

Concentration

Action Taken

<10% of LEL

10% to 20% LEL

>20% LEL

Work may continue. Consider toxicity potential.

Work may continue. Increase monitoring freq.

Work must stop. Ventilate area before returning.

Carbon Monoxide (CO)

Concentration

Action Taken

Less than 35 ppm (NIOSH REL)

Between 35 ppm and 350 ppm

Greater than 35 ppm

Work may continue

EXIT the work area...APR for Escape Use Only

Continue work only with use of SCBA & Ventilate

*Special Notation for CO Sensor Readings...Hydrogen Gas will be detected with a CO Sensor, so if you detect CO, consider the possibility of Hydrogen Gas potentially being present and plan safety, additional Hydrogen-specific air monitoring, and work activities accordingly.

Hydrogen Sulfide (H₂S)

<u>Concentration</u>	<u>Action Taken</u>
Less than 10 ppm (NIOSH REL)	Work may continue
Between 100 ppm and 100 ppm	EXIT the work area...APR for Escape Use Only
Greater than 10 ppm	Continue work only with use of SCBA & Ventilate

Decontamination Plan

Personnel and equipment leaving the Hot Zone (Hot Zone may also be referred to as the Exclusion Zone) shall be decontaminated if they have any chemical contamination on them. The site safety officer is responsible for monitoring adherence with this decontamination plan. Attendants assigned to the decontamination operation shall be donned in PPE that is either the same, or one level lower, as the PPE being utilized by the entrants.

A decontamination station shall be established at a designated location at the interface between the Hot Zone and the Warm Zone. Decontamination attendants will assess the entrants upon exiting the Hot Zone. Assessments will include visual observations and the use of resources such as chlorine detection equipment, pH paper, etc. If the entrants show no evidence of chemical contamination, then dry-decon measures may be exercised to simply doff the PPE in an inverted manner (roll the PPE suit inside-out upon doffing it). However, if the entrants have chlorine or other chemical contamination on them, the following decontamination process shall be followed:

A three-step technical decontamination line will be established with primary and secondary containments for decontamination waste materials collection.

1. Primary Station (closest to the Hot Zone) = Gross Decontamination (gross volume of material removal). This can be achieved in any number of ways from using absorbent pads, to brushes, to a basic water spray.
2. Neutralizing and Washing Station (middle station) = Baking soda solution can be used (if needed) as a mild neutralizing solution for any weak acid formation on PPE, and soap and water washing shall follow the baking soda application. Regardless of any baking soda application, soap and water shall wash the entrants from head to toe at this station prior to final rinse.
3. Rinse Station (closest to Cold Zone) = A top to bottom water rinse shall be performed to remove any baking soda and soap and water from the previous station.

All entrants and equipment utilized in the Hot Zone shall be instructed to exit the Hot Zone via the decontamination operations area to ensure effective control of contamination (i.e. keeping contamination in the Hot Zone and removed from entrants and equipment in the Warm Zone).

There is an exception to utilizing the complete technical process when exiting the Hot Zone. That exception is considered as Emergency Decontamination. An Emergency Decontamination shall be acceptable in any situation in which a medical emergency of an entrant would take priority over going through a multi-step technical decontamination process.

Two essential objectives of Emergency Decontamination are to get medical attention to the patient as rapidly as possible without having to wait for technical decontamination, and second, not to transfer chemical contamination from the Hot Zone to medical care facilities (i.e. the ambulance, the hospital emergency room, etc.).

Emergency Decontamination shall be considered as follows:

Remove the patient from the Hot Zone to the Warm Zone as rapidly as possible and in a manner that will not cause greater harm to the entrant. For example, if collapsed from heat stress, drag the patient to the Warm Zone ASAP and start getting his/her suit cut away...however, if patient fell from an elevated position (i.e. top of tank car) and may have a serious spinal cord injury, then rescue personnel will need to come into the Hot Zone for back-board patient packaging prior to moving the patient to Warm Zone. In the latter example, Rapid Intervention Team (RIT), will be called into duty to ensure the patient does not run out of breathing air, etc. Once the patient is back at the Warm Zone, scissors will be used to cut the chemical protective suit away from the patient. Scissor cutting of the chemical suit should start from the head/neck area downward (cut away from neck area...not upwards and towards it), and the same consideration for cutting must be given to cutting the suit away from arms and legs...cut from high to low in order not to cut upwards towards large blood vessels, groin area, etc.

Note 8: This decontamination section complies with 29 CFR 1910.120(b)(4)(ii)(G) and 1910.120(k)(2)(i) through (k)(8).

Confined Space Entry

Will this response require any Confined Space Entry work? Mark "X": Yes ____ No ☒

If No, then skip to the next section of this plan and ignore following information within this section.

If Yes, then the Confined Space Work must be performed by personnel who have been trained to work within a Confined Space and a Confined Space Entry Permit process. Likewise, a Confined Space Rescue Plan must be prepared, and a Confined Space Rescue Team (staffed with personnel who have been trained in Confined Space Rescue) must be identified and available for immediate response in the event of an emergency within the confined space.

The Confined Space Entry Permit must be maintained near the immediate work area (near the confined space entry point ideally), and it must be formally closed once all entry work in the confined space has concluded.

Any/All Confined Space Work must be performed in accordance with 29 CFR 1910.146 regulations.

Spill Containment / Contingency Measures

Any portable equipment such as light plants, generators, portable pumps, etc. shall be deployed on top of a secondary containment materials (i.e. HDPE, LLHDPE, Polyethylene, etc.) to capture and contain any accidental fuel, coolant, or oil drips from operating equipment, refueling spills, drips, etc.

The CHLOREP Team will maintain a reasonable supply of emergency spill containment and recovery supplies on hand at the job site in case any fluids are leaking or any machines or trucks accidentally breach a fuel tank or fuel line, etc.

Other heavy equipment may also be working on site. If a spill occurs and there is a backhoe and/or tracked excavation unit available, we will call upon that resource to further enhance containment such as diking, berm construction, etc.

We will recover any spilled material rapidly if any such situation would occur. We will not allow any spilled material to be left un-addressed.

Note 9: This spill containment section complies with 29 CFR 1910.120(b)(4)(ii)(J) and 1910.120(j) through (j)(9)(ii).

Emergency Response Contingency Planning

An emergency alert signal shall be identified for use to alert all personnel of an emergency. If an emergency alert signal is initiated, all personnel are to report the pre-designated muster area to be accounted for. A Personnel Accountability Reporting (PAR) system shall be used to count personnel assigned in each working group. In the event on an emergency, all personnel will be accounted for via PAR verification and communications.

