

Cover Sheet	Version Name: Health and Safety Plan
Incident Name: East Palestine Train Derailment 02032023	Period: Period 14 [03/31/2023 07:00 - 04/07/2023 07:00]

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Health And Safety Plan (HASP)

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East Palestine Train Derailment Site
 Unified Command Group
 Health & Safety Plan
 v. 2.0

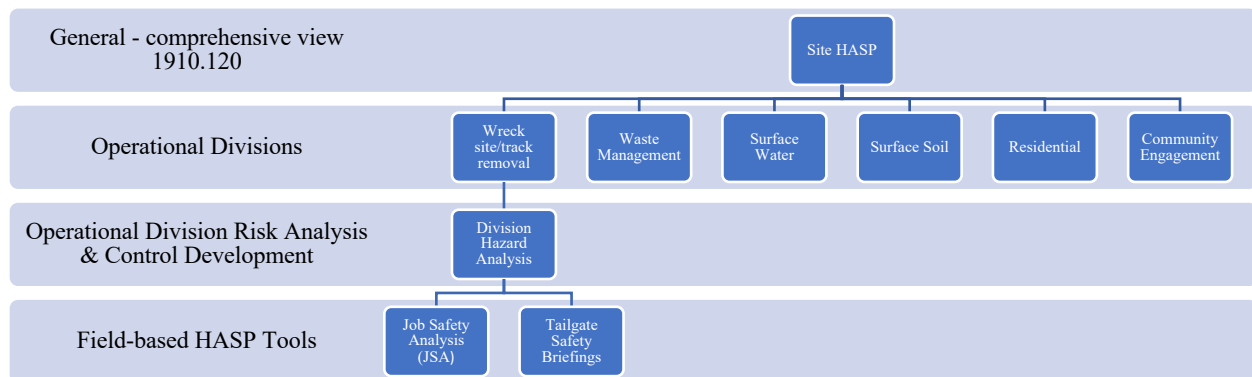
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East Palestine Derailment HASP Preamble and User’s Guide

The East Palestine Derailment site maintains a dynamic status and includes a variety of operational theatres. The purpose of this Health and Safety Plan (HASP) model is to fulfill the requirements established in the HAZWOPER standard 29 CFR 1910.120(b). Pursuant to this standard, this HASP seeks to fulfill established criteria while remaining flexible for sustainable implementation. Perhaps the greatest objective is to provide critical information for site workers to bolster individual safe work practices.

Plan Construction & Utilization Scope

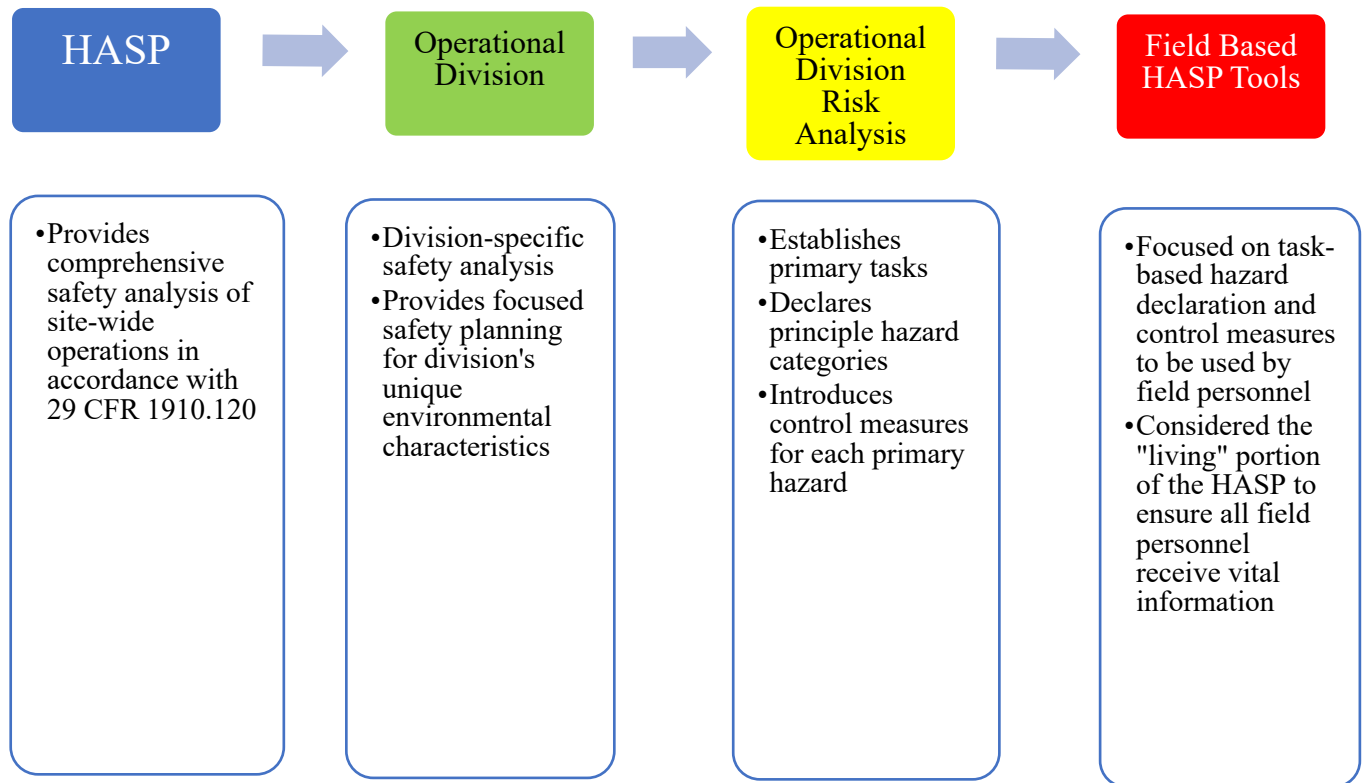
No one safety plan can fully address all hazards for all tasks on all days. However, this HASP model was constructed to drive the safety culture to optimize Job Safety Analysis (JSA) and tailgate briefings to ensure that the conveyance of planning-level hazard awareness is driven into the field where it is most necessary. This HASP is built upon 4 levels, specifically: 1) Comprehensive Site HASP; 2) Divisional HASP; 3) Operational Risk Analysis; and, 4) Frontline safety tools and documentation. This user’s guide was prepared to facilitate proper use and consistent utilization across all working theatres. The following diagram outlines the plan’s components.



The site HASP was written to comprehensively address site-wide hazards ranging from industrial wreck site operations to work activity with socio-environmental hazards. This plan relies on the Operational Division HASP to further address operation-specific hazards and controls specific to the eight respective environments and workforce dynamics. For each Operational Division, an Operational Risk Analysis is conducted to focus on high-consequence risk based on the operational tactics. The Operational Risk Analysis is a focused step to address the hazards more in-depth and establish control measures that may not be necessary in other operational divisions. Lastly, the field-based HASP tools represent the “living” portion of the plan wherein day-to-day changes are captured and communicated to site workers performing the work.

HASP Progression to Field Activity

The following diagram illustrates the progression from the site-wide HASP down through each planning function ultimately yielding functional safety planning tools for regular consumption by the workforce at large.



Implementation

All personnel should review and be aware of the site-wide HASP (Blue Plan) to gain a full understanding of the site's hazard profile and exposure control provisions. Once the full plan has been reviewed and understood, the Operational Division HASP (Green Plan) will serve as each division's platform to bolt on additional hazards and safety controls not addressed in the Blue Plan based on the dynamic nature of the operational periods and new tactics. The Operational Risk Analysis is intended to be completed initially to provide a more rigorous review of high-consequence hazards along with the benefit of prescriptive controls. Lastly, the content derived from the Green Plan and Operational Risk Analysis should serve as the basis for JSA and tailgate briefing content. The JSA and tailgate briefings will bear the responsibility of in-field additions to the overall HASP, where document retention will capture nuance safety matters and the controls employed.

Health and Safety Plan (HASP)

Project: East Palestine Train Derailment Site

Location: East Palestine, OH

Date Prepared: 3-20-2023

Version: 2.0

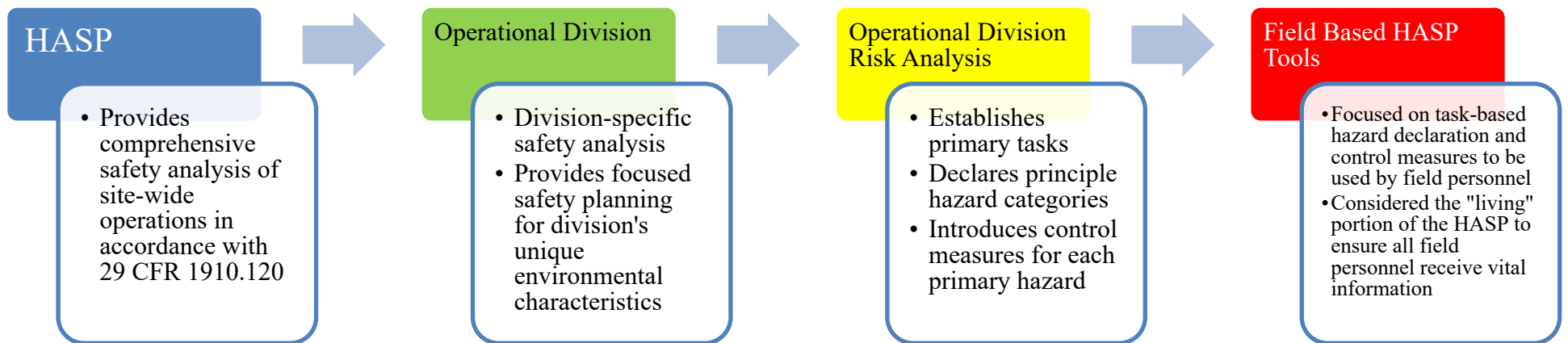
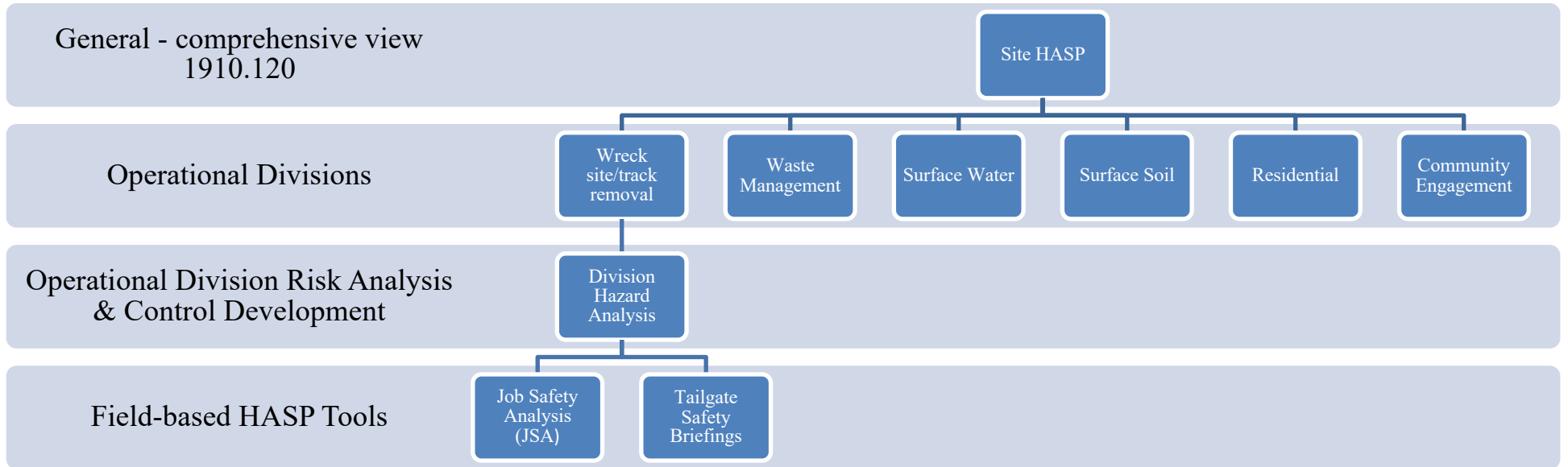
Operational Period: 24 hours

Work Zone: General Site

For Emergencies Contact: Site EMT and/or 911

Scope: This Operations Safety Plan outlines the safety strategy and safe work practices to be implemented, maintained, and updated in order to accomplish response objectives as determined for each operational period. This Plan will focus on a hierarchy of controls based on Task Specific work operations involved.

1 Plan Organization and Scope



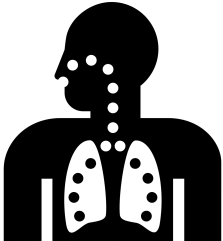



2 Site Characterization & Hazards Overview

Major Operational Divisions:		Description and Location Where Operation(s) to be Performed		
1. Wreck site/Track Removal	Primary location: Affected track from Pleasant St. and eastward to derailment area			
2. Waste Management	Soil staging on-site adjacent to track. Liquids storage at various frac-tank staging areas			
3. Surface Water	Various watersheds beginning with those within and adjacent to track area and downstream			
4. Surface Soil	Soil determined to be impacted by derailment contamination. Locals adjacent to wreck area			
5. Residential	Residences adjacent to track of interest for assessment, cleaning, outreach, etc.			
6. Community Engagement	Efforts associated with community outreach. Located at the EPA Welcome Center and various community meetings/townhalls			
Site Infrastructure	Roadways:	E Taggart Street, N Pleasant Drive, S Pleasant Drive		
	Waterways:	Topographical drainage, creeks,	Facility Equipment:	Passing trains, tractor trailers (adj businesses)
	Railways:	Norfolk Southern – Track 1 (south) & Track 2 (north)	Heavy Machinery:	Excavator, front-end loader, dozer, crane, mini-ex, vac truck, railway maintenance equipment
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility
	Operational theatres:	Unified Command (Columbiana), Incident command (E. Palestine), Frac-tank staging, equipment staging, Welding Shop Field Command, Waste stockpiles		

Chemical Hazards

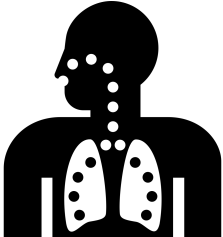



Chemical	Source	Exposure Potential	Estimated Volume
n-Butyl acrylate	Damaged railcar, impacted soil, standing liquids, underground drainage pipes; Transfer equipment, wastewater storage, vac trucks	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	1 Railcar, spill volume unknown
Vinyl chloride	Derailed railcars, vent & burn consumed a large portion of material; Impacted soil & waterways; Leaks may occur through car manipulations during wrecking	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	5 Railcars, spill volume unknown
Ethylene glycol monobutyl ether (2-butoxy ethanol)	Damaged railcar, impacted soil, standing liquids, underground drainage pipes; Transfer equipment, wastewater storage, vac trucks	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	1 Railcar, spill volume unknown
Isobutylene	Car did not release lading. Onsite transfer	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input checked="" type="checkbox"/> Unlikely	1 Railcar, no release
2-ethylhexyl acrylate	Damaged railcar, impacted soil, standing liquids, underground drainage pipes	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	1 Railcar, spill volume unknown

Toxicology Information¹: Butyl acrylate

Exposure Route	Exposure	Possible Symptoms /Health Effects of Exposure	How to Avoid
	Low Concentration (< 2 ppm)	Odor threshold of 0.05 ppb (ERPG); odor classified as sharp, fragrant odor.	Remain upwind, avoid prolonged exposure using respiratory protection
	Moderate (2 – 25 ppm)	ACGIH TLV-TWA of 2 ppm; Irritation of the URT, drowsiness, headache, and nausea	Full-faced Air Purifying Respirator (APR)
	High (> 25 ppm)	IDLH: ND (NIOSH 2016); ERPG-2 of 25 ppm; Drowsiness, headache, nausea; Liver damage; Marked irritation, salivation, conjunctive irritation; pulmonary edema	Full-faced APR, SCBA for concentrations >100 ppm.
	Liquid contact	Repeated contact of the skin may cause skin sensitization in some individuals, with redness, swelling, itching, and oozing of the affected areas.	Chemical-resistant protective suit. Handle liquids with care, full decontamination of CPC
	Dermal vapor exposure	Dermal sensitizer; Irritation, redness, and cracking of the skin	Avoid working in atmospheres containing moderate to high concentrations without chemical protective clothing.
	Irritation from vapor	Irritation, mild discomfort, and redness	Full-face Respiratory protection
	Liquid contact	May cause pain disproportionate to the level of irritation to the eye tissues; slight eye irritation, slight corneal injury	Full-face Respiratory protection
	Ingestion of liquid	Collapse, severe respiratory difficulties, and CNS stimulation.	Good workplace hygiene, Handle liquids with care, proper decontamination of protective clothing

¹ Agency for Toxic Substances and Disease Registry (ATSDR), NIOSH Pocket Guide, ACGIH TLVs, & Emergency Response Planning Guidelines (ERPGs)

Toxicology Information²: Vinyl chloride

Exposure Route	Dose	Possible Symptoms /Health Effects of Exposure	How to Avoid
	Low (< 1 ppm)	No apparent observable effects or symptoms	
	Moderate (1 – 1200 ppm)	Acute effects may not be perceptible in this concentration range. OSHA PEL Ceiling of 5 ppm; Chronic exposure is linked to “vinyl chloride illness”, which includes Raynaud’s Syndrome and acroosteolysis. The toxic effect of greatest concern is cancer of the liver, which is largely the result of chronic exposure. TLV A1 confirmed human carcinogen.	Supplied Air Respirator (SAR)
	High (>1200 ppm)	PAC-2 of 1200 ppm; Odor threshold observed at 3000 ppm; anesthesia, drowsiness, slight visual disturbances, faltering gait, numbness and tingling of extremities. CNS depression and death from high concentrations. Exposure to 4000 ppm for 5 minutes, no effects; 8000 ppm for 5 minutes – dizziness; 20,000 ppm for 5 minutes- dizziness, light headedness, nausea, and dulling of vision (Rumack Poison Index 2016).	Supplied Air Respirator (SAR)
	Liquid contact	Frostbite; irritation of skin; contact dermatitis	Chemical-resistant protective suit. Handle liquids with care, full decontamination of CPC
	Dermal vapor exposure	Irritation of skin at very high concentrations	Chemical-resistant protective suit with properly taped seams.
	Irritation from vapor	Irritation	Full-face Respiratory protection
	Liquid contact	Severe chemical burns and damage to cornea, temporary blindness; Ocular irritation; conjunctivitis	Full-face Respiratory protection
	Ingestion of liquid	Severe burns and irritation to GI tract; assumed systemic toxicity after exposure to critical organs	Handle liquids with care, proper decontamination of protective clothing

² Agency for Toxic Substances and Disease Registry (ATSDR), NIOSH Pocket Guide, ACGIH TLVs, & Emergency Response Planning Guidelines (ERPGs)

Physical Hazards					
Name of Physical Hazard	Source	Exposure Potential during Task/Operation		Affected Work Group(s)	Control Measure
Burns, explosion	Flash or deflagration may occur with flammable liquids:	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Workers transferring material, workers entering containment, support personnel	LEL monitoring, hot work safety procedures, avoid excess heating of anhydride (flash point 120F)
Heavy machinery	Site equipment with pivoting tools and abundant blind spots	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Workers in excavation, wrecking, remediation, waste & liquid handling	Pedestrian awareness. Visual contact before walking near machinery. Backup alarms. Designated travel pathways.
Corrosion, tissue damage, ocular damage	Irritation associated with liquid products, or other cleaning agents used	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Workers transferring material, workers entering containment, impacted soil, transfer liquids, sampling	Chemical protective clothing (including boots & gloves), full-faced respiratory protection to protect face and eyes
Cold Stress	Cold overnight, early morning temps. Hypothermia, trench foot, and chilblains possible with wet skin	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	All workers in outdoor spaces exposed to cold temperatures and precipitation	OSHA Cold Stress Guidance. In general, proper rest, insulated layer clothing, hydration, abundant rest, proper nutrition, assessment of weather to prepare
Mechanical injury	Compromised steel structure, heavy equipment, suspended loads, mashing or blunt force trauma	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Primarily limited to workers in exclusion zone and track repair areas.	Safe distances, eye contact with operators, backup alarms, boom radius avoidance, pedestrian awareness and situational awareness. Avoid suspended loads and walking between operating machinery
Railroad collision	Pedestrians or vehicles getting struck by train due to track protection violation or crossing.	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	All site workers working near or crossing tracks in transit	Follow track protection at all times. Stop, look, listen when crossing tracks
Noise	Small engines, high rpm vehicle or equipment engines, etc.	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Workers in work area near generators, or dose in excess of 85 dBA site wide	Hearing Protection with a Noise reduction Rating of 35 dB or greater
Slips, trips, & falls	Uneven walking surfaces on ballast stone. Potential for falls into excavations prior to being barricaded or covered with fill.	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	All workers, especially entry workers walking among debris or traversing slick uneven surfaces.	Three points of contact, good travel pathway, good visible walking path; do not traverse aggressive debris.

Trenching hazards – cave in	Excavation around railcar. Workers entering to inspect railcar during soil removal. Workers entering to rig the railcar for removal.	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	All workers in excavation area	Trenching standards for safe work practices
Cuts, abrasions	Sharp metal edges, rigging, debris removal, sharps/knives	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Track workers in the presence of railcar wreckage or sharp debris. All personnel using sharps	Leather gloves for handling sharp debris. Avoid walking near wreckage or damaged structures. Long-sleeve shirts and pants capable of resisting abrasion. Safe handling practices.
Foreign objects in eyes	Airborne dust and debris, mechanically generated fine metals, un-combusted aerosols,	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	All workers	Safety glasses. Awareness of ambient dust from weather events or roadway dusts. Limit dust-generating activities without ventilation or water suppression
Electrical shock	Power chords and portable electrical equipment will be predominant sources.	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Workers near affected utilities, pumps, etc. Workers using portable generators or plugging/unplugging electrical devices	Lockout/Tagout Procedures. De-energized equipment must be confirmed before performing work with shock hazards. Caution when plugging and unplugging electrical devices. Maintenance of generators.
Vehicle/machinery hazards	Blind spots, congested work area, community air monitoring/support/logistics	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	All workers	Seatbelts. No distracted driving. Obey all municipal and state roadway laws. Maintain constant awareness while driving. Do not drive tired.
Rapid water	Fast flowing water in areas of surface water or env mgmt.	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Possible	<input type="checkbox"/> Unknown <input type="checkbox"/> Unlikely	Workers near creeks or runoff during flash floods	Avoid working near water exceeding 1.3 knots in flow velocity.

Inclimate Weather Procedures

Lightening

Please follow your employers or organizations lightening policy. At a minimum ensure a safe response to lightening within 10 miles to ensure safety of persons working outside shelter

Severe Weather

Follow local weather alerts and warnings during anticipated severe weather. Consider the following:

- Avoid isolating workers in outdoor tasks when severe weather warnings are issued
- Muster personnel to a tornado shelter when tornado warnings are issued for the work site and staging areas.
- Assign personnel to evaluate weather regularly within each work team or task group.
- Seek shelter when a severe storm is imminent regardless of the presence of tornado.

3 Site Control

Zone description	Primary Characteristics	
Exclusion Zone	<ul style="list-style-type: none"> • Mostly limited to the affected track areas, or other locations where prolonged chemical exposure is possible. • Location where chemical exposure is likely and added safety precautions are necessary to avoid exposure. • Engineering or administrative controls may be warranted. PPE greater than Level D will be determined as needed to avoid worker exposure. • Environmental monitoring should be performed until Exclusion Zone is no longer warranted based on removal. • All entrants must abide by the protective measures and PPE criteria (when required) for the specified area of work and the task-specific safety procedures assigned. 	
Contaminant Reduction Zone	<ul style="list-style-type: none"> • Perimeter boundary of Exclusion Zone, including frac tank staging areas, decontamination, and EZ entrance locations. • Purposed to reduce site contamination from migrating outside of EZ through site control and decontamination • This zone is dynamic and will change regularly based on decontamination locations and evolution of remediation. 	
Support Zone	<ul style="list-style-type: none"> • All work areas outside of CRZ. • General Site-Specific PPE will be required in the SZ. • Muster locations have been designated in the SZ, please refer to the site control map for approved muster locations located near the work site. 	
Operational Divisions:	Work Zone Description	Zone classification
1. Wreck site/Track Removal	Affected track from Pleasant St. eastward to derailment area, railcar staging on north and south of track	<input checked="" type="checkbox"/> EZ <input type="checkbox"/> CRZ <input type="checkbox"/> SZ
2. Waste Management	Primary derailment area	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
3. Surface Water	Watersheds downstream and/or outside derailment area	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
4. Surface Soil	Soil impacted areas outside derailment area	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
5. Residential	Residences adjacent to derailment area and throughout affected community	<input type="checkbox"/> EZ <input type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
6. Community Engagement	USEPA Welcome Center on E. Main Street, East Palestine High School Auditorium	<input type="checkbox"/> EZ <input type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ

Site Control Map



4 Communication Plan

Work Area:	Available Comms	Emergency Communication Procedures	
All affected areas	<input checked="" type="checkbox"/> 2-way Radios <input checked="" type="checkbox"/> Hand Signals <input checked="" type="checkbox"/> Cell phone <input checked="" type="checkbox"/> Air Horn	Emergency Signal	Short Air horn Blast: Attention all personnel 2 Horn Blast: Attention all personnel, controlled egress to SZ Long Horn Blast: Emergency evacuation
		Action	Cross-wind, then upwind to muster point
		Hand Signal	Two hands placed on top of head

5 Required Training

✓	HAZWOPER 24	Required for workers that: <ol style="list-style-type: none"> Are onsite occasionally for a specific limited task, and <ul style="list-style-type: none"> Are unlikely exposed over permissible exposure limits and published exposure limits May enter a fully characterized contaminated area, and: <ul style="list-style-type: none"> Are not at risk of exposure to site contaminants above the OSHA PELs, Will not be wearing respiratory protection
✓	HAZWOPER 40	Required for workers that: <ol style="list-style-type: none"> Are described as general site workers engaged in hazardous substance removal, and May be exposed to hazardous substances and associated health hazards In addition to the 40 hr offsite training, workers must also achieve a minimum of 3 days field experience and work under the direct supervision of a trained experienced supervisor.
✓	Current 8 Hour Refresher	Required for all site workers, must be taken annually beginning the first year after completion of initial training.
✓	HAZWOPER Supervisor	Those directly in control of responding personnel
✓	First Aid/CPR	Certified first aid/CPR providers

6 Medical Surveillance

<p>Site-Specific Requirements</p>	<p>Based on limited worker exposure to hazardous substances at or above the PELs or other published exposure limits (less than 30 days per year); limited use of respirators (less than 30 days per year); and the absence of an employee-staffed HAZMAT team, the medical surveillance program required at this site is also limited. The site medical surveillance program provides that:</p> <ol style="list-style-type: none"> 1. workers assigned to tasks requiring the use of respirators receive medical examinations in accordance with 29 CFR 1910.134€ to ensure they are physically capable to perform the work and use the equipment, 2. workers who could potentially be exposed to chemical contaminants at this site are covered by a medical protocol addressing this exposure, and 3. if a worker is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substances or health hazards, medical examinations are provided to that worker as soon as possible after the occurrence and as required by the attending physician. <p>Medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to employees free of cost, without loss of pay, and at a reasonable time and place. The need to implement a more comprehensive medical surveillance program will be re-evaluated in the event of an over-exposure incident.</p>	
<p>Site Medical Surveillance Program Scope</p>	<p>All personnel who enter contaminated areas of this site are covered by the medical surveillance program. In addition, all workers assigned to tasks requiring the use of respirators receive medical evaluations in accordance with 29 CFR 1910.134€ to ensure they are physically capable to perform the work and use the equipment.</p>	
<p>Substance-specific Medical Surveillance Requirements</p>	<p>29 CFR 1910.1017(k)</p>	<p>Applies for persons whose exposure exceeds the OSHA Action Level of 0.5 as 8-hour TWA for vinyl chloride. Exceedance will be determined based on exposure badge sampling where applicable.</p>

7 Personal Protective Equipment

General Level D PPE for site workers	CPC:	May include nitrile gloves, boot coverings	Hi-Viz Vest:	Should be worn at all times near roadways, railways or in work area parking lots
	Respiratory Protection:	Chemical-specific, will be determined as needed. Continuous air monitoring and site action levels will determine.	Boots:	Must be steel toe and heel with pierce protective soles and heels.
	Hearing Protection:	Must be worn if noise levels are above 85 dBA. Must meet ANSI S3.19-1974 Est Exp (dBA) = 85 dBA – [NRR x 50%]	Safety Glasses:	Dark shades are appropriate for full or partial sun. If cloudy conditions exist or working at night, clear safety glasses should be worn. Must meet ANSI Z87.1
	Hard Hat:	Required in work area. Not required in community or other support zone locations and beyond. Must meet ANSI Z89.1	Fall Harness:	Fall-protection harness must be worn when working at heights above 4 feet with no suitable guardrails or other fall protection provisions (29 CFR 1926.501). Must meet ANSI Z359
	Gloves:	Designated glove fabric and type will be determined if handling sampling material, leather gloves if handling sharps.	FRC Coverall:	Required if working near fire, flame, or flash hazards. Must meet NFPA 2113

Designated Levels of Personal Protection			
Ops Division:	Work Area (e.g., EZ, CRZ, other):	Job Function:	Baseline Level of Protection ¹ :
Wreck site/Track Removal	Affected site along tracks	HAZMAT, track removal, soil remediation, environmental sampling, track repair, liquids removal, infrastructure	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
Waste Management	Frac tank staging, soil piles, EZ for retrieval	Vac truck ops, transport, soil excavation, stockpile management, truck loading, environmental monitoring	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
Surface Water	Affected waterways, sulfur creek and tributaries	Environmental sampling, water treatment, light excavation, infrastructure, test well installation	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
Surface Soil	Affected soil and land adjacent to site	Environmental sampling, soil treatment, test well installation	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
Residential	At residences in affected community	Home inspections, residential cleaning, wellness checks	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
Community Engagement	USEPA Wellness Center, Townhall meetings	Community interface personnel	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>

¹ Baseline level of protection should be understood as the starting point at which the work can be completed when risk of exposure is minimal or non-existent. Upgrades in PPE to Level C should be considered if splash hazards or excessive soiling of contaminated materials exist. Upgrades in respiratory protection for vinyl chloride should only include atmosphere-supplying respiratory protection (Level C not applicable).

PPE Matrix³: Butyl acrylate

Conditions		PPE Level	Respirator		Dermal Protection	
					Suit:	Control measures first. Fire protective Level A Bunker or FRC otherwise
Release rate:	Unknown or Uncontrolled	Level A for extensive dermal contact with high conc. vapor				
Risk of sudden release:	Unknown or High					
					Suit:	Control measures first. Fire protective Level A Bunker or FRC otherwise
					Gloves:	Silver Shield ® if liquid contact is significant; NFPA gloves otherwise
Conditions		PPE Level	Respirator		Dermal Protection	
	> 2 ppm, but < 100 ppm	C	APR		Fire or Flash Risk	
Release rate:	Known and insignificant		Special Instructions:		Suit:	
Risk of sudden release:	Low				Gloves:	Level C is not recommended with significant fire risk
Skin contact w/ vapor:	Very low - intermittent		Cartridge: P100/OV		Boots:	Level C is not recommended with significant fire risk
Skin contact w/ liquid:	Indirect, no splash		Style: Full-face		Non-fire hazard	
					Suit:	
				Gloves & Boots:	Chemical – taped seams	
Conditions		PPE Level	Respirator		Dermal Protection	
	< 2 ppm	D	None required		Fire or Flash Risk	
Release rate:	None				Suit:	
Risk of sudden release:	Low				Gloves:	NFPA gloves
Skin contact w/ vapor:	No vapor contact				Boots:	NFPA
Skin contact w/ liquid:	No splash risk				Non-fire hazard	
					Suit:	

³ NIOSH Emergency Response Safety and Health Database, Dupont Safe Spec™, Wiley Quick Selection Guide, 6th edition

PPE Matrix ⁴ : Vinyl chloride						
Conditions				Dermal Protection		
Vinyl chloride	Unknown or > 10 ppm	A	SCBA	Fire or Flash Risk		
	Release rate:			Unknown or Uncontrolled	Suit:	Control measures first. If cannot control: Fire-protective Level A if liquid contact risk; Bunker gear otherwise
	Risk of sudden release:			Unknown or High	Gloves:	Fire/chemical glove if liquid contact; NFPA otherwise
	Skin contact w/ vapor:			Greatest	Boots:	NFPA /chemical resistant
	Non-fire hazard					
	Skin contact w/ liquid:			Greatest	Suit:	Chemical - encapsulating
		Gloves & Boots:	Chemical - taped at seams			
Conditions		PPE Level	Respirator	Dermal Protection		
Vinyl chloride	> 10 ppm	B	SCBA	Fire or Flash Risk		
	Release rate:			Known and controlled	Suit:	Control measures first. If cannot control: Fire-protective Level B if liquid contact risk; Bunker gear otherwise
	Risk of sudden release:			Moderate	Gloves:	Fire/chemical glove if liquid contact; NFPA otherwise
	Skin contact w/ vapor:			Moderate-low	Boots:	NFPA /chemical resistant
	Non-fire hazard					
	Skin contact w/ liquid:			Direct, splash potential	Suit:	Chemical-hooded
		Gloves & Boots:	Chemical – taped seams			
Conditions		PPE Level	Respirator	Dermal Protection		
Vinyl chloride	> 1, but < 10 ppm	C⁵	APR	Fire or Flash Risk		
	Release rate:			Known and insignificant	Suit:	Level C is not recommended with significant fire risk
	Risk of sudden release:			Low	Gloves:	Level C is not recommended with significant fire risk
	Skin contact w/ vapor:			Very low - intermittent	Boots:	Level C is not recommended with significant fire risk
	Non-fire hazard					
	Skin contact w/ liquid:			Indirect, no splash	Cartridge:	OV/AG; P100
		Style:	Full-face	Suit:	Chemical-hooded	
		USE FOR ESCAPE ONLY		Gloves & Boots:	Chemical – taped seams	
Conditions		PPE Level	Respirator	Dermal Protection		
Vinyl chloride	< 1 ppm	D	None required	Fire or Flash Risk		
	Release rate:			None	Suit:	FRC clothing
	Risk of sudden release:			Low	Gloves:	NFPA gloves
	Skin contact w/ vapor:			No vapor contact	Boots:	NFPA
	Non-fire hazard					
	Skin contact w/ liquid:			No splash risk	Suit:	Long sleeves, reflective vest, safety glasses, hardhat

⁴ NIOSH Emergency Response Safety and Health Database, Dupont Safe Spec™, Wiley Quick Selection Guide, 6th edition

⁵ NIOSH does not recommend using full-face APR for VC. OSHA does permit using full-face APR in the VC standard but limits the maximum use concentration to 10 ppm (1910.1017(f)(3)(ii)). Caution is warranted for use of APR due to the lack of supporting documentation by the three major respirator manufacturers. See APR changeout schedule on the following page.

8 Decontamination

Decontamination Procedures

Personnel (Level A, B, C) Decontamination Procedures:

Personnel decon is primarily conducted as a boot wash procedure due to the limited use of chemical protective clothing beyond footwear. For chemical suit decontamination, use the following procedure:

Station 1: Equipment Drop

Deposit equipment used on site (tools, sampling devices and monitoring instruments, radios, etc.) on plastic drop cloths. These items must be decontaminated or discarded as waste prior to removal from the exclusion zone.

