CHLOREP Handbook
Appendix III

CHLOREP Team Incident Management Guidance Document

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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 <u>on the site</u> who has responsibility for controlling the operations <u>at the site</u>.

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 levels[1]:

- **<u>Level I – Potential Emergency Conditions:</u>** 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.

  <u>Resources:</u> 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).

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

- **<u>Level II – Limited Emergency Conditions:</u>** 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.

  <u>Resources:</u> 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.

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

- **<u>Level III – Full Emergency Conditions:</u>** 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.

  <u>Resources:</u> 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

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

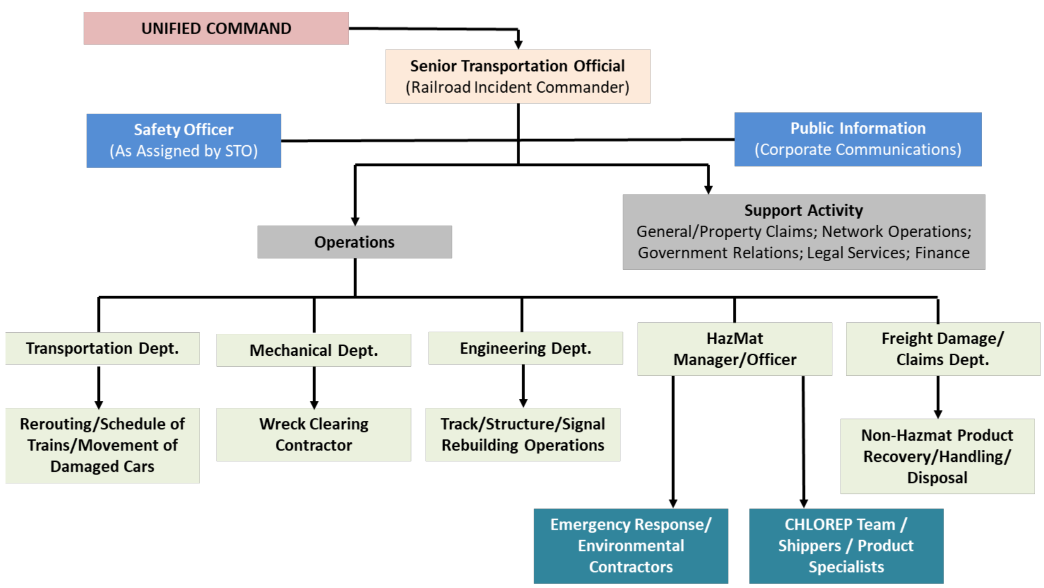
agencies, mutual aid fire, law enforcement, and EMS, state emergency management staff, state Department of Environmental Resources, state Department of Health, Environmental Protection Agency (EPA), U.S. Coast Guard, and/or Federal Emergency Management Agency (FEMA).

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 <u>maximum</u> 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 *(American Conference of Governmental Industrial Hygienists)*	Threshold Limit Value	TLV
NIOSH *(National Institute for Occupational Safety & Health)*	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 tie 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.

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 is 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.

[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.

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 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 or 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.

   <u>CAUTION:</u> 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.

   <u>DANGER:</u> 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]

[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.

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.

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**	
Pounds (net)	100% NaOH (lbs.)	Water (gal.)	100% Na_2CO_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 1st 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
Liason 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.