At each shift change, a designated path(s) of ingress and egress, and a designated muster location(s), shall be identified and communicated to all personnel. All personnel are collectively responsible to ensure that the path(s) of ingress and egress remain passible during work activities. If a delivery vehicle (or other) starts momentum in blocking access in or out of the work area, all personnel are empowered, and expected, to communicate with applicable people to not allow that to happen.

This emergency planning is intended to be in harmony with emergency planning and contingency measures that the Unified Command Group may also have established.

This emergency contingency section of this HASP may be subject to a “mock emergency drill” to exercise this plan and the CHLOREP Team readiness at the discretion of the Safety Officer.

The following table provides key emergency response planning information for easy reference in the event of an emergency:

Planning Item	Detail	Phone Number or Other
Alert Signal	Air Horn – Several Long Blasts on Air Horn	Safety Officer or Lead Operations Person to Control Air Horn Alerting & PAR
Ingress & Egress Path	Temporary Dirt/Rock Access Road that runs from Church Parking Lot through field to derailment site	Ensure this remains open for emergency traffic
Accountability Muster Location	Church Parking Lot	Stay there until an all-clear is issued
Fire, Rescue, or Hazmat Release Emergency	Jackson Fire Department	Dial “911”
Police or Security Emergency	Jackson Police Department XYZ Class 1 Railroad Police	Dial “911” Railroad P.D. # xxx-xxx-xxxx
Medical Emergency	Jackson Fire Dept EMS Division	Dial “911”

Rapid Intervention Team	Hazmat & Rescue Trained Personnel – RIT provided by Jackson Fire Dept	On site; nearby; notify via on site communications
Nearest Hospital	Merit Health Rankin 350 Crossgates Blvd. Brandon, MS 39042	24-hours # 601-825-2811
Driving Directions to Nearest Hospital: <ul style="list-style-type: none"> • From Church Parking Lot, turn Right. • Proceed approximately 1 mile to 7th Avenue • Left Turn onto 7th Avenue • Proceed 2 miles to Main Street • Turn Right onto Main Street • Proceed 3 blocks • Turn Left onto Crossgates Blvd. • Proceed 3 blocks on Crossgates Blvd...hospital is on the Right 		

Note 10: This emergency contingency section complies with 29 CFR 1910.120(b)(4)(ii)(H) and 1910.120(l)(3) through (l)(3)(vii).

Site Security

Site security responsibility is that of the Unified Command Group. The CHLOREP Team's operations will include the following security measures:

Background investigations shall be conducted on all CHLOREP members and ensure no criminal history exists.

Background investigations on subcontractor employees may be done on a case by case basis.

During service events, no CHLOREP or subcontractor employee shall work alone.

During off work hours, equipment will be secured and locked. Whenever possible, good lighting will compliment equipment staging areas.

Whenever vulnerability and/or threat assessment suggests elevated risk, the responsible party will be asked to provide 24-hour on site security support for the project.

Modifications to this Site-Specific Health and Safety Plan (HASP)

Nothing in this work plan is to be interpreted as an absolute. This safety plan provides the framework for working at this site safely. It is to be considered as a "living document" and can be edited as site conditions, circumstances, or work objectives may change.

Actual site conditions encountered may justify modifications to any one or more of the key elements of this plan to safely address field conditions encountered. If/when any such a situation would occur, the following process must be followed prior to initiating the modification:

1. The CHLOREP Team Leader must approve the modification; and
2. Updated Job Safety Briefings must be communicated with all personnel to share the update(s).

Appendix A

Incident Action and Work Plan

Incident Action and Work Plan

Incident Date:	04/30/19
Incident Location:	Jackson, Mississippi
Incident Description:	Derailment Response – Chlorine Tank Cars
Responsible Party:	XYZ Class 1 Railroad Company
Prepared by:	Johnny Hazmat, Agent for CHLOREP Team
Date of Plan Preparation:	04/30/19
Latest Revision Date:	05/02/19

Note 1: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 2: The above table of information also complies with 29 CFR 1910.120(b)3 and 1910.120(b)(4)(ii).

Introduction & Purpose

This document is a safe work plan that outlines essential elements of the work necessary to safely terminate this emergency response incident. Its purpose is to identify the CHLOREP Team response objective(s), the tasks required to meet the objective(s), and outline any logistical support and resources needed.

Background/Available Information (Assessment of Conditions Presumed)

Chemical(s) Involved:	Chlorine
Container Type(s):	Tank Cars
Number of Containers:	2
Condition of Container(s):	1 upright & not leaking; 1 on its side and leaking from protective housing
Topography (general description of site):	Flat – railroad parallels river
Estimated Temperature (Day High/Night Low):	79/60 (degrees F)
Forecasted Weather:	Sun and Clear Skies for next 3 days
Wind Direction Forecasted:	From SW @ 5 mph (day)/Nights Calm

Note 3: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 4: The above table of information also complies with 29 CFR 1910.120(l)(3)(i)(A).

CHLOREP Team Response Objective(s)

Prioritized Objectives	Define Objectives	Note(s)
1	Verify that Unified Command Group has adequate air monitoring being performed	Worker protection and community protection considerations with air monitoring
2	Stop Chlorine Leak from overturned tank car	Coordinate with Unified Command to get CHLOREP or other trained Entry Team with Capping Kit authorized into hot zone for leak mitigation work activity

Prioritized Objectives	Define Objectives	Note(s)
3	Transfer Chlorine from leaking tank car into receiving car	Damage Assessment to be performed prior to re-railing or up-righting the overturned car. Ideally railroad to safely upright the car in preparation for field transfer. Re-railing operations should be considered carefully with Damage Assessment information to determine field transfer tactics, etc.
4	Purge/Clean the empty/residue chlorine car following transfer.	This can be performed following field transfer operations to inert the empty tank car preparation for capping kit removal and car disposition (repairs or scrap, etc).

Note 5: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 6: The above table of information also complies with 29 CFR 1910.120(b)(3)(ii).