Station 2: Outer Boot and Outer Garment Soap Wash

Scrub outer boots, outer gloves and/or splash suit with decontamination solution or detergent water. Rinse off using water.

Station 3: Outer Boot and Outer Garment Rinse

Rinse off using water.

Emergency Decontamination Procedures:

Render first aid first unless contamination puts responders at risk. If such contamination exists, use a high-volume flush from water sources onsite. There is a HAZMAT fire truck on site that can be used if flushing is necessary. Otherwise, first responders should don nitrile gloves when rendering first aid out of an abundance of caution.

Heavy Equipment Decontamination Procedures:

Truck, transport, and heavy machinery decontamination is located at Leake Oil Corp, on Taggart Rd. High pressure rinse is the primary method of decontamination to loosen mud and debris from the wheels and soiled portions of the vehicle.

Sampling Equipment Decontamination Procedures:

Decontamination of equipment must be performed by using portable wash tubs, sprayers, and disposable scrub brushes. Any equipment that cannot be thoroughly decontaminated along with the contents from the wash tub should be decontaminated with higher means such as high-pressure or high temperature with suitable solutions.

Decontamination Waste Disposal Procedures:

Decontamination waste must be segregated, characterized, and disposed of with similar appropriate waste streams generated by the response.

Decontamination Equipment:

Plastic sheeting

Kiddie swimming pools

Pump (hand or electric)

Decontamination solution (determined in SDS)

Location Stored On Site:

Table, chairs, and tent (if possible)

5-gallon pails and scrub brushes

Water sprayer

Sorbent materials (towels, boom, kitty litter)

9 Environmental and Personal Monitoring

AIR MONITORING SUMMARY (common site air requirements)			
Instrument Type:	Contaminant:	Frequency:	Action Level/Comments:
RAE Systems MultiRAE Pro (PID)	VOCs	As needed	Detection above 0.2 ppm requires assessment for vinyl chloride. Detection above 0.5, don respiratory protection or egress.
RAE Systems MultiRAE Pro (O ₂ sensor)	Oxygen	Confined space work	≤ 19.5% or ≥ 23.5% oxygen, evacuate area and re-evaluate
RAE Systems MultiRAE Pro (LEL sensor)	Combustible range vapors and gases, CO	Periodic	> 10% of LEL (corrected) prompts work stoppage and personnel egress
Detector Tubes	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Drager XPID	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Personal Monitoring Procedures			
Chemical Exposure:			
Assay 525 Organic Vapor Monitors (OVM) are utilized to measure workers 8-hour TWA exposure for butyl acrylate and vinyl chloride. Workers will be notified of their individual exposure per OSHA reporting criteria for personal sampling notification.			
Butyl acrylate: analysis method is conducted per modified NIOSH 2537. Vinyl chloride: analysis method is conducted per NIOSH 1007 method.			
Inclement Weather Monitoring:			
Severe weather alerts to be communicated for inclement weather; lightning stand down subject to division supervisor, stand down for 30 minutes for strikes within 10 mile radius			
Heat/Cold Stress Monitoring:			
Currently, the weather lacks extreme heat or cold temperatures. Supervisors are encouraged to monitor staff for wellness, employees are requested to report any symptoms.			
Monitoring Instrument Maintenance and Calibration Methods:			
Per manufacturer's recommendations			
Delivery of Monitoring Records:			
Keep records in a secure location			

Norfolk Southern has employed CTEH (private contractor) to provide air monitoring on behalf of site workers and the community. USEPA is also conducting environmental monitoring for worker and public health. Should you have questions or request air monitoring to support work operations, contact NS or USEPA for assistance with onsite air monitoring resources.

10 HYGIENE AND SANITATION

Personnel Hygiene and Biological Provisions

Toilets:

Portable toilets have been located throughout the work site, primarily in the affected track work zones and frac tank staging.

- All portable toilets must be maintained with a 10-person for 1-week maximum usage.
- Portable toilets should be accompanied by a hand-wash station.
- Portable toilets should be located away from break areas of food stations to reduce the potential for biological hazards.
- Where necessary, adequate facilities should be provided for both men and women's usage needs.

Hand sanitizer is located throughout office work areas. Adequate supplies should be maintained to encourage continuous use to prevent the spread of illness.

Biological Waste Removal

Portable toilet waste should be removed only by a qualified and reputable company whose contract maintains the provision of servicing on a 1-week frequency. Hand-wash stations should also be serviced and have adequate supply of soap, water, and drying towels.

11 CONFINED SPACE PROCEDURES

Written Programs

Any employer who allows employee entry into a permit space must develop and implement a written program for the space.

- Implement necessary measures to prevent unauthorized entry; Identify and evaluate permit space hazards before allowing employee entry;
- Test atmospheric conditions in the permit space before entry operations and monitor the space during entry; Perform appropriate testing for the following atmospheric hazards in this sequence: oxygen, combustible gases or vapors, and toxic gases or vapors;
- Establish and implement the means, procedures and practices to eliminate or control hazards necessary for safe permit space entry operations;
- Identify employee job duties;
- Provide and maintain, at no cost to the employee, personal protective equipment and any other equipment necessary for safe entry and require employees to use it;
- Ensure that at least one attendant is stationed outside the permit space for the duration of entry operations;
- Coordinate entry operations when employees of more than one employer are working in the permit space;
- Implement appropriate procedures for summoning rescue and emergency services, and preventing unauthorized personnel from attempting rescue;
- Establish, in writing, and implement a system for the preparation, issue, use and cancellation of entry permits;
- Review established entry operations annually and revise the permit space entry program as necessary; and
- Implement the procedures that any attendant who is required to monitor multiple spaces will follow during an emergency in one or more of those spaces.

Controlling Hazards

Means and procedures to eliminate or control hazards:

- Acceptable entry conditions: 19.5 – 22.0% oxygen, 0% LEL, no contaminant above the OSHA PEL or site action levels
- Isolate the permit space
- Provide barriers
- Verification of entry conditions using observation and properly functioning calibrated instrumentation
- Purging, inertion, flushing, or ventilation of permit space.

Equipment for Safe Entry

In addition to PPE:

- Testing, monitoring, ventilating, communications, and lighting equipment
- Barriers and shields
- Ladders and retrieval devices

Entry Permits

Entry permits must include:

- Name of permit space to be entered, authorized entrant(s), eligible attendants, and individuals authorized to be entry supervisors
- Test results of space conditions
- Name and signature who authorizes entry
- Purpose of entry and known space hazards
- Measures to be taken to isolate permit spaces and to eliminate or control space hazards
- Name and telephone numbers of rescue personnel and emergency services and means to contact them
- Date and authorized duration of entry
- Acceptable entry conditions
- Communication procedures and equipment to maintain contact during entry
- Additional permits, such as for hot work, that have been issued authorizing work in the permit space
- Special equipment and procedures, including PPE and alarm systems
- Any additional information needed to ensure employee safety

Worker Training

Before the initial work assignment, the employer must provide proper training for all workers who are required to work in permit spaces. Additional training is required when:

- Job duties change
- A change occurs in the permit space program or permit space operation presents any new hazard
- An employee's job performance shows deficiencies

Assigned Duties

Authorized entrant

- Know space hazards, including information on the means of exposure, signs of symptoms, and consequences of exposure
- Use appropriate PPE
- Maintain communication with attendants as necessary to enable them to monitor the entrant's status and alert the entrant to evacuate when necessary
- Exit from the permit space as soon as possible when:
 - Ordered by the authorized person
 - He or she recognizes the warning signs or symptoms of exposure
 - A prohibited condition exists, or
 - The alarm is activated
- Alert attendant when a prohibited condition exists or when warning signs or symptoms of exposure exist

Attendant

- Remain outside the permit space during entry operations unless relieved by another authorized attendant
- Perform non-entry rescues when specified by the rescue procedure
- Knowing existing and potential hazards
- Maintain communication with and keep an accurate account of those workers entering the permit space
- Order evacuation when:
 - A prohibited condition exists
 - A worker shows signs of physiological effects of hazard exposure
 - An emergency outside the confined space exists
 - The attendant cannot effectively and safely perform required duties
- Summon rescue and other services during and emergency
- Ensure that unauthorized people stay away from permit spaces
- Inform authorized entrants and the entry supervisor if any unauthorized person enters the permit space
- Perform no other duties that interfere with the attendant's primary duties

Entry Supervisor

- Know space hazards including information on the mode of exposure, signs or symptoms and consequences
- Verify emergency plans and specified entry conditions such as permits, tests, procedures, and equipment before allowing entry
- Terminate entry and cancel permits when entry operations are completed or if a new condition exists
- Verify that rescue services are available and that means of summoning them are operable
- Take appropriate measures to remove unauthorized entrants
- Ensure that entry operations remain consistent with the entry permit and that acceptable entry conditions are maintained

Rescue Service Personnel

- Ensure responders are capable of responding to an emergency in a timely manner, qualified to perform such services, and trained in first aid and CPR.

12 EMERGENCY RESPONSE

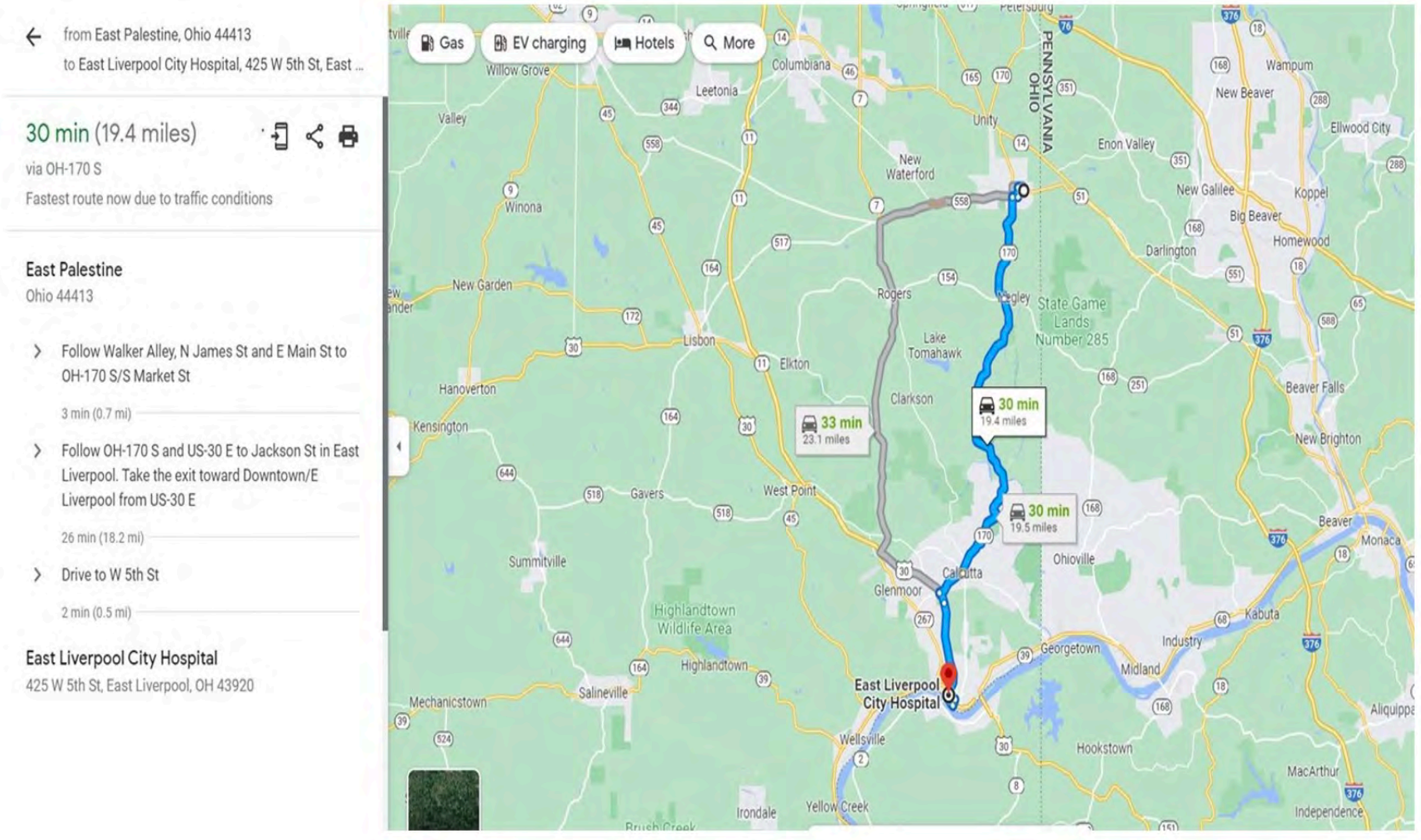
For Emergencies Contact		
Agency	Nature of Emergency	Contact Number:
On-site EMT	First aid, initial emergency care, trauma care	911
Air Evac	Emergency, life-threatening, major trauma	911
Fire	Medical, criminal, and fire emergency	Onsite resources, 911
Police	Security, crime, suspicious behavior	911, NS police: (800) 453-2530
Emergency Medical Facility Name East Liverpool City Hospital – Emergency Room		Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
Non-Emergency Medical Facility Name East Liverpool Hospital		Non-Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
First Aid Location Site vehicles		Fire Extinguisher Location Site vehicles, heavy machinery

Emergency Notification Procedures	Places of Refuge	Emergency Decon and Evacuation	Site Security Measures
<p>Notify site safety and then call 911 for paramedics. Phone and/or verbal notification for evacuation.</p> <p>Hospital: See above</p> <p>Discern whether emergency care is needed. If in doubt, proceed to emergency medical facility or contact 911.</p>	<p>Refuge locations vary, but egress must be upwind/uphill in all locations. Work crew supervisors must account for all personnel under their direction in the event of evacuation or relocation. See Refinery map section</p>	<p>Establish an area of refuge for contaminated individuals ASAP</p> <p>Establish the gross decon area using a water source such as garden hoses, engine lines or pump sprayers.</p> <p>Spray individuals with copious amounts of water to remove overt quantities of contaminants.</p>	<p>Site security being provided by local law enforcement.</p>

Automated External Defibrillator (AED) Locations:

<p>Incident Command – Centenary United Methodist Church 40 S Market St, East Palestine, OH 44413 (Located on 2nd floor, CTEH/Arcadis Room, above sink)</p>	<p>Unified Command – EPA Command Post 42083 OH-344, Columbiana, OH 44408 – (2 AED locations) EPA Command Connex / Command & General Staff Meeting (Doublewide)</p>
<p>Derailment Work Site Staging Area - CTEH Trailer 895 E Taggart St, East Palestine, OH 44413 (Located within green/white command trailer, at parking lot entrance)</p>	<p>EPA FOB – EPA START Trailer 1101 W Main St, East Palestine, OH 44413 (Located in EPA START Connex)</p>
<p>East Palestine City Park – Stored in truck with HEPACO Mgmt https://maps.app.goo.gl/oWpnnmESowRUnNAj7?g_st=ic (Staged at Park for aeration and remediation work activities; Ortenzio Chiropractic Center Parking Lot)</p>	<p>Lordstown Tank Car Loading Operation https://maps.app.goo.gl/G2LbRnhhLRK8iZMr8?g_st=ic (Staged onsite for work activities)</p>
<p>Norfolk Southern Trailer in Work Area: Location Near Leake Oil, 1000 Taggart Road, East Palestine, OH 44413 https://maps.app.goo.gl/qU1uA2biozivKGPq9?g_st=ic</p>	

East Liverpool City Hospital
425 W. 5th St,
East Liverpool, OH 43920
(330) 385-7200



HASP – Division: Derailment & Track Removal

Project: East Palestine Train Derailment Site

Location: East Palestine, OH

Date Prepared: 3-20-2023

Version: 2.0

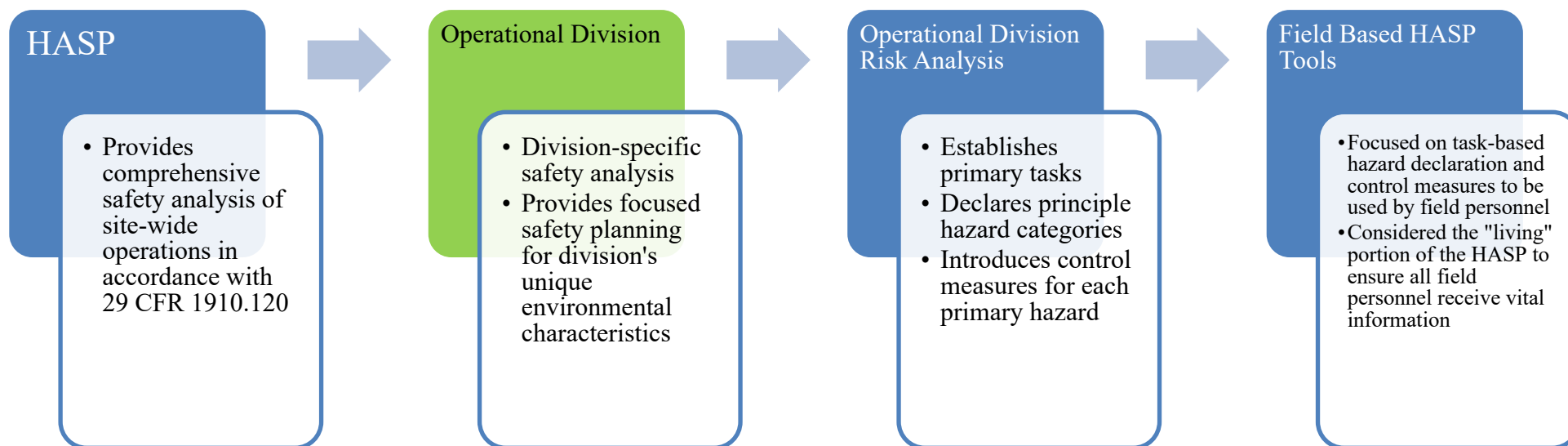
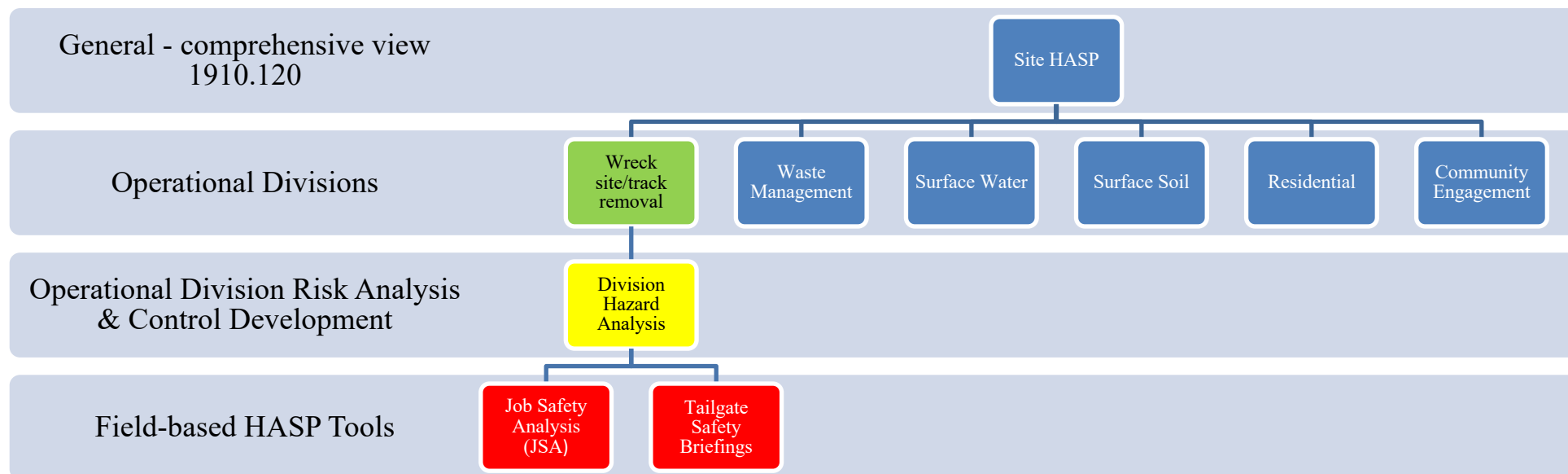
Operational Period: 24 hours

Operational Division: Derailment and Track Removal

For Emergencies Contact: Site EMT and/or 911

Scope: This condensed HASP is an operation-specific addendum to the East Palestine Train Derailment site wide HASP. The content in this addendum is not intended to be comprehensive but focused on health and safety components not specifically covered in the site-wide HASP. For more inclusive content, please refer to the sitewide HASP.

1 Plan Organization and Responsibilities



2 Site Characterization & Hazards Overview

Major Tasks:	Risk Category (GAR)	Description and Location Where Task(s)/Operation(s) to be Performed		
1. Railcar manipulations & wrecking	46	Access construction; remove, stage, or deconstruct damaged railcars		
2. HAZMAT	34	Transfer from railcar, vacuum liquids from spill, remove residue for scrap		
3. Environmental Remediation	29	Soil [removal, handling/storage], Water [run-off control, storage]		
4. Environmental Science	28	Industrial hygiene, public health, environmental (soil/water) impact		
5. Railway Track Maintenance	31	Railway workers removing track, and tasked with restoring track after excavation		
Site Information	Roadways:	E Taggart Street, N Pleasant Drive, S Pleasant Drive		
	Waterways:	Topographical drainage, creeks,	Facility Equipment:	Passing trains, tractor trailers (adj businesses)
	Railways:	NS	Heavy Machinery:	Excavator, front-end loader, dozer, crane, mini-ex, vac truck, railway maintenance equipment
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention Needed	Correction Needed	Discontinue/ Stop

Additional Chemical Hazards

Added chemical	Anticipated source or product utilization description	Exposure Potential	Estimated Volume
Acronal	Used to break down butyl acrylate, topically applied to soil when air monitoring determines above action level during work activity	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	250-gallon tote
Reason for deviation from HASP	This material was added as a control measure to reduce airborne exposure from impacted soil, also to reduce odor	Expected Interaction	
		<input checked="" type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Once	

Additional Physical Hazards

Added Hazard	Source of Hazard	Exposure Potential	Affected Workers
Grinding/metal work	Welding and grinding for track installation	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Railway workers and support contractors
Reason for deviation from HASP	Welding not covered in Blue Plan	Expected Interaction	
		<input type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Once	

3 Site Control

Zone description	Standard Operating Procedures	
Exclusion Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the EZ access locations. • This area is off limits to non-authorized, or non-essential personnel during the response and mitigation operations. • All entrants must abide by the protective measures and PPE criteria (when required) for the specified area of work and the task-specific safety procedures assigned. 	
Contaminant Reduction Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the approved site entry locations. • This area will include work activity conducted to support EZ operations. This area also includes decontamination locations. • This area is off limits to non-authorized, or non-essential personnel during response and mitigation operations. 	
Support Zone	<ul style="list-style-type: none"> • Access will be provided through approved site access locations, maintained by badge check-in and checkout. • General Site-Specific PPE will be required in the SZ. • Muster locations have been designated in the SZ, please refer to the site control map for approved muster locations located near the work site. 	
Job Tasks:	Work Zone Description	Zone classification
1. Railcar manipulations & wrecking	Primary derailment area, railcar staging on north track	<input checked="" type="checkbox"/> EZ <input type="checkbox"/> CRZ <input type="checkbox"/> SZ
2. HAZMAT	Primary derailment area	<input checked="" type="checkbox"/> EZ <input type="checkbox"/> CRZ <input type="checkbox"/> SZ
3. Environmental Remediation	Impacted track lanes, soil staging area, liquid management areas	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
4. Environmental Monitoring	Throughout derailment and track restoration work area	<input checked="" type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input type="checkbox"/> SZ
5. Railway Track Maintenance	North and south track extents for excavation and track replacement	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input type="checkbox"/> SZ

Site Control Map



4 Communication Plan

Work Area:	Available Comms	Emergency Communication Procedures	
Derailment & Track Removal	<input checked="" type="checkbox"/> 2-way Radios <input checked="" type="checkbox"/> Hand Signals <input checked="" type="checkbox"/> Cell phone <input checked="" type="checkbox"/> Air Horn	Emergency Signal	Short Air horn Blast: Attention all personnel 2 Horn Blast: Attention all personnel, controlled egress to SZ Long Horn Blast: Emergency evacuation
		Action	Crosswind, then upwind to muster point
		Hand Signal	Two hands placed on top of head

5 Personal Protective Equipment

Designated Levels of Personal Protection

Task:	Work Area (e.g., EZ, CRZ, other):	Job Function:	Level of Protection:			
1. Railcar manipulations & wrecking	EZ, CRZ	Removal of damaged railcars, staging, loading for transport	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>
2. HAZMAT	EZ, CRZ	Control of railcar lading, transfer, mitigation of known uncontrolled sources	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>
3. Environmental Remediation	CRZ, SZ	Removal of impacted soils and liquids. Maintenance of liquids storage, transport. Stockpile of waste soil	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>
4. Environmental Science	EZ, CRZ, SZ	Ambient air monitoring, worker exposure, soil & water testing	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>
5. Railway Track Maintenance	CRZ, SZ	Removal of panels, replenishment of track bed material, grading, track installation	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>

6 Decontamination

Decontamination Procedures	
Personnel (Level A, B, C) Decontamination Procedures:	
Decontamination of personnel is largely focused on boot wash to prevent contamination migration outside of EZ:	
<u>Station 1: Boot Wash/Scrub</u> Using available boot wash stations, remove heavy soils and mud with soap and brush.	
<u>Station 2: Rinse</u> Using secondary decon pool, rinse boots free of remaining soils and soap.	
Emergency Decontamination Procedures:	
If exposure occurs, use the least aggressive but affective means to decon personnel before rendering first aid. If life saving means are necessary, dismiss decontamination unless a greater hazard is posed to the attending first aid personnel. First aid personnel should use nitrile gloves or conduct localized decontamination to assess injured persons.	

7 Environmental and Personal Monitoring

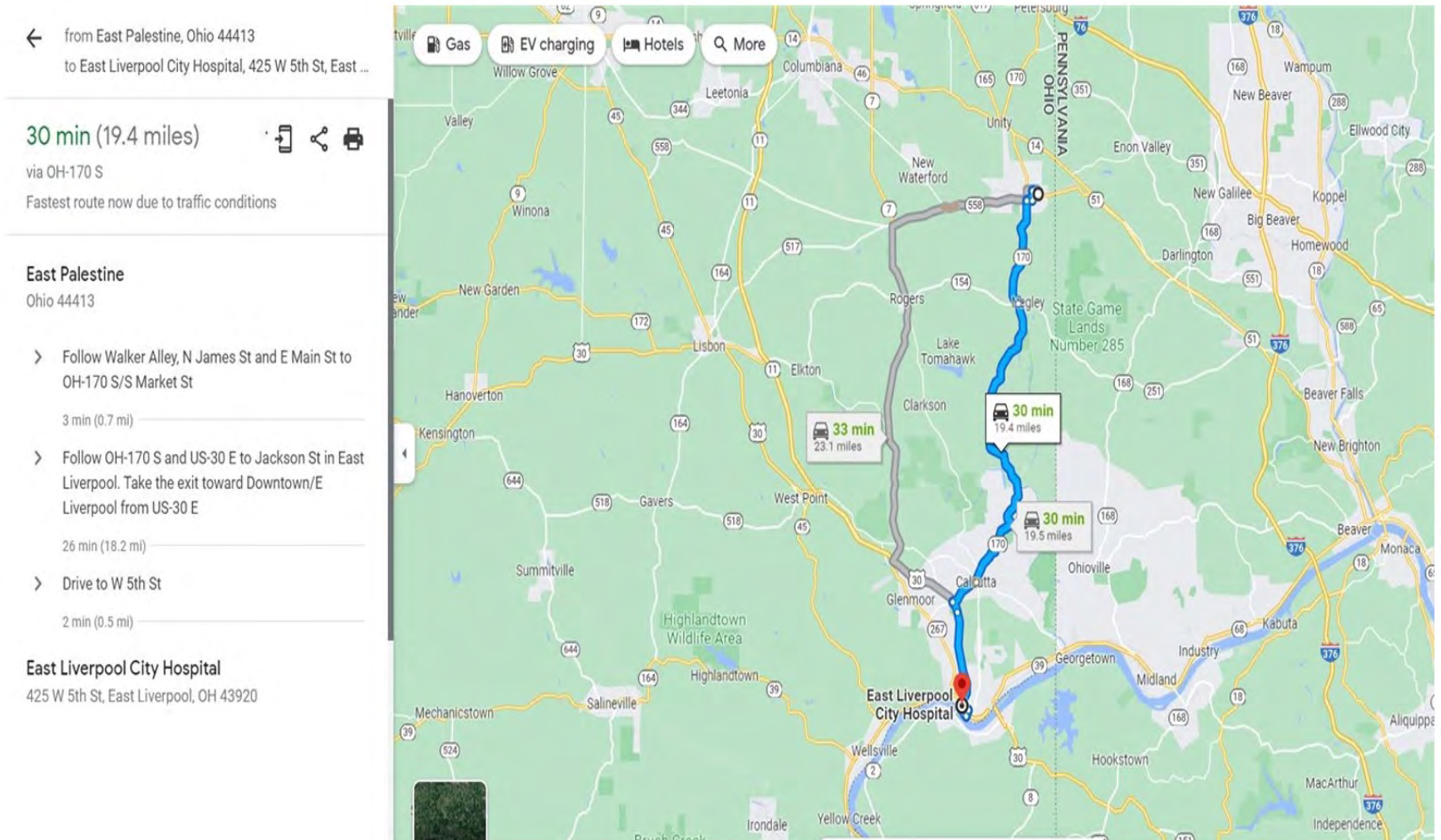
AIR MONITORING SUMMARY			
Instrument Type:	Contaminant:	Frequency:	Action Level/Comments:
RAE Systems MultiRAE Pro (PID)	VOCs	As needed	Detection above 0.2 ppm requires assessment for vinyl chloride. Detection above 0.5, don respiratory protection or egress.
RAE Systems MultiRAE Pro (O ₂ sensor)	Oxygen	Confined space work	≤ 19.5% or ≥ 23.5% oxygen, evacuate area and re-evaluate
RAE Systems MultiRAE Pro (LEL sensor)	Combustible range vapors and gases, CO	Periodic	> 10% of LEL (corrected) prompts work stoppage and personnel egress
Detector Tubes	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Drager XPID	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Personal Monitoring Procedures			
Chemical Exposure:			
Assay 525 Organic Vapor Monitors (OVM) are utilized to measure workers 8-hour TWA exposure for butyl acrylate and vinyl chloride. Workers will be notified of their individual exposure per OSHA reporting criteria for personal sampling notification.			
Butyl acrylate: analysis method is conducted per modified NIOSH 2537.			
Vinyl chloride: analysis method is conducted per NIOSH 1007 method.			

8 EMERGENCY RESPONSE (AED Locations, See Blue Plan)

Agency	Nature of Emergency	Contact Number:
On-site EMT	First aid, initial emergency care, trauma care	911
Air Evac	Emergency, life-threatening, major trauma	911
Fire	Medical, criminal, and fire emergency	Onsite resources, 911
Police	Security, crime, suspicious behavior	911, NS police: (800) 453-2530
Emergency Medical Facility Name East Liverpool City Hospital – Emergency Room		Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
Non-Emergency Medical Facility Name East Liverpool Hospital		Non-Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
First Aid Location Site vehicles	Fire Extinguisher Location Site vehicles, heavy machinery	

Emergency Notification Procedures	Places of Refuge	Emergency Decon and Evacuation	Site Security Measures
<p>Notify site safety and then call 911 for paramedics. Phone and/or verbal notification for evacuation.</p> <p>Hospital: See above</p> <p>Discern whether emergency care is needed. If in doubt, proceed to emergency medical facility or contact 911.</p>	<p>Refuge locations vary, but egress must be upwind/uphill in all locations. Work crew supervisors must account for all personnel under their direction in the event of evacuation or relocation. See Refinery map section</p>	<p>Establish an area of refuge for contaminated individuals ASAP</p> <p>Establish the gross decon area using a water source such as garden hoses, engine lines or pump sprayers.</p> <p>Spray individuals with copious amounts of water to remove overt quantities of contaminants.</p>	<p>Site security being provided by local law enforcement.</p>

East Liverpool City Hospital
425 W. 5th St,
East Liverpool, OH 43920
(330) 385-7200



HASP – Division: Waste Management

Project: East Palestine Train Derailment Site

Location: East Palestine, OH

Date Prepared: 3-23-2023

Version: 2.0

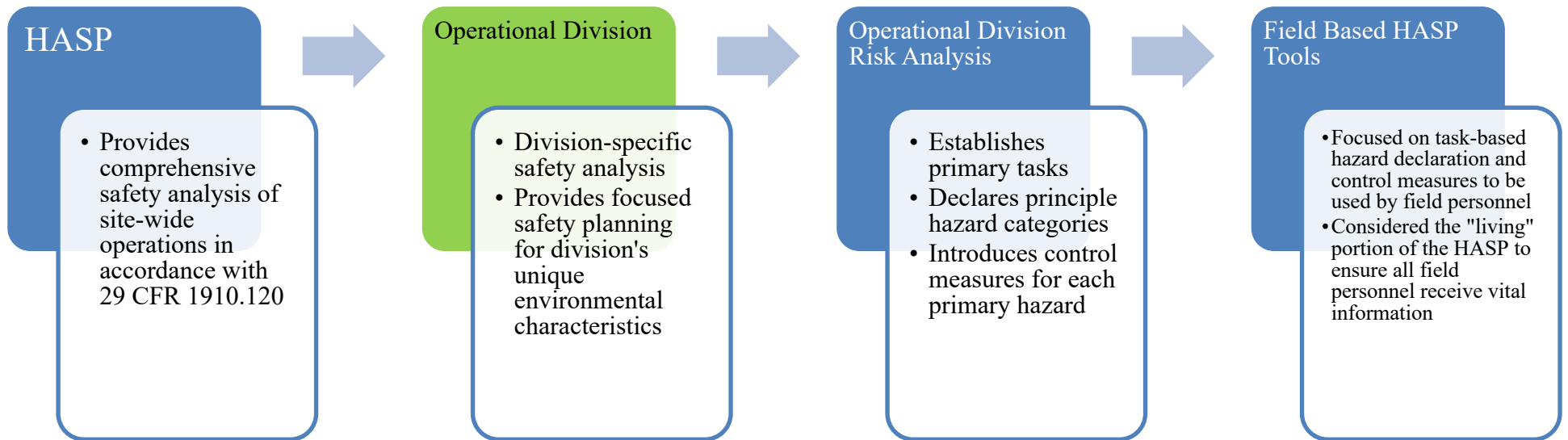
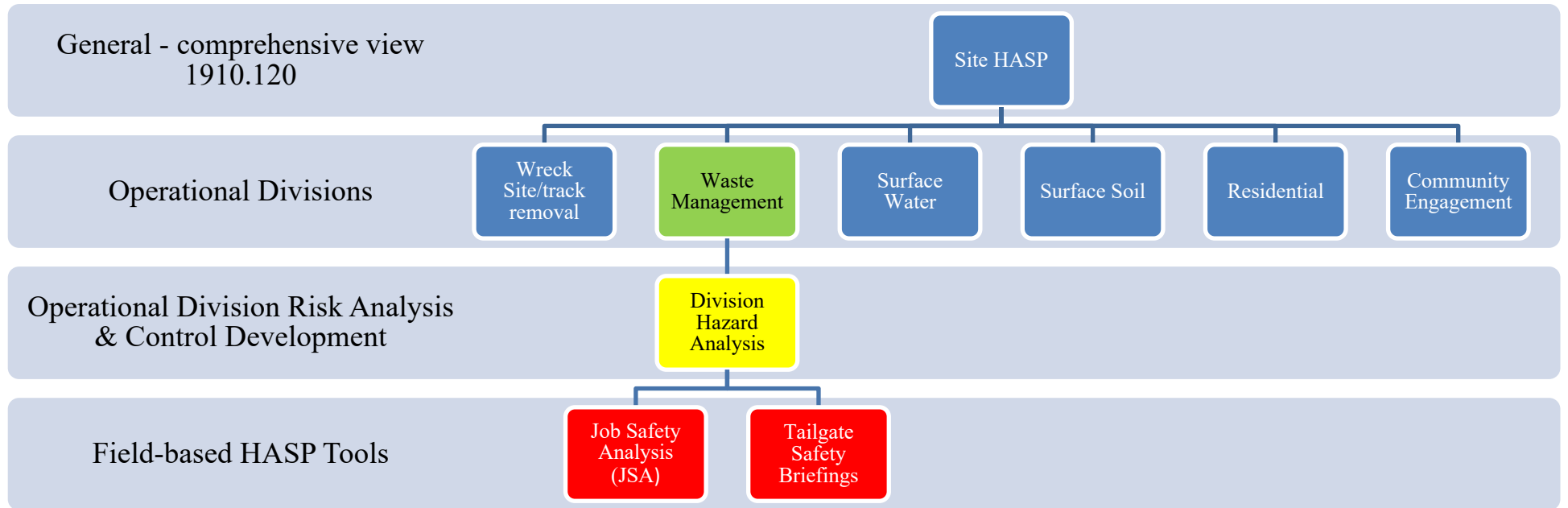
Operational Period: 7-day

Operational Division: Waste Management

For Emergencies Contact: Site EMT and/or 911

Scope: This condensed HASP is an operation-specific addendum to the East Palestine Train Derailment site wide HASP. The content in this addendum is not intended to be comprehensive but focused on health and safety components not specifically covered in the site-wide HASP. For more inclusive content, please refer to the sitewide HASP.