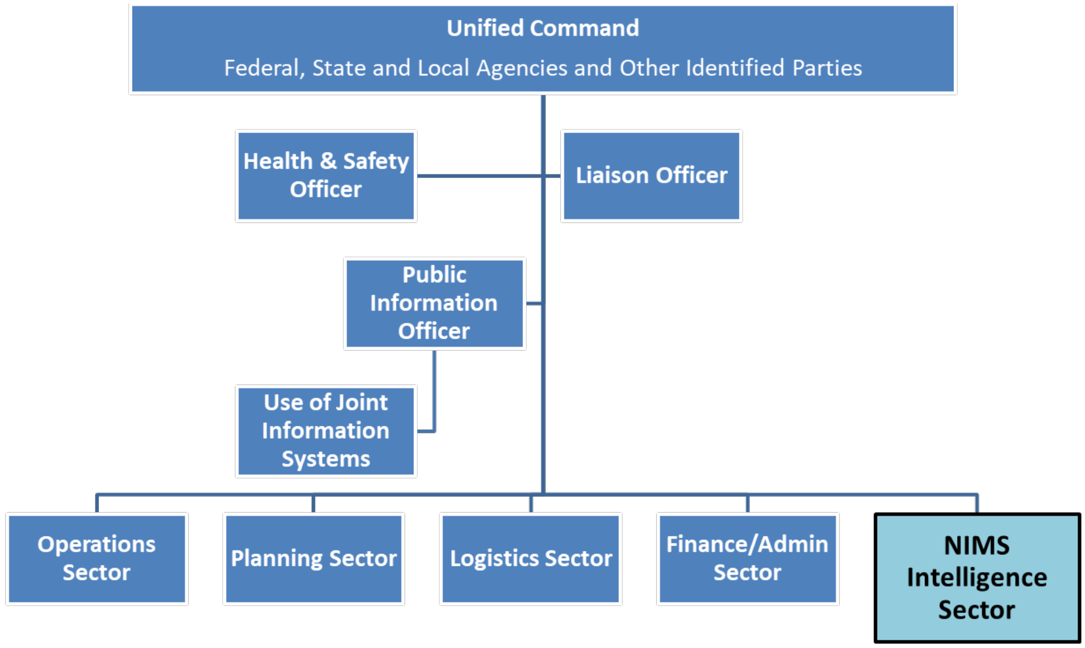


Figure 1
Typical Incident Command Structure

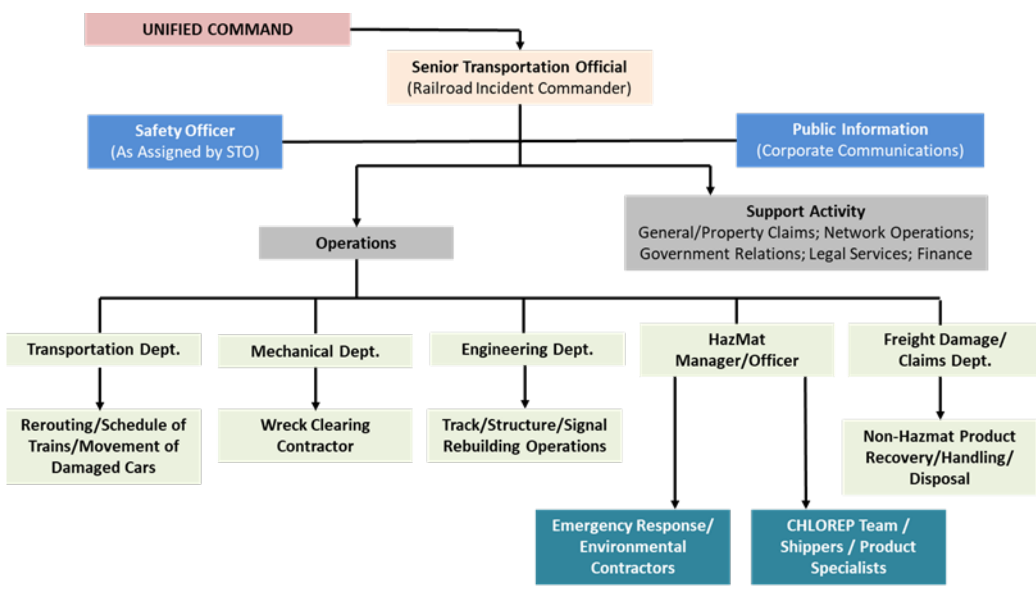


Figure 2
Typical Railroad Incident Management Structure

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	Chorine 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)
Hot Zone & Warm Zone & Cold Zone Delineation	OSHA PEL Focus on Data Interpretation and Zone Boundaries Delineation	Same as Above

Function/Mission	Focus Considerations	Type(s) of Equipment
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 (Cl_2) 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 (O_2)

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 (H_2S)

Concentration	Action Taken
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 vanes, 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 __X___

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: • 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).

Signature Page

The undersigned acknowledges that he/she has reviewed this plan, and its appendices, and agrees to work safely within the guidelines of these documents.

Personnel Names	Organization Represented	Date

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
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.

Prioritized Objectives	Define Objectives	Note(s)
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 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.	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, 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

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)	*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.
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.