Tasks & Resources Needed to Meet Objectives

Objective(s) & Task(s)	Personnel	Resources
Verify Air Monitoring. Perform additional air monitoring using chlorine direct reading instruments and/or colorimetric tubes	1-4 air monitoring personnel as may be needed to supplement either community air monitoring, or worker air monitoring, or both, if needed	Chlorine monitoring equipment, note pads, GPS, hand held weather station unit, solar sensor, and cell phone(s) to communicate data collected
Stop Chlorine Leak from overturned tank car. Cut seal, assess valves & fittings, tighten valve if possible, and install capping kit if needed.	2 person entry team + 1-2 person back-up and logistical support with capping kit components, etc. + 1-2 person decon team	Level A PPE for entrants; Level B PPE for logistical & decon personnel; tool to cut security seal; tools and capping kit to stop leak; decon water source and supplies; drinking water for crew hydration
Transfer chlorine. Establish track protection and a grounding field, ground & bond cars and the vapor compressor, deploy, purge, & leak test transfer equipment, transfer chlorine, purge transfer equipment, secure tank cars, wrap up equipment.	3-6 person transfer crew (depending on site and weather conditions...host of factors to drive staffing)	Corken chlorine vapor compressor, chlorine transfer valves, fittings, hoses, pressure gauges, nitrogen supply, nitrogen regulators, purging hoses, rope, hand tools, ladders, leak testing ammonia vapors, leak testing "snoop" solution, chlorine air monitoring equipment, and SCBA, APR's, and other PPE on stand by
Purge & Clean the chlorine car after it is empty. Maintain track protection and a grounding field and maintain empty car grounded to grounding field. Deploy 18-22% NaOH	2-4person purging crew (depending on site and weather conditions...host of factors to drive staffing)	Sparging bar with check valves and control valves and jet pump, chlorine transfer valves, fittings, hoses, pressure gauges, nitrogen or dry air supply, nitrogen or dry air regulators, purging hoses, rope,

scrubbing solution in scrubber tank, deploy sparging and jet pumping and nitrogen or dry-air purging equipment, purge, & leak test chlorine vapor transfer equipment, purge the tank to caustic scrubber, wrap up equipment, and demobilize.		hand tools, ladders, leak testing ammonia vapors, leak testing “snoop” solution, chlorine air monitoring equipment, and SCBA, APR’s, and other PPE on stand by
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Note 7: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 8: The above table of information also complies with 29 CFR 1910.120(b)(3)(i), 1910.120(b)(3)(ii), and 1920.120(b)(3)(iii).

Acknowledgement of Prerequisites

All CHLOREP Team members working at this response participate in a Medical Surveillance Program, and their respective physicians have deemed them “fit for duty” *as required by 29 CFR 1910.120(b)(4)(ii)(D) and 1910.120(f)(1) through 1910.120(f)(8).*

All CHLOREP Team Members working at this response have been trained, and their respective employer has qualified them to perform the tasks and functions assigned *as required by 29 CFR 1910.120(b)(4)(ii)(B) and 1910.120(e)(2) through 1910.120(e)(9).*

Other Documentation Incorporated by Reference

Document Description	Applicability/Comment(s)
Chlorine Capping Kit Inventory	Field reference document
Air Monitor Instrument Technical Manual	Field reference document for whatever instrument(s) are being used for sampling
CHLOREP Team Chlorine Field Transfer Procedure	Field reference document
CHLOREP Team Chlorine Vapor Scrubbing and/or Vessel Purging Procedure	Field reference document
Site Specific Health & Safety Plan (HASP)	<i>Required by 29 CFR 1910.120(b)(4)(ii) and supports this Incident Action Work Plan with host of other important details such as PPE, Emergency Response Contingencies, Decontamination, Job Safety Analysis, Etc.</i>
Safety Data Sheets (SDS’s)	Chlorine, Sodium Hydroxide, and Nitrogen

Note 9: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 10: The above table of information also complies with 29 CFR 1910.120(b)(3)(v).

Communications

Pre-job safety briefings are an important element to ensuring safe performance. The CHLOREP Team shall conduct, at a minimum, a pre-job safety briefing at each shift change prior to beginning work. The CHLOREP Team shall also conduct a pre-job safety briefing if/when there is a change in the scope of work.

Hand signals may be utilized to communicate with personnel working in various locations at the site. If hand signals are utilized, the following table summarizes some common hand signals that all personnel should be aware of and understand:

Hand Signal	Message - Meaning
Hand(s) Gripping Throat	Out of Air or Cannot Breathe
Grip Partner's Wrist or Waist with Both Hands	Exit Area Immediately
Hands/Arms Raised Over Head	Need Immediate Assistance
Thumbs Up	Okay or Yes
Thumbs Down	Not Okay or No

Two-way radios may be utilized to communicate with personnel working in various locations at the site. If two-way radios are to be utilized, the following table summarizes radio channel assignments and estimated maximum range of signal service:

2-way radios for use	Operational Group	Channel Assigned
Fire Department Radios	Air Monitoring Crew	3
Fire Department Radios	Leak Stopping Crew	1
CHLOREP Team Radios	Chlorine Transfer & Purge Crew	1

Telephone communications should also be established. The following table provides key telephone numbers associated with CHLOREP Team response operations:

Contact	Organization	Phone Number
Johnny Hazmat	CHLOREP Team Leader	xxx-xxx-xxxx
Captain Staysafe	Jackson Fire Dept Incident Safety Officer	xxx-xxx-xxxx
Hazmat/Environmental Operations Division, Railroad Hazmat Manager	XYZ Class 1 Railroad	xxx-xxx-xxxx

This Plan shall be provided to the Unified Command Group for review and operational approval.

Modifications to this Incident Action and Work Plan

Nothing in this work plan is to be interpreted as an absolute. This work plan is the framework for approaching this project in a safe and methodical manner.

Actual site conditions encountered may justify modifications to any one or more of the key elements of this plan to safely address field conditions encountered. If/when any such a situation would occur, the following process must be followed prior to initiating the modification:

1. The CHLOREP Team Leader must approve the modification; and
2. The Unified Command Group must approve the modification.

Preparation and Parties to this Incident Action and Work Plan

This work plan has been prepared by the CHLOREP Team on behalf of ABC CHLORINE PRODUCER(s), XYZ Class 1 Railroad Company, and the Unified Command Group with respect to the safe handling of derailed chlorine tank cars.

Upon Unified Command Group approval of this plan, each of these parties is prepared to initiate work within the framework of this plan.

ATTACHMENT B - SITE-SPECIFIC HEALTH AND SAFETY PLAN (BLANK)

Site Specific Health and Safety Plan (HASP)

Incident Date:	
Incident Location:	
Incident Description:	
Responsible Party (RP):	
Office Address of RP:	
Prepared by:	
Date of Plan Preparation:	
Latest Revision Date:	

Note 1: The above table of information complies with 29 CFR 1910.120(b)(4)(ii).

Introduction and Applicability/Disclaimer

This document is a site-specific Health and Safety Plan (HASP) that outlines essential information to enhance personnel safety during this emergency response incident. The information contained within this document and any/all of its supporting attachments or appendices shall be maintained on site and accessible to all CHLOREP Team member. This document applies to the response activities of the CHLOREP Team and is not intended to address any other activities being performed by any other agency(s) at this site. This HASP has been prepared for the site-specific conditions, purpose, tasks, dates and CHLOREP Team members. This HASP should be considered as a “living document” and periodically amended and reviewed by the CHLOREP Team member if site conditions and/or work scope change.