1 Plan Organization and Responsibilities



2 Site Characterization & Hazards Overview

Major Tasks: Waste Management – Liquid/Vapor Extraction		Risk Category (GAR)	Description and Location Where Task(s)/Operation(s) to be Performed	
1. Water Treatment (HEPACO)		33	Pleasant St and Railroad intersection, along creek beds, at water treatment plant. Water aeration with compressors and air knifing in creeks. At Pleasant and the railroad water treatment through filtration into the large storage tanks	
2. Vapor and Liquid Product Recovery (HEPACO)		36	In the work zone and containments for lay down yards. HEPACO will recover liquid and vapor from to keep liquid level below containment and out of work area	
3. Lordstown Tank Car Loading (SPSI)		40	NS Lordstown rail yard. SPSI contracted 18-wheeler tank trucks discharging to tank rail cars	
4. Frac. Tank Farm Tank Truck Loading (SPSI)		33	Frac. Tank farms 3,5, and 6. SPSI connecting to frac tanks to load the vac trucks and or 18-wheeler tank trucks for transportation to a disposal location.	
5. Frac. Tank Farm Vac Truck Discharge (HEPACO)		33	Tank farms 3,5, and 6. HEPACO is connecting to dedicated frac tanks to discharge collected liquid and vapor.	
Site Information	Roadways:	E Taggart Street, N Pleasant Drive, S Pleasant Drive, Lordstown, and surrounding roadways		
	Waterways:	Topographical drainage, creeks,	Facility Equipment:	Passing trains, tractor trailers (adj businesses)
	Railways:	NS	Heavy Machinery:	Excavator, front-end loader, dozer, crane, mini-ex, vac truck, railway maintenance equipment
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention Needed	Correction Needed	Discontinue/ Stop

Major Tasks: Waste Management – Soil Removal/Recovery		Risk Category (GAR)	Description and Location Where Task(s)/Operation(s) to be Performed		
1. Work Zone Roll Off Loading (HEPACO)		42	In work zone, long reach excavators loading contaminated soil into roll off dumpsters.		
2. Roll Off Staging - truck loading (HEPACO and SPSI)		34	Tank farm 5 and 6, HEPACO is loading empty roll offs to take to work area. SPSI loading full roll offs to dispose of contaminated debris.		
3. Roll Off Staging - truck unloading (HEPACO and SPSI)		32	Tank farms 5 and 6. HEPACO is unloading full roll offs. SPSI is unloading clean empty roll offs.		
Site Information	Roadways:	E Taggart Street, N Pleasant Drive, S Pleasant Drive, Lordstown, and surrounding roadways			
	Waterways:	Topographical drainage, creeks,	Facility Equipment:	Passing trains, tractor trailers (adj businesses)	
	Railways:	NS	Heavy Machinery:	Excavator, front-end loader, dozer, crane, mini-ex, vac truck, railway maintenance equipment	
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility	

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention Needed	Correction Needed	Discontinue/ Stop

Additional Chemical Hazards

Added chemical	Anticipated source or product utilization description	Exposure Potential	Estimated Volume
Acronal	Used to break down butyl acrylate, topically applied to soil when air monitoring determines above action level during work activity	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	250-gallon tote
Reason for deviation from HASP	This material was added as a control measure to reduce airborne exposure from impacted soil, also to reduce odor	Expected Interaction	
		<input checked="" type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Once	

Additional Physical Hazards

Added Hazard	Source of Hazard	Exposure Potential	Affected Workers
Inclement weather	Strong winds and lightning strikes; follow employers inclement weather stand down protocol if working outdoors or on elevated surfaces	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Workers and support contractors
Reason for deviation from HASP	Inclement weather with strong winds, not covered in Blue Plan	Expected Interaction	
		<input type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Once	

3 Site Control

Zone description	Standard Operating Procedures	
Exclusion Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the EZ access locations. • This area is off limits to non-authorized, or non-essential personnel during the response and mitigation operations. • All entrants must abide by the protective measures and PPE criteria (when required) for the specified area of work and the task-specific safety procedures assigned. 	
Contaminant Reduction Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the approved site entry locations. • This area will include work activity conducted to support EZ operations. This area also includes decontamination locations. • This area is off limits to non-authorized, or non-essential personnel during response and mitigation operations. 	
Support Zone	<ul style="list-style-type: none"> • Access will be provided through approved site access locations, maintained by badge check-in and checkout. • General Site-Specific PPE will be required in the SZ. • Muster locations have been designated in the SZ, please refer to the site control map for approved muster locations located near the work site. 	
Job Tasks: Waste Management – Liquid/Vapor Extraction	Work Zone Description	Zone classification
1. Water Treatment (HEPACO)	Pleasant St and Railroad intersection, along creek beds, at water treatment plant. Water aeration with compressors and air knifing in creeks. At Pleasant and the railroad water treatment through filtration into the large storage tanks	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
2. Vapor and Liquid Product Recovery (HEPACO)	In the work zone and containments for lay down yards. HEPACO will recover liquid and vapor from to keep liquid level below containment and out of work area	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
3. Lordstown Tank Car Loading (SPSI)	NS Lordstown rail yard. SPSI contracted 18-wheeler tank trucks discharging to tank rail cars	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
4. Frac. Tank Farm Tank Truck Loading (SPSI)	Frac. Tank farms 3,5, and 6. SPSI connecting to frac tanks to load the vac trucks and or 18-wheeler tank trucks for transportation to a disposal location.	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
5. Frac. Tank Farm Vac Truck Discharge (HEPACO)	Tank farms 3,5, and 6. HEPACO is connecting to dedicated frac tanks to discharge collected liquid and vapor.	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ

Job Tasks: Waste Management – Soil Removal/Recovery	Work Zone Description	Zone classification
6. Work Zone Roll Off Loading (HEPACO)	In work zone, long reach excavators loading contaminated soil into roll off dumpsters.	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
7. Roll Off Staging - truck loading (HEPACO and SPSI)	Tank farm 5 and 6, HEPACO is loading empty roll offs to take to work area. SPSI loading full roll offs to dispose of contaminated debris.	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
8. Roll Off Staging - truck unloading (HEPACO and SPSI)	Tank farms 5 and 6. HEPACO is unloading full roll offs. SPSI is unloading clean empty roll offs.	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ

Site Control Map



4 Communication Plan

Work Area:	Available Comms	Emergency Communication Procedures	
Waste Management: Liquid/Vapor Extraction & Soil Removal/Recovery	<input checked="" type="checkbox"/> 2-way Radios <input checked="" type="checkbox"/> Hand Signals <input checked="" type="checkbox"/> Cell phone <input checked="" type="checkbox"/> Air Horn	Emergency Signal	Short Air horn Blast: Attention all personnel 2 Horn Blast: Attention all personnel, controlled egress to SZ Long Horn Blast: Emergency evacuation
		Action	Crosswind, then upwind to muster point
		Hand Signal	Two hands placed on top of head

5 Personal Protective Equipment

Designated Levels of Personal Protection

Job Tasks: Waste Management – Liquid/Vapor Extraction	Work Area (e.g., EZ, CRZ, other):	Work Zone Description:	Level of Protection:
1. Water Treatment (HEPACO)	CRZ, SZ	Pleasant St and Railroad intersection, along creek beds, at water treatment plant. Water aeration with compressors and air knifing in creeks. At Pleasant and the railroad water treatment through filtration into the large storage tanks.	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
2. Vapor and Liquid Product Recovery (HEPACO)	CRZ, SZ	In the work zone and containments for lay down yards. HEPACO will recover liquid and vapor from to keep liquid level below containment and out of work area.	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
3. Lordstown Tank Car Loading (SPSI)	CRZ, SZ	NS Lordstown rail yard. SPSI contracted 18-wheeler tank trucks discharging to tank cars.	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
4. Frac. Tank Farm Tank Truck Loading (SPSI)	CRZ, SZ	Frac. Tank farms 3,5, and 6. SPSI connecting to frac tanks to load the vac trucks and or 18-wheeler tank trucks for transportation to a disposal location.	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>

5. Frac. Tank Farm Vac Truck Discharge (HEPACO)	CRZ, SZ	Tank farms 3,5, and 6. HEPACO is connecting to dedicated frac tanks to discharge collected liquid and vapor.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>
Job Tasks: Waste Management – Soil Removal/Recovery	Work Area (e.g., EZ, CRZ, other):	Work Zone Description:	Level of Protection:			
6. Work Zone Roll Off Loading (HEPACO)	CRZ, SZ	In work zone, long reach excavators loading contaminated soil into roll off dumpsters.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>
7. Roll Off Staging - truck loading (HEPACO and SPSI)	CRZ, SZ	Tank farm 5 and 6, HEPACO is loading empty roll offs to take to work area. SPSI loading full roll offs to dispose of contaminated debris.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>
8. Roll Off Staging - truck unloading (HEPACO and SPSI)	CRZ, SZ	Tank farms 5 and 6. HEPACO is unloading full roll offs. SPSI is unloading clean empty roll offs.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>	D <input checked="" type="checkbox"/>

6 Decontamination

Decontamination Procedures

Personnel (Level A, B, C) Decontamination Procedures:

Decontamination of personnel is largely focused on boot wash to prevent contamination migration outside of EZ:

Station 1: Boot Wash/Scrub

Using available boot wash stations, remove heavy soils and mud with soap and brush.

Station 2: Rinse

Using secondary decon pool, rinse boots free of remaining soils and soap.

Emergency Decontamination Procedures:

If exposure occurs, use the least aggressive but affective means to decon personnel before rendering first aid. If life saving means are necessary, dismiss decontamination unless a greater hazard is posed to the attending first aid personnel. First aid personnel should use nitrile gloves or conduct localized decontamination to assess injured persons.

7 Environmental and Personal Monitoring

AIR MONITORING SUMMARY			
Instrument Type:	Contaminant:	Frequency:	Action Level/Comments:
RAE Systems MultiRAE Pro (PID)	VOCs	As needed	Detection above 0.2 ppm requires assessment for vinyl chloride. Detection above 0.5, don respiratory protection or egress.
RAE Systems MultiRAE Pro (O ₂ sensor)	Oxygen	Confined space work	≤ 19.5% or ≥ 23.5% oxygen, evacuate area and re-evaluate
RAE Systems MultiRAE Pro (LEL sensor)	Combustible range vapors and gases, CO	Periodic	> 10% of LEL (corrected) prompts work stoppage and personnel egress
Detector Tubes	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Drager XPID	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Personal Monitoring Procedures			
Chemical Exposure:			
Assay 525 Organic Vapor Monitors (OVM) are utilized to measure workers 8-hour TWA exposure for butyl acrylate and vinyl chloride. Workers will be notified of their individual exposure per OSHA reporting criteria for personal sampling notification.			
Butyl acrylate: analysis method is conducted per modified NIOSH 2537. Vinyl chloride: analysis method is conducted per NIOSH 1007 method.			

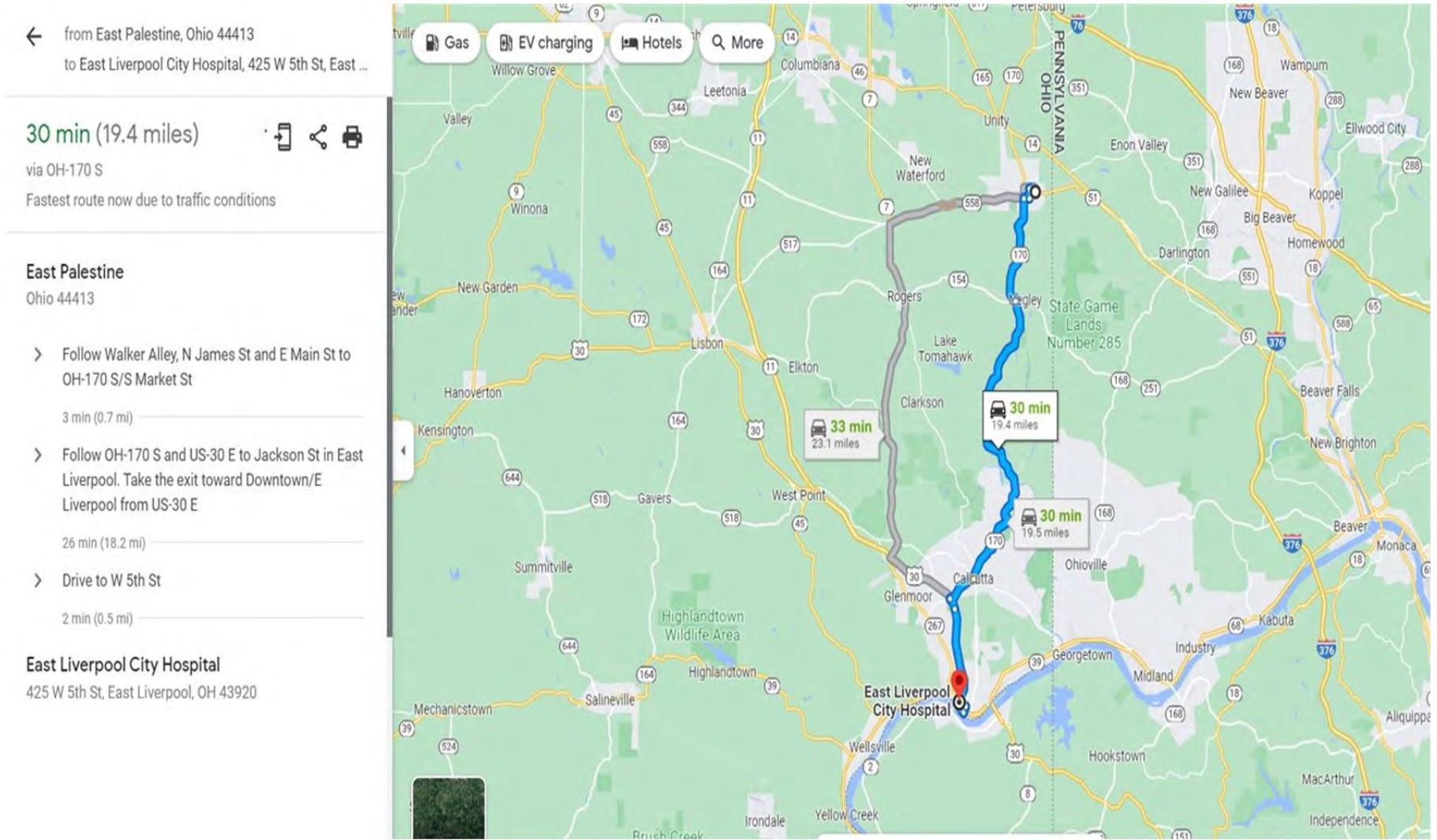
8 EMERGENCY RESPONSE (AED Locations, See Blue Plan)

Agency	Nature of Emergency	Contact Number:
On-site EMT	First aid, initial emergency care, trauma care	911
Air Evac	Emergency, life-threatening, major trauma	911
Fire	Medical, criminal, and fire emergency	Onsite resources, 911
Police	Security, crime, suspicious behavior	911, NS police: (800) 453-2530
Emergency Medical Facility Name East Liverpool City Hospital – Emergency Room		Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
Non-Emergency Medical Facility Name East Liverpool Hospital		Non-Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200

First Aid Location Site vehicles	Fire Extinguisher Location Site vehicles, heavy machinery
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Emergency Notification Procedures	Places of Refuge	Emergency Decon and Evacuation	Site Security Measures
<p>Notify site safety and then call 911 for paramedics. Phone and/or verbal notification for evacuation.</p> <p>Hospital: See above</p> <p>Discern whether emergency care is needed. If in doubt, proceed to emergency medical facility or contact 911.</p>	<p>Refuge locations vary, but egress must be upwind/uphill in all locations. Work crew supervisors must account for all personnel under their direction in the event of evacuation or relocation. See Refinery map section</p>	<p>Establish an area of refuge for contaminated individuals ASAP</p> <p>Establish the gross decon area using a water source such as garden hoses, engine lines or pump sprayers.</p> <p>Spray individuals with copious amounts of water to remove overt quantities of contaminants.</p>	<p>Site security being provided by local law enforcement.</p>

East Liverpool City Hospital
425 W. 5th St,
East Liverpool, OH 43920
(330) 385-7200



HASP – Division: Surface Water

Project: East Palestine Train Derailment Site

Location: East Palestine, OH

Date Prepared: 3-23-2023

Version: 2.0

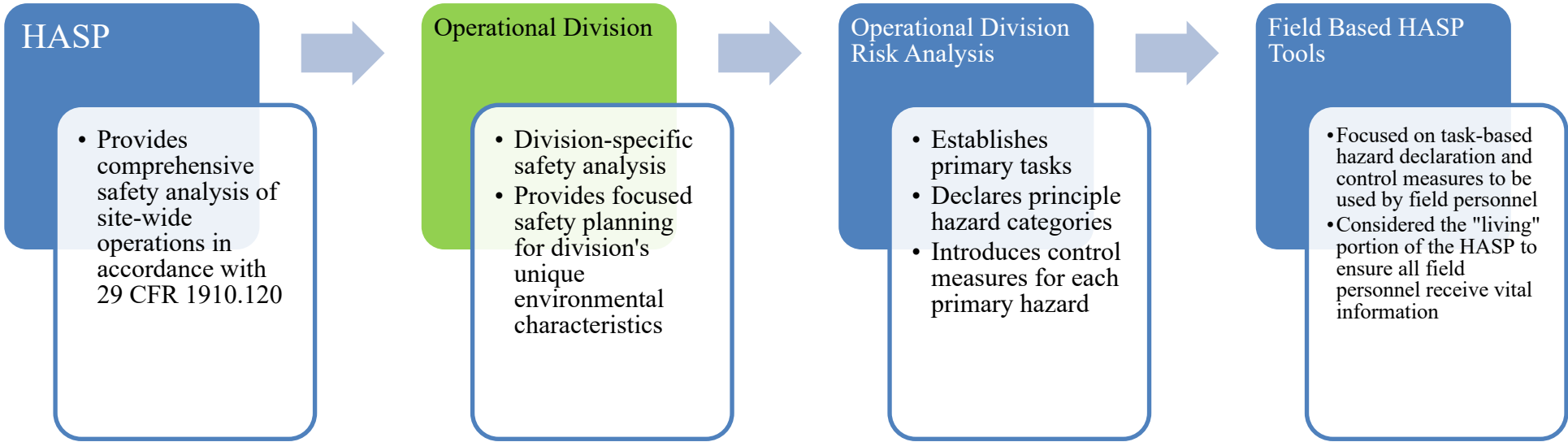
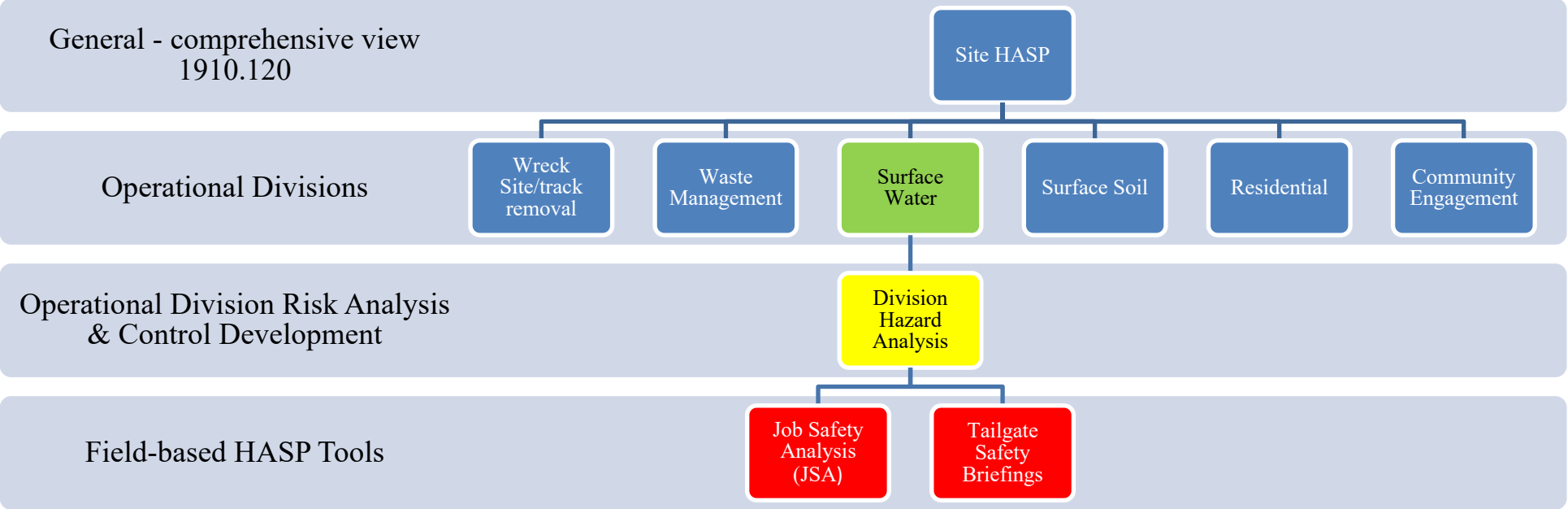
Operational Period: 7-day

Operational Division: Surface Water

For Emergencies Contact: Site EMT and/or 911

Scope: This condensed HASP is an operation-specific addendum to the East Palestine Train Derailment site wide HASP. The content in this addendum is not intended to be comprehensive but focused on health and safety components not specifically covered in the site-wide HASP. For more inclusive content, please refer to the sitewide HASP.

1 Plan Organization and Responsibilities



2 Site Characterization & Hazards Overview

Major Tasks:	Risk Category (GAR)	Description and Location Where Task(s)/Operation(s) to be Performed		
1. Traffic / Roadway Navigation	28	Roadway navigation and community travel; parking, pedestrians, animals		
2. Environmental Sampling – Vessel Over Water / Deep Water (PFD required)	26	Surface water sampling in locations with deeper and faster moving water; 7 locations at Little Beaver Creek and further south, W005, W006, W007, W008, W017, W018, W019		
3. Environmental Sampling – Work Area	19	Work area surface water sampling locations; 4 locations, W014, W015, W016, W020		
4. Environmental Sampling – Community	17	Water sampling at strategic waterway locations throughout the community setting		
Site Information	Roadways:	All Roadways Surrounding East Palestine, Columbiana, & south to East Liverpool		
	Waterways:	Topographical drainage, creeks, swift moving waterways (PFDs req.)	Facility Equipment:	Passing trains, tractor trailers (adj businesses)
	Railways:	NS	Heavy Machinery:	Dump trucks, Frac Tanks, Vac truck, railway maintenance equipment
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention Needed	Correction Needed	Discontinue/ Stop

Additional Chemical Hazards

Added chemical	Anticipated source or product utilization description	Exposure Potential	Estimated Volume
HCl preservative contained within water sampling media	Required for laboratory analysis, Methods 8260 & 1664; generally safe when appropriately handled, stored, and secured (special care with glass jars)	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	5mL HCl preservative contained in 1L Amber sample jar 0.5mL HCl preservative contained in 40mL VOA vial

Additional Physical Hazards

Added Hazard	Source of Hazard	Exposure Potential	Affected Workers
Slips, trips, and falls	Uneven surfaces, steps, slick surfaces (mud/wet), yards, well locations	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Aggressive residents/pets	Residential engagement, property access, entering homes for testing	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Vehicle/traffic hazards	Distracted driving, increased traffic from response, blind spots, pedestrians, deer, low light, varying weather conditions	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Reason for deviation from HASP	Blue Plan is specific to work area; this covers residential	Expected Interaction	
		<input checked="" type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Once	

3 Site Control

Zone description	Standard Operating Procedures	
Exclusion Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the EZ access locations. • This area is off limits to non-authorized, or non-essential personnel during the response and mitigation operations. • All entrants must abide by the protective measures and PPE criteria (when required) for the specified area of work and the task-specific safety procedures assigned. 	
Contaminant Reduction Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the approved site entry locations. • This area will include work activity conducted to support EZ operations. This area also includes decontamination locations. • This area is off limits to non-authorized, or non-essential personnel during response and mitigation operations. 	
Support Zone	<ul style="list-style-type: none"> • Access will be provided through approved site access locations, maintained by badge check-in and checkout. • General Site-Specific PPE will be required in the SZ. • Muster locations have been designated in the SZ, please refer to the site control map for approved muster locations located near the work site. 	
Job Tasks:	Work Zone Description	Zone classification
1. Traffic / Roadway Navigation	Roadway navigation and community travel; parking, pedestrians, animals	<input type="checkbox"/> EZ <input type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
2. Environmental Sampling – Vessel Over Water / Deep Water (PFD required)	Surface water sampling in locations with deeper and faster moving water; 7 locations at Little Beaver Creek and further south, W005, W006, W007, W008, W017, W018, W019	<input type="checkbox"/> EZ <input type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
3. Environmental Sampling – Work Area	Work area surface water sampling locations; 4 locations, W014, W015, W016, W020	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
4. Environmental Sampling – Community	Water sampling at strategic waterway locations throughout the community setting	<input type="checkbox"/> EZ <input type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ

Site Control Map



Surface Water Sampling Map

CTEH Surface Water Sampling Locations

Taggart Road Incident | Mar 18, 2023

Project: PROJ-024579
 Client: Norfolk Southern
 City: East Palestine, OH
 County: Columbiana



Projection: WGS 1984 UTM Zone 17N

Datum: WGS 1984



Updated at 2023-03-24 10:39

4 Communication Plan

Work Area:	Available Comms	Emergency Communication Procedures	
Surface Water Sampling Locations	<input checked="" type="checkbox"/> 2-way Radios <input checked="" type="checkbox"/> Hand Signals <input checked="" type="checkbox"/> Cell phone <input checked="" type="checkbox"/> Air Horn	Emergency Signal	Short Air horn Blast: Attention all personnel 2 Horn Blast: Attention all personnel, controlled egress to SZ Long Horn Blast: Emergency evacuation
		Action	Crosswind, then upwind to muster point; i.e., incident command or tailgate briefing location
		Hand Signal	Two hands placed on top of head
		Cell comms	Chain of Command communication

5 Personal Protective Equipment

Designated Levels of Personal Protection			
Task:	Work Area (e.g., EZ, CRZ, other):	Job Function:	Level of Protection:
1. Traffic / Roadway Navigation	Other	Roadway navigation and community travel; parking, pedestrians, animals	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)
2. Environmental Sampling – Vessel Over Water / Deep Water (PFD required)	Other	Surface water sampling in locations with deeper and faster moving water; 7 locations at Little Beaver Creek and further south, W005, W006, W007, W008, W017, W018, W019	Modified Level D <input checked="" type="checkbox"/> (PFD while on vessel over water or within 10' of swift moving water)
3. Environmental Sampling – Work Area	CRZ, SZ	Work area surface water sampling locations; 4 locations, W014, W015, W016, W020	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
4. Environmental Sampling – Community	Other	Water sampling at strategic waterway locations throughout the community setting	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)

6 Decontamination (Be advised, if Sampling or Visiting Work Areas, please proceed with directives below)

Decontamination Procedures	
Personnel (Level A, B, C) Decontamination Procedures:	
Decontamination of personnel is largely focused on boot wash to prevent contamination migration outside of EZ:	
<u>Station 1: Boot Wash/Scrub</u> Using available boot wash stations, remove heavy soils and mud with soap and brush.	
<u>Station 2: Rinse</u> Using secondary decon pool, rinse boots free of remaining soils and soap.	
Emergency Decontamination Procedures:	
If exposure occurs, use the least aggressive but affective means to decon personnel before rendering first aid. If life saving means are necessary, dismiss decontamination unless a greater hazard is posed to the attending first aid personnel. First aid personnel should use nitrile gloves or conduct localized decontamination to assess injured persons.	

7 Environmental and Personal Monitoring

AIR MONITORING SUMMARY			
Instrument Type:	Contaminant:	Frequency:	Action Level/Comments:
RAE Systems MultiRAE Pro (PID)	VOCs	As needed	Detection above 0.2 ppm requires assessment for vinyl chloride. Detection above 0.5, don respiratory protection or egress.
RAE Systems MultiRAE Pro (O ₂ sensor)	Oxygen	Confined space work	≤ 19.5% or ≥ 23.5% oxygen, evacuate area and re-evaluate
RAE Systems MultiRAE Pro (LEL sensor)	Combustible range vapors and gases, CO	Periodic	> 10% of LEL (corrected) prompts work stoppage and personnel egress
Detector Tubes	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Drager XPID	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Personal Monitoring Procedures			
Chemical Exposure:			

Assay 525 Organic Vapor Monitors (OVM) are utilized to measure workers 8-hour TWA exposure for butyl acrylate and vinyl chloride. Workers will be notified of their individual exposure per OSHA reporting criteria for personal sampling notification.

Butyl acrylate: analysis method is conducted per modified NIOSH 2537.

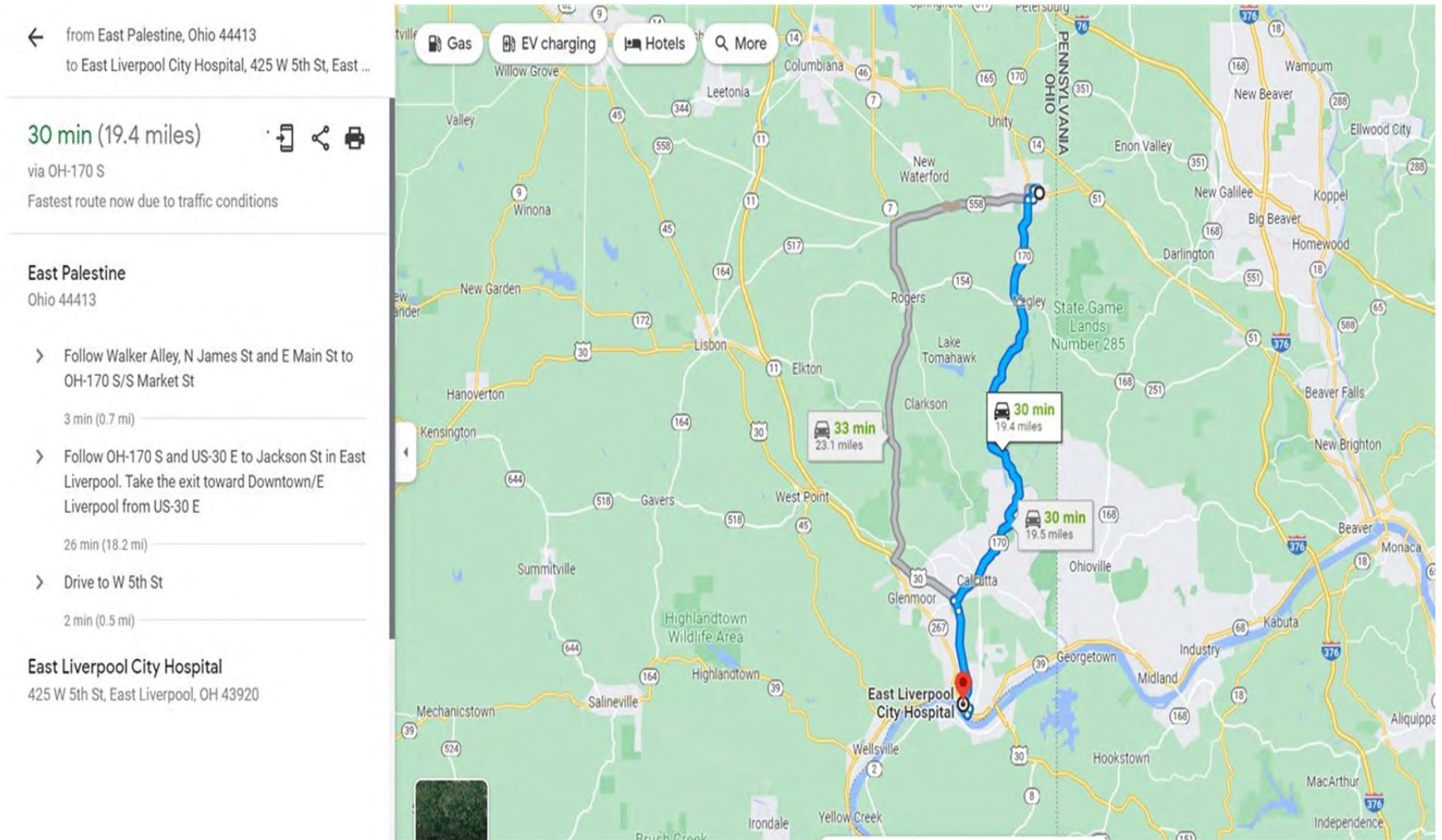
Vinyl chloride: analysis method is conducted per NIOSH 1007 method.