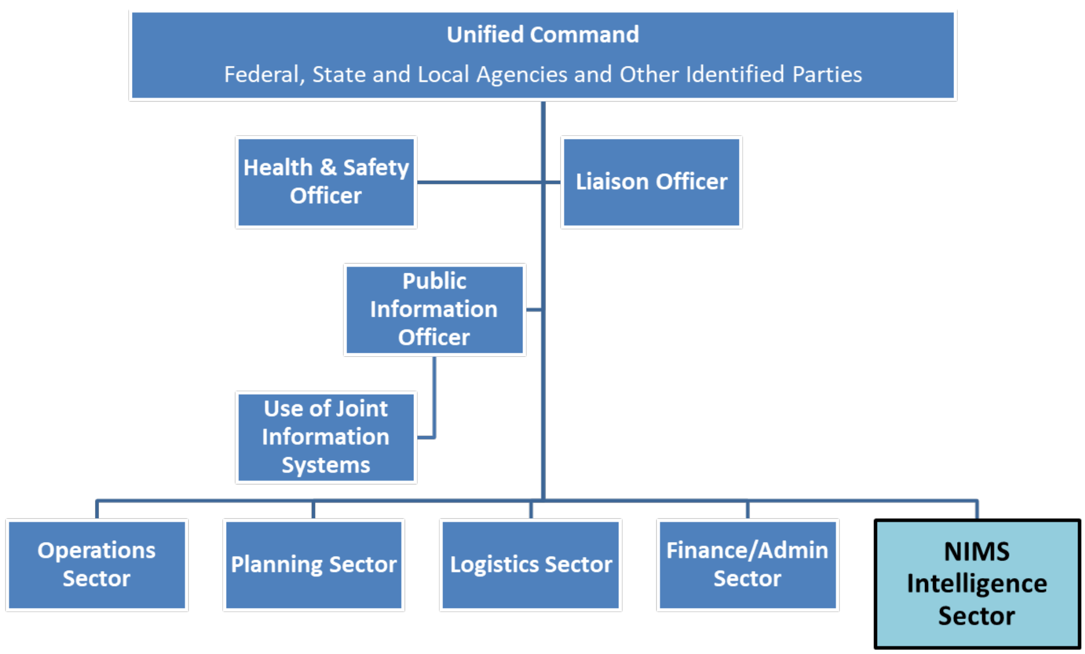


Figure 1
Typical Incident Command Structure

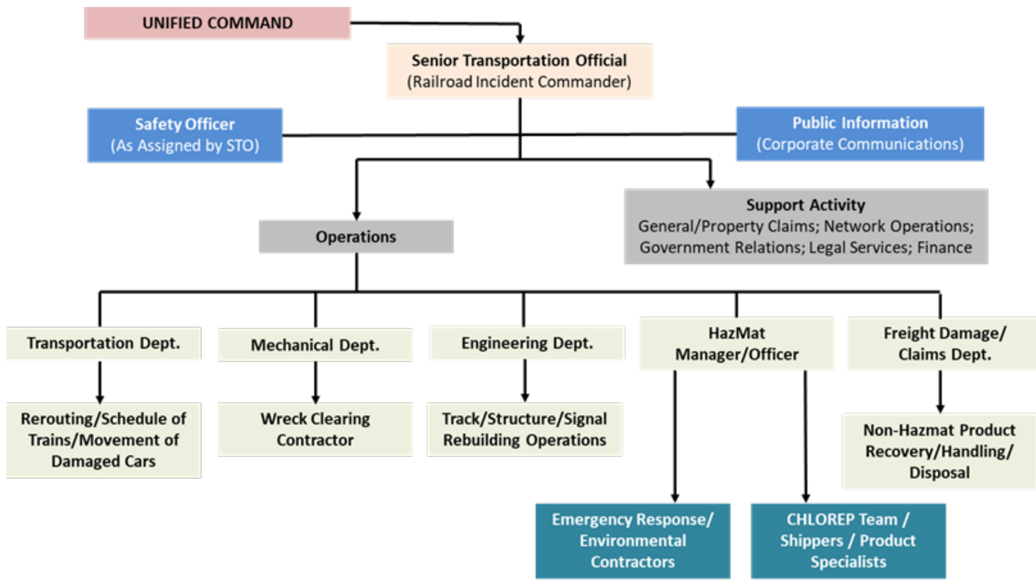


Figure 2
Typical Railroad Incident Management Structure

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 (Cl_2) 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 (O_2)

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 (H_2S)

Concentration	Action Taken
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.).

<u>Emergency Decontamination shall be considered as follows:</u>

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 vanes, 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 __X___

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).

Signature Page

The undersigned acknowledges that he/she has reviewed this plan, and its appendices, and agrees to work safely within the guidelines of these documents.

Personnel Names	Organization Represented	Date

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

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).