Background/Available Information (Assessment of Conditions Presumed)

Chemical(s) Involved:	
Container Type(s):	
Number of Containers:	
Condition of Container(s):	
Topography (general description of site):	
Estimated Temperature (Day High/Night Low):	
Forecasted Weather:	
Wind Direction Forecasted:	

Note 2: The above table of information complies with 29 CFR 1910.120(b)(4)(ii).

Organizational Structure & Lines of Authority

Position & Personnel	Organization(s)	Reports To

Note 3: The above table of information complies with 29 CFR 1910.120(b)(2)(i).

The following Organizational Charts on the next page present two *EXAMPLES* that are not necessarily site-specific, but they do add visual structure perspective for the information contained within the above table. Figure 1 is a broad view of a typical Unified Command Structure. Figure 2 is a typical railroad-specific structure starting with the railroad's Senior Official represented within the Unified Command Group and shows where the CHLOREP Team and CHLOREP Contractors fit in to the overall organizational structure at the site.

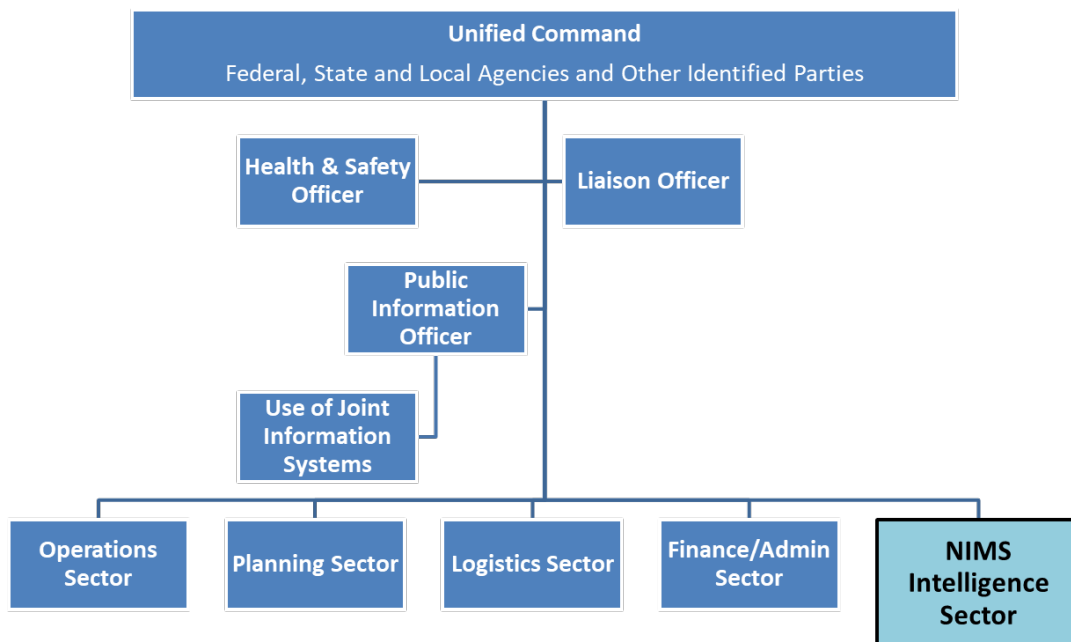
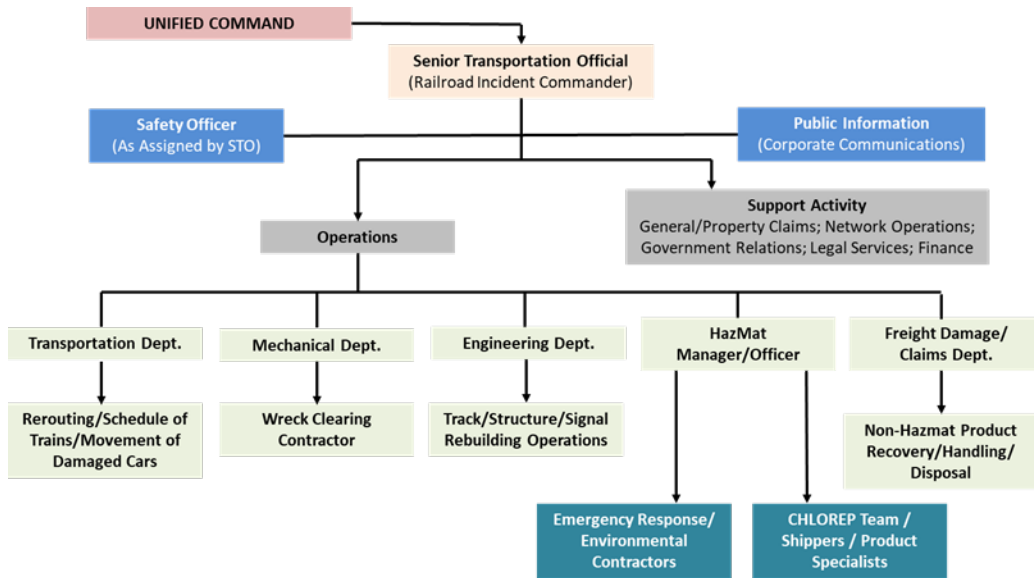


Figure 1
Typical Incident Command Structure



1

Figure 2
Typical Railroad Incident Management Structure

Site Sketch Map (*Not to Scale*)
(Show Reference to North and Hot, Warm, and Cold Zones)

Note 4: The above Site Sketch Map above complies with 29 CFR 1910.120(b)(4)(ii)(F) and 29 CFR 1910.120(d)(1) through (d)(3).

Incident Action and Work Plan

In addition to, and in harmony with, this HASP, an Incident Action and Work Plan has been prepared and is hereby incorporated by reference. The Incident Action and Work Plan is included as Appendix A to this HASP. The Incident Action and Work Plan contains objectives, tasks, personnel, and resources. It also includes supporting information such as Standard Operating Procedures, Safety Data Sheets, and other guidance and/or reference documentation.

Note 5: The Incident Action and Work Plan documentation provided within Appendix A of this HASP complies with 29 CFR 1910.120(b)(3), 1920.120(b)(4)(ii), and NIMS Incident Action Planning guidelines.

Risk Analysis (Job Safety Analysis)

Tasks	Risks Associated with Task	PPE & Engineering Controls to Eliminate or Minimize Risks

Note 6: The above JSA & PPE information complies with 29 CFR 1910.120(b)(4)(ii)(a), 1910.120(b)(4)(ii)(c), and 1920.120(g)(3) through (g)(5).