8 EMERGENCY RESPONSE (AED Locations, See Blue Plan)

Agency	Nature of Emergency	Contact Number:
On-site EMT	First aid, initial emergency care, trauma care	911
Air Evac	Emergency, life-threatening, major trauma	911
Fire	Medical, criminal, and fire emergency	Onsite resources, 911
Police	Security, crime, suspicious behavior	911, NS police: (800) 453-2530
Emergency Medical Facility Name East Liverpool City Hospital – Emergency Room		Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
Non-Emergency Medical Facility Name East Liverpool Hospital		Non-Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
First Aid Location Site vehicles		Fire Extinguisher Location Site vehicles, heavy machinery

Emergency Notification Procedures	Places of Refuge	Emergency Decon and Evacuation	Site Security Measures
<p>Notify site safety and then call 911 for paramedics. Phone and/or verbal notification for evacuation.</p> <p>Hospital: See above</p> <p>Discern whether emergency care is needed. If in doubt, proceed to emergency medical facility or contact 911.</p>	<p>Refuge locations vary, but egress must be upwind/uphill in all locations. Work crew supervisors must account for all personnel under their direction in the event of evacuation or relocation. See Refinery map section</p>	<p>Establish an area of refuge for contaminated individuals ASAP</p> <p>Establish the gross decon area using a water source such as garden hoses, engine lines or pump sprayers.</p> <p>Spray individuals with copious amounts of water to remove overt quantities of contaminants.</p>	<p>Site security being provided by local law enforcement.</p>

East Liverpool City Hospital
425 W. 5th St,
East Liverpool, OH 43920
(330) 385-7200



HASP – Division: Surface Soil

Project: East Palestine Train Derailment Site

Location: East Palestine, OH

Date Prepared: 3-23-2023

Version: 2.0

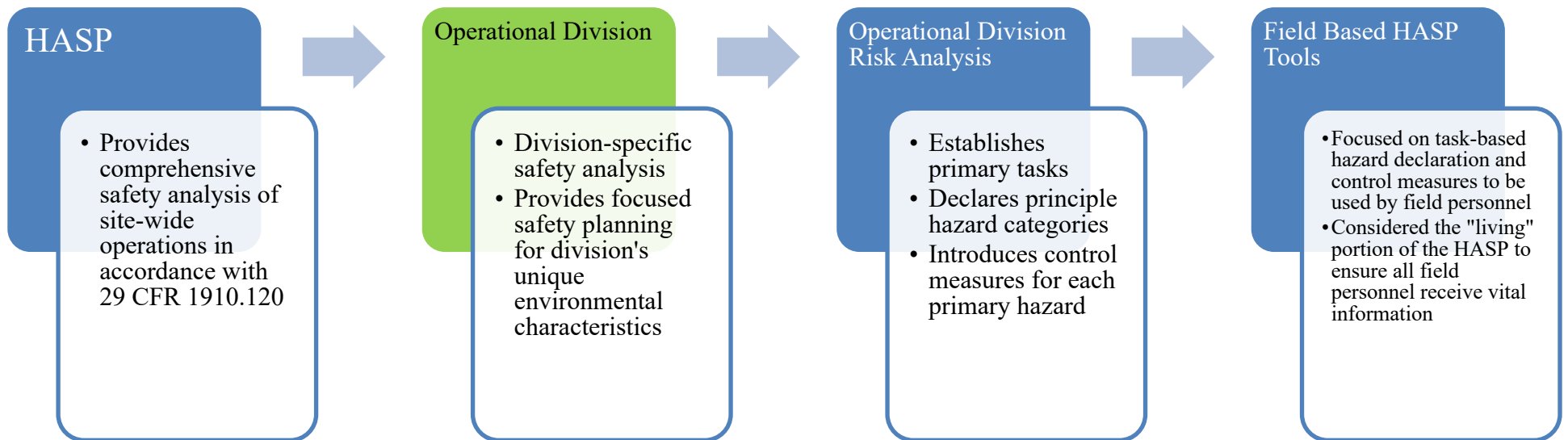
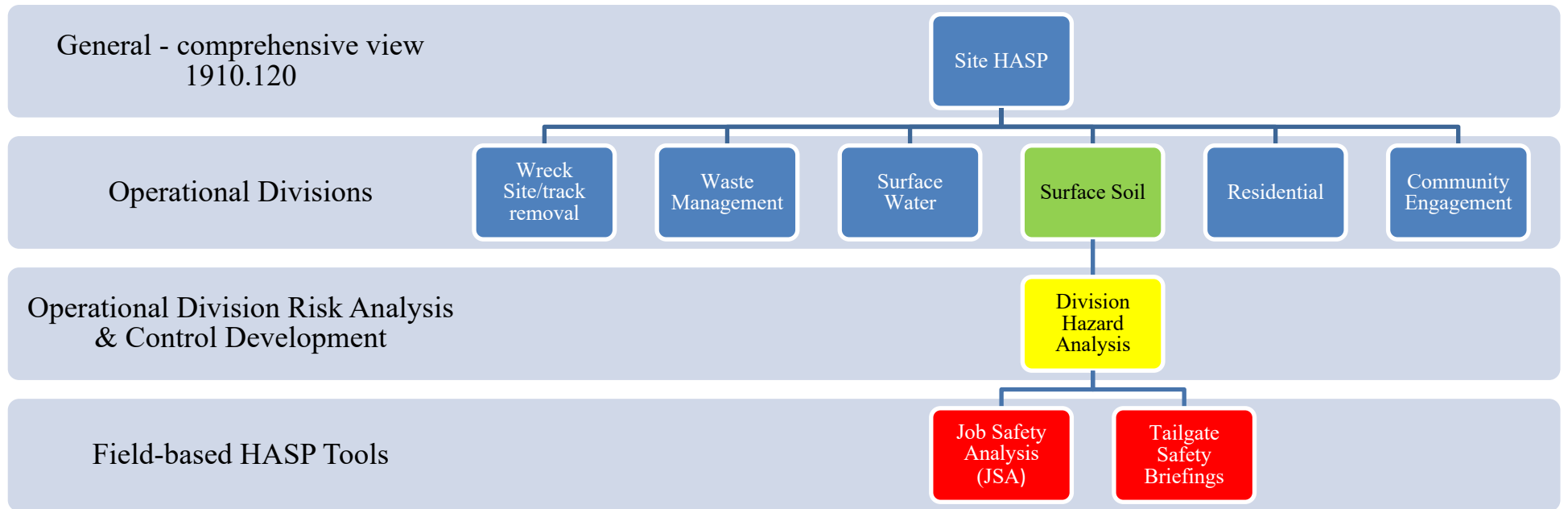
Operational Period: 7-day

Operational Division: Surface Soil

For Emergencies Contact: Site EMT and/or 911

Scope: This condensed HASP is an operation-specific addendum to the East Palestine Train Derailment site wide HASP. The content in this addendum is not intended to be comprehensive but focused on health and safety components not specifically covered in the site-wide HASP. For more inclusive content, please refer to the sitewide HASP.

1 Plan Organization and Responsibilities



2 Site Characterization & Hazards Overview

Major Tasks:	Risk Category (GAR)	Description and Location Where Task(s)/Operation(s) to be Performed		
1. Traffic / Roadway Navigation	28	Roadway navigation and community travel; parking, pedestrians, animals		
2. Environmental Sampling – Work Area	19	Onsite work area soil sampling locations: multiple locations along rail bed and response impacted areas		
3. Environmental Sampling – Community & Residential	17	Soil sampling at strategic locations throughout the residential setting		
Site Information	Roadways:	All Roadways Surrounding East Palestine, Columbiana, & surrounding communities		
	Waterways:	Topographical drainage, creeks, swift moving waterways (PFDs req.)	Facility Equipment:	Passing trains, tractor trailers (adj businesses)
	Railways:	NS	Heavy Machinery:	Dump trucks, Frac Tanks, Vac truck, railway maintenance equipment
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention Needed	Correction Needed	Discontinue/ Stop

Additional Chemical Hazards

Added chemical	Anticipated source or product utilization description	Exposure Potential	Estimated Volume
Methanol preservative contained within soil sampling media	Required for laboratory analysis, Method 846; generally safe when appropriately handled, stored, and secured (special care with glass jars)	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	5mL Methanol preservative contained in sampling media

Additional Physical Hazards

Added Hazard	Source of Hazard	Exposure Potential	Affected Workers
Slips, trips, and falls	Uneven surfaces, steps, slick surfaces (mud/wet), yards, well locations	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Aggressive residents/pets	Residential engagement, property access, entering homes for testing	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Vehicle/traffic hazards	Distracted driving, increased traffic from response, blind spots, pedestrians, deer, low light, varying weather conditions	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Reason for deviation from HASP	Blue Plan is specific to work area; this covers residential	Expected Interaction	
		<input checked="" type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Once	

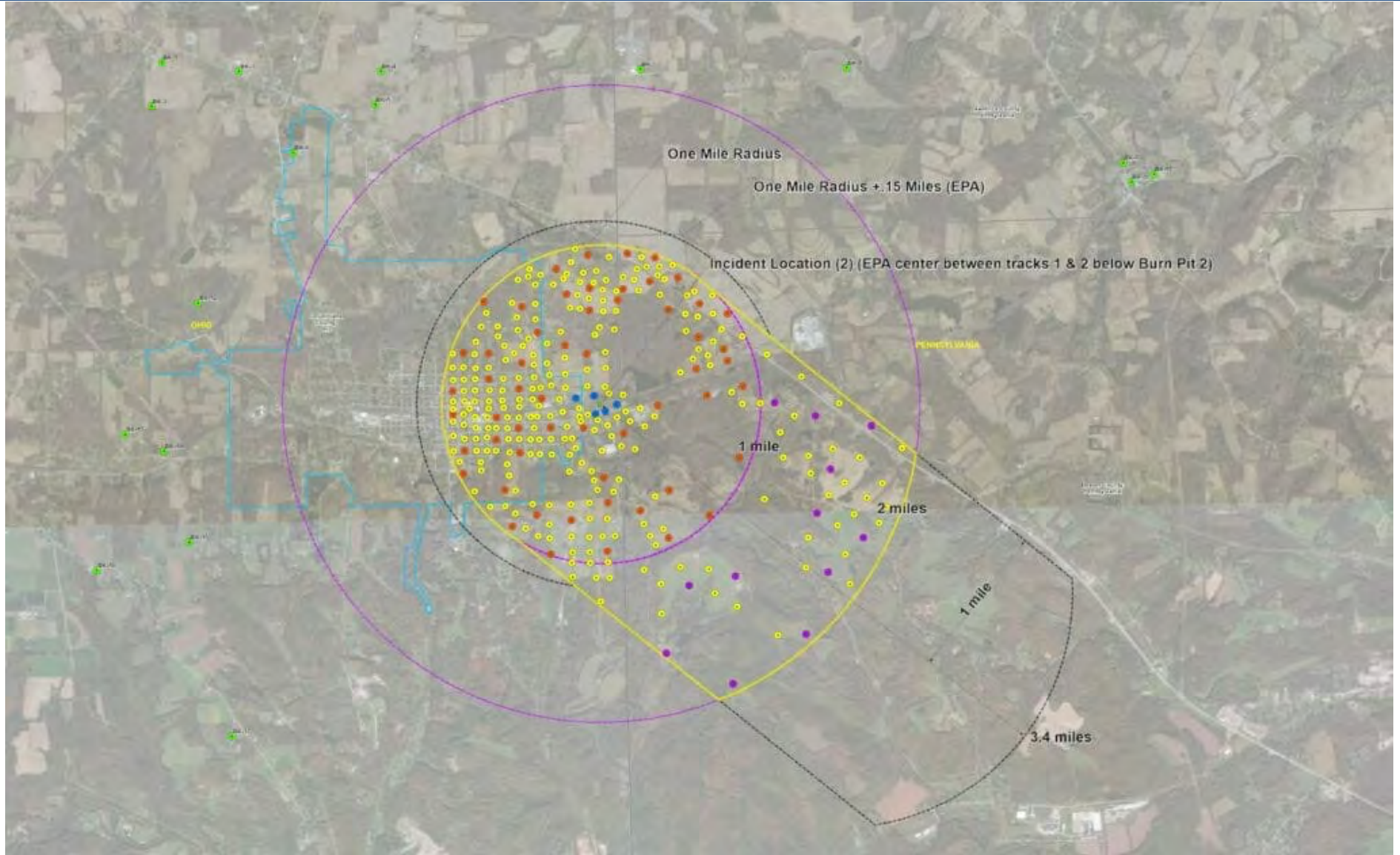
3 Site Control

Zone description	Standard Operating Procedures	
Exclusion Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the EZ access locations. • This area is off limits to non-authorized, or non-essential personnel during the response and mitigation operations. • All entrants must abide by the protective measures and PPE criteria (when required) for the specified area of work and the task-specific safety procedures assigned. 	
Contaminant Reduction Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the approved site entry locations. • This area will include work activity conducted to support EZ operations. This area also includes decontamination locations. • This area is off limits to non-authorized, or non-essential personnel during response and mitigation operations. 	
Support Zone	<ul style="list-style-type: none"> • Access will be provided through approved site access locations, maintained by badge check-in and checkout. • General Site-Specific PPE will be required in the SZ. • Muster locations have been designated in the SZ, please refer to the site control map for approved muster locations located near the work site. 	
Job Tasks:	Work Zone Description	Zone classification
1. Traffic / Roadway Navigation	Roadway navigation and community travel; parking, pedestrians, animals	<input type="checkbox"/> EZ <input type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
2. Environmental Sampling – Onsite Work Areas	Onsite work area soil sampling locations: multiple locations along rail bed and response impacted areas	<input type="checkbox"/> EZ <input checked="" type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ
3. Environmental Sampling – Community & Residential	Soil sampling at strategic locations throughout the residential setting	<input type="checkbox"/> EZ <input type="checkbox"/> CRZ <input checked="" type="checkbox"/> SZ

Surface Soil Sampling Map: Onsite Work Area



Surface Soil Sampling Map: Residential Area



4 Communication Plan

Work Area:	Available Comms	Emergency Communication Procedures	
Surface Water Sampling Locations	<input checked="" type="checkbox"/> 2-way Radios <input checked="" type="checkbox"/> Hand Signals <input checked="" type="checkbox"/> Cell phone <input checked="" type="checkbox"/> Air Horn	Emergency Signal	Short Air horn Blast: Attention all personnel 2 Horn Blast: Attention all personnel, controlled egress to SZ Long Horn Blast: Emergency evacuation
		Action	Crosswind, then upwind to muster point; i.e., incident command or tailgate briefing location
		Hand Signal	Two hands placed on top of head
		Cell comms	Chain of Command communication

5 Personal Protective Equipment

Designated Levels of Personal Protection

Task:	Work Area (e.g., EZ, CRZ, other):	Job Function:	Level of Protection:
1. Traffic / Roadway Navigation	Other	Roadway navigation and community travel; parking, pedestrians, animals	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)
2. Environmental Sampling – Onsite Work Areas	CRZ, SZ	Onsite work area soil sampling locations: multiple locations along rail bed and response impacted areas	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/>
3. Environmental Sampling – Community & Residential	Other	Soil sampling at strategic locations throughout the residential setting	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)

6 Decontamination (Be advised, if Sampling or Visiting Work Areas, please proceed with directives below)

Decontamination Procedures	
Personnel (Level A, B, C) Decontamination Procedures:	
Decontamination of personnel is largely focused on boot wash to prevent contamination migration outside of EZ:	
<u>Station 1: Boot Wash/Scrub</u> Using available boot wash stations, remove heavy soils and mud with soap and brush.	
<u>Station 2: Rinse</u> Using secondary decon pool, rinse boots free of remaining soils and soap.	
Emergency Decontamination Procedures:	
If exposure occurs, use the least aggressive but affective means to decon personnel before rendering first aid. If life saving means are necessary, dismiss decontamination unless a greater hazard is posed to the attending first aid personnel. First aid personnel should use nitrile gloves or conduct localized decontamination to assess injured persons.	

7 Environmental and Personal Monitoring

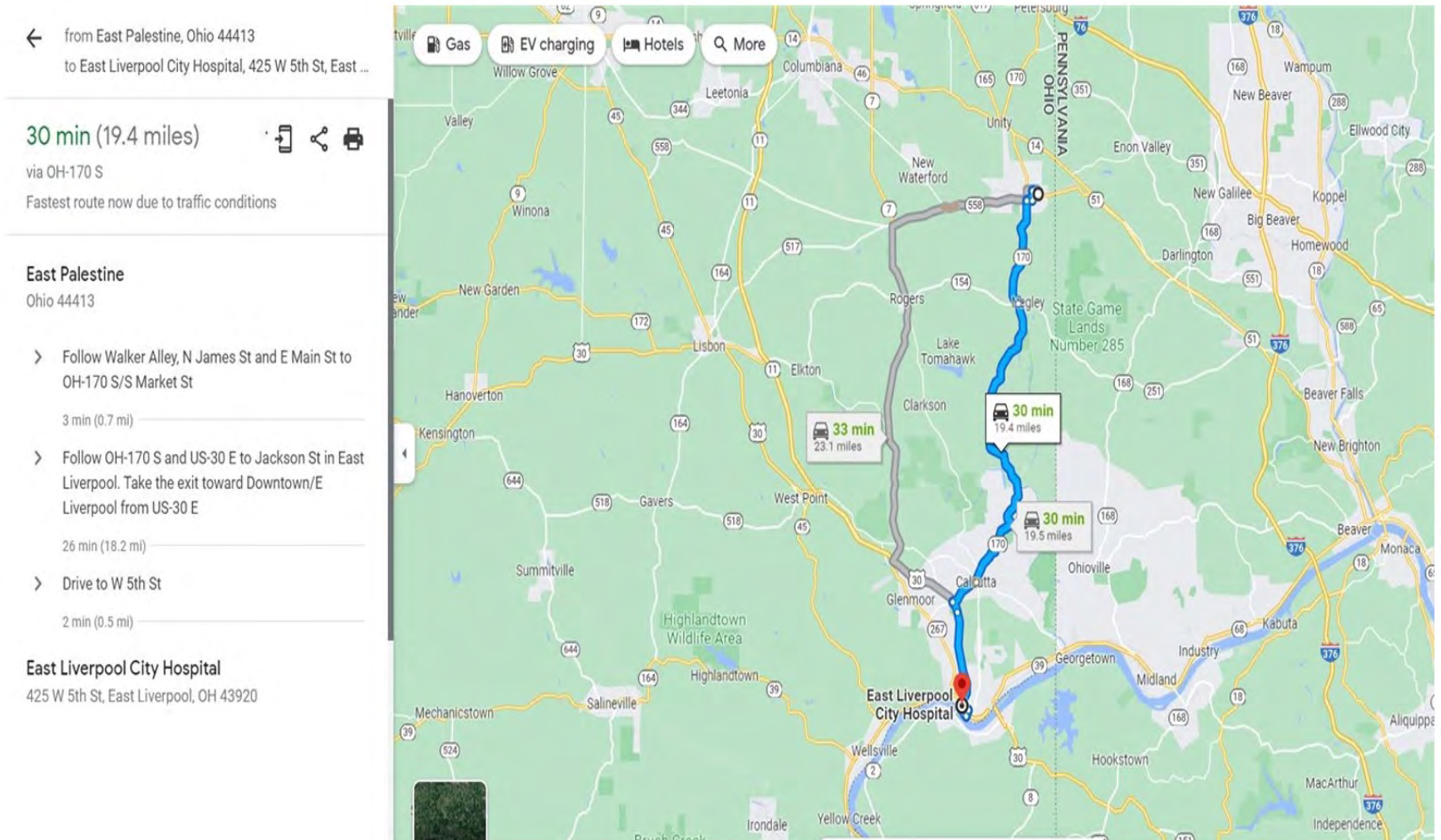
AIR MONITORING SUMMARY			
Instrument Type:	Contaminant:	Frequency:	Action Level/Comments:
RAE Systems MultiRAE Pro (PID)	VOCs	As needed	Detection above 0.2 ppm requires assessment for vinyl chloride. Detection above 0.5, don respiratory protection or egress.
RAE Systems MultiRAE Pro (O ₂ sensor)	Oxygen	Confined space work	≤ 19.5% or ≥ 23.5% oxygen, evacuate area and re-evaluate
RAE Systems MultiRAE Pro (LEL sensor)	Combustible range vapors and gases, CO	Periodic	> 10% of LEL (corrected) prompts work stoppage and personnel egress
Detector Tubes	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Drager XPID	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Personal Monitoring Procedures			
Chemical Exposure:			
Assay 525 Organic Vapor Monitors (OVM) are utilized to measure workers 8-hour TWA exposure for butyl acrylate and vinyl chloride. Workers will be notified of their individual exposure per OSHA reporting criteria for personal sampling notification.			
Butyl acrylate: analysis method is conducted per modified NIOSH 2537. Vinyl chloride: analysis method is conducted per NIOSH 1007 method.			

8 EMERGENCY RESPONSE (AED Locations, See Blue Plan)

Agency	Nature of Emergency	Contact Number:
On-site EMT	First aid, initial emergency care, trauma care	911
Air Evac	Emergency, life-threatening, major trauma	911
Fire	Medical, criminal, and fire emergency	Onsite resources, 911
Police	Security, crime, suspicious behavior	911, NS police: (800) 453-2530
Emergency Medical Facility Name East Liverpool City Hospital – Emergency Room		Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
Non-Emergency Medical Facility Name East Liverpool Hospital		Non-Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
First Aid Location Site vehicles		Fire Extinguisher Location Site vehicles, heavy machinery

Emergency Notification Procedures	Places of Refuge	Emergency Decon and Evacuation	Site Security Measures
<p>Notify site safety and then call 911 for paramedics. Phone and/or verbal notification for evacuation.</p> <p>Hospital: See above</p> <p>Discern whether emergency care is needed. If in doubt, proceed to emergency medical facility or contact 911.</p>	<p>Refuge locations vary, but egress must be upwind/uphill in all locations. Work crew supervisors must account for all personnel under their direction in the event of evacuation or relocation. See Refinery map section</p>	<p>Establish an area of refuge for contaminated individuals ASAP</p> <p>Establish the gross decon area using a water source such as garden hoses, engine lines or pump sprayers.</p> <p>Spray individuals with copious amounts of water to remove overt quantities of contaminants.</p>	<p>Site security being provided by local law enforcement.</p>

East Liverpool City Hospital
425 W. 5th St,
East Liverpool, OH 43920
(330) 385-7200



HASP – Division: Residential

Project: East Palestine Train Derailment Site

Location: East Palestine, OH

Date Prepared: 3-23-2023

Version: 2.0

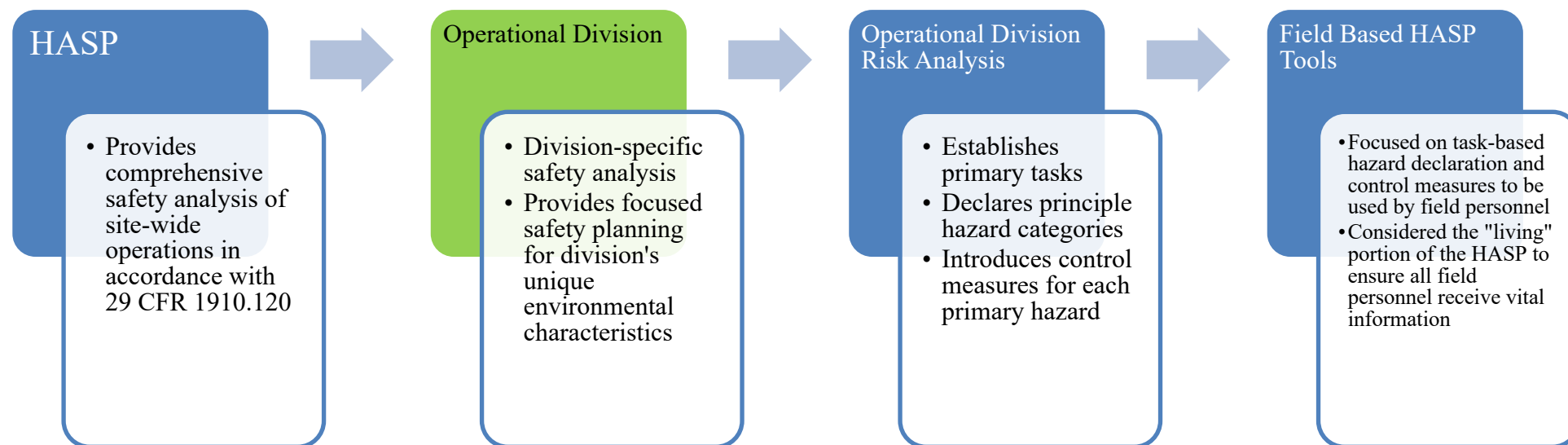
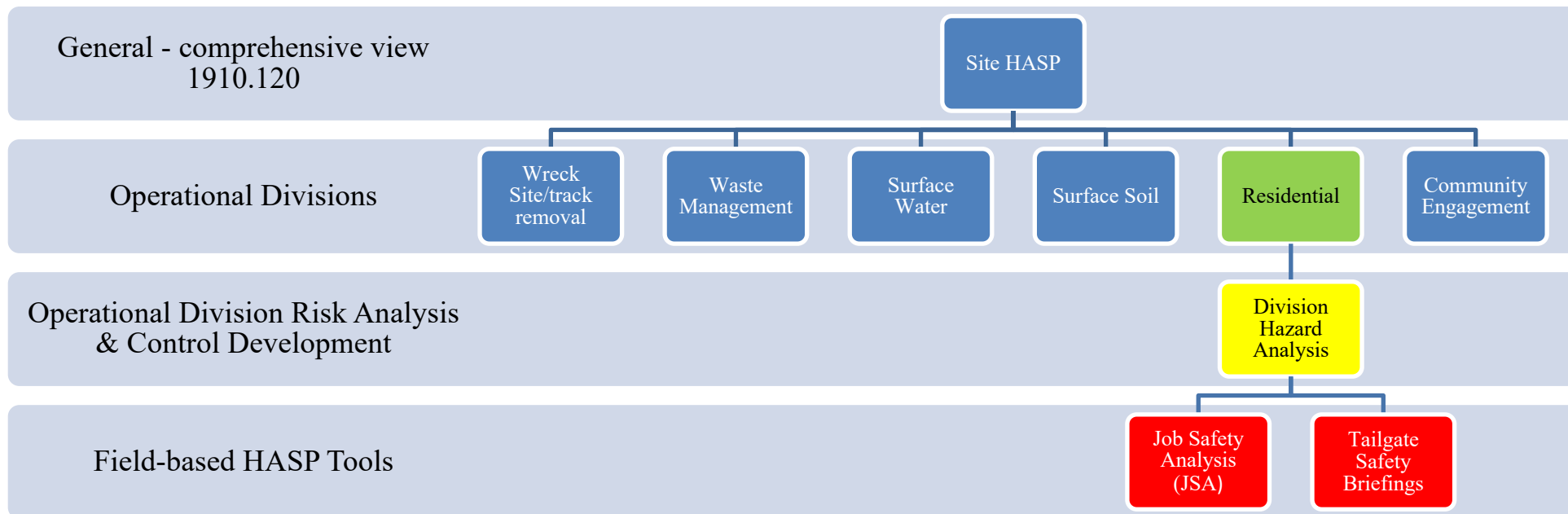
Operational Period: 7-day

Operational Division: Residential

For Emergencies Contact: Site EMT and/or 911

Scope: This condensed HASP is an operation-specific addendum to the East Palestine Train Derailment site wide HASP. The content in this addendum is not intended to be comprehensive but focused on health and safety components not specifically covered in the site-wide HASP. For more inclusive content, please refer to the sitewide HASP.

1 Plan Organization and Responsibilities



2 Site Characterization & Hazards Overview

Major Tasks:	Risk Category (GAR)	Description and Location Where Task(s)/Operation(s) to be Performed		
1. Traffic / Navigation	28	Roadway navigation and community travel; parking, pedestrians, pets		
2. Well Testing	20	Homeowners with well water requesting tests; accessibility, footing		
3. Air Monitoring	18	Homeowners requesting environmental monitoring inside home; access, pets		
4. Personal Communication	14	Engagement with homeowners requesting monitoring; access, pets		
Site Information	Roadways:	All Roadways Surrounding East Palestine & Columbiana		
	Waterways:	Topographical drainage, creeks,	Facility Equipment:	Passing trains, tractor trailers (adj businesses)
	Railways:	NS	Heavy Machinery:	Dump trucks, Frac Tanks, Vac truck, railway maintenance equipment
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention Needed	Correction Needed	Discontinue/ Stop

Additional Chemical Hazards

Added chemical	Anticipated source or product utilization description	Exposure Potential	Estimated Volume
Calibration Gas	Used to calibrate air monitoring instruments; generally safe when appropriately stored and secured (especially while driving)	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input checked="" type="checkbox"/> Unlikely	1-Liter cannister

Additional Physical Hazards

Added Hazard	Source of Hazard	Exposure Potential	Affected Workers
Slips, trips, and falls	Uneven surfaces, steps, slick surfaces (mud/wet), yards, well locations	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Aggressive residents/pets	Residential engagement, property access, entering homes for testing	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Vehicle/traffic hazards	Distracted driving, increased traffic from response, blind spots, pedestrians, deer, low light, varying weather conditions	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Reason for deviation from HASP	Blue Plan is specific to work area; this covers residential	Expected Interaction	
		<input checked="" type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Once	

3 Site Control

Zone description	Standard Operating Procedures	
Exclusion Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the EZ access locations. • This area is off limits to non-authorized, or non-essential personnel during the response and mitigation operations. • All entrants must abide by the protective measures and PPE criteria (when required) for the specified area of work and the task-specific safety procedures assigned. 	
Contaminant Reduction Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the approved site entry locations. • This area will include work activity conducted to support EZ operations. This area also includes decontamination locations. • This area is off limits to non-authorized, or non-essential personnel during response and mitigation operations. 	
Support Zone	<ul style="list-style-type: none"> • Access will be provided through approved site access locations, maintained by badge check-in and checkout. • General Site-Specific PPE will be required in the SZ. • Muster locations have been designated in the SZ, please refer to the site control map for approved muster locations located near the work site. 	
Job Tasks:	Work Area Description	Zone classification
1. Traffic / Navigation	Roadway navigation and community travel; parking, pedestrians, pets	No Zone Classification / Outside of Work Area / Community Access
2. Well Testing	Homeowners with well water requesting tests; accessibility, footing	
3. Air Monitoring	Homeowners requesting environmental monitoring inside home; access, pets	
4. Personal Communication	Engagement with homeowners requesting monitoring; access, pets	

Site Control Map



4 Communication Plan

Work Area:	Available Comms	Emergency Communication Procedures	
Residential and Community Monitoring	<input checked="" type="checkbox"/> 2-way Radios <input checked="" type="checkbox"/> Hand Signals <input checked="" type="checkbox"/> Cell phone <input checked="" type="checkbox"/> Car Horn	Emergency Signal	Short Car horn Blast: Attention to surrounding personnel, drivers, operators. Long Car Horn Blast: Emergency egress
		Action	Crosswind, then upwind to muster point; i.e., incident command or tailgate briefing location
		Hand Signal	Two hands placed on top of head
		Cell comms	Chain of Command communication

5 Personal Protective Equipment

Designated Levels of Personal Protection

Task:	Work Area (e.g., EZ, CRZ, other):	Job Function:	Level of Protection:
1. Traffic / Navigation	Other	Roadway navigation and community travel; parking, pedestrians, pets	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)
2. Well Testing	Other	Homeowners with well water requesting tests; accessibility, footing	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)
3. Air Monitoring	Other	Homeowners requesting environmental monitoring inside home; access, pets	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)
4. Personal Communication	Other	Engagement with homeowners requesting monitoring; access, pets	Modified Level D <input checked="" type="checkbox"/> (hi-viz safety vest)

6 Decontamination (Should not be necessary; however, if visiting work area, please proceed with directives below)

Decontamination Procedures	
Personnel (Level A, B, C) Decontamination Procedures:	
Decontamination of personnel is largely focused on boot wash to prevent contamination migration outside of EZ:	
<u>Station 1: Boot Wash/Scrub</u> Using available boot wash stations, remove heavy soils and mud with soap and brush.	
<u>Station 2: Rinse</u> Using secondary decon pool, rinse boots free of remaining soils and soap.	
Emergency Decontamination Procedures:	
If exposure occurs, use the least aggressive but affective means to decon personnel before rendering first aid. If life saving means are necessary, dismiss decontamination unless a greater hazard is posed to the attending first aid personnel. First aid personnel should use nitrile gloves or conduct localized decontamination to assess injured persons.	

7 Environmental and Personal Monitoring

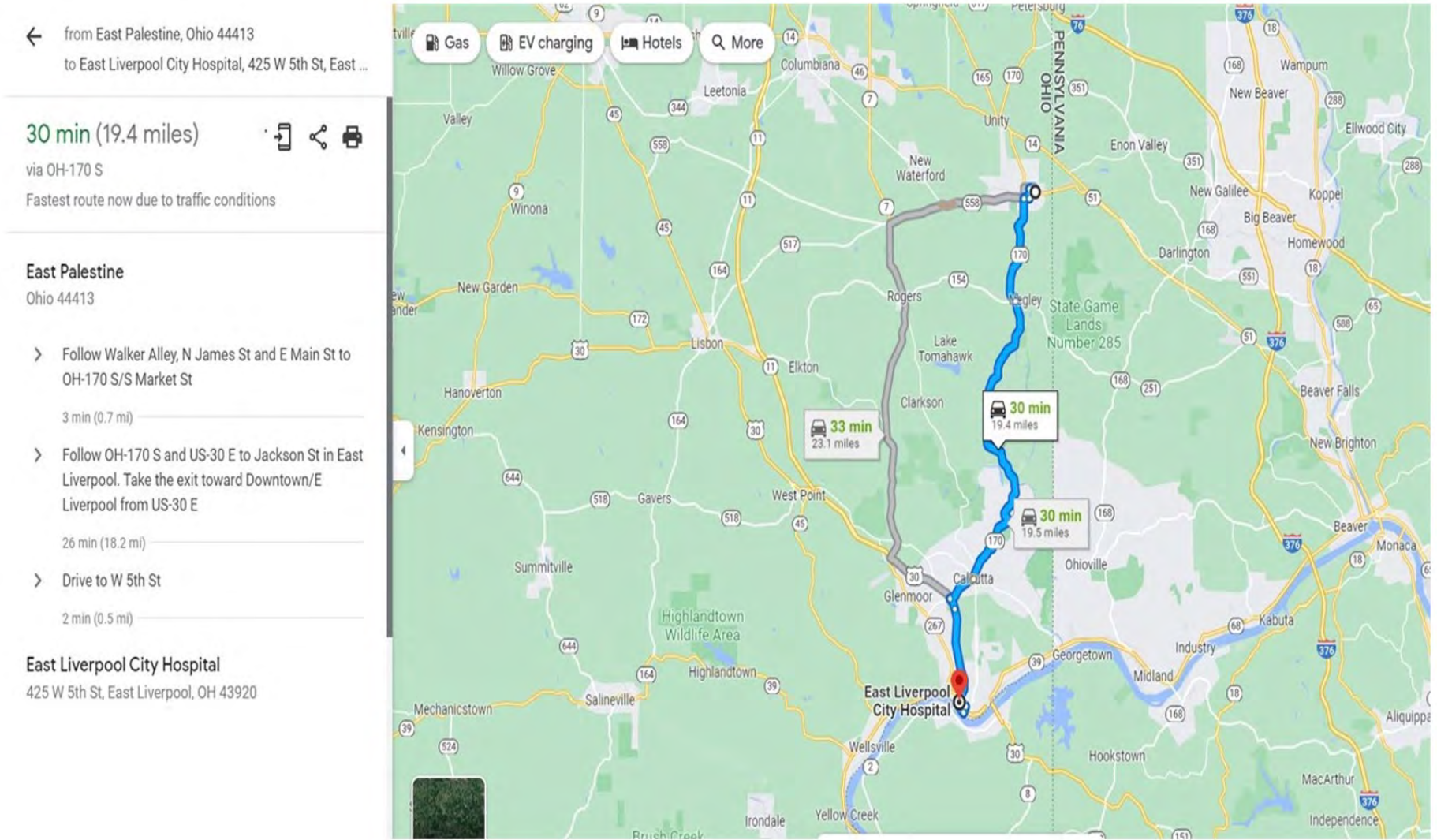
AIR MONITORING SUMMARY			
Instrument Type:	Contaminant:	Frequency:	Action Level/Comments:
RAE Systems MultiRAE Pro (PID)	VOCs	As needed	Detection above 0.2 ppm requires assessment for vinyl chloride. Detection above 0.5, don respiratory protection or egress.
RAE Systems MultiRAE Pro (O ₂ sensor)	Oxygen	Confined space work	≤ 19.5% or ≥ 23.5% oxygen, evacuate area and re-evaluate
RAE Systems MultiRAE Pro (LEL sensor)	Combustible range vapors and gases, CO	Periodic	> 10% of LEL (corrected) prompts work stoppage and personnel egress
Detector Tubes	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Drager XPID	Vinyl chloride Butyl acrylate	As necessary to further evaluate photo ionization detector	VC: 0.5 ppm, report detection – prepare for protective controls BA: 2.0 ppm, report detection & don APR for continued work
Personal Monitoring Procedures			
Chemical Exposure:			
Assay 525 Organic Vapor Monitors (OVM) are utilized to measure workers 8-hour TWA exposure for butyl acrylate and vinyl chloride. Workers will be notified of their individual exposure per OSHA reporting criteria for personal sampling notification.			
Butyl acrylate: analysis method is conducted per modified NIOSH 2537. Vinyl chloride: analysis method is conducted per NIOSH 1007 method.			

8 EMERGENCY RESPONSE (AED Locations, See Blue Plan)

Agency	Nature of Emergency	Contact Number:
On-site EMT	First aid, initial emergency care, trauma care	911
Air Evac	Emergency, life-threatening, major trauma	911
Fire	Medical, criminal, and fire emergency	Onsite resources, 911
Police	Security, crime, suspicious behavior	911, NS police: (800) 453-2530
Emergency Medical Facility Name East Liverpool City Hospital – Emergency Room		Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
Non-Emergency Medical Facility Name East Liverpool Hospital		Non-Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
First Aid Location Site vehicles	Fire Extinguisher Location Site vehicles, heavy machinery	

Emergency Notification Procedures	Places of Refuge	Emergency Decon and Evacuation	Site Security Measures
<p>Notify site safety and then call 911 for paramedics. Phone and/or verbal notification for evacuation.</p> <p>Hospital: See above</p> <p>Discern whether emergency care is needed. If in doubt, proceed to emergency medical facility or contact 911.</p>	<p>Refuge locations vary, but egress must be upwind/uphill in all locations. Work crew supervisors must account for all personnel under their direction in the event of evacuation or relocation. See Refinery map section</p>	<p>Establish an area of refuge for contaminated individuals ASAP</p> <p>Establish the gross decon area using a water source such as garden hoses, engine lines or pump sprayers.</p> <p>Spray individuals with copious amounts of water to remove overt quantities of contaminants.</p>	<p>Site security being provided by local law enforcement.</p>

East Liverpool City Hospital
425 W. 5th St,
East Liverpool, OH 43920
(330) 385-7200



HASP – Division: Community Engagement

Project: East Palestine Train Derailment Site

Location: East Palestine, OH

Date Prepared: 3-23-2023

Version: 2.0

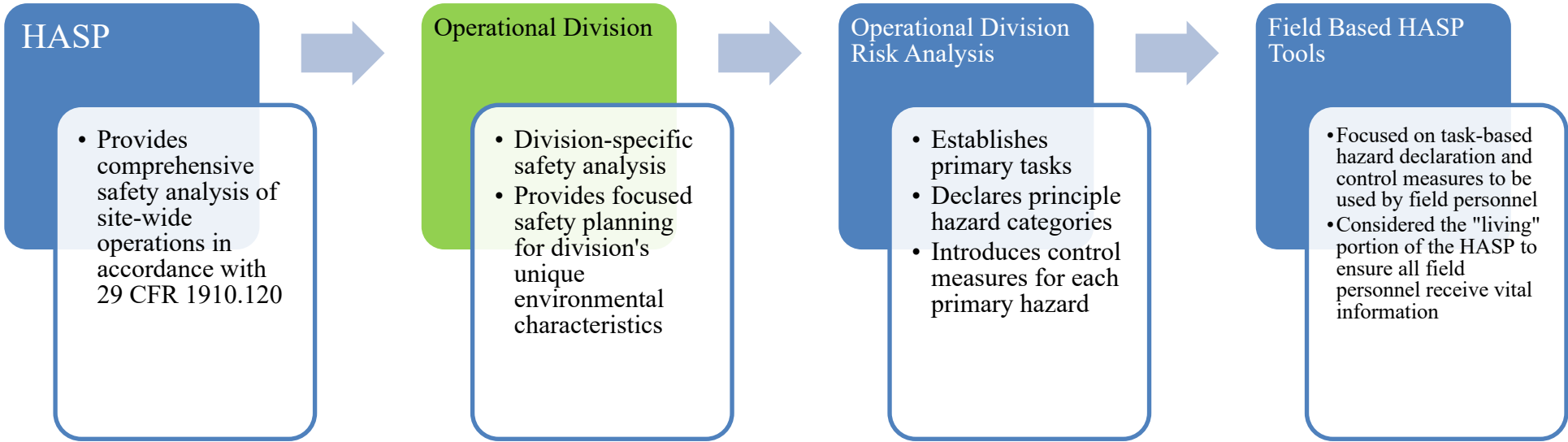
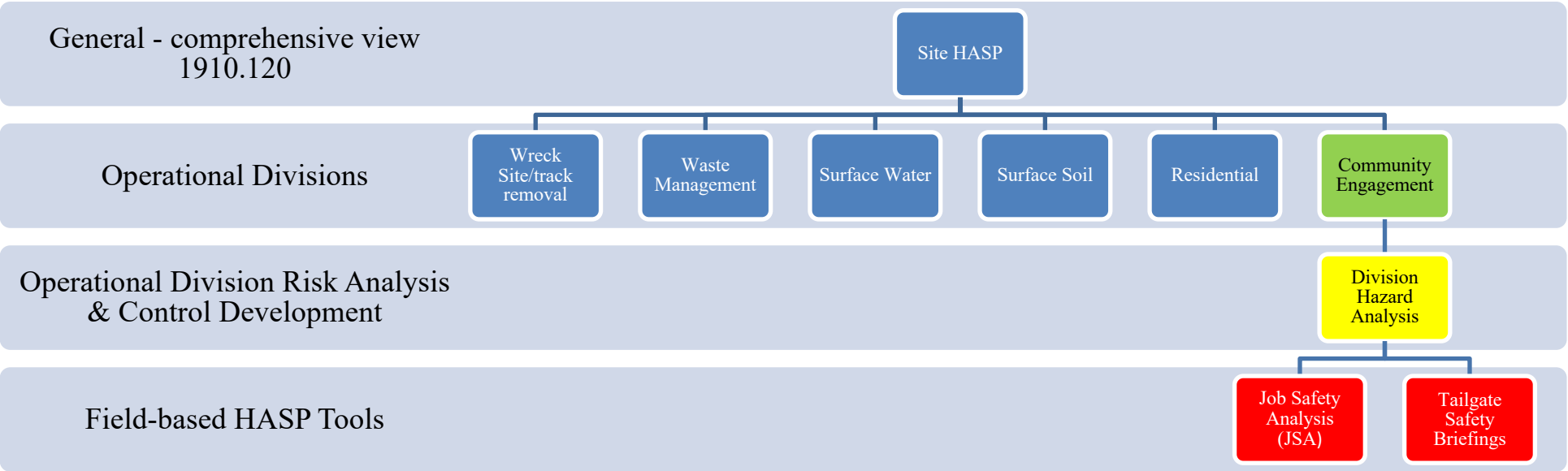
Operational Period: 7-day

Operational Division: Community Engagement

For Emergencies Contact: Site EMT and/or 911

Scope: This condensed HASP is an operation-specific addendum to the East Palestine Train Derailment site wide HASP. The content in this addendum is not intended to be comprehensive but focused on health and safety components not specifically covered in the site-wide HASP. For more inclusive content, please refer to the sitewide HASP.

1 Plan Organization and Responsibilities



2 Site Characterization & Hazards Overview

Major Tasks:	Risk Category (GAR)	Description and Location Where Task(s)/Operation(s) to be Performed		
1. Traffic / Navigation	28	Roadway navigation and community travel; parking, pedestrians, pets		
2. Community Outreach / Townhall Meetings	11	Homeowners requesting environmental monitoring or additional information		
3. Community Outreach / Welcome Center	11	Homeowners requesting environmental monitoring or additional information		
4. Personal Communication	11	Engagement with community; various settings		
Site Information	Roadways:	All Roadways Surrounding East Palestine & Columbiana		
	Waterways:	Topographical drainage, creeks,	Facility Equipment:	Passing trains, tractor trailers (adj businesses)
	Railways:	NS	Heavy Machinery:	Dump trucks, Frac Tanks, Vac truck, railway maintenance equipment
	Electrical Sources:	High voltage power line, temp power, etc.	Pipelines:	Determine with utility

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention Needed	Correction Needed	Discontinue/ Stop

Additional Physical Hazards

Added Hazard	Source of Hazard	Exposure Potential	Affected Workers
Slips, trips, and falls	Uneven surfaces, steps, slick surfaces (mud/wet), yards, well locations	<input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Aggressive residents/pets	Residential engagement, property access, various settings	<input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Vehicle/traffic hazards	Distracted driving, increased traffic from response, blind spots, pedestrians, deer, low light, varying weather conditions	<input type="checkbox"/> Likely <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Possible <input type="checkbox"/> Unlikely	Community workers and support contractors
Reason for deviation from HASP	Blue Plan is specific to work area; this covers community settings	Expected Interaction	
		<input checked="" type="checkbox"/> Hourly <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Once	

3 Site Control

Zone description	Standard Operating Procedures	
Exclusion Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the EZ access locations. • This area is off limits to non-authorized, or non-essential personnel during the response and mitigation operations. • All entrants must abide by the protective measures and PPE criteria (when required) for the specified area of work and the task-specific safety procedures assigned. 	
Contaminant Reduction Zone	<ul style="list-style-type: none"> • Check in and out of this zone at the approved site entry locations. • This area will include work activity conducted to support EZ operations. This area also includes decontamination locations. • This area is off limits to non-authorized, or non-essential personnel during response and mitigation operations. 	
Support Zone	<ul style="list-style-type: none"> • Access will be provided through approved site access locations, maintained by badge check-in and checkout. • General Site-Specific PPE will be required in the SZ. • Muster locations have been designated in the SZ, please refer to the site control map for approved muster locations located near the work site. 	
Job Tasks:	Work Area Description	Zone classification
1. Traffic / Navigation	Roadway navigation and community travel; parking, pedestrians, pets	No Zone Classification / Outside of Work Area / Community Access
2. Community Outreach / Townhall Meetings	Homeowners requesting environmental monitoring or additional information	
3. Community Outreach / Welcome Center	Homeowners requesting environmental monitoring or additional information	
4. Personal Communication	Engagement with community; various settings	

Site Control Map



4 Communication Plan

Work Area:	Available Comms	Emergency Communication Procedures	
Residential and Community Monitoring	<input checked="" type="checkbox"/> 2-way Radios <input checked="" type="checkbox"/> Hand Signals <input checked="" type="checkbox"/> Cell phone <input checked="" type="checkbox"/> Car Horn	Emergency Signal	Short Car horn Blast: Attention to surrounding personnel, drivers, operators. Long Car Horn Blast: Emergency egress
		Action	Crosswind, then upwind to muster point; i.e., incident command or tailgate briefing location
		Hand Signal	Two hands placed on top of head
		Cell comms	Chain of Command communication

5 Personal Protective Equipment

Designated Levels of Personal Protection

Task:	Work Area (e.g., EZ, CRZ, other):	Job Function:	Level of Protection:
1. Traffic / Navigation	Other	Roadway navigation and community travel; parking, pedestrians, pets	Modified Level D <input checked="" type="checkbox"/> (Response Badge / Identification)
2. Community Outreach / Townhall Meetings	Other	Homeowners requesting environmental monitoring or additional information	Modified Level D <input checked="" type="checkbox"/> (Response Badge / Identification)
3. Community Outreach / Welcome Center	Other	Homeowners requesting environmental monitoring or additional information	Modified Level D <input checked="" type="checkbox"/> (Response Badge / Identification)
4. Personal Communication	Other	Engagement with community; various settings	Modified Level D <input checked="" type="checkbox"/> (Response Badge / Identification)

6 Decontamination (Should not be necessary; however, if visiting work area, please proceed with directives below)

Decontamination Procedures	
Personnel (Level A, B, C) Decontamination Procedures:	
Decontamination of personnel is largely focused on boot wash to prevent contamination migration outside of EZ:	
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<u>Station 2: Rinse</u> Using secondary decon pool, rinse boots free of remaining soils and soap.	
Emergency Decontamination Procedures:	
If exposure occurs, use the least aggressive but affective means to decon personnel before rendering first aid. If life saving means are necessary, dismiss decontamination unless a greater hazard is posed to the attending first aid personnel. First aid personnel should use nitrile gloves or conduct localized decontamination to assess injured persons.	

7 Environmental and Personal Monitoring

AIR MONITORING SUMMARY			
Instrument Type:	Contaminant:	Frequency:	Action Level/Comments:
RAE Systems MultiRAE Pro (PID)	VOCs	As needed	Detection above 0.2 ppm requires assessment for vinyl chloride. Detection above 0.5, don respiratory protection or egress.
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RAE Systems MultiRAE Pro (LEL sensor)	Combustible range vapors and gases, CO	Periodic	> 10% of LEL (corrected) prompts work stoppage and personnel egress
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Personal Monitoring Procedures			
Chemical Exposure:			
Assay 525 Organic Vapor Monitors (OVM) are utilized to measure workers 8-hour TWA exposure for butyl acrylate and vinyl chloride. Workers will be notified of their individual exposure per OSHA reporting criteria for personal sampling notification.			
Butyl acrylate: analysis method is conducted per modified NIOSH 2537.			
Vinyl chloride: analysis method is conducted per NIOSH 1007 method.			

8 EMERGENCY RESPONSE (AED Locations, See Blue Plan)

Agency	Nature of Emergency	Contact Number:
On-site EMT	First aid, initial emergency care, trauma care	911
Air Evac	Emergency, life-threatening, major trauma	911
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Police	Security, crime, suspicious behavior	911, NS police: (800) 453-2530
Emergency Medical Facility Name East Liverpool City Hospital – Emergency Room		Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
Non-Emergency Medical Facility Name East Liverpool Hospital		Non-Emergency Medical Facility Location 425 W. 5 th Street: (330) 385-7200
First Aid Location Site vehicles	Fire Extinguisher Location Site vehicles, heavy machinery	

Emergency Notification Procedures	Places of Refuge	Emergency Decon and Evacuation	Site Security Measures
<p>Notify site safety and then call 911 for paramedics. Phone and/or verbal notification for evacuation.</p> <p>Hospital: See above</p> <p>Discern whether emergency care is needed. If in doubt, proceed to emergency medical facility or contact 911.</p>	<p>Refuge locations vary, but egress must be upwind/uphill in all locations. Work crew supervisors must account for all personnel under their direction in the event of evacuation or relocation. See Refinery map section</p>	<p>Establish an area of refuge for contaminated individuals ASAP</p> <p>Establish the gross decon area using a water source such as garden hoses, engine lines or pump sprayers.</p> <p>Spray individuals with copious amounts of water to remove overt quantities of contaminants.</p>	<p>Site security being provided by local law enforcement.</p>

East Liverpool City Hospital
425 W. 5th St,
East Liverpool, OH 43920
(330) 385-7200

← from East Palestine, Ohio 44413
to East Liverpool City Hospital, 425 W 5th St, East ...

Gas EV charging Hotels More

30 min (19.4 miles)
via OH-170 S
Fastest route now due to traffic conditions

East Palestine
Ohio 44413

- > Follow Walker Alley, N James St and E Main St to OH-170 S/S Market St
3 min (0.7 mi)
- > Follow OH-170 S and US-30 E to Jackson St in East Liverpool. Take the exit toward Downtown/E Liverpool from US-30 E
26 min (18.2 mi)
- > Drive to W 5th St
2 min (0.5 mi)

East Liverpool City Hospital
425 W 5th St, East Liverpool, OH 43920

Map details: The map shows a route starting from East Palestine, Ohio, heading south on OH-170 S, then east on US-30 E, and finally south on W 5th St to East Liverpool City Hospital. The route is highlighted in blue. The map includes various landmarks, roads, and a sidebar with navigation instructions. The sidebar also includes a search bar and icons for Gas, EV charging, Hotels, and More. The map shows the following route segments:

- 33 min, 23.1 miles (via OH-170 S and US-30 E)
- 30 min, 19.4 miles (via OH-170 S)
- 30 min, 19.5 miles (via OH-170 S)

High Consequence SAFETY ANALYSIS		Hazard Scale	Severity/ Probability/ Exposure	Chemical exposure	Machine-person contact	Soft-tissue damage from debris	High-pressure liquid release	Overhead lifts - mechanical injury	Moving trains	Total	Severity weighted total possible	Gar Scale Percentage	CONTROLS	Chemical Exposure	Machine-Person Contact	Soft-tissue damage from debris	High-pressure liquid release	Overhead lifts - mechanical injury	Moving trains											
1. Division: Derailment & Track Removal	2. Date/Time Prepared: 3-18-2023																													
Task Groups		Ranking 1-5	S	P	E	GAR	Adj GAR	S	P	E	GAR	Adj GAR	S	P	E	GAR	Adj GAR	S	P	E	GAR	Adj GAR	Protection Multiplier	Fans	Alarms, travel path, visual	PPE-FR & gloves	Safety clamps for hose	SCBA, SAR	Watchman - comms	
Railcar manipulations & wrecking		Ranking 1-5	S	4	5	4	3	4	5												25	536.5	56	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
			P	3	4	4	2	3	2				18																	
			E	3	5	4	4	3	4				23																	
			GAR	36.0	100.0	64.0	24.0	36.0	40.0				300.0																	
		Adj GAR	25.2	80.0	60.8	16.8	34.2	32.0				249.0	536.5	46																
HAZMAT		Ranking 1-5	S	4	5	4	3	4	5												25	536.5	44	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
			P	4	3	3	4	2	2				18																	
			E	4	3	2	4	2	4				19																	
			GAR	64.0	45.0	24.0	48.0	16.0	40.0				237																	
		Adj GAR	44.8	36.0	22.8	33.6	15.2	32.0				184.4	536.5	34																
Environmental Remediation		Ranking 1-5	S	4	5	4	3	4	5												25	536.5	37	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
			P	3	4	3	2	1	2				15																	
			E	3	4	2	2	1	4				16																	
			GAR	36.0	80.0	24.0	12.0	4.0	40.0				196																	
		Adj GAR	25.2	64.0	22.8	8.4	3.8	32.0				156.2	536.5	29																
Environmental Science		Ranking 1-5	S	4	5	4	3	4	5												25	536.5	35	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
			P	4	4	2	2	1	2				15																	
			E	4	4	2	1	1	2				14																	
			GAR	64.0	80.0	16.0	6.0	4.0	20.0				190																	
		Adj GAR	44.8	64.0	15.2	4.2	3.8	16.0				148.0	536.5	28																
Railway Track Maintenance		Ranking 1-5	S	4	5	4	3	4	5												25	536.5	38	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
			P	2	4	2	1	3	2				14																	
			E	2	5	1	1	3	4				16																	
			GAR	16.0	100.0	8.0	3.0	36.0	40.0				203																	
		Adj GAR	11.2	80.0	7.6	2.1	34.2	32.0				167.1	536.5	31																

ICS Form 215A (mod)	Operational Risk Management Key	Scale	1	2	3	4	5
		Severity	Slight	Minimal	Significant	Major	Catastrophic
		Probability	Remote	Un-high	50/50	>50	Very high
		Exposure	Episodic	Weekly	Daily	Hourly	Continuous

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention	Correction Needed	Discontinue/

High Consequence SAFETY ANALYSIS		Hazard Scale	Severity/ Probability/ Exposure	Chemical exposure	Machine-person contact injury	Soft-tissue damage (debris /equipment / pinchpo	Vacuum/presurized liquid release	Slips, Trips, Falls - mechanical injury	Moving trains	Electrical Hazards	Total	Severity weighted total possible	Gar Scale Percentage	CONTROLS	Chemical Exposure	Machine-person contact injury	Soft-tissue damage	Vacuum/presurized liquid release	Slips, Trips, Falls - mechanical injury	Moving trains	Electrical Hazards													
1. Division: Waste Management - Liquid/Vapor Extraction																						2. Date/Time Prepared: 3-23-2023												
Task Groups																																		
Water Treatment (HEPACO)	Ranking 1-5	S	3	4	3	3	4	5	4														26	558.7	41	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	0.70	
		P	2	2	3	2	3	2	2														16											
		E	4	4	4	4	5	3	4	4																								28
		GAR	24.0	32.0	36.0	30.0	36.0	40.0	32.0																									230.0
	Adj GAR	16.8	25.6	34.2	21.0	34.2	32.0	22.4															186.2	558.7	33		Fans	Alarms, travel path, visual	PPE-FR & gloves	Safety clamps for hose	SCBA, SAR	Watchman - comms	Grounding and Bonding	
Vapor and Liquid Product Recovery (HEPACO)	Ranking 1-5	S	3	4	3	3	4	5	4														26	558.7	44	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	0.70	
		P	2	3	3	2	3	2	2														17											
		E	4	4	4	5	3	4	4																									28
		GAR	24.0	48.0	36.0	30.0	36.0	40.0	32.0																									246
	Adj GAR	16.8	38.4	34.2	21.0	34.2	32.0	22.4															199.0	558.7	36		Fans	Alarms, travel path, visual	PPE-FR & gloves	Safety clamps for hose	SCBA, SAR	Watchman - comms	Grounding and Bonding	
Lordstown Tank Car Loading (SPSI)	Ranking 1-5	S	3	4	3	4	4	5	4														27	550.8	50	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	0.70	
		P	2	3	3	3	3	2	2														18											
		E	4	4	4	5	3	4	4																									28
		GAR	24.0	48.0	36.0	60.0	36.0	40.0	32.0																									276
	Adj GAR	16.8	38.4	34.2	42.0	34.2	32.0	22.4															220	550.8	40		Fans	Alarms, travel path, visual	PPE-FR & gloves	Safety clamps for hose	SCBA, SAR	Watchman - comms	Grounding and Bonding	
Frac. Tank Farm Tank Truck Loading (SPSI)	Ranking 1-5	S	3	2	3	3	4	5	4														24	576.5	41	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	0.70	
		P	3	3	3	3	3	2	2														19											
		E	4	3	4	4	3	4	4																									26
		GAR	36.0	18.0	36.0	36.0	36.0	40.0	32.0																									234
	Adj GAR	25.2	14.4	34.2	25.2	34.2	32.0	22.4															187.6	576.5	33		Fans	Alarms, travel path, visual	PPE-FR & gloves	Safety clamps for hose	SCBA, SAR	Watchman - comms	Grounding and Bonding	
Frac. Tank Farm Vac Truck Discharge (HEPACO)	Ranking 1-5	S	3	2	3	3	4	5	4														24	576.5	41	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	0.70	
		P	3	3	3	3	3	2	2														19											
		E	4	3	4	4	3	4	4																									26
		GAR	36.0	18.0	36.0	36.0	36.0	40.0	32.0																									234
	Adj GAR	25.2	14.4	34.2	25.2	34.2	32.0	22.4															187.6	576.5	33		Fans	Alarms, travel path, visual	PPE-FR & gloves	Safety clamps for hose	SCBA, SAR	Watchman - comms	Grounding and Bonding	

ICS Form 215A (mod)	Operational Risk Management Key	Scale	1	2	3	4	5
		Severity	Slight	Minimal	Significant	Major	Catastrophic
		Probability	Remote	Un-high	50/50	>50	Very high
		Exposure	Episodic	Weekly	Daily	Hourly	Continuous

Gar Scale	Percentage	0-25	25-50	50-75	75-100
Risk		Slight	Possible	Substantial	Very High
Color		Green	Yellow	Amber	Red
Action		Possibly Acceptable	Attention	Correction Needed	Discontinue/

High Consequence SAFETY ANALYSIS		1. Division: Waste Management - Soil Recovery/Removal		2. Date/Time Prepared: 3-23-2023		Task Groups										Total	Severity weighted total possible	Gar Scale Percentage	CONTROLS	Chemical Exposure	Machine-person contact injury	Soft-tissue damage	Electrical Hazards	Slips, Trips, Falls - mechanical injury	Moving trains
Task Groups		Hazard Scale	Severity/ Probability/ Exposure	Chemical exposure	Machine-person contact injury	Soft-tissue damage (debris /equipment / pinchpo	Electrical Hazards	Slips, Trips, Falls - mechanical injury	Moving trains																
Work Zone Roll Off Loading (HEPACO)		Ranking 1-5	S	3	5	4	4	4	5																
		P	2	3	4	2	3	2																	
		E	4	5	4	4	3	4																	
		GAR	24.0	75.0	64.0	32.0	36.0	40.0																	
		Adj GAR	16.8	60.0	60.8	22.4	34.2	32.0																	
Roll Off Staging - truck loading (HEPACO and SP51)		Ranking 1-5	S	3	5	4	4	4	5																
		P	2	2	3	2	3	2																	
		E	4	4	4	4	3	4																	
		GAR	24.0	40.0	48.0	32.0	36.0	40.0																	
		Adj GAR	16.8	32.0	45.6	22.4	34.2	32.0																	
Roll Off Staging - truck unloading (HEPACO and SP51)		Ranking 1-5	S	3	5	3	4	4	5																
		P	2	2	3	2	3	2																	
		E	4	4	4	4	3	4																	
		GAR	24.0	40.0	36.0	32.0	36.0	40.0																	
		Adj GAR	16.8	32.0	34.2	22.4	34.2	32.0																	
		Ranking 1-5	S	3	0	0	0	0	0																
		P	0	0	0	0	0	0																	
		E	0	0	0	0	0	0																	
		GAR	0.0	0.0	0.0	0.0	0.0	0.0																	
		Adj GAR	0.0	0.0	0.0	0.0	0.0	0.0																	
		Ranking 1-5	S	3	0	0	0	0	0																
		P	0	0	0	0	0	0																	
		E	0	0	0	0	0	0																	
		GAR	0.0	0.0	0.0	0.0	0.0	0.0																	
		Adj GAR	0.0	0.0	0.0	0.0	0.0	0.0																	

ICS Form 215A (mod)	Operational Risk Management Key	Scale	1	2	3	4	5	
		Severity	Slight	Minimal	Significant	Major	Catastrophic	
		Probability	Remote	Un-high	50/50	>50	Very high	
		Exposure	Episodic	Weekly	Daily	Hourly	Continuous	

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention	Correction Needed	Discontinue/

High Consequence SAFETY ANALYSIS		Hazard Scale	Severity/ Probability/ Exposure	Chemical exposure	Vehicular injury	Soft-tissue damage (debris /equipment / pinchpo	Aggressive Personnel / Pets	Slips, Trips, Falls - mechanical injury	Moving trains								Total	Severity weighted total possible	Gar Scale Percentage	CONTROLS	Chemical Exposure	Vehicular injury	Soft-tissue damage	Aggressive Personnel / Pets	Slips, Trips, Falls - mechanical injury	Moving trains	
1. Division: Surface Water	2. Date/Time Prepared: 3-23-2023																										
Task Groups																											
Traffic / Roadway Navigation	Ranking 1-5	S	1	5	4	1	3	5										19	586.5	34	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
		P	1	4	3	1	2	2										13									
		E	1	5	3	3	3	4										19									
		GAR	1.0	100.0	36.0	3.0	18.0	40.0										198.0									
		Adj GAR	0.7	80.0	34.2	2.1	17.1	32.0										166.1									
Environmental Sampling – Vessel Over Water / Deep Water (PFD required)	Ranking 1-5	S	1	5	3	2	5	5										21	567.2	30	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
		P	1	3	3	2	3	2										14									
		E	1	3	3	3	3	4										17									
		GAR	1.0	45.0	27.0	12.0	45.0	40.0										170									
		Adj GAR	0.7	36.0	25.7	8.4	42.8	32.0										145.5									
Environmental Sampling – Work Area	Ranking 1-5	S	2	5	3	2	4	5										21	567.2	23	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
		P	2	3	3	2	1	2										13									
		E	1	3	3	3	1	4										15									
		GAR	4.0	45.0	27.0	12.0	4.0	40.0										132									
		Adj GAR	2.8	36.0	25.7	8.4	3.8	32.0										108.7									
Environmental Sampling – Community	Ranking 1-5	S	1	5	3	2	4	5										20	576.5	20	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
		P	1	3	3	2	1	2										12									
		E	1	3	3	5	1	2										15									
		GAR	1.0	45.0	27.0	20.0	4.0	20.0										117									
		Adj GAR	0.7	36.0	25.7	14.0	3.8	16.0										96.2									
	Ranking 1-5	S	4	5	4	3	4	5										25	536.5	38	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
		P	2	4	2	1	3	2										14									
		E	2	5	1	1	3	4										16									
		GAR	16.0	100.0	8.0	3.0	36.0	40.0										203									
		Adj GAR	11.2	80.0	7.6	2.1	34.2	32.0										167.1									

ICS Form 215A (mod)	Operational Risk Management Key	Scale	1	2	3	4	5
		Severity	Slight	Minimal	Significant	Major	Catastrophic
		Probability	Remote	Un-high	50/50	>50	Very high
		Exposure	Episodic	Weekly	Daily	Hourly	Continuous

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention	Correction Needed	Discontinue/

High Consequence SAFETY ANALYSIS		1. Division: Surface Soil Sampling		2. Date/Time Prepared: 3-23-2023		Task Groups										Total	Severity weighted total possible	Gar Scale Percentage	CONTROLS	Chemical Exposure	Vehicular injury	Soft-tissue damage	Aggressive Personnel / Pets	Slips, Trips, Falls - mechanical injury	Moving trains
		Hazard Scale	Severity/ Probability/ Exposure	Chemical exposure	Vehicular injury	Soft-tissue damage (debris /equipment / pinchpo	Aggressive Personnel / Pets	Slips, Trips, Falls - mechanical injury	Moving trains																
Traffic / Roadway Navigation		Ranking 1-5	S	1	5	4	1	3	5																
			P	1	4	3	1	2	2																
			E	1	5	3	3	3	4																
			GAR	1.0	100.0	36.0	3.0	18.0	40.0																
		Adj GAR	0.7	80.0	34.2	2.1	17.1	32.0																	
		Ranking 1-5	S	1	5	3	2	5	5																
			P	1	3	3	2	3	2																
			E	1	3	3	3	3	4																
			GAR	1.0	45.0	27.0	12.0	45.0	40.0																
		Adj GAR	0.7	36.0	25.7	8.4	42.8	32.0																	
Environmental Sampling – Work Area		Ranking 1-5	S	2	5	3	2	4	5																
			P	2	3	3	2	1	2																
			E	1	3	3	3	1	4																
			GAR	4.0	45.0	27.0	12.0	4.0	40.0																
		Adj GAR	2.8	36.0	25.7	8.4	3.8	32.0																	
Environmental Sampling – Community		Ranking 1-5	S	1	5	3	2	4	5																
			P	1	3	3	2	1	2																
			E	1	3	3	5	1	2																
			GAR	1.0	45.0	27.0	20.0	4.0	20.0																
		Adj GAR	0.7	36.0	25.7	14.0	3.8	16.0																	
		Ranking 1-5	S	4	5	4	3	4	5																
			P	2	4	2	1	3	2																
			E	2	5	1	1	3	4																
			GAR	16.0	100.0	8.0	3.0	36.0	40.0																
		Adj GAR	11.2	80.0	7.6	2.1	34.2	32.0																	

ICS Form 215A (mod)	Operational Risk Management Key	Scale					
		Severity	Slight	Minimal	Significant	Major	Catastrophic
		Probability	Remote	Un-high	50/50	>50	Very high
		Exposure	Episodic	Weekly	Daily	Hourly	Continuous

Gar Scale	0-25		25-50		50-75		75-100		
	Percentage								
	Risk	Slight		Possible		Substantial		Very High	
	Color	Green		Yellow		Amber		Red	
Action	Possibly Acceptable		Attention		Correction Needed		Discontinue/		

High Consequence SAFETY ANALYSIS		Hazard Scale	Severity/ Probability/ Exposure	Chemical exposure	Vehicular injury	Soft-tissue damage (debris /equipment / pinchpo	Aggressive Personnel/ Pets	Slips, Trips, Falls - mechanical injury	Moving trains	Total	Severity weighted total possible	Gar Scale Percentage	CONTROLS	Chemical Exposure	Vehicular injury	Soft-tissue damage	Aggressive Personnel / Pets	Slips, Trips, Falls - mechanical injury	Moving trains	
1. Division: Residential	2. Date/Time Prepared: 3-23-2023																			
Task Groups																				
Traffic / Roadway Navigation	Ranking 1-5	S	1	5	4	1	3	5												19
		P	1	4	3	1	2	2												13
		E	1	5	3	3	3	4												19
		GAR	1.0	100.0	36.0	3.0	18.0	40.0												
	Adj GAR	0.7	80.0	34.2	2.1	17.1	32.0													166.1
Environmental Science - Well Testing	Ranking 1-5	S	1	5	3	2	4	5												20
		P	1	3	3	2	2	2												13
		E	1	3	3	3	2	4												16
		GAR	1.0	45.0	27.0	12.0	16.0	40.0												
	Adj GAR	0.7	36.0	25.7	8.4	15.2	32.0													118.0
Environmental Science - Air Monitoring	Ranking 1-5	S	1	5	3	2	4	5												20
		P	1	3	3	2	1	2												12
		E	1	3	3	3	1	4												15
		GAR	1.0	45.0	27.0	12.0	4.0	40.0												
	Adj GAR	0.7	36.0	25.7	8.4	3.8	32.0													106.6
Personal Communication	Ranking 1-5	S	2	5	2	2	4	5												20
		P	2	3	2	2	1	2												12
		E	2	3	2	5	1	2												15
		GAR	8.0	45.0	8.0	20.0	4.0	20.0												
	Adj GAR	5.6	36.0	7.6	14.0	3.8	16.0													83.0
	Ranking 1-5	S	4	5	4	3	4	5												25
		P	2	4	2	1	3	2												14
		E	2	5	1	1	3	4												16
		GAR	16.0	100.0	8.0	3.0	36.0	40.0												
	Adj GAR	11.2	80.0	7.6	2.1	34.2	32.0													167.1

ICS Form 215A (mod)	Operational Risk Management Key	Scale	1	2	3	4	5
		Severity	Slight	Minimal	Significant	Major	Catastrophic
		Probability	Remote	Un-high	50/50	>50	Very high
		Exposure	Episodic	Weekly	Daily	Hourly	Continuous