Acknowledgement of Prerequisites

All CHLOREP Team members working at this response participate in a Medical Surveillance Program and their respective physicians have deemed them fit for duty *as required by 29 CFR 1910.120(b)(4)(ii)(D) and 1910.120(f)(1) through 1910.120(f)(8).*

All CHLOREP Team members working at this response have been trained and their respective employer has qualified them to perform the tasks and functions assigned *as required by 29 CFR 1910.120(b)(4)(ii)(B) and 1910.120(e)(2) through 1910.120(e)(9).*

Personnel Monitoring

All CHLOREP Team members will be fit for duty. Certain response activities justify additional personal monitoring for things like chemical exposure, blood pressure, etc.

For this response, no urine sampling or blood testing is required beyond what the CHLOREP Team employer's normal practices are for Medical Monitoring, Substance Abuse Screening, etc. However, if Level A operations are to be performed, baseline blood pressure and post entry blood pressure evaluations will be performed by on-site qualified individuals. No CHLOREP Team member with high blood pressure should participate in Level A operations. Team members will also undergo post-entry medical evaluation. *This complies with 29 CFR 1910.120(f).*

Communications

The contents of this HASP, as well as the contents of the Incident Action and Work Plan (Appendix A), should be reviewed and acknowledged by all CHLOREP Team members on site. After reviewing this information, which will include an opportunity for questions, clarifications, good faith challenges, etc., personnel will sign on the signature page of this HASP as an acknowledgement of this information and their promise to work safely within the framework of this plan.

Pre-job safety briefings are an important element to ensuring safe performance. The CHLOREP Team shall conduct, at a minimum, a pre-job safety briefing at each shift change prior to beginning work. The CHLOREP Team shall also conduct a pre-job safety briefing if/when there is a change in the scope of work.

Hand signals may be utilized to communicate with personnel working in various locations at the site. If hand signals are utilized, the following table summarizes some common hand signals that all personnel should be aware of and understand:

Hand Signal	Message - Meaning
Hand(s) Gripping Throat	Out of Air or Cannot Breathe
Grip Partner's Wrist or Waist with Both Hands	Exit Area Immediately
Hands/Arms Raised Over Head	Need Immediate Assistance
Thumbs Up	Okay or Yes
Thumbs Down	Not Okay or No

Two-way radios may be utilized to communicate with personnel working in various locations at the site. If two-way radios are to be utilized, the following table summarizes radio channel assignments and estimated maximum range of signal service:

2-way radios for use	Operational Group	Channel Assigned

Telephone communications should also be established. The following table provides key telephone numbers associated with CHLOREP Team response operations:

Contact	Organization	Phone Number

Note 7: This communications section complies with 29 CFR 1910.120(b)(4)(iii) and 1910.120(b)(4)(iv).

Air Monitoring

Chlorine air monitoring equipment shall be utilized in support of this response. The CHLOREP Team air monitoring for this response may include one, or more, of the following air monitoring activities:

Function/Mission	Focus Considerations	Type(s) of Equipment

Any direct reading instrument(s) utilized for air monitoring shall be in good work order and calibrated at least as frequently as the manufacturer's guidelines and recommendations. Any colorimetric sample tube(s) utilized with air monitoring shall be within the tube shelf life expectancy (i.e. no use of expired tubes), and the instructions for sampling and data interpretation will be followed.

General PPE and Safety Recommendations for Various Detection Levels

Chlorine (Cl₂) Phases (at any concentration)

Level B Gaseous chlorine

Enhanced Level B Liquid chlorine

(For more details regarding PPE, refer to Section 4 of CI Pamphlet 65, Personal Protective Equipment for Chlor-Alkali chemicals.)

Oxygen (O₂)

Concentration

Action Taken

< 19.5% Oxygen

Leave area. Re-enter only with supplied air.

19.5% to 23.5% Oxygen

Work may continue. Investigate changes from 21%

>23.5% Oxygen

Work must stop. Ventilate area before returning.

Flammability (LEL)

Concentration

Action Taken

<10% of LEL

Work may continue. Consider toxicity potential.

10% to 20% LEL

Work may continue. Increase monitoring freq.

>20% LEL

Work must stop. Ventilate area before returning.

Carbon Monoxide (CO)

Concentration

Action Taken

Less than 35 ppm (NIOSH REL)

Work may continue

Between 35 ppm and 350 ppm

EXIT the work area...APR for Escape Use Only

Greater than 35 ppm

Continue work only with use of SCBA & Ventilate

*Special Notation for CO Sensor Readings...Hydrogen Gas will be detected with a CO Sensor, so if you detect CO, consider the possibility of Hydrogen Gas potentially being present and plan safety, additional Hydrogen-specific air monitoring, and work activities accordingly.

Hydrogen Sulfide (H₂S)

<u>Concentration</u>	<u>Action Taken</u>
Less than 10 ppm (NIOSH REL)	Work may continue
Between 100 ppm and 100 ppm	EXIT the work area...APR for Escape Use Only
Greater than 10 ppm	Continue work only with use of SCBA & Ventilate

Decontamination Plan

Personnel and equipment leaving the Hot Zone (Hot Zone may also be referred to as the Exclusion Zone) shall be decontaminated if they have any chemical contamination on them. The site safety officer is responsible for monitoring adherence with this decontamination plan. Attendants assigned to the decontamination operation shall be donned in PPE that is either the same, or one level lower, as the PPE being utilized by the entrants.

A decontamination station shall be established at a designated location at the interface between the Hot Zone and the Warm Zone. Decontamination attendants will assess the entrants upon exiting the Hot Zone. Assessments will include visual observations and the use of resources such as chlorine detection equipment, pH paper, etc. If the entrants show no evidence of chemical contamination, then dry-decon measures may be exercised to simply doff the PPE in an inverted manner (roll the PPE suit inside-out upon doffing it). However, if the entrants have chlorine or other chemical contamination on them, the following decontamination process shall be followed:

A three-step technical decontamination line will be established with primary and secondary containments for decontamination waste materials collection.

1. Primary Station (closest to the Hot Zone) = Gross Decontamination (gross volume of material removal). This can be achieved in any number of ways from using absorbent pads, to brushes, to a basic water spray.
2. Neutralizing and Washing Station (middle station) = Baking soda solution can be used (if needed) as a mild neutralizing solution for any weak acid formation on PPE, and soap and water washing shall follow the baking soda application. Regardless of any baking soda application, soap and water shall wash the entrants from head to toe at this station prior to final rinse.
3. Rinse Station (closest to Cold Zone) = A top to bottom water rinse shall be performed to remove any baking soda and soap and water from the previous station.

All entrants and equipment utilized in the Hot Zone shall be instructed to exit the Hot Zone via the decontamination operations area to ensure effective control of contamination (i.e. keeping contamination in the Hot Zone and removed from entrants and equipment in the Warm Zone).