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention	Correction Needed	Discontinue/

High Consequence SAFETY ANALYSIS																								
1. Division: Community Engagement			2. Date/Time Prepared: 3-23-2023																					
Task Groups			Hazard Scale	Severity/ Probability/ Exposure	Chemical exposure	Vehicular injury	Soft-tissue damage (debris /equipment / pinchpo	Aggressive Personnel / Pets	Slips, Trips, Falls - mechanical injury	Moving trains					Total	Severity weighted total possible	Gar Scale Percentage	CONTROLS	Chemical Exposure	Vehicular injury	Soft-tissue damage	Aggressive Personnel / Pets	Slips, Trips, Falls - mechanical injury	Moving trains
Traffic / Roadway Navigation	Ranking 1-5	S	1	5	4	1	3	5							19	586.5	34	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80
		P	1	4	3	1	2	2						13										
		E	1	5	3	3	3	4						19										
		GAR	1.0	100.0	36.0	3.0	18.0	40.0						198.0										
		Adj GAR	0.7	80.0	34.2	2.1	17.1	32.0						166.1	586.5									
Community Outreach / Townhall Meetings	Ranking 1-5	S	1	5	2	2	3	5						18	597.5	13	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	
		P	1	3	2	2	2	1						11										
		E	1	2	2	2	3	2						12										
		GAR	1.0	30.0	8.0	8.0	18.0	10.0						75										
		Adj GAR	0.7	24.0	7.6	5.6	17.1	8.0						63.0										597.5
Community Outreach / Welcome Center	Ranking 1-5	S	1	5	2	2	3	5						18	597.5	13	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	
		P	1	2	2	2	2	1						10										
		E	1	3	2	2	3	2						13										
		GAR	1.0	30.0	8.0	8.0	18.0	10.0						75										
		Adj GAR	0.7	24.0	7.6	5.6	17.1	8.0						63										597.5
Personal Communication	Ranking 1-5	S	1	5	2	2	3	5						18	597.5	13	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	
		P	1	2	2	2	2	1						10										
		E	1	2	2	5	3	2						15										
		GAR	1.0	20.0	8.0	20.0	18.0	10.0						77										
		Adj GAR	0.7	16.0	7.6	14.0	17.1	8.0						63.4										597.5
	Ranking 1-5	S	4	5	4	3	4	5						25	536.5	38	Protection Multiplier	0.70	0.80	0.95	0.70	0.95	0.80	
		P	2	4	2	1	3	2						14										
		E	2	5	1	1	3	4						16										
		GAR	16.0	100.0	8.0	3.0	36.0	40.0						203										
		Adj GAR	11.2	80.0	7.6	2.1	34.2	32.0						167.1										536.5

ICS Form 215A (mod)	Operational Risk Management Key	Scale	1	2	3	4	5
		Severity	Slight	Minimal	Significant	Major	Catastrophic
		Probability	Remote	Un-high	50/50	>50	Very high
		Exposure	Episodic	Weekly	Daily	Hourly	Continuous

Gar Scale	Percentage	0-25	25-50	50-75	75-100
	Risk	Slight	Possible	Substantial	Very High
	Color	Green	Yellow	Amber	Red
	Action	Possibly Acceptable	Attention	Correction Needed	Discontinue/

JOB SAFETY ANALYSIS

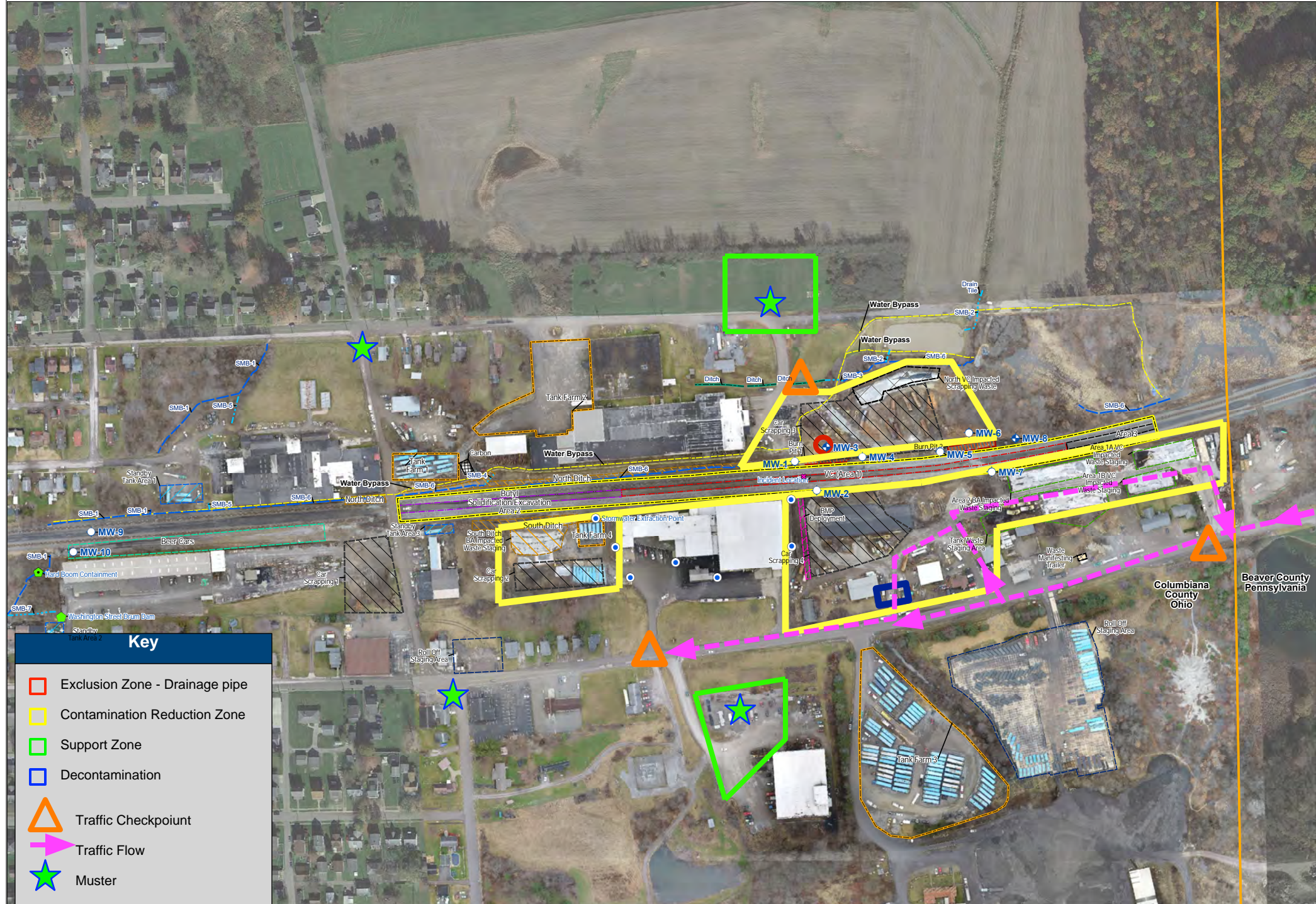
OPERATIONAL DIV: Wreck site/Track Removal	WORK TASK: Railcar manipulations & wrecking	DATE: 03/19/2023
COMMUNICATION PLAN: One member of group should be equipped with a functional radio monitoring the safety channel established for all site personnel. If operating equipment and using additional radios, monitor safety channel in addition to operational channel		
FIRST AID/MEDICAL PROVISIONS: Ensure access to first aid supplies, identify the kit location before starting work. Identify safe egress from your location to locate emergency response medical if activated.		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Moving trains	<ul style="list-style-type: none"> - Maintain situational awareness at all times. - Track protection (if applicable) - Avoid fouling track unless approved by RR Employee In Charge (EIC) 	<ul style="list-style-type: none"> - Identify a group spotter to watch for trains. - Roadway worker protection rules - Maintain > 4' distance from field side of nearest running rail
Chemical hazards	<ul style="list-style-type: none"> - Communicate chemicals and potential for exposure - Avoid BZ entering confined spaces - Describe symptoms of exposure - Assess for presence during work 	<ul style="list-style-type: none"> - NS Chemical Specific JSAs - Air monitoring or review of available data - Radial axial fans for source dilution and mobilization away from workers
Heavy equipment	<ul style="list-style-type: none"> - Avoid presence or walking through machine's operating radius - Visual contact with operator when walking behind or up to machine 	<ul style="list-style-type: none"> - Utilize a spotter when working as a group near operational equipment. - Identify boom radius of excavators - All stop when horn is activated
Sharp objects	<ul style="list-style-type: none"> - Locate scrap steel, existing sharp metal objects - Avoid contact with sharp objects through situational awareness 	<ul style="list-style-type: none"> - Utilize gloves when handling or grabbing metal or hardened objects that can cut or damage skin on hands - Ensure full-length FRC sleeves and pants
High-pressure liquid release	<ul style="list-style-type: none"> - Ensure hose clamp pins are installed - Use caution when disconnecting once pressurized lines for residual - Assume all lines are pressurized until confirmation 	<ul style="list-style-type: none"> - Distance during disconnection - Pressure gauges & other means of determining if lines are pressurized - Control lines when disconnecting with restraints if applicable
Overhead lifts/mechanical injury	<ul style="list-style-type: none"> - Avoid walking below suspended loads on excavators, front-end loaders, etc. - Do not reach between moving mechanical components or lifted loads 	<ul style="list-style-type: none"> - Only qualified personnel and operators should be in areas where suspended loads, or mechanical lifts are underway.
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before work begins, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

JOB SAFETY ANALYSIS

AREA OF OPERATION: Work area - Refer to NS JSAs for more detail	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE: 03/02/2023
COMMUNICATION PLAN: One member of group should be equipped with a functional radio monitoring the safety channel established for all site personnel. If operating equipment and using additional radios, monitor safety channel in addition to operational channel		
FIRST AID/MEDICAL PROVISIONS: Ensure access to first aid supplies, identify the kit location before starting work. Identify safe egress from your location to locate emergency response medical if activated.		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Moving trains	<ul style="list-style-type: none"> - Maintain situational awareness at all times. - Track protection (if applicable) - Avoid fouling track unless approved by RR Employee In Charge (EIC) 	<ul style="list-style-type: none"> - Identify a group spotter to watch for trains. - Roadway worker protection rules - Maintain > 4' distance from field side of nearest running rail
Chemical hazards	<ul style="list-style-type: none"> - Communicate chemicals and potential for exposure - Describe symptoms of exposure - Assess for presence during work 	<ul style="list-style-type: none"> - NS Chemical Specific JSAs - Air monitoring or review of available data
Heavy equipment	<ul style="list-style-type: none"> - Avoid presence or walking through machine's operating radius - Visual contact with operator when walking behind or up to machine 	<ul style="list-style-type: none"> - Utilize a spotter when working as a group near operational equipment. - Identify boom radius of excavators - All stop when horn is activated
Sharp objects	<ul style="list-style-type: none"> - Locate scrap steel, existing sharp metal objects - Avoid contact with sharp objects through situational awareness 	<ul style="list-style-type: none"> - Utilize gloves when handling or grabbing metal or hardened objects that can cut or damage skin on hands - Ensure full-length FRC sleeves and pants
Pedestrian traffic hazards	<ul style="list-style-type: none"> - Ensure proper footing when traversing uneven terrain - Be mindful of ballast and large rock for lower leg injuries - Assume all operators do not see you 	<ul style="list-style-type: none"> - Avoid walking in areas where your presence is not essential - Avoid standing in areas where your presence is not warranted
Overhead lifts/mechanical injury	<ul style="list-style-type: none"> - Avoid walking below suspended loads on excavators, front-end loaders, etc. - Do not reach between moving mechanical components or lifted loads 	<ul style="list-style-type: none"> - Only qualified personnel and operators should be in areas where suspended loads, or mechanical lifts are underway.
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before work begins, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

Site Control Map

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 Project Name: 20230313_Site Control Map, Date: 02/28/2023, User: jason.l...



Key

- Exclusion Zone - Drainage pipe
- Contamination Reduction Zone
- Support Zone
- Decontamination
- Traffic Checkpoint
- Traffic Flow
- ★ Muster

Legend

 Proposed Groundwater Monitoring Wells	 Standby Tank Areas	 South Ditch Basin	 Solidification/Excavation	 Carbon
 Right-of-Way Excavation Footprint	 Stormwater Catch Basin	 Stormwater Catch Basin	 Tank Wash Staging	 Area 3
 Stormwater Catch Basin	 Waste Manifesting Trailer	 Waste Manifesting Trailer	 Car Scrapping	 Beer Cars
 Monitoring Location	 Area 1 VC Impacted Waste Staging	 BMP Deployment	 Beer Cars	 North Ditch
 Incident Location	 Area 2 BA Impacted Waste Staging	 Tank Farm	 Tank Farm	 South Ditch
 Water Bypass	 Area 3 VC Impacted Waste Staging	 VC (Area 1)	 Roll Off Staging Area	
	 Roll Off Staging Area			

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 Prepared at the Direction of Counsel

Map Date: 3/1/2023
 Drone imagery date: 02/28/2023

NORFOLK SOUTHERN
 EAST PALESTINE, OHIO

ONSITE FEATURES

ARCADIS

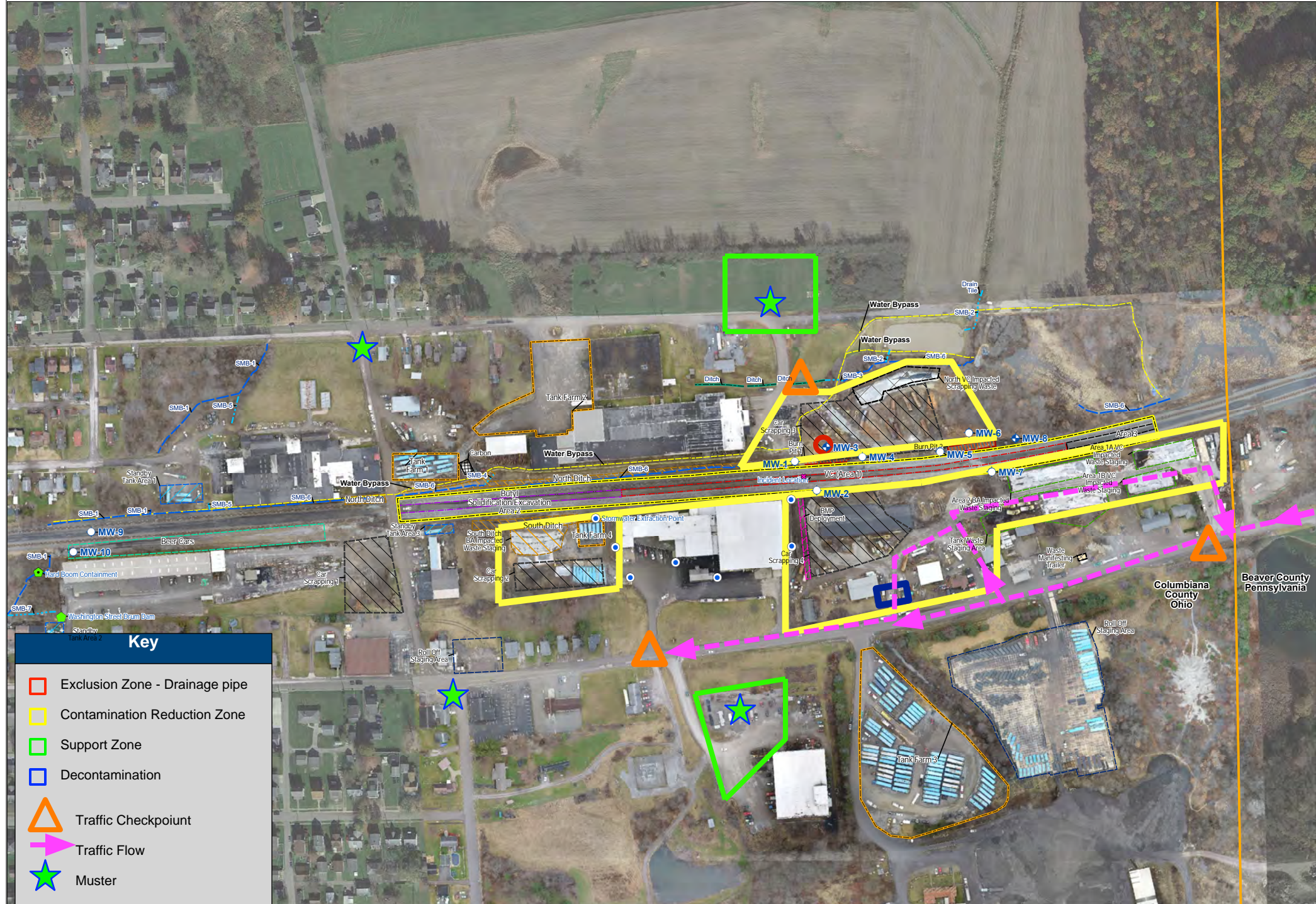
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JOB SAFETY ANALYSIS

AREA OF OPERATION: Public work	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE: 03/03/2023
COMMUNICATION PLAN: One member of group should be equipped with a functional radio monitoring the safety channel established for all site personnel. If operating equipment and using additional radios, monitor safety channel in addition to operational channel		
FIRST AID/MEDICAL PROVISIONS: Ensure access to first aid supplies, identify the kit location before starting work. Identify safe egress from your location to locate emergency response medical if activated.		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Professional/work attire. Use high-vis vest for work near active roadways. Visible ID or identification through affiliate logos		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Slip/Trip/Fall	<ul style="list-style-type: none"> - Maintain situational awareness at all times. - Focus on pedestrian travel path 	<ul style="list-style-type: none"> - Communicate difficult travel conditions to working group
Dangerous animals	<ul style="list-style-type: none"> - Survey the location for animals wild or domestic outside in proximity to group - Do not interact with or confront animals of any kind - Use the buddy system - Ensure property owner has control of any animals at residences 	<ul style="list-style-type: none"> - Consider using local law enforcement or animal control in certain instances - Stop work if solution cannot be presented
Disgruntled persons	<ul style="list-style-type: none"> - Avoid contact with visible disturbed or angry persons - Make a reasonable attempt to de-escalate confrontations. - Egress if initial efforts to de-escalate are unsuccessful - Always use buddy system 	<ul style="list-style-type: none"> - Consider local law enforcement escort for instances where contention is believed or observed prior to access - Maintain safe egress path at all times - Identify 1 person to activate 9-11 in all cases even when confrontation is
Vehicle/roadway	<ul style="list-style-type: none"> - Always wear seatbelts - No distracted driving will be tolerated - Abide by all local and state driving laws, including speed restriction and approved travel/parking corridors 	<ul style="list-style-type: none"> - Use a back-up spotter at all times when available - Back into approved parking space for rapid egress, use spotter - Avoid working on or too closely to active roadways.
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before work begins, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

Site Control Map

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Key

- Exclusion Zone - Drainage pipe
- Contamination Reduction Zone
- Support Zone
- Decontamination
- Traffic Checkpoint
- Traffic Flow
- ★ Muster

Legend

 Proposed Groundwater Monitoring Wells	 Standby Tank Areas	 South Ditch Basin	 Solidification/Excavation	 Carbon
 Right-of-Way Excavation Footprint	 South VC Impacted Scraping	 Standby Tank Area 2	 Tank Wash Staging	 Area 3
 Stormwater Catch Basin	 Waste Manifesting Trailer	 Area 1 VC Impacted Waste Staging	 Car Scrapping	 Bear Cars
 Monitoring Location	 BMP Deployment	 Area 2 BA Impacted Waste Staging	 Tank Farm	 North Ditch
 Incident Location	 Tank Farm	 Area 2 BA Impacted Waste Staging	 Tank Farm	 South Ditch
 Water Bypass	 Roll Off Staging Area	 VC (Area 1)	 VC (Area 1)	 County/State Boundary

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Map Date: 3/1/2023
 Drone imagery date: 02/28/2023

NORFOLK SOUTHERN
 EAST PALESTINE, OHIO

ONSITE FEATURES

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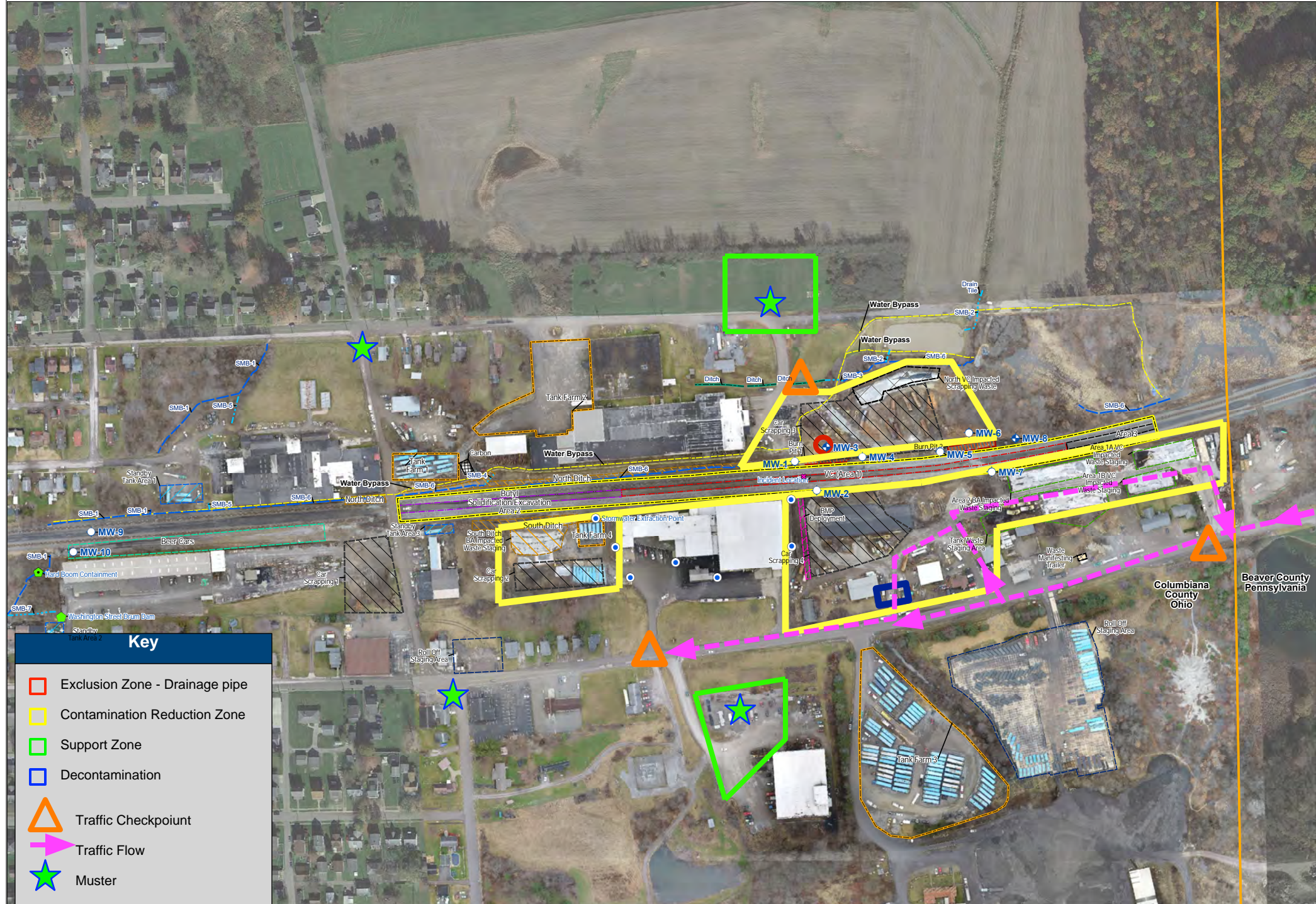
Page: 2

JOB SAFETY ANALYSIS

AREA OF OPERATION: Environmental assessment/impact prevention	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE: 03/03/2023
COMMUNICATION PLAN: One member of group should be equipped with a functional radio monitoring the safety channel established for all site personnel. If operating equipment and using additional radios, monitor safety channel in addition to operational channel		
FIRST AID/MEDICAL PROVISIONS: Ensure access to first aid supplies, identify the kit location before starting work. Identify safe egress from your location to locate emergency response medical if activated.		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Level D PPE, specifically: hardhat, safety toe boots, safety glasses, high visibility vest. Tyvek may be worn to prevent soiling.		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Slip/Trip/Fall	<ul style="list-style-type: none"> - Maintain situational awareness at all times. - Focus on pedestrian travel path - Establish solid, slip-resistant travel paths for regular travel corridors 	<ul style="list-style-type: none"> - Communicate difficult travel conditions to working group - Install earthen or synthetic steps for areas with steep traverse and regular travel.
Debris hazards, sharp objects	<ul style="list-style-type: none"> - Remove hazardous debris from the work area if possible - Mark sharp objects if unable to abate - Handle sharps with gloves and only store sharp objects with covered blades - Use hand tools responsible and with specific purpose, no modifications 	<ul style="list-style-type: none"> - Use tape or high-vis paint to demarcate sharp objects or hazardous debris that cannot be removed. - Be your brother's keeper, watch out for each other when walking throughout work area
Water hazards	<ul style="list-style-type: none"> - Avoid traversing water ways and creeks that are of a depth where drowning risk is present - Maintain sure footing when walking through or near shallow waterways 	<ul style="list-style-type: none"> - USCG approved PFDs may be necessary in certain instances - Demarcate approved travel pathways along waterways.
Vehicle/roadway	<ul style="list-style-type: none"> - Always wear seatbelts - No distracted driving will be tolerated - Abide by all local and state driving laws, including speed restriction and approved travel/parking corridors 	<ul style="list-style-type: none"> - Use a back-up spotter at all times when available - Back into approved parking space for rapid egress, use spotter - Avoid working on or too closely to active roadways.
Overhead lifts/mechanical injury	<ul style="list-style-type: none"> - Ensure proper ergonomics for lifting or awkward body positions 	<ul style="list-style-type: none"> - Team lifts for objects greater than 50 lbs.
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before work begins, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

Site Control Map

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 Project Name: 20230313_Site Control Map, Date: 02/28/2023, User: jason.l...



Key

- Exclusion Zone - Drainage pipe
- Contamination Reduction Zone
- Support Zone
- Decontamination
- Traffic Checkpoint
- Traffic Flow
- ★ Muster

Legend

 Proposed Groundwater Monitoring Wells	 Standby Tank Areas	 South Ditch Basin	 Solidification/Excavation	 Carbon
 Right-of-Way Excavation Footprint	 Storm Water Catch Basin	 South Ditch Basin	 Waste Manifesting Trailer	 1 Mile Radius from Incident Location
 Stormwater Catch Basin	 Tank Waste Staging	 Waste Manifesting Trailer	 Car Scrapping	 County/State Boundary
 Monitoring Location	 Area 1 VC Impacted Waste Staging	 BMP Deployment	 Beer Cars	 Beer Cars
 Incident Location	 Area 2 BA Impacted Waste Staging	 Tank Farm	 North Ditch	 South Ditch
 Water Bypass	 Roll Off Staging Area	 VC (Area 1)	 South Ditch	

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Map Date: 3/1/2023
 Drone imagery date: 02/28/2023

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JOB SAFETY ANALYSIS

AREA OF OPERATION: Aeration WWTP	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE:
COMMUNICATION PLAN: Communication methods between crews shall be verbal/face to face. If other crews need to contact other personnel, cell phones will be used		
FIRST AID/MEDICAL PROVISIONS: First Aid Kits Shall be in the closest SPSI supervisor truck		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Water Resistant Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots, hip waders. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Working in and around water	<ul style="list-style-type: none"> - When working within 6' of the shoreline, a Personal floatation must be worn - No working inside the water is allowed during the night shift 	<ul style="list-style-type: none"> - No working inside the water is allowed if swift water conditions are present
Chemical Exposure	<ul style="list-style-type: none"> - When working in water, PVC gloves and hip waders must be worn. - Before lunch or end of shift, hand must be washed with soap and water or hand wipes. 	<ul style="list-style-type: none"> - If air quality becomes unsafe provided by CTEH, all personnel will immediately leave the area
Pedestrian Traffic/Rough Terrain	<ul style="list-style-type: none"> - Avoid deep mud areas if possible. - When performing maintenance on machines avoid climbing on trailers - During cold weather conditions avoid wet/icy walking surfaces 	<ul style="list-style-type: none"> - A rope set up should be used to assist entry into the creek
Spills/Leaks	<ul style="list-style-type: none"> - Containments under machines must be cleaned out daily. - Contain all possible drips with white absorbent pads 	<ul style="list-style-type: none"> - When starting up aeration ops using portable monitors, ensure they are pointed in appropriate direction back into sulfur run
Hot engines	<ul style="list-style-type: none"> - When checking fluids on machines, hot engines should be shut off and left to cool down before checking fluids. - Gloves must be worn when checking fluids 	<ul style="list-style-type: none"> - If any fuel spills or drips occur on containment, they should be cleaned up before operations continue. -
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before entering work area, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

JOB SAFETY ANALYSIS

AREA OF OPERATION: South Side (Excavation and Dirt Moving Operations)	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE:
COMMUNICATION PLAN: A form of communication between operators and truck drivers must be established (i.e. horn). All other communications will be visual contact with spotters		
FIRST AID/MEDICAL PROVISIONS: A first aid kit will be available in the nearest SPSI supervisor vehicle. If treatment above first aid is required, call 911 for emergency services or take the individual(s) to a medical treatment center.		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Moving trains	<ul style="list-style-type: none"> - Always maintain situational awareness. - Track protection (if applicable) - Avoid fouling track unless approved by RR Employee in Charge (EIC) 	<ul style="list-style-type: none"> - Identify a group spotter to watch for trains. - Roadway worker protection rules - Maintain > 6' distance from field side of nearest running rail
Inhalation/Dermal Exposure	<ul style="list-style-type: none"> - Communicate chemicals onsite and potential for exposure. - Describe symptoms of exposure - Assess for presence during work 	<ul style="list-style-type: none"> - NS Chemical Specific JSAs - Air monitoring or review of available data - Dermal PPE (PVC Boots, Gloves) - Respiratory Protection (APR/SCBA)
Moving Machinery	<ul style="list-style-type: none"> - Avoid presence or walking through machine's operating radius. - Visual contact with operator when walking behind or up to machine 	<ul style="list-style-type: none"> - Utilize a spotter when working as a group near operational equipment. - Identify boom radius of excavators. - All stop when horn is activated
Sharp objects	<ul style="list-style-type: none"> - Locate scrap steel, existing sharp metal objects. - Avoid contact with sharp objects through situational awareness. 	<ul style="list-style-type: none"> - Utilize gloves when handling or grabbing metal or hardened objects that can cut or damage skin on hands. - Ensure full-length FRC sleeves and pants
Rough Walking Working Surfaces/Working From Heights	<ul style="list-style-type: none"> - Ensure proper footing when traveling through uneven terrain. - Be mindful of ballast, large rock, and rail for lower leg injuries. - Assume all operators do not see you. - Avoid walking in areas where your presence is not essential. 	<ul style="list-style-type: none"> - Avoid standing in areas where your presence is not warranted. - Three Points of Contact when Climbing - A competent person must inspect scaffolding every day. - Avoid reaching over hand rails of scaffolding
Overhead lifts/mechanical injury	<ul style="list-style-type: none"> - Avoid walking below suspended loads on excavators, front-end loaders, etc. - Do not reach between moving mechanical components or lifted loads 	<ul style="list-style-type: none"> - Only qualified personnel and operators should be in areas where suspended loads, or mechanical lifts are underway.
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before work begins, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

Name	Signature	Date

JOB SAFETY ANALYSIS

AREA OF OPERATION: Around Site (Fueling Operations)	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE:
COMMUNICATION PLAN: Communication shall be designated through cell phones and fuelers must pull over to respond to phone calls and text messages		
FIRST AID/MEDICAL PROVISIONS: First Aid Kits Shall be		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Petroleum Resistant Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Fire/Explosion	<ul style="list-style-type: none"> - Fueling operations shall be carried out in well-ventilated areas. - Ignition sources shall be shut off or be at least 35' away from fueling 	<ul style="list-style-type: none"> - A fire extinguisher must be on standby within 50' of fueling. - Do not store flammable liquids inside cab or any enclosed space
Rough Walking Working Surfaces	<ul style="list-style-type: none"> - Ensure proper footing when on ballast, large stone, and muddy areas. - When climbing on machines, use three points of contact to climb 	<ul style="list-style-type: none"> - Avoid ice covered areas and wait for salt or temperature to melt the ice.
Traffic and vehicle operation hazards	<ul style="list-style-type: none"> - Obey all road laws and follow traffic controls direction. - Perform a 360 walk around before backing up vehicles 	<ul style="list-style-type: none"> - If possible, use a spotter when backing up
Lifting and Ergonomic Hazards	<ul style="list-style-type: none"> - Avoid carrying multiple fuel containers. - Lift predominantly with legs - Avoid holding fuel containers above the shoulder area. 	<ul style="list-style-type: none"> - Fuel gas containers on tailgate of vehicle to prevent unnecessary lifts.
Dermal Exposure	<ul style="list-style-type: none"> - Use nitrile or PVC gloves when fueling. - Contain any drips or spills on white pads or containments. 	<ul style="list-style-type: none"> - Monitor filling to prevent overflows
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before entering work area, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

: JOB SAFETY ANALYSIS

AREA OF OPERATION: Jetting Operation on Sulfur Run by T & M Industries	OPERATIONAL PERIOD: FROM: 09:30 TO: 19:00	DATE: 03/16/2023
COMMUNICATION PLAN: On both sides of the jetting operation, at least one crew member should have a radio to establish safe communication of jetter line location.		
FIRST AID/MEDICAL PROVISIONS: Ensure access to first aid supplies, identify the kit location before starting work. Identify safe egress from your location to locate emergency response medical if activated.		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots. Near shoreline operations, waterproof waders and a PFD are required. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
High Pressure Jetter Line	<ul style="list-style-type: none"> - Communicate Jetter Distance Inside Tunnel/Culvert - Keep 50' Distance from Tunnel Entrance/Exit when Jetter is in Operation 	<ul style="list-style-type: none"> - Keep Jetting Operations contained within the confined area.
Working In and Around Water	<ul style="list-style-type: none"> - Keep Secure footing and avoid climbing on rocks/ Debris. - Don PFD when around or in water - Don Waterproof Gloves 	<ul style="list-style-type: none"> - Wash/Clean hands when breaking for lunch or end of shift
Pinch Points around Jetter Truck	<ul style="list-style-type: none"> - Avoid contract with jetter hose or reel when retracting jetter line. - Keep Clear of jetter head when retracting in the event of a kick or jump 	<ul style="list-style-type: none"> - Utilize a spotter when jetter line is retracting/advancing into the tunnel. - Utilize a spotter when positioning jetter
Sharp objects	<ul style="list-style-type: none"> - When working in the stream, ensure proper footing to prevent falls onto rocks or debris in water. - When handling hoses and metal equipment, leather gloves should be used 	<ul style="list-style-type: none"> - If any sharps or needles are found in the work area, Hepaco will be the party responsible for disposing of the material
Pedestrian traffic hazards	<ul style="list-style-type: none"> - Ensure proper footing when traversing uneven terrain. - Be mindful of ballast and large rock for lower leg injuries. - Assume all operators do not see you 	<ul style="list-style-type: none"> - Avoid walking in areas where your presence is not essential. - Avoid standing in areas where your presence is not warranted
Chemical Exposure	<ul style="list-style-type: none"> - When working with and around creek water, PVC gloves and rubber boots should be used. - During Jetting operations, air monitoring must be present 	<ul style="list-style-type: none"> - When packaging impacted material in waste containers, use proper PPE and double bag material to move across rough terrain
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before work begins, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

JOB SAFETY ANALYSIS

AREA OF OPERATION: Lordstown Water Transfer	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE:
COMMUNICATION PLAN: Communication methods between crews shall be verbal/face to face. If other crews need to contact other personnel, cell phones will be used		
FIRST AID/MEDICAL PROVISIONS: First Aid Kits Shall be in the closest SPSI supervisor truck		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: PVC Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Fire/Explosion	<ul style="list-style-type: none"> - Grounding and bonding must be in place when loading and unloading railcars. - When loading Rail cars, tanks must be vented to prevent and increase of pressure 	<ul style="list-style-type: none"> - Transfer pumps must be shut off before fueling operations can begin. - Highway tankers must not exceed 10 psi when pressuring up
Chemical Exposure	<ul style="list-style-type: none"> - PVC gloves must be worn when moving waste. - When gauging tanks, APR's with P100/organic vapor cartridges must be worn 	<ul style="list-style-type: none"> - Contain all lines breaks within containments and open hoses away from the body
Working From Heights	<ul style="list-style-type: none"> - When gauging railcars, Personnel should only be on top of the tank for a limited time to measure outage. - When climbing on rail cars, three points of contact must be always maintained 	<ul style="list-style-type: none"> - Personnel climbing on top of highway tankers must always maintain 3 points of contact. - Tools shall not be carried to the top of tanks; rope bags must be used to lift tools
Struck by/Vehicle Accident	<ul style="list-style-type: none"> - Spotters must be always used when vehicles are backing up or near other vehicles/ property. - Rail cars being involved in transfer ops must be choked. 	<ul style="list-style-type: none"> - When walking around vehicles, contact with drivers must be made to prevent working in blind spots.
Spills/Leaks	<ul style="list-style-type: none"> - Transfer hoses must be cleared and walked out into a container before breaking down transfer system. - Camlock fittings must be taped/secured during liquid movement 	<ul style="list-style-type: none"> - All Line breaks must be over containments and in drip pans to prevent any uncontrolled liquid
-Pedestrian Traffic/Rough Terrain	<ul style="list-style-type: none"> - Keep secure footing when walking on large stone, rail, or over containments. - No walking between railcars is permitted 	<ul style="list-style-type: none"> - When hoses are not in use they should be rolled neatly and placed in an area that would not make them a tripping hazard
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before entering work area, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

JOB SAFETY ANALYSIS

AREA OF OPERATION: Tank Farm Water Transfer	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE:
COMMUNICATION PLAN: Communication methods between crews shall be verbal/face to face. If other crews need to contact other personnel, cell phones will be used		
FIRST AID/MEDICAL PROVISIONS: First Aid Kits Shall be in the closest SPSI supervisor truck		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Petroleum Resistant Gloves, FRA- approved reflective vests, eye protection, long sleeves, safety boots. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Fire/Explosion	<ul style="list-style-type: none"> - Grounding and bonding must be in place when loading and unloading trucks. - When loading highway tankers, tanks must be vented to prevent and increase of pressure 	<ul style="list-style-type: none"> - Transfer pumps must be shut off before fueling operations can begin. -
Chemical Exposure	<ul style="list-style-type: none"> - PVC gloves must be worn when moving waste. - When gauging tanks, respirators must be worn 	<ul style="list-style-type: none"> - Contain all lines breaks within containments and open hoses away from the body
Working From Heights	<ul style="list-style-type: none"> - When gauging highway tankers, Personnel should only be on top of the tank for a limited time to measure outage - When climbing on frac tanks, three points of contact must be maintained 	<ul style="list-style-type: none"> - Personnel climbing on top of highway tankers must always maintain 3 points of contact. - When taking tank measurements on frac tanks, 3 points of contact must be maintained
Struck by/Vehicle Accident	<ul style="list-style-type: none"> - Spotters must be always used when vehicles are backing up or near other vehicles or property. 	<ul style="list-style-type: none"> - When walking around vehicles, contact with drivers must be made to prevent working in blind spots.
Spills/Leaks	<ul style="list-style-type: none"> - Transfer hoses must be cleared and walked out into container before breaking down transfer system. - Camlock fittings must be taped/secured during liquid movement 	<ul style="list-style-type: none"> - All Line breaks must be over containments and in drip pans to prevent any uncontrolled liquid
-Pedestrian Traffic/Rough Terrain	<ul style="list-style-type: none"> - Keep secure footing when walking on large stone or over containments. - Avoid walking on wet/ice covered containments 	<ul style="list-style-type: none"> - When climbing frac tank steps, use handrails.
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before entering work area, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress

JOB SAFETY ANALYSIS

AREA OF OPERATION: Truck Decon.	OPERATIONAL PERIOD: FROM: 07:00 TO: 19:00	DATE:
COMMUNICATION PLAN: Communication methods between crews shall be verbal/face to face. If other crews need to contact personnel, cell phones will be used		
FIRST AID/MEDICAL PROVISIONS: First Aid Kits Shall be in the closest SPSI supervisor truck		
PERSONAL PROTECTIVE EQUIPMENT REQUIRED: Petroleum Resistant Gloves, Tychem QC, FRA- approved reflective vests, eye protection, long sleeves, safety boots. If increased PPE is warranted, consult recommendations in NS JSA(s).		
POTENTIAL HAZARDS	RECOMMENDED ACTION	ADDITIONAL CONTROLS
Fire/Explosion	<ul style="list-style-type: none"> - Heaters and pressure washer units must be turned off before fueling operations can begin. - Ensure caps to fuel tanks are secured and tightened. 	<ul style="list-style-type: none"> - The hot pressure washer should not be run inside the trailer. - When pressure washer units are not in use, units should be turned off.
Chemical/Mud Exposure	<ul style="list-style-type: none"> - Tychem QC suits should be worn to prevent clothing becoming contaminated by splashes. - Face shields and gloves should also be worn to prevent any splashing from hitting the operators face 	<ul style="list-style-type: none"> - A distance should be kept from the point of operation to minimize the amount of splash/mud kick up. - Avoid entry to pressure washer trailers while they are running
Pressure Washer	<ul style="list-style-type: none"> - The pressure washer gun should always be pointed away from people. - When changing pw gun tips. The pressure washer should be shut down and all the pressure in the hose should be bled off 	<ul style="list-style-type: none"> - Windows of vehicles getting pressure washed, must close all windows, otherwise operators must leave the vehicle
Struck by/Vehicle Accident	<ul style="list-style-type: none"> - Stand out of the way of vehicles pulling onto containment. - Spot vehicles backing onto containment. - Keep clear of equipment blind spots 	<ul style="list-style-type: none"> - Contact driver before spotting vehicles. - Work area must maintain good housekeeping and leave clear paths for vehicles to prevent injury/damage.
-Pedestrian Traffic/Rough Terrain	<ul style="list-style-type: none"> - Keep secure footing when walking on large stone or over containments. - Avoid walking on wet/ice covered containments 	<ul style="list-style-type: none"> - Avoid walking on containment berms. - Keep Hoses neat and out of walking paths.
CHANGE IN CONDITIONS	SPECIAL CONSIDERATIONS	EMERGENCY PROCEDURES
<ul style="list-style-type: none"> - Weather-related impact - Operational changes that challenge existing control measures - Muster locations on Site Control map - Communicate additional chemical hazards upon observation 	<ul style="list-style-type: none"> - All site personnel have STOP WORK AUTHORITY - Operational changes that create additional hazards - Identify muster locations before entering work area, <ul style="list-style-type: none"> o egress cross then upwind o remain at muster and rollcall 	<ul style="list-style-type: none"> - Health: <ul style="list-style-type: none"> o Render first aid for non-life-threatening injury o Call 9-11 when injury requires beyond first aid - Alarms & warnings <ul style="list-style-type: none"> o 1 short blast = attention o 3 long horn blasts = egress



**JOB SAFETY ANALYSIS (JSA)
CHEMICAL-SPECIFIC WORKSHEET**






Date:	February 13, 2018
Chemical:	Butyl acrylate
Location:	Emergency Response Site
Prepared By:	Scott Skelton, MS, CIH
Version:	Butyl Acrylate_JSA2.0_2018

Emergency Procedures	
Muster Point	Egress cross-wind, then upwind to: Entrance Gate
Medical Emergency	1) Call 911, 2) Administer First Aid, 3) Contact Site Safety Officer
Emergency Signal	3 long horn blasts, hand signals for entry team
Site Safety Contact	John Doe, Site Safety Officer, Phone: 555-123-5555

Notice: The content included in this JSA has been prepared in advance of its use during an actual event. Workers engaged in response operations associated with butyl acrylate should use this JSA only after assessing site hazards daily to determine the effectiveness and completeness of this JSA's content. This JSA should not be used as the only safety provision for activities involving a butyl acrylate tank car. Please refer to the Norfolk Southern Corporate Emergency Response Plan (ERP), Contractor and Employee Safety rules, and site safety plans as necessary for policies and procedures not identified herein.

Chemical Safety Information¹: Butyl acrylate

Hazardous Property		Important Considerations & Safety Procedures
	<p>Health Hazard</p>	<p>Acute exposure to butyl acrylate vapor can cause redness, tearing, and irritation of the eyes, runny nose, scratchy throat, difficult breathing, and redness and cracking of skin. Repeated contact of the skin with butyl acrylate may cause skin sensitization in some individuals, with redness, swelling, itching, and oozing of the affected areas. Nervous system and behavioral effects are also possible. (NIOSH, 1992).</p> <p>OSHA (GHS) hazard statements:</p> <ul style="list-style-type: none"> • Causes skin irritation, • May cause allergic skin reaction, • Causes serious eye irritation, • Harmful if inhaled, and • May cause respiratory irritation
	<p>Flammability & Explosion</p>	<p>HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Many liquids are lighter than water. (ERG, 2016)</p> <p>Flash Point: 120 ° F (NTP, 1992) Lower Explosive Limit (LEL): 1.5 % (NTP, 1992) Upper Explosive Limit (UEL): 9.9 % (NTP, 1992) Autoignition Temperature: 534 ° F (USCG, 1999)</p>
	<p>Firefighting</p>	<p>Excerpt from ERG Guide 129P [Flammable Liquids (Water-Miscible / Noxious)]:</p> <p>CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.</p> <p>SMALL FIRE: Dry chemical, CO₂, water spray or alcohol-resistant foam. Do not use dry chemical extinguishers to control fires involving nitromethane (UN1261) or nitroethane (UN2842).</p> <p>LARGE FIRE: Water spray, fog or alcohol-resistant foam. Do not use straight streams. Move containers from fire area if you can do it without risk.</p>

¹ NOAA CAMEO Chemicals, Globally Harmonized System, OSHA

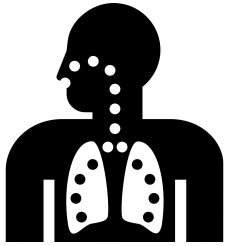





Job Safety Analysis Chemical-Specific Worksheet

Butyl acrylate

		<p>FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2016)</p>
	<p>Reactivity</p>	<p>BUTYL ACRYLATE reacts exothermically with acids to liberate heat along with alcohols and acids. Reacts with strong oxidizing agents, perhaps sufficiently exothermically to ignite the reaction products. Mixing with basic solutions generates heat. Generates flammable hydrogen with alkali metals and hydrides. Attacks many plastics [Handling Chemicals Safely 1980. p. 233]. Polymerizes readily, generating much heat in a reaction that is favored by heat and light [Handling Chemicals Safely 1980. p. 235].</p> <p>From DOW (Manufacturer): Stable under recommended storage conditions. Unstable at elevated temperatures. Hygroscopic inhibitor may be added to product, depending on whether classified as "stabilized". However this material can undergo hazardous polymerization. Avoid moisture. Do not blanket or purge with an inert gas to avoid depleting of oxygen concentration. Avoid direct sunlight or ultraviolet sources.</p> <p>Avoid contact with oxidizing materials. Avoid contact with: aldehydes, azides, amines, ethers, free radical inhibitors, halides, mercaptans, mineral acids, peroxides, rust, strong inorganic bases; metals such as: brass and copper. Avoid unintended contact with silica gel and activated carbon. Avoid contact with absorbent materials such as clay-based sorbents.</p>
	<p>Volatility/Mobility</p>	<p>Vapor Pressure: 10 mm Hg at 95.9 ° F ; 4 mm Hg at 68° F (NTP, 1992) Vapor Density (Relative to Air): 4.42 (NTP, 1992) Specific Gravity: 0.899 at 68 ° F (USCG, 1999) Boiling Point: 295 to 298 ° F at 760 mm Hg (NTP, 1992) Molecular Weight: 128.17 (NTP, 1992) Water Solubility: less than 1 mg/mL at 68° F (NTP, 1992) Ionization Potential: data unavailable</p>

Toxicology Information²: Butyl acrylate

Exposure Route	Exposure	Possible Symptoms /Health Effects of Exposure	How to Avoid
	Low Concentration (< 2 ppm)	Odor threshold of 0.05 ppb (ERPG); odor classified as sharp, fragrant odor.	Remain upwind, avoid prolonged exposure using respiratory protection
	Moderate (2 - 25 ppm)	ACGIH TLV-TWA of 2 ppm; Irritation of the URT, drowsiness, headache, and nausea	Full-faced Air Purifying Respirator (APR)
	High (> 25 ppm)	IDLH: ND (NIOSH 2016); ERPG-2 of 25 ppm; Drowsiness, headache, nausea; Liver damage; Marked irritation, salivation, conjunctive irritation; pulmonary edema	Full-faced APR, SCBA for concentrations >100 ppm.
	Liquid contact	Repeated contact of the skin may cause skin sensitization in some individuals, with redness, swelling, itching, and oozing of the affected areas.	Chemical-resistant protective suit. Handle liquids with care, full decontamination of CPC
	Dermal vapor exposure	Dermal sensitizer; Irritation, redness, and cracking of the skin	Avoid working in atmospheres containing moderate to high concentrations without chemical protective clothing.
	Irritation from vapor	Irritation, mild discomfort, and redness	Full-face Respiratory protection
	Liquid contact	May cause pain disproportionate to the level of irritation to the eye tissues; slight eye irritation, slight corneal injury	Full-face Respiratory protection
	Ingestion of liquid	Collapse, severe respiratory difficulties, and CNS stimulation.	Good workplace hygiene, Handle liquids with care, proper decontamination of protective clothing

² Agency for Toxic Substances and Disease Registry (ATSDR), NIOSH Pocket Guide, ACGIH TLVs, & Emergency Response Planning Guidelines (ERPGs)

First Aid Measures	
Exposure	Recommended First Aid Treatment
Inhalation	<p>INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.</p>
Skin & Eye Contact	<p>SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.</p> <p>EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.</p>
Ingestion	<p>INGESTION: DO NOT INDUCE VOMITING. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. Be prepared to transport the victim to a hospital if advised by a physician. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)</p>

PPE Matrix ³ : Butyl acrylate																																			
Conditions																																			
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Release rate:	Unknown or Uncontrolled	Level A for extensive dermal contact with high conc. vapor																																	
Risk of sudden release:	Unknown or High																																		
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Risk of sudden release:	Low																																		
Skin contact w/ vapor:	Very low - intermittent																																		
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Skin contact w/ liquid:	No splash risk																																		

³ NIOSH Emergency Response Safety and Health Database, Dupont Safe Spec™, Wiley Quick Selection Guide, 6th edition

Site Action Levels			
Analyte	Action Level	Basis	Comments
Butyl acrylate	1 ppm	1/2 ACGIH® TLV-TWA for BA - Reading sustained	Exposure at this concentration is not considered unhealthy; however, workers should be alert to the presence and situational awareness should be increased.
	2 ppm	ACGIH® TLV-TWA – for BA Reading sustained	Exposure at this concentration is not considered life threatening; however, workers and site management should implement controls and/or PPE to reduce exposure below the TLV-TWA for unprotected workers.
	Not established	ACGIH® TLV-STEL for BA Reading sustained for 15 minutes	Workers can be exposed up to 15 ppm for a 15-minute period as per the short-term exposure limit (STEL).
	Not established	IDLH (Immediately Dangerous to Life and Health)	Exposure at this concentration should be considered life threatening and all protective measures, including immediate evacuation of un-protected workers should be considered.
LEL	1%	1% of LEL for BA Reading sustained for 1 minute	Although 1% of the LEL is conservative, workers and site management should be aware of conditions and prepare for protective action to avoid reaching flammable limits
	10 %	10% of LEL for BA Reading sustained for 1 minute	10% of the LEL is a reasonable precautionary action level to halt work activity so that source mitigation techniques can be employed to reduce the flammable atmosphere prior to the continuation of work activity.

Monitoring Strategy					
Flammability					
Instrument	Instrument Reading	Corrected Value	Correction Factor	Basis	Action to be Taken
MultiRAE PID	937 ppm	1,500 ppm	1.6 for BA (10.6eV lamp)	10% LEL	Notify Site Management
Exposure					
Instrument	Instrument Reading	Corrected Value	Correction Factor	Basis	Action to be Taken
MultiRAE PID	1.2 ppm	2 ppm	1.6 for BA (10.6eV lamp)	ACGIH TLV-TWA	Don respiratory protection or Egress; Notify Site Management
Gastec Tube 142L	10 ppm	10 ppm	Tube LOD is > 2 ppm	ACGIH TLV-TWA	

Job Steps	Hazards	Hazard Controls
<p>1. Initial Entry & Damage Assessment</p>	<p>1.1 Slips/Trips/Falls</p>	<p>1.1.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 1.1.2 Wear railroad approved work boots with ankle support. 1.1.3 Avoid climbing on wreckage if suitable walking/working surfaces and or climbing structures are not available. 1.1.4 If tank car ladder and guardrail at protective dome housing are damaged, configure a suitable fall-arrest system before accessing the protective dome housing area. 1.1.5 Ensure that entrants in aggressive PPE are physically able to withstand the demands of the suit and also physically strong enough to traverse difficult terrain.</p>
	<p>1.2 Fire/Explosion</p>	<p>1.2.1 Identify all open sources and other potential flammable liquids & gases using manifest. 1.2.2 Identify potential ignition sources, locate all active fires. 1.2.3 If potential for ignition is real: wear flash-protective bunker gear/FRC only if vapor/liquid exposure risk is moderate-low. If protection from vapor and liquid is necessary and fire risk is elevated, utilize proper control measures to reduce fire threat first. Using control measures to reduce the threat of fire will allow use of more common PPE. If fire threat cannot be reduced, use fire protective Level B. If aggressive protection from liquids and vapor is not warranted, bunker gear with SCBA can be worn. 1.2.4 Conduct LEL monitoring. Action level 10% of LEL should result in egress. 1.2.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid. 1.2.6 Provide fire fighting measures to control fires. 1.2.7 Use appropriate fire fighting measures to cool cars with flame impingement or adjacent to active fires or hot spots. 1.2.8 Use caution when walking among wreckage, look for subsurface pooling of liquid, especially in the vicinity of active fires.</p>
	<p>1.3 Chemical Exposure</p>	<p>1.3.1 Don Level A PPE if release conditions are unknown or vapor/skin contact will be significant. Downgrade to B or C PPE to continue damage assessment if conditions permit (see PPE matrix). 1.3.2 Perform air monitoring on initial entry, document readings. 1.3.3 Observe wind direction and deploy a windsock. 1.3.4 Identify and mark areas of liquid releasing, secondary containment/ liquids, impacted soil, or standing liquid. 1.3.5 All workers entering the site in PPE must receive a full decontamination of all</p>

Job Steps	Hazards	Hazard Controls
		respiratory protection, CPC and equipment prior to exiting the warm zone. 1.3.6 Decon workers must perform decontamination activities in 1 lower-level PPE ensemble unless contamination is significant.
	1.4 Heat Stress from PPE	1.4.1 Using CPC and respiratory protection can increase heat stress risk if ambient conditions are warm or hot. 1.4.2 Conduct medical monitoring prior to and after entry to evaluate worker's condition. 1.4.3 If necessary, limit the duration of each entry and maximize rest periods based on site conditions and medical monitoring information. 1.4.4 Drink plenty of water; avoid excessive use of sports drinks. 1.4.5 Rest in shaded, cool areas. Consider adding fans, misting devices, or air-conditioned rest areas (vehicles). 1.4.6 Avoid excessive intake of caffeine while at work and alcoholic beverages after work.
	1.5 Mechanical Injury from wreckage or falling	1.5.1 Stay clear of unstable or elevated wreckage. 1.5.2 Avoid reaching/walking between unstable cars/loads. 1.5.3 Use caution when tightening valves. Observe all pinch points for hands.
	1.6 Miscommunication	1.6.1 Establish effective hand signals for entrants to use if radio coms are not available. 1.6.2 Establish radio or cell phone communication with all responders. 1.6.3 Safety briefing conducted prior to initial entry.
	1.7 Polymerization	1.7.1 Can polymerize rapidly leading to container explosion. Monitor tank temperature and pressure to assess if polymerization is occurring. 1.7.2 If polymerization is occurring, isolate area and evacuate immediately. Monitor polymerization rate through temperature readings at a safe distance. 1.7.3 If polymerization is confirmed, isolate for 800 (1/2 mile) meters in all directions and consider evacuation for same distance. 1.7.4 Be aware that during polymerization, the PRV will activate and vapor may be emitted at a high rate. Site concentrations may increase and all personnel should be moved upwind to avoid exposure.

Job Steps	Hazards	Hazard Controls
2. Release Mitigation	2.1 Fire/Explosion	<p>2.1.1 Identify all open sources and other potential flammable liquids & gases using manifest.</p> <p>2.1.2 Identify potential ignition sources, locate all active fires.</p> <p>2.1.3 If potential for ignition is real: wear flash-protective bunker gear/FRC only if vapor/liquid exposure risk is moderate-low. If protection from vapor and liquid is necessary and fire risk is elevated, utilize proper control measures to reduce fire threat first. Using control measures to reduce the threat of fire will allow use of more common PPE. If fire threat cannot be reduced, use fire protective level B. If aggressive protection from liquids and vapor is not warranted, bunker gear with SCBA can be worn.</p> <p>2.1.4 Conduct LEL monitoring. Action level 10% of LEL.</p> <p>2.1.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid.</p> <p>2.1.6 Provide fire fighting measures to control fires.</p> <p>2.1.7 Use appropriate fire fighting measures to cool car(s) with flame impingement or adjacent to active fires or hot spots.</p> <p>2.1.8 Use caution when walking among wreckage, look for subsurface hot spots or subsurface pooling in the vicinity of active fires.</p> <p>2.1.9 All tools used during release mitigation should be non-sparking, intrinsically safe. Combustion engines or electrical tools should not be used near flammable atmospheres.</p>
	2.2 Injury from valve or container repair	<p>2.2.1 Use secure hoist to raise tools to the protective dome housing.</p> <p>2.2.2 Avoid single-man manual lifting for loads greater than 50 lbs.</p> <p>2.2.3 Ensure all connections are tight and secured.</p> <p>2.2.4 Avoid body contact with high-pressure liquid streams.</p> <p>2.2.5 Wear protective clothing capable of protecting from high-pressure water impact.</p> <p>2.2.6 Remember, aggressive PPE will make tasks requiring good manual dexterity very difficult. Work safely and slowly to ensure proper use of valves, fittings, and tools.</p> <p>2.2.7 All tools should be non-sparking (brass).</p> <p>2.2.8 Avoid contact chemical protective clothing with sharp edges of damaged shell, brake lines, catwalk, railing etc. to keep the suit from tearing.</p>

Job Steps	Hazards	Hazard Controls
	2.3 Miscommunication	2.3.1 Establish effective hand signals for entrants to use if radio coms are not available. 2.3.2 Establish radio or cell phone communication with all responders. 2.3.3 Safety briefing conducted prior to initial entry.
	2.4 Chemical Exposure	2.4.1 Don Level A or B PPE to approach leak source depending on release conditions. If leak is insignificant and controlled, and worker can be upwind, then consider Level C PPE using PPE matrix. 2.4.2 Continuous air monitoring with workers during mitigation. 2.4.3 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone. 2.4.4 Decon workers must perform decontamination activities in 1-lower level PPE ensemble.
	2.6 Mechanical Injury	2.6.1 Stay clear of unstable or elevated wreckage. 2.6.2 Avoid reaching/walking between unstable cars/loads.
	2.7 Slips/trips/falls	2.7.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 2.7.2 Wear railroad approved work boots with ankle support. 2.7.3 Abide by site fall protection safety protocols while working at elevations above 6 feet. 2.7.4 Ensure workers are prepared and trained to traverse the worksite with movement-restrictive PPE. Only fit workers with the strength to wear such PPE should be used to traverse challenging terrain or wreckage.
	2.8 High Pressure Release	2.8.1 Perform all necessary pressure checks to ensure tank car is not pressurized from polymerizing styrene. 2.8.2 Ensure that valves are manipulated in a safe and controlled manner when tightening. 2.8.3 Essential personnel only at protective dome housing. 2.1.4 Conduct LEL monitoring. Action level 10% of LEL for known substances.
	2.9 Polymerization	2.9.1 Can polymerize rapidly leading to container explosion. Monitor tank temperature and pressure to assess if polymerization is occurring 2.9.2 If polymerization is occurring, isolate area and evacuate immediately. Monitor polymerization rate through temperature readings at a safe distance. 2.9.3 If polymerization is confirmed, isolate for 800 (1/2 mile) meters in all directions and consider evacuation for same distance.



Job Safety Analysis Chemical-Specific Worksheet

Butyl acrylate

Job Steps	Hazards	Hazard Controls
		2.9.4 Be aware that during polymerization, the PRV will activate and styrene vapor will be emitted at a high rate. Site concentrations may increase and all personnel should be moved upwind to avoid exposure.

Job Steps	Hazards	Hazard Controls
3. Transfer of Butyl acrylate	3.1 Chemical Exposure	3.1.1 Perform air monitoring at the protective dome housing prior to connecting transfer equipment to damaged car's valve assembly. 3.1.2 Don Level B when connecting transfer hose to damaged car's liquid and vapor valves. See PPE Matrix to determine Level based on conditions. 3.1.3 Ensure that transfer hoses, pumps, and compressors are free of liquid product and depressurized before opening lines. 3.1.4 Don Level C PPE (if conditions warrant-see PPE matrix) when disconnecting hoses, pumps, and compressors that have been emptied of free liquids. 3.1.5 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone. 3.1.6 Decon workers must perform decontamination activities in CPC. 3.1.7 Employ vapor scrubbing systems such as charcoal canisters to reduce vapor emissions into work area. Monitor temperature of charcoal canisters to avoid temperature increase and fire risk.
	3.2 Transfer system release or pressurization	3.2.1 Be cautious of pressure buildup in lines during transfer. 3.2.2 Continue pressure checks on tank cars to monitor pressure conditions. 3.2.3 Valves should only be manipulated by competent persons. 3.2.4 Use chemical compatible, valves, fittings, and hoses. 3.2.5 Ensure all system pressures are within manufacture recommended ranges. 3.2.6 Ensure all connections are tight and secured. 3.2.7 Avoid body contact with pressurized liquid and gas streams even though worker is protected by PPE. 3.2.8 Initially and periodically monitor pumps, hoses, valves, and fittings for liquid or vapor leaks. 3.2.9 Use caution when connecting and disconnecting hydraulic pump lines; avoid pressurized release of compressed air.
	3.3 Miscommunication	3.3.1 Establish effective hand signals for entrants to use if radio coms are not available. 3.3.2 Establish radio or cell phone communication with all responders. 3.3.3 Safety briefing conducted prior to initial entry.
	3.4 Static Electrical Discharge	3.4.1 Ensure that all transfer equipment and receiving vessels are grounded and bonded according to best practice.

Job Steps	Hazards	Hazard Controls
	3.5 Mechanical Injury	3.5.1 Stay clear of unstable or elevated wreckage. 3.5.2 Avoid reaching/walking between unstable cars/loads. 3.5.3 Ensure that tank car is secured to stabilize equipment during tank car rotations.
	3.6 Slips/trips/falls	3.6.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 3.6.2 Wear railroad approved work boots with ankle support. 3.6.3 Abide by site fall protection safety protocols while working at elevations above 6 feet. 3.6.4 Ensure that workers are aware of the decrease in flexibility and mobility when wearing aggressive PPE, especially when climbing onto railcars or other equipment.
	3.7 Fire/Explosion	3.7.1 Identify all open sources and other potential flammable liquids & gases using manifest. 3.7.2 Identify potential ignition sources, locate all active fires. 3.7.3 If potential for ignition: wear flash-protective bunker gear/FRC and SCBA when vapor concentrations are moderate to low; if airborne concentrations are extreme & sustained, use control measures to reduce threat. 3.7.4 Conduct LEL monitoring. Action level 10% of LEL for known substances. 3.7.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid. 3.7.8 All tools used during release mitigation should be non-sparking, intrinsically safe. Combustion engines or electrical tools should not be used near flammable atmospheres.

Job Steps	Hazards	Hazard Controls
4. Clean and purge	4.1 Fugitive emissions	4.1.1 Use chemical compatible, valves, fittings, and hoses. 4.1.2 Ensure that vapor lines are properly secured to vapor scrubbing system if used. 4.1.3 Ensure all connections are tight and secured. 4.1.4 Initially and periodically monitor pumps, hoses, valves, and fittings for liquid or gas leaks. 4.1.6 Properly decontaminate all hoses, fittings, tools, and other equipment used during scrubbing operation. 4.1.7 If using a propane-assisted flare to control emissions, ensure flare lighting is safe by following hot work procedures, specifically, identifying all flammable materials and monitoring the area for flammable gas (LEL monitor) before lighting flare. Use caution when connecting propane lines, ensure tight fittings and vapor leaks. 4.1.8 If using charcoal canister scrubbing system, periodically monitor system exhaust to ensure proper scrubbing of vapor. Be sure to monitor the temperature of the charcoal bed to ensure that a flammable atmosphere is not present inside the system.
	4.2 Chemical Exposure	4.2.1 Perform air monitoring at the protective dome housing prior to connecting transfer equipment to damaged car's valve assembly. 4.2.2 Don Level B or Level C PPE when connecting vapor line to damaged car's vapor valves. See PPE Matrix to determine Level B or C based on conditions. 4.2.3 Ensure that transfer hoses, pumps, and compressors are free of liquid product before opening lines. 4.2.4 Don Level C PPE when disconnecting hoses, pumps, and compressors that have been emptied of free liquids. 4.2.5 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone. 4.2.6 Decon workers must perform decontamination activities in CPC.
	4.3 System release or pressurization	4.3.1 Be cautious of pressure buildup in lines during purge. 3.2.2 Continue pressure checks on tank cars to monitor pressure conditions. 3.2.3 Valves should only be manipulated by competent persons. 3.2.4 Use chemical compatible, valves, fittings, and hoses. 3.2.5 Ensure all system pressures are within manufacture recommended ranges. 3.2.6 Ensure all connections are tight and secured.

Job Steps	Hazards	Hazard Controls
		3.2.7 Avoid body contact with pressurized liquid and gas streams. 3.2.8 Initially and periodically monitor pumps, hoses, valves, and fittings for liquid or vapor leaks. 3.2.9 Use caution when connecting and disconnecting hydraulic pump lines; avoid pressurized release of compressed air.
	4.4 Mechanical Injury	4.4.1 Stay clear of unstable or elevated wreckage. 4.4.2 Avoid reaching/walking between unstable cars/loads.
	4.5 Slips/trips/falls	4.5.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 4.5.2 Wear railroad approved work boots with ankle support. 4.5.3 Abide by site fall protection safety protocols while working at elevations above 6 feet.
	4.6 Fire/Explosion	4.6.1 Identify all sources and other potential flammable liquids & gases using manifest. 4.6.2 Identify potential ignition sources, locate all active fires. 4.6.3 If potential for ignition: wear flash-protective bunker gear/FRC. 4.6.4 Conduct LEL monitoring. Action level 10% of LEL for known substances. 4.6.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid. 4.6.6 If using charcoal canister scrubbing system, periodically monitor system exhaust to ensure proper scrubbing of vapor. Be sure to monitor the temperature of the charcoal bed to ensure that a flammable atmosphere is not present inside the system.

Job Steps	Hazards	Hazard Controls
5. Removal of residual materials and impacted soil	5.1 Chemical Exposure	<p>5.1.1 Provide continuous air monitoring to determine if vapors are elevated in the work areas near impacted soil.</p> <p>5.1.2 Don Level C PPE to work in close proximity to impacted soils with elevated vapor. If vapor levels are high, return to using Level B until vapor concentrations are reduced.</p> <p>5.1.3 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone.</p> <p>5.1.4 Decon workers must perform decontamination activities in LEVEL C PPE, but full-faced respirator may not be required if minimal contamination is present.</p> <p>5.1.5 Excavation, loading, and unloading of impacted soil or debris may generate elevated vapor. Excavation operators should be prepared to don full-faced APR if conditions require respiratory protection. Ground-level workers may be required to don Level C PPE to avoid inhalation of vapor and skin contact with impacted soil.</p> <p>5.1.6 Vapor suppressants, surfactants, and scavengers may be applied where approved and suitable to arrest excessive contaminant generation from soil or during soil agitation.</p> <p>5.1.7 Plastic sheeting and sand may also be used to suppress vapor if workers must be in close proximity to saturated soil. Ensure that no static buildup occurs through the use of plastic sheeting. Do not remove sheeting where continuous friction is applied from the soil surface.</p>
	5.2 Vac operations	<p>5.2.1 Use chemical compatible, valves, fittings, and hoses.</p> <p>5.2.2 Ensure all system pressures are within manufacture recommended ranges.</p> <p>5.2.3 Ensure all connections are tight and secured.</p> <p>5.2.4 Avoid body contact with liquid streams.</p> <p>5.2.5 Initially and periodically monitor hoses, valves, and fittings for liquid leaks.</p> <p>5.2.6 Ensure that all vent hoses are positioned to direct vacuum exhaust away from the work area.</p> <p>5.2.7 Ensure that vac trucks are parked on secure areas and are properly staged to minimize potential for unwanted equipment movements.</p> <p>5.2.8 Properly ground and bond all vac truck equipment to avoid static discharge.</p> <p>5.2.9 The use of a vac truck to remove liquids may require the most aggressive form of PPE if the liquid is highly concentrated or pure product, based on the volume and disposition of liquid being removed.</p>

Job Steps	Hazards	Hazard Controls
	5.3 Excavation operations	5.3.1 Ensure that all machinery is equipped with properly functioning audible alarms for movement. 5.3.2 Avoid unnecessary foot traffic within the operating distances of the machinery. 5.3.3 Workers within the operating distance of the machine must remain within the line-of-sight of the operator at all times. Use hand signals to signal movement once within the operating distance of the machine. 5.3.4 Keep all workers from working beneath suspended loads. 5.3.5 All receiving containers must be properly staged on a suitable foundation and secured before loading. 5.3.6 All machinery must be operated from secure locations. 5.3.7 Open trenches must be maintained within the requirements of applicable trenching/shoring standards. Workers should not enter an un-secured trench at any time. Use barricades to prevent workers from working closely to trench or pit openings.
	5.4 Slips/trips/falls	6.4.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 6.4.1 Wear railroad approved work boots with ankle support.
	5.5 Railway hazards	6.5.1 All workers must be briefed on track protection 6.5.2 All workers must abide by railroad track safety rules as covered by contractor orientation.