There is an exception to utilizing the complete technical process when exiting the Hot Zone. That exception is considered as Emergency Decontamination. An Emergency Decontamination shall be acceptable in any situation in which a medical emergency of an entrant would take priority over going through a multi-step technical decontamination process.

Two essential objectives of Emergency Decontamination are to get medical attention to the patient as rapidly as possible without having to wait for technical decontamination, and second, not to transfer chemical contamination from the Hot Zone to medical care facilities (i.e. the ambulance, the hospital emergency room, etc.).

Emergency Decontamination shall be considered as follows:

Remove the patient from the Hot Zone to the Warm Zone as rapidly as possible and in a manner that will not cause greater harm to the entrant. For example, if collapsed from heat stress, drag the patient to the Warm Zone ASAP and start getting his/her suit cut away...however, if patient fell from an elevated position (i.e. top of tank car) and may have a serious spinal cord injury, then rescue personnel will need to come into the Hot Zone for back-board patient packaging prior to moving the patient to Warm Zone. In the latter example, Rapid Intervention Team (RIT), will be called into duty to ensure the patient does not run out of breathing air, etc. Once the patient is back at the Warm Zone, scissors will be used to cut the chemical protective suit away from the patient. Scissor cutting of the chemical suit should start from the head/neck area downward (cut away from neck area...not upwards and towards it), and the same consideration for cutting must be given to cutting the suit away from arms and legs...cut from high to low in order not to cut upwards towards large blood vessels, groin area, etc.

Note 8: This decontamination section complies with 29 CFR 1910.120(b)(4)(ii)(G) and 1910.120(k)(2)(i) through (k)(8).

Confined Space Entry

Will this response require any Confined Space Entry work? Mark "X": Yes ____ No ☒

If No, then skip to the next section of this plan and ignore following information within this section.

If Yes, then the Confined Space Work must be performed by personnel who have been trained to work within a Confined Space and a Confined Space Entry Permit process. Likewise, a Confined Space Rescue Plan must be prepared, and a Confined Space Rescue Team (staffed with personnel who have been trained in Confined Space Rescue) must be identified and available for immediate response in the event of an emergency within the confined space.

The Confined Space Entry Permit must be maintained near the immediate work area (near the confined space entry point ideally), and it must be formally closed once all entry work in the confined space has concluded.

Any/All Confined Space Work must be performed in accordance with 29 CFR 1910.146 regulations.

Spill Containment / Contingency Measures

Any portable equipment such as light plants, generators, portable pumps, etc. shall be deployed on top of a secondary containment materials (i.e. HDPE, LLHDPE, Polyethylene, etc.) to capture and contain any accidental fuel, coolant, or oil drips from operating equipment, refueling spills, drips, etc.

The CHLOREP Team will maintain a reasonable supply of emergency spill containment and recovery supplies on hand at the job site in case any fluids are leaking or any machines or trucks accidentally breach a fuel tank or fuel line, etc.

Other heavy equipment may also be working on site. If a spill occurs and there is a backhoe and/or tracked excavation unit available, we will call upon that resource to further enhance containment such as diking, berm construction, etc.

We will recover any spilled material rapidly if any such situation would occur. We will not allow any spilled material to be left un-addressed.

Note 9: This spill containment section complies with 29 CFR 1910.120(b)(4)(ii)(J) and 1910.120(j) through (j)(9)(ii).

Emergency Response Contingency Planning

An emergency alert signal shall be identified for use to alert all personnel of an emergency. If an emergency alert signal is initiated, all personnel are to report the pre-designated muster area to be accounted for. A Personnel Accountability Reporting (PAR) system shall be used to count personnel assigned in each working group. In the event on an emergency, all personnel will be accounted for via PAR verification and communications.

At each shift change, a designated path(s) of ingress and egress, and a designated muster location(s), shall be identified and communicated to all personnel. All personnel are collectively responsible to ensure that the path(s) of ingress and egress remain passible during work activities. If a delivery vehicle (or other) starts momentum in blocking access in or out of the work area, all personnel are empowered, and expected, to communicate with applicable people to not allow that to happen.

This emergency planning is intended to be in harmony with emergency planning and contingency measures that the Unified Command Group may also have established.

This emergency contingency section of this HASP may be subject to a “mock emergency drill” to exercise this plan and the CHLOREP Team readiness at the discretion of the Safety Officer.

The following table provides key emergency response planning information for easy reference in the event of an emergency:

Planning Item	Detail	Phone Number or Other
Alert Signal		
Ingress & Egress Path		
Accountability Muster Location		
Fire, Rescue, or Hazmat Release Emergency		
Police or Security Emergency		
Medical Emergency		
Rapid Intervention Team		
Nearest Hospital		
Driving Directions to Nearest Hospital:		

Note 10: This emergency contingency section complies with 29 CFR 1910.120(b)(4)(ii)(H) and 1910.120(l)(3) through (l)(3)(vii).

Site Security

Site security responsibility is that of the Unified Command Group. The CHLOREP Team's operations will include the following security measures:

Background investigations shall be conducted on all CHLOREP members and ensure no criminal history exists.

Background investigations on subcontractor employees may be done on a case by case basis.

During service events, no CHLOREP or subcontractor employee shall work alone.

During off work hours, equipment will be secured and locked. Whenever possible, good lighting will compliment equipment staging areas.

Whenever vulnerability and/or threat assessment suggests elevated risk, the responsible party will be asked to provide 24-hour on site security support for the project.

Modifications to this Site-Specific Health and Safety Plan (HASP)

Nothing in this work plan is to be interpreted as an absolute. This safety plan provides the framework for working at this site safely. It is to be considered as a "living document" and can be edited as site conditions, circumstances, or work objectives may change.

Actual site conditions encountered may justify modifications to any one or more of the key elements of this plan to safely address field conditions encountered. If/when any such a situation would occur, the following process must be followed prior to initiating the modification:

1. The CHLOREP Team Leader must approve the modification; and
2. Updated Job Safety Briefings must be communicated with all personnel to share the update(s).

Appendix A

Incident Action and Work Plan

Incident Action and Work Plan

Incident Date:	
Incident Location:	
Incident Description:	
Responsible Party:	
Prepared by:	
Date of Plan Preparation:	
Latest Revision Date:	

Note 1: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 2: The above table of information also complies with 29 CFR 1910.120(b)3 and 1910.120(b)(4)(ii).

Introduction & Purpose

This document is a safe work plan that outlines essential elements of the work necessary to safely terminate this emergency response incident. Its purpose is to identify the CHLOREP Team response objective(s), the tasks required to meet the objective(s), and outline any logistical support and resources needed.

Background/Available Information (Assessment of Conditions Presumed)

Chemical(s) Involved:	
Container Type(s):	
Number of Containers:	
Condition of Container(s):	
Topography (general description of site):	
Estimated Temperature (Day High/Night Low):	
Forecasted Weather:	
Wind Direction Forecasted:	

Note 3: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 4: The above table of information also complies with 29 CFR 1910.120(l)(3)(i)(A).

CHLOREP Team Response Objective(s)

Prioritized Objectives	Define Objectives	Note(s)
1		
2		
3		
4		

Note 5: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 6: The above table of information also complies with 29 CFR 1910.120(b)(3)(ii).

Tasks & Resources Needed to Meet Objectives

Objective(s) & Task(s)	Personnel	Resources

Note 7: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 8: The above table of information also complies with 29 CFR 1910.120(b)(3)(i), 1910.120(b)(3)(ii), and 1920.120(b)(3)(iii).

Acknowledgement of Prerequisites

All CHLOREP Team members working at this response participate in a Medical Surveillance Program, and their respective physicians have deemed them “fit for duty” *as required by 29 CFR 1910.120(b)(4)(ii)(D) and 1910.120(f)(1) through 1910.120(f)(8).*

All CHLOREP Team Members working at this response have been trained, and their respective employer has qualified them to perform the tasks and functions assigned *as required by 29 CFR 1910.120(b)(4)(ii)(B) and 1910.120(e)(2) through 1910.120(e)(9).*

Other Documentation Incorporated by Reference:

Document Description	Applicability/Comment(s)

Note 9: The above table of information complies with NIMS Incident Action Planning Guidance.

Note 10: The above table of information also complies with 29 CFR 1910.120(b)(3)(v).

Communications

Pre-job safety briefings are an important element to ensuring safe performance. The CHLOREP Team shall conduct, at a minimum, a pre-job safety briefing at each shift change prior to beginning work. The CHLOREP Team shall also conduct a pre-job safety briefing if/when there is a change in the scope of work.

Hand signals may be utilized to communicate with personnel working in various locations at the site. If hand signals are utilized, the following table summarizes some common hand signals that all personnel should be aware of and understand:

Hand Signal	Message - Meaning
Hand(s) Gripping Throat	Out of Air or Cannot Breathe
Grip Partner's Wrist or Waist with Both Hands	Exit Area Immediately
Hands/Arms Raised Over Head	Need Immediate Assistance
Thumbs Up	Okay or Yes

Thumbs Down	Not Okay or No
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Two-way radios may be utilized to communicate with personnel working in various locations at the site. If two-way radios are to be utilized, the following table summarizes radio channel assignments and estimated maximum range of signal service:

2-way radios for use	Operational Group	Channel Assigned

Telephone communications should also be established. The following table provides key telephone numbers associated with CHLOREP Team response operations:

Contact	Organization	Phone Number

This Plan shall be provided to the Unified Command Group for review and operational approval.

Modifications to this Incident Action and Work Plan

Nothing in this work plan is to be interpreted as an absolute. This work plan is the framework for approaching this project in a safe and methodical manner.

Actual site conditions encountered may justify modifications to any one or more of the key elements of this plan to safely address field conditions encountered. If/when any such a situation would occur, the following process must be followed prior to initiating the modification:

1. The CHLOREP Team Leader must approve the modification; and
2. The Unified Command Group must approve the modification.

Preparation and Parties to this Incident Action and Work Plan

This work plan has been prepared by the CHLOREP Team on behalf of _____, and the Unified Command Group with respect to the safe handling of derailed chlorine tank cars.

Upon Unified Command Group approval of this plan, each of these parties is prepared to initiate work within the framework of this plan.

ATTACHMENT C – EIGHT STEP INCIDENT MANAGEMENT PROCEDURE®

The following is a summary of the Eight Step Incident Management Procedure[®], developed by Hildebrand and Noll Associates, Inc, for on-scene emergency response operations.

- 1) Site Management and Control
- 2) Identify the Problem
- 3) Evaluate the Hazards and Risks
- 4) Select the Proper Level of Personal Protective Clothing
- 5) Information Management and Resource Coordination
- 6) Implement Response Objectives
- 7) Decontamination and Clean-up Operations
- 8) Terminate the Emergency

Full details of this procedure can be found in the book titled “Hazardous Materials: Managing the Incident” by Gregory N. Noll and Michael S. Hildebrand, with contributions by Glen Rudner and Rob Schnepp. The fourth edition of this book was available at the time of approval of the CHLOREP Handbook Edition 8 (November 2023).

APPENDIX IV – RESPONDING TO ORPHANED CHLORINE CONTAINERS

CHLOREP Team Responsibilities & Expectations

All CHLOREP activation calls in the U.S. are typically initiated through CHEMTREC. Calls involving chlorine containers may also go through CANUTEC in Canada or SETIQ in Mexico. Occasionally, a call will come into CI staff when it involves a non-leaking container and staff will contact the appropriate CHLOREP Team to assist. If a CHLOREP Team receives a call from CHEMTREC or CI staff involving an orphaned chlorine cylinder or ton container, leaking or not, they should handle it like any other chlorine emergency call. It is critical for a CHLOREP Team to ensure that the person(s) who may answer the initial call from CHEMTREC is properly trained on CHLOREP activation, including the various types of calls that may come in, how to respond to the CHEMTREC dispatcher or other source of the call, and immediately forwarding the information to the appropriate CHLOREP contact at their site.

Initial Call to Emergency

It is critical that the CHLOREP Team Leader (or designated person) immediately calls the on-site contact (and identifies him/herself) to ensure the container has been properly identified and is being handled safely. If a non-leaking container is not safely handled, it could quickly turn into a much-worse scenario with leaking chlorine. The following are considerations when the CHLOREP Team calls the on-site contact:

- Verify the container is one that does or did contain chlorine, by using any of the following:
 - Type of container is a 150-lb cylinder or one-ton container
 - Type of valve(s) installed; or
 - “CHLORINE” or “UN 1017” marking is identifiable on the container.
- Verify the condition of the container, including whether it is leaking.
- Identify the owner or distributor/supplier of the container from the markings, typically around the neck ring, as a stencil on the side of the container, or tag attached (if legible).
- Advise the personnel on-site to not open the valve(s) and only move the container if it is an imminent threat to people and can be moved safely.
- Insist the on-site contact sends pictures of the container (especially if the container is not leaking) to assist in ascertaining identification markings, the condition of the container and needed response.

Actions to Consider

Based on the information provided, the CHLOREP Team should consider the below actions. See the attachment to this appendix for examples of calls involving orphaned chlorine containers and how they were handled.

If the chlorine container is leaking:

- Mitigate the leak:
 - The CHLOREP Team should immediately dispatch to the site to mitigate the leak. If the CHLOREP Team feels on-site personnel are capable of mitigating the leak themselves, the Team Leader can simply provide assistance over the phone, as needed.
 - Similar to other typical activation calls, the Primary CHLOREP Team may consider calling upon a closer Secondary CHLOREP Team (or even a CHLOREP Contractor) to provide on-site assistance. If a Secondary CHLOREP Team or CHLOREP Contractor is dispatched for the event, that party will resume responsibility for the remainder of the response.
 - Use typical troubleshooting and mitigation methods as would be used for any chlorine container leak (e.g., emergency capping kit, recovery vessel, etc.).



- If the condition of the valve(s) or container is deteriorated enough, the chlorine emergency kits may not be a viable option. Field transfer or field scrubbing may be necessary.



- The CHLOREP Team should ensure they collect all of the necessary details during the initial call to determine the equipment that will be required on-site.
- Disposal of the container:
 - Once the leak is mitigated, call the container owner or distributor/supplier to pick up the container for disposal as soon as possible.

- If a leak is no longer a threat and is located in a safe position, the CHLOREP Team may choose to leave the site and have on-site personnel await the owner's or distributor/supplier arrival.
- Note that, because the container is typically very old, the owner or distributor/supplier may no longer be in business or may have been acquired by another company that is currently in business. Some level of research may be required in this case.
- The CHLOREP Team can choose to handle disposal themselves or take the time to find the actual owner or distributor/supplier of the container. The choice is likely dependent on the amount of time it may take to identify and contact the actual owner or distributor/supplier. The CHLOREP Team is welcome to call CI staff for assistance with researching the container owner or distributor/supplier.
- If the container owner or distributor/supplier cannot be identified, the responding CHLOREP Team should transport the container off-site themselves for disposal.
- Follow transportation regulations for transporting the container and typical procedures for disposing of the chlorine and container once back at the CHLOREP Team's site.

If the chlorine container is not leaking:

- On-Site Assistance:
 - The Primary CHLOREP Team will determine if assistance is needed on-site based on the information provided to them.
 - If on-site assistance is required,
 - The CHLOREP Team should immediately dispatch to the site to retrieve the container for disposal or ensure the container is in stable condition to avoid leaks and await the owner/distributor to retrieve it.
 - Similar to other typical activation calls, the Primary CHLOREP Team may consider calling upon a closer Secondary CHLOREP Team (or even a CHLOREP Contractor) to provide on-site assistance. In most cases, for non-leaking container, the closest Secondary Team is called to assist. If a Secondary CHLOREP Team or CHLOREP Contractor is dispatched for the event, that party will resume responsibility for the remainder of the response.
 - Disposal of the container:
 - If on-site assistance is not required, advise on-site personnel to contact the container owner or distributor/supplier (if it can be identified) to pick up for disposal as soon as practical.
-

- If the owner or distributor/supplier cannot be identified, the CHLOREP Team should dispatch to the site to pick up the container for disposal. Follow transportation regulations for transporting the container and typical procedures for disposing of the chlorine and container once back at the CHLOREP Team's site.
 - Note that, because the container is typically very old, the owner or distributor/supplier may no longer be in business or may have been acquired by another company that is currently in business. Some level of research may be required in this case. The CHLOREP Team can choose to assist on-site personnel in researching the owner or dispatch to the site to handle disposal themselves. The choice is likely dependent on the amount of time it may take to identify and contact the actual owner. The CHLOREP Team is welcome to call CI staff for assistance with researching the container owner.
-

APPENDIX IV - ATTACHMENT

Example #1 - Farm



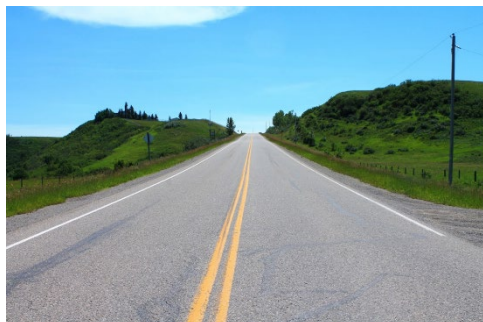
A chicken farm called CHEMTREC about an old cylinder it found leaking with a corroded valve. The farmer did a leak check with ammonia solution, which resulted in white vapors. He did not know where the cylinder came from and requested assistance.

The CHLOREP Team arrived at the site to assess the situation. It was suspected the cylinder was

leaking ferric chloride. Due to the condition of the cylinder and the chlorinator that was attached, the Team was unable to secure the cylinder and remove it. Because the CHLOREP Team did not have the appropriate equipment, they left and went back to the site the next day for pick up and disposal of the cylinder.



Example #2 - Roadway



A ton container rolled off of a truck into an interstate ditch. The fire chief called it in and was using ERG guidance to determine any public protective actions. The container was not leaking, so there were no injuries or exposures. A local hazmat team arrived on-site to perform any handling. The CHLOREP Team contacted the caller and no assistance by the CHLOREP Team was needed. The hazmat team placed the ton container onto the truck to move on to its destination.

Example #3 – Campground

Seven non-leaking chlorine cylinders (with some residue) were abandoned in the woods at a boy scout camp. Chlorine was identified from the cylinder markings. The CHLOREP Team dispatched to the site to retrieve the cylinders for disposal. The cylinders were in good condition. Because the cylinders were dumped so far into the woods, they had to be retrieved one-by-one to a staging area where a backhoe was then used to move them further to prepare for transport.



Example #4 – Scrap Recycling Yard

A cylinder containing chlorine residue was punctured at a scrap recycling yard. It was a windy day, so the gas dissipated quickly. However, the event resulted in ten exposures, five of which were transported to the hospital (one by air). All were treated and had improved conditions. The cylinder had limited markings and the owner could not be identified. The local fire department had used a pH strip and, even though they indicated it smelled like chlorine/bleach, they were still uncertain of the product inside the cylinder. The fire department eventually called CHEMTREC after the emergency ended. CHEMTREC proceeded with notifying the Primary CHLOREP Team. By the time the CHLOREP Team contacted the fire department, assistance was no longer needed.



Example #5 – Autobody Shop



An old chlorine cylinder was found at an autobody shop and leaking through a small pinhole where the valve attaches to the cylinder. Shop personnel originally thought it contained nitrogen. A hazmat team responded and capped-off the valve. When the CHLOREP Team made contact, the hazmat team claimed the valve was intact. Once the CHLOREP team

arrived on site for retrieval, it was discovered that much of the valve components were missing, including the stem, packing, and broken fusible plug (brought certain details of the initial response into question).