Job Safety Analysis Chemical-Specific Worksheet

Butyl acrylate

Additional Site Hazards	Actions to Eliminate Hazards
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.



**JOB SAFETY ANALYSIS (JSA)
CHEMICAL-SPECIFIC WORKSHEET**






Date:	February 13, 2018
Chemical:	Vinyl chloride
Location:	Emergency Response Site
Prepared By:	Scott Skelton, MS, CIH
Version:	Vinyl Chloride_JSA2.0_2018


Emergency Procedures	
Muster Point	Egress cross-wind, then upwind to: Entrance Gate
Medical Emergency	1) Call 911, 2) Administer First Aid, 3) Contact Site Safety Officer
Emergency Signal	3 long horn blasts, hand signals for entry team
Site Safety Contact	John Doe, Site Safety Officer, Phone: 555-123-5555

Notice: The content included in this JSA has been prepared in advance of its use during an actual event. Workers engaged in response operations associated with vinyl chloride should use this JSA only after assessing site hazards daily to determine the effectiveness and completeness of this JSA's content. This JSA should not be used as the only safety provision for activities involving a vinyl chloride tank car. Please refer to the Norfolk Southern Corporate Emergency Response Plan (ERP), Contractor and Employee Safety rules, and site safety plans as necessary for policies and procedures not identified herein.

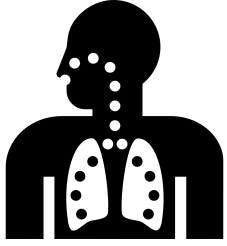


Chemical Safety Information¹: Vinyl chloride

GHS Label	Hazardous Property	Important Considerations & Safety Procedures
	<p>Health Hazards</p>	<p>Inhalation of high concentrations cause dizziness, anesthesia, lung irritation. SKIN: may cause frostbite; phenol inhibitor may be absorbed through skin if large amounts of liquid evaporate. (USCG, 1999)</p> <p>OSHA GHS Hazard Statements:</p> <ul style="list-style-type: none"> • May cause cancer, • May displace oxygen and cause rapid suffocation <p>Exposure to vinyl chloride can cause dizziness, light-headedness, nausea, dullness of visual and auditory responses, drowsiness, and unconsciousness. Irritation of the skin and eyes can also occur. Skin contact with liquid may cause frostbite. Prolonged exposure to VC can cause thickening of the skin, contact and allergic dermatitis, fatigue, coughing and sneezing, abdominal pain, gastrointestinal bleeding, nausea, vomiting, indigestion, diarrhea, jaundice, weight loss, anorexia, and a cold and tingling sensation of the hands and feet (NIOSH 1978).</p>
	<p>Flammability & Explosion</p>	<p>Highly flammable, Class IA Flammable Liquid, NFPA Flammability Rating of 4.</p> <p>Flash Point: -110° F (NTP, 1992) Lower Explosive Limit (LEL): 3.6 % (USCG, 1999) Upper Explosive Limit (UEL): 33 % (USCG, 1999) Autoignition Temperature: 882 ° F (USCG, 1999)</p>
	<p>Firefighting</p>	<p>Hazardous decomposition products: Toxic gases and vapors (e.g., hydrogen chloride, phosgene, and carbon monoxide) may be released in a fire involving vinyl chloride (NIOSH Occupational Safety and Health Guideline 0621).</p> <p>FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions. (ERG, 2016)</p> <p>Excerpt from ERG Guide 116P [Gases - Flammable (Unstable)]:</p> <p>DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.</p> <p>SMALL FIRE: Dry chemical or CO2.</p> <p>LARGE FIRE: Water spray or fog. Move containers from fire area if you can do it without risk.</p>


¹ NOAA CAMEO Chemicals

		<p>FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2016)</p>
	<p>Reactivity</p>	<p>VINYL CHLORIDE is peroxidizable. Forms explosive polymeric peroxides in contact with air (in the presence of any of a variety of catalysts) [Bretherick 1979. p. 164]. Long storage in contact with air increases the concentration of the polyperoxides to hazardous levels [MCA Case History 1551. 1969]. The peroxides may initiate exothermic polymerization of the remaining material [Handling Chemicals Safely 1980.p. 958; Bretherick 1979. p. 160]. Light-sensitive. Many oxidizing agents apparently initiate polymerization (oxides of nitrogen, O₂, etc.). May react with very hot water or steam to produce toxic fumes.</p>
	<p>Pressurized System</p>	<p>Vinyl chloride tankcars are typically equipped with a PRV rated for 225 psig. If using pressure assist to transfer, ensure that pressurization does not exceed the PRV capacity thus resulting in vapor emissions.</p>
	<p>Volatility/Mobility</p>	<p>Vapor Pressure: 3877.5 mm Hg (USCG, 1999) Vapor Density: 2.15 (Air = 1) (Sax's, 2004) Specific Gravity: 0.969 at 8.6 ° F (USCG, 1999) Boiling Point: 7 ° F at 760 mm Hg (NTP, 1992) Molecular Weight: 62.5 (NTP, 1992) Water Solubility: Slightly soluble (NTP, 1992) Ionization Potential: 9.99 eV (NIOSH, 2016)</p>

Toxicology Information²: Vinyl chloride

Exposure Route	Dose	Possible Symptoms /Health Effects of Exposure	How to Avoid
	Low (< 1 ppm)	No apparent observable effects or symptoms	
	Moderate (1 - 1200 ppm)	Acute effects may not be perceptible in this concentration range. OSHA PEL Ceiling of 5 ppm; Chronic exposure is linked to “vinyl chloride illness”, which includes Raynaud’s Syndrome and acroosteolysis. The toxic effect of greatest concern is cancer of the liver, which is largely the result of chronic exposure. TLV A1 confirmed human carcinogen.	Supplied Air Respirator (SAR)
	High (>1200 ppm)	PAC-2 of 1200 ppm; Odor threshold observed at 3000 ppm; anesthesia, drowsiness, slight visual disturbances, faltering gait, numbness and tingling of extremities. CNS depression and death from high concentrations. Exposure to 4000 ppm for 5 minutes, no effects; 8000 ppm for 5 minutes – dizziness; 20,000 ppm for 5 minutes-dizziness, light headedness, nausea, and dulling of vision (Rumack Poison Index 2016).	Supplied Air Respirator (SAR)
	Liquid contact	Frostbite; irritation of skin; contact dermatitis	Chemical-resistant protective suit. Handle liquids with care, full decontamination of CPC
	Dermal vapor exposure	Irritation of skin at very high concentrations	Chemical-resistant protective suit with properly taped seams.
	Irritation from vapor	Irritation	Full-face Respiratory protection

² Agency for Toxic Substances and Disease Registry (ATSDR), NIOSH Pocket Guide, ACGIH TLVs, & Emergency Response Planning Guidelines (ERPGs)

	Liquid contact	Severe chemical burns and damage to cornea, temporary blindness; Ocular irritation; conjunctivitis	Full-face Respiratory protection
	Ingestion of liquid	Severe burns and irritation to GI tract; assumed systemic toxicity after exposure to critical organs	Handle liquids with care, proper decontamination of protective clothing

First Aid Measures

Exposure	Recommended First Aid Treatment
Inhalation	IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.
Skin & Eye Contact	EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop. SKIN: CAUTION: Exposure of skin to compressed gases may result in freezing of the skin. Treatment for frostbite may be necessary. Remove the victim from the source of contamination. IMMEDIATELY wash affected areas gently with COLD water (and soap, if necessary) while removing and isolating all contaminated clothing. Dry carefully with clean, soft towels. If symptoms such as inflammation or irritation develop, IMMEDIATELY call a physician or go to a hospital for treatment.

Conditions		PPE Level	Respirator		Dermal Protection	
PPE Matrix³: Vinyl chloride						
Vinyl chloride		A	SCBA		Fire or Flash Risk	
Unknown or > 10 ppm	Suit:				Control measures first. If cannot control: Fire-protective Level A if liquid contact risk; Bunker gear otherwise	
Release rate: Unknown or Uncontrolled	Gloves:				Fire/chemical glove if liquid contact; NFPA otherwise	
Risk of sudden release: Unknown or High	Boots:				NFPA /chemical resistant	
Skin contact w/ vapor: Greatest	Non-fire hazard					
Skin contact w/ liquid: Greatest	Suit:				Chemical - encapsulating	
	Gloves & Boots:				Chemical - taped at seams	
Vinyl chloride		B	SCBA		Fire or Flash Risk	
> 10 ppm	Suit:				Control measures first. If cannot control: Fire-protective Level B if liquid contact risk; Bunker gear otherwise	
Release rate: Known and controlled	Gloves:				Fire/chemical glove if liquid contact; NFPA otherwise	
Risk of sudden release: Moderate	Boots:				NFPA /chemical resistant	
Skin contact w/ vapor: Moderate-low	Non-fire hazard					
Skin contact w/ liquid: Direct, splash potential	Suit:				Chemical-hooded	
	Gloves & Boots:				Chemical – taped seams	
Vinyl chloride		C⁴	APR		Fire or Flash Risk	
> 1, but < 10 ppm	Suit:				Level C is not recommended with significant fire risk	
Release rate: Known and insignificant	Gloves:				Level C is not recommended with significant fire risk	
Risk of sudden release: Low	Boots:				Level C is not recommended with significant fire risk	
Skin contact w/ vapor: Very low - intermittent	Non-fire hazard					
Skin contact w/ liquid: Indirect, no splash	Suit:				Chemical-hooded	
	Gloves & Boots:				Chemical – taped seams	
Vinyl chloride		D	None required		Fire or Flash Risk	
< 1 ppm	Suit:				FRC clothing	
Release rate: None	Gloves:				NFPA gloves	
Risk of sudden release: Low	Boots:				NFPA	
Skin contact w/ vapor: No vapor contact	Non-fire hazard					
Skin contact w/ liquid: No splash risk	Suit:				Long sleeves, reflective vest, safety glasses, hardhat	

³ NIOSH Emergency Response Safety and Health Database, Dupont Safe Spec™, Wiley Quick Selection Guide, 6th edition

⁴ NIOSH does not recommend using full-face APR for VC. OSHA does permit using full-face APR in the VC standard, but limits the maximum use concentration to 10 ppm (1910.1017(f)(3)(ii)). Caution is warranted for use of APR due to the lack of supporting documentation by the three major respirator manufacturers. See APR changeout schedule on the following page.

Chemical Resistance Table for Suits and Gloves⁵

Key		Gloves										Suits																	
>8	Recommended >8h	Butyl Rubber	Natural Rubber	Neoprene Rubber	Nitrile Rubber	Polyvinylalcohol – PVAL	Polyvinylchloride – PVC	Viton®	Viton®/Butyl Rubber	Barriert® - PE/PA/PE	Silver Shield® - PE/EVAL/PE	Saranex®	ChemMAX® 3	ChemMAX® 4	Frontline® 500	Interceptor®	Microchem® 4000	Trellechem® HPS	Trellechem® VPS	Tychem® SL	Tychem® CPF 3	Tychem® F	Tychem® Thermopro	Tychem® BR/LV	Tychem® Responder® CSM	Tychem® TK	Tychem® Reflector	Zytron® 300	Zytron® 500
	Recommended >4h																												
	Caution 1-4 h																												
	Not Recom, < 1h																												
	Not Tested																												
Vinyl chloride									>8	>8	>8	>8	>8					>8	>8	>8	>8	>8	>8	>8	>8	>8	>8	>8	>8

Cartridge Life Using Full Face APR by Brand

Criteria	Scott AV3000 Full-Face APR	3M 60293 Full-Face APR	MSA
Site Concentration			
Exposure Limit			
Maximum Use Concentration			
Protection Factor (APF)			
Temperature			
Work Rate			
Service Life ⁶	Not recommended	Not recommended	Not recommended

⁵ Taken directly from Wiley 6th Edition Quick Selection Guide to Chemical Protective Clothing

⁶ The service life may far exceed 8-12 hour usage; however, it is best practice to change out cartridges before each new work shift.

Site Action Levels for Airborne Vinyl chloride			
Analyte	Action Level	Basis	Comments
Vinyl chloride	0.5 ppm	½ ACGIH® TLV-TWA for VC - Reading sustained for 15 minutes	Exposure at this concentration is not considered life threatening; however, workers and site management should implement controls and/or PPE to reduce exposure below the TLV-TWA for unprotected workers.
	1 ppm	ACGIH® TLV-TWA for VC Reading sustained for 15 minutes	Exposure at this concentration is not considered life threatening; however, workers and site management should implement controls and/or PPE to reduce exposure below the TLV-TWA for unprotected workers.
LEL	1%	1% of LEL for VC Reading sustained for 1 minute	Although 1% of the LEL is conservative, workers and site management should be aware of conditions and prepare for protective action to avoid reaching flammable limits
	10 %	10% of LEL for VC Reading sustained for 1 minute	10% of the LEL is a reasonable precautionary action level to halt work activity so that source mitigation techniques can be employed to reduce the flammable atmosphere prior to the continuation of work activity.

Monitoring Strategy					
Flammability					
Instrument	Instrument Reading	Corrected Value	Correction Factor	Basis	Action to be Taken
MultiRAE PID	1800 ppm	3600 ppm	2.0 for VC using PID	10% LEL	Egress and Notify Site Management
MultiRAE LEL Sensor	5%	10%	2.0 for VC using LEL Sensor	10% LEL	
Exposure					
Instrument	Instrument Reading	Corrected Value	Correction Factor	Basis	Action to be Taken
MultiRAE PID	0.5 ppm	1 ppm	2.0 for VC using PID	ACGIH TLV-TWA	Don respiratory protection or Egress; Notify Site Management
Gastec Tube No. 131L	1 ppm	1 ppm	1.0 for VC with 2 – 100 mL pump strokes	ACGIH TLV-TWA	

Job Steps	Hazards	Hazard Controls
<p>1. Initial Entry & Damage Assessment</p>	<p>1.1 Slips/Trips/Falls</p>	<p>1.1.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 1.1.2 Wear railroad approved work boots with ankle support. 1.1.3 Avoid climbing on wreckage if suitable walking/working surfaces and or climbing structures are not available. 1.1.4 If tank car ladder and guardrail at protective dome housing are damaged, configure a suitable fall-arrest system before accessing the protective dome housing area. 1.1.5 Ensure that entrants in Level A PPE are physically able to withstand the demands of the suit and also physically strong enough to traverse difficult terrain.</p>
	<p>1.2 Fire/Explosion</p>	<p>1.2.1 Identify all open sources of and other potential flammable liquids & gases using manifest. 1.2.2 Identify potential ignition sources, locate all active fires. 1.2.3 If potential for ignition is real: wear flash-protective bunker gear/FRC only if liquid and vapor exposure is not a threat. If protection from vapor and liquid exposure is necessary and fire risk is elevated, utilize control measures to reduce fire threat first. Using control measures to reduce the threat of fire will allow use of more common PPE. If fire threat cannot be reduced, a more aggressive flash protective suit may be necessary. 1.2.4 Conduct LEL monitoring. Action level 10% of LEL should result in egress. 1.2.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid. 1.2.6 Provide fire fighting measures to control fires. 1.2.7 Use appropriate fire fighting measures to cool cars with flame impingement or adjacent to active fires or hot spots. 1.2.8 Use caution when walking among wreckage, look for subsurface pooling of liquid, especially in the vicinity of active fires.</p>
	<p>1.3 Chemical Exposure</p>	<p>1.3.1 Don Level B PPE if release conditions are unknown. Downgrade to Level C PPE to continue damage assessment if conditions permit (see PPE matrix). 1.3.2 Perform air monitoring on initial entry, document readings. 1.3.3 Observe wind direction and deploy a windsock. 1.3.4 Identify and mark areas of liquid releasing, secondary containment/ liquids, impacted soil, or standing liquid. 1.3.5 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone.</p>

Job Steps	Hazards	Hazard Controls
		1.3.6 Decon workers must perform decontamination activities in 1 lower-level PPE ensemble unless contamination is significant.
	1.4 Heat Stress from PPE	1.4.1 Using CPC and respiratory protection can increase heat stress risk if ambient conditions are warm or hot. 1.4.2 Conduct medical monitoring prior to and after entry to evaluate worker's condition. 1.4.3 If necessary, limit the duration of each entry and maximize rest periods based on site conditions and medical monitoring information. 1.4.4 Drink plenty of water; avoid excessive use of sports drinks. 1.4.5 Rest in shaded, cool areas. Consider adding fans, misting devices, or air-conditioned rest areas (vehicles). 1.4.6 Avoid excessive intake of caffeine while at work and alcoholic beverages after work.
	1.5 Mechanical Injury from wreckage or falling	1.5.1 Stay clear of unstable or elevated wreckage. 1.5.2 Avoid reaching/walking between unstable cars/loads. 1.5.3 Use caution when tightening valves. Observe all pinch points for hands.
	1.6 Miscommunication	1.6.1 Establish effective hand signals for entrants to use if radio coms are not available. 1.6.2 Establish radio or cell phone communication with all responders. 1.6.3 Safety briefing conducted prior to initial entry.

Job Steps	Hazards	Hazard Controls
<p>2. Release Mitigation</p>	<p>2.1 Fire/Explosion</p>	<p>2.1.1 Identify all open sources of and other potential flammable liquids & gases using manifest.</p> <p>2.1.2 Identify potential ignition sources, locate all active fires.</p> <p>2.1.3 If potential for ignition is real: wear flash-protective bunker gear/FRC only if liquid and vapor exposure is not a threat. If protection from vapor and liquid exposure is necessary and fire risk is elevated, utilize control measures to reduce fire threat first. Using control measures to reduce the threat of fire will allow use of more common PPE. If fire threat cannot be reduced, a more aggressive flash protective suit may be necessary.</p> <p>2.1.4 Conduct LEL monitoring. Action level 10% of LEL.</p> <p>2.1.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid.</p> <p>2.1.6 Provide fire fighting measures to control fires.</p> <p>2.1.7 Use appropriate fire fighting measures to cool car(s) with flame impingement or adjacent to active fires or hot spots.</p> <p>2.1.8 Use caution when walking among wreckage, look for subsurface hot spots or subsurface pooling in the vicinity of active fires.</p> <p>2.1.9 All tools used during release mitigation should be non-sparking, intrinsically safe. Combustion engines or electrical tools should not be used near flammable atmospheres.</p>
	<p>2.2 Injury from valve or container repair</p>	<p>2.2.1 Use secure hoist to raise tools to the protective dome housing.</p> <p>2.2.2 Avoid single-man manual lifting for loads greater than 50 lbs.</p> <p>2.2.3 Ensure all connections are tight and secured.</p> <p>2.2.4 Avoid body contact with high-pressure liquid streams.</p> <p>2.2.5 Wear protective clothing capable of protecting from high-pressure water impact.</p> <p>2.2.6 Remember, aggressive PPE will make tasks requiring good manual dexterity very difficult. Work safely and slowly to ensure proper use of valves, fittings, and tools.</p> <p>2.2.7 All tools should be non-sparking (brass).</p> <p>2.2.8 Avoid contact chemical protective clothing with sharp edges of damaged shell, brake lines, catwalk, railing etc. to keep the suit from tearing.</p>

Job Steps	Hazards	Hazard Controls
	2.3 Miscommunication	2.3.1 Establish effective hand signals for entrants to use if radio coms are not available. 2.3.2 Establish radio or cell phone communication with all responders. 2.3.3 Safety briefing conducted prior to initial entry.
	2.4 Chemical Exposure	2.4.1 Don Level A PPE to approach leak source. If leak is insignificant and controlled, and worker can be upwind, then consider Level B PPE using PPE matrix. 2.4.2 Continuous air monitoring with workers during mitigation. 2.4.3 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone. 2.4.4 Decon workers must perform decontamination activities in 1-lower level PPE ensemble.
	2.6 Mechanical Injury	2.6.1 Stay clear of unstable or elevated wreckage. 2.6.2 Avoid reaching/walking between unstable cars/loads.
	2.7 Slips/trips/falls	2.7.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 2.7.2 Wear railroad approved work boots with ankle support. 2.7.3 Abide by site fall protection safety protocols while working at elevations above 6 feet. 2.7.4 Ensure workers are prepared and trained to traverse the worksite with movement-restrictive PPE. Only fit workers with the strength to wear such PPE should be used to traverse challenging terrain or wreckage.
	2.8 High Pressure Release	2.8.1 Perform all necessary pressure checks, PRV will activate at 75 psi. 2.8.2 Ensure that valves are manipulated in a safe and controlled manner when tightening. 2.8.3 Essential personnel only at protective dome housing. 2.1.4 Conduct LEL monitoring. Action level 10% of LEL for known substances.

Job Steps	Hazards	Hazard Controls
3. Transfer of Vinyl chloride	3.1 Chemical Exposure	3.1.1 Perform air monitoring at the protective dome housing prior to connecting transfer equipment to damaged car's valve assembly. 3.1.2 Don Level B when connecting transfer hose to damaged car's liquid and vapor valves. See PPE Matrix to determine level based on conditions. 3.1.3 Ensure that transfer hoses, pumps, and compressors are free of liquid product and depressurized before opening lines. 3.1.4 Don Level B PPE (if conditions warrant-see PPE matrix) when disconnecting hoses, pumps, and compressors that have been emptied of free liquids. 3.1.5 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone. 3.1.6 Decon workers must perform decontamination activities in CPC. 3.1.7 If pressurizing damaged car with nitrogen to transfer, be aware that excessive concentrations of nitrogen can displace oxygen and will asphyxiate unprotected workers in the area of high concentration.
	3.2 Transfer system release or pressurization	3.2.1 Be cautious of pressure buildup in lines during transfer. 3.2.2 Continue pressure checks on tank cars to monitor pressure conditions. 3.2.3 Valves should only be manipulated by competent persons. 3.2.4 Use chemical compatible, valves, fittings, and hoses. 3.2.5 Ensure all system pressures are within manufacture recommended ranges. 3.2.6 Ensure all connections are tight and secured. 3.2.7 Avoid body contact with pressurized liquid and gas streams even though worker is protected by PPE. 3.2.8 Initially and periodically monitor pumps, hoses, valves, and fittings for liquid or vapor leaks. 3.2.9 Use caution when connecting and disconnecting hydraulic pump lines; avoid pressurized release of compressed air.
	3.3 Miscommunication	3.3.1 Establish effective hand signals for entrants to use if radio coms are not available. 3.3.2 Establish radio or cell phone communication with all responders. 3.3.3 Safety briefing conducted prior to initial entry.
	3.4 Static Electrical Discharge	3.4.1 Ensure that all transfer equipment and receiving vessels are grounded and bonded according to best practice.

Job Steps	Hazards	Hazard Controls
	3.5 Mechanical Injury	3.5.1 Stay clear of unstable or elevated wreckage. 3.5.2 Avoid reaching/walking between unstable cars/loads. 3.5.3 Ensure that tank car is secured to stabilize equipment during tank car rotations.
	3.6 Slips/trips/falls	3.6.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 3.6.2 Wear railroad approved work boots with ankle support. 3.6.3 Abide by site fall protection safety protocols while working at elevations above 6 feet. 3.6.4 Ensure that workers are aware of the decrease in flexibility and mobility when wearing aggressive PPE, especially when climbing onto railcars or other equipment.
	3.7 Fire/Explosion	3.7.1 Identify all open sources and other potential flammable liquids & gases using manifest. 3.7.2 Identify potential ignition sources, locate all active fires. 3.7.3 If potential for ignition: wear flash-protective bunker gear/FRC and SCBA. If airborne concentrations are high & sustained, use control measures to reduce threat first. 3.7.4 Conduct LEL monitoring. Action level 10% of LEL for known substances. 3.7.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid. 3.7.8 All tools used during release mitigation should be non-sparking, intrinsically safe. Combustion engines or electrical tools should not be used near flammable atmospheres.

Job Steps	Hazards	Hazard Controls
4. Clean and purge	4.1 Fugitive emissions	4.1.1 Use chemical compatible, valves, fittings, and hoses. 4.1.2 Ensure that vapor lines are properly secured to vapor scrubbing system if used. 4.1.3 Ensure all connections are tight and secured. 4.1.4 Initially and periodically monitor pumps, hoses, valves, and fittings for liquid or gas leaks. 4.1.6 Properly decontaminate all hoses, fittings, tools, and other equipment used during scrubbing operation. 4.1.7 If using a propane-assisted flare to control emissions, ensure flare lighting is safe by following hot work procedures, specifically, identifying all flammable materials and monitoring the area for flammable gas (LEL monitor) before lighting flare. Use caution when connecting propane lines, ensure tight fittings and vapor leaks.
	4.2 Chemical Exposure	4.2.1 Perform air monitoring at the protective dome housing prior to connecting transfer equipment to damaged car's valve assembly. 4.2.2 Don Level B PPE when connecting vapor line to damaged car's vapor valves. See PPE Matrix to determine based on conditions. 4.2.3 Ensure that transfer hoses, pumps, and compressors are free of liquid product before opening lines. 4.2.4 Don Level B or C PPE when disconnecting hoses, pumps, and compressors that have been emptied of free liquids. 4.2.5 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone. 4.2.6 Decon workers must perform decontamination activities in CPC.
	4.3 System release or pressurization	4.3.1 Be cautious of pressure buildup in lines during purge. 3.2.2 Continue pressure checks on tank cars to monitor pressure conditions. 3.2.3 Valves should only be manipulated by competent persons. 3.2.4 Use chemical compatible, valves, fittings, and hoses. 3.2.5 Ensure all system pressures are within manufacture recommended ranges. 3.2.6 Ensure all connections are tight and secured. 3.2.7 Avoid body contact with pressurized liquid and gas streams. 3.2.8 Initially and periodically monitor pumps, hoses, valves, and fittings for liquid or vapor leaks. 3.2.9 Use caution when connecting and disconnecting hydraulic pump lines; avoid



Job Safety Analysis Chemical-Specific Worksheet

Vinyl chloride

Job Steps	Hazards	Hazard Controls
		pressurized release of compressed air.
	4.4 Mechanical Injury	4.4.1 Stay clear of unstable or elevated wreckage. 4.4.2 Avoid reaching/walking between unstable cars/loads.
	4.5 Slips/trips/falls	4.5.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 4.5.2 Wear railroad approved work boots with ankle support. 4.5.3 Abide by site fall protection safety protocols while working at elevations above 6 feet.
	4.6 Fire/Explosion	4.6.1 Identify all sources and other potential flammable liquids & gases using manifest. 4.6.2 Identify potential ignition sources, locate all active fires. 4.6.3 If potential for ignition: wear flash-protective bunker gear/FRC. 4.6.4 Conduct LEL monitoring. Action level 10% of LEL for known substances. 4.6.5 Utilize hot work procedures before conducting activity capable of generating sparks or could ignite flammable vapors or liquid.

Job Steps	Hazards	Hazard Controls
5. Removal of residual materials and impacted soil	5.1 Chemical Exposure	<p>5.1.1 Provide continuous air monitoring to determine if vapors are elevated in the work areas near impacted soil.</p> <p>5.1.2 Don Level B PPE to work in close proximity to impacted soils with elevated vapor. If vapor levels are high, return to using Level A until vapor concentrations are reduced.</p> <p>5.1.3 All workers entering the site in PPE must receive a full decontamination of all respiratory protection, CPC and equipment prior to exiting the warm zone.</p> <p>5.1.4 Decon workers should perform decontamination activities in LEVEL C PPE, but full-faced respirator may not be required if minimal contamination is present.</p> <p>5.1.5 Excavation, loading, and unloading of impacted soil or debris may generate elevated vapor. Excavation operators should be prepared to don full-faced APR if conditions require respiratory protection. Ground-level workers may be required to don Level B PPE to avoid inhalation of vapor and skin contact with impacted soil.</p>
	5.2 Vac operations	<p>5.2.1 Use chemical compatible, valves, fittings, and hoses.</p> <p>5.2.2 Ensure all system pressures are within manufacture recommended ranges.</p> <p>5.2.3 Ensure all connections are tight and secured.</p> <p>5.2.4 Avoid body contact with liquid streams.</p> <p>5.2.5 Initially and periodically monitor hoses, valves, and fittings for liquid leaks.</p> <p>5.2.6 Ensure that all vent hoses are positioned to direct vacuum exhaust away from the work area.</p> <p>5.2.7 Ensure that vac trucks are parked on secure areas and are properly staged to minimize potential for unwanted equipment movements.</p> <p>5.2.8 Properly ground and bond all vac truck equipment to avoid static discharge.</p> <p>5.2.9 The use of a vac truck to remove liquids may require the most aggressive form of PPE if the liquid is highly concentrated, based on the volume and disposition of liquid being removed.</p>
	5.3 Excavation operations	<p>5.3.1 Ensure that all machinery is equipped with properly functioning audible alarms for movement.</p> <p>5.3.2 Avoid unnecessary foot traffic within the operating distances of the machinery.</p> <p>5.3.3 Workers within the operating distance of the machine must remain within the line-of-sight of the operator at all times. Use hand signals to signal movement once within the operating distance of the machine.</p> <p>5.3.4 Keep all workers from working beneath suspended loads.</p>



Job Safety Analysis Chemical-Specific Worksheet

Vinyl chloride

Job Steps	Hazards	Hazard Controls
		5.3.5 All receiving containers must be properly staged on a suitable foundation and secured before loading. 5.3.6 All machinery must be operated from secure locations. 5.3.7 Open trenches must be maintained within the requirements of applicable trenching/shoring standards. Workers should not enter an un-secured trench at any time. Use barricades to prevent workers from working closely to trench or pit openings.
	5.4 Slips/trips/falls	6.4.1 Watch footing on loose/shifting rocks. Visualize a safe travel path. 6.4.1 Wear railroad approved work boots with ankle support.
	5.5 Railway hazards	6.5.1 All workers must be briefed on track protection 6.5.2 All workers must abide by railroad track safety rules as covered by contractor orientation.



Job Safety Analysis Chemical-Specific Worksheet

Vinyl chloride

Additional Site Hazards	Actions to Eliminate Hazards
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.



Norfolk Southern Train derailment East Palestine, OH East Palestine, OH

CTEH® Site-Specific Health and Safety Plan (HASP)

Version 1.0

Prepared By:



CTEH, LLC

5120 Northshore Drive

North Little Rock, Arkansas 72118

501-801-8500

CTEH Project Number PROJ-024579

	Name	Signature	Date Signed
Prepared By:	Jason Davis		
Reviewed By:	Micah Kendrick, CSP		February 3, 2023
Approved By:			
Approved By:			
Approved By:			

Incident Information

Effective Date	
Incident Name	Norfolk Southern Train derailment East Palestine, OH
Location	East Palestine, OH

1.0 DESCRIPTION OF INCIDENT:

This incident is involving a fire caused by a train derailment in East Palestine, OH.

2.0 PURPOSE:

This plan addresses air and environmental monitoring tasks by CTEH®, LLC (CTEH). The activities may include: worker air monitoring, community assessment air monitoring, site assessment air monitoring, water sampling, sediment sampling, and soil sampling.

This site-specific information has been developed from the latest available information. Revisions and alterations to this plan may become necessary as further information, (i.e., environmental sampling results, changes in site conditions, changes in scope of work, etc.), is developed or becomes available. All alterations to this plan should be recorded in the Health & Safety Plan Management of Change section.

All on-site personnel are required to review and comply with this Health and Safety Plan. It is the responsibility of the project manager to ensure this plan is implemented.

3.0 SITE & EMERGENCY CONTACTS

3.1 Emergency Services Contact Information

Fire/Police/Ambulance – 911

East Liverpool City Hospital - (330) 385-7200

3.2 Project Contact Information

Air PM - Ethan Currie - CTEH - 409-204-2751

Project Technical Director - Katrina Jew - CTEH - 760-576-9696

Client Contact – Mark Duddle – 404-273-2082

4.0 SITE CONTROL

See Addendum for a Location map and hospital route.

Site Control	Location
Staging Area:	
Site Security and Access Points:	TBD
Exclusion Zone:	TBD
Support Zone:	TBD

5.0 HAZARD ASSESSMENT

5.1 Chemical Hazards

Vinyl Chloride is a colorless gas with a sweet odor. Easily ignited. Shipped as a liquefied gas under own vapor pressure. Contact with the unconfined liquid may cause frostbite by evaporative cooling. Leaks may be liquid or vapor. Vapors are heavier than air. May asphyxiate by the displacement of air. Under prolonged exposure to fire or intense heat the containers may rupture violently and rocket. Suspected carcinogen. Used to make plastics, adhesives, and other chemicals. Chemical health hazards include INHALATION: high concentrations cause dizziness, anesthesia, lung irritation. SKIN: may cause frostbite; phenol inhibitor may be absorbed through skin if large amounts of liquid evaporate. (USCG, 1999)

Liquefied Petroleum Gas is a mixture of butane, isobutane, propane, propylene, butylenes and other hydrocarbons of low molecular weight that is refined from petroleum. Maintained as a liquid under pressure. Leaking vessels can release either the liquid, which quickly vaporizes, or the gaseous mixture. The gas is heavier than air-- a flame can flash back to the source of the leak very easily. Under prolonged exposure to heat the containers may rupture violently and rocket. Used as a fuel, an aerosol propellant, in cigarette lighters, and to make other chemicals. Chemical health hazards include Concentrations in air greater than 10%; cause dizziness in a few minutes, 1% concentrations give the same symptom in 10 min. High concentrations cause asphyxiation. (USCG, 1999)

Isobutylene is a colorless gas with a faint petroleum-like odor. For transportation it may be stented. It is shipped as a liquefied gas under its own vapor pressure. Contact with the liquid can cause frostbite. It is easily ignited. Its vapors are heavier than air and a flame can flash back to the source of leak very easily. The leak can either be a liquid or vapor leak. It can asphyxiate by the displacement of air. Under prolonged

exposure to fire or heat the containers may rupture violently and rocket. It is used in the production of isooctane, a high octane aviation gasoline. Chemical health hazards include Inhalation of moderate concentrations causes dizziness, drowsiness, and unconsciousness. Contact with eyes or skin may cause irritation; the liquid may cause frostbite. (USCG, 1999)

Benzene is a clear colorless liquid with a petroleum-like odor. Flash point less than 0°F. Less dense than water and slightly soluble in water. Hence floats on water. Vapors are heavier than air. Chemical health hazards include Dizziness, excitation, pallor, followed by flushing, weakness, headache, breathlessness, chest constriction, nausea, and vomiting. Coma and possible death. (USCG, 1999)

Ethylene glycol is a clear, colorless syrupy liquid. The primary hazard is the threat to the environment. Immediate steps should be taken to limit its spread to the environment. Since it is a liquid it can easily penetrate the soil and contaminate groundwater and nearby streams. Chemical health hazards include Inhalation of vapor is not hazardous. Ingestion causes stupor or coma, sometimes leading to fatal kidney injury. (USCG, 1999)

2-Ethylhexyl Acrylate is a clear colorless liquid with a pleasant odor. Less dense than water and insoluble in water. Vapors heavier than air. Flash point 180°F. Used in making of paints and plastics. Chemical health hazards include Inhalation of concentrated vapor causes drowsiness and convulsions. Liquid causes irritation of eyes and may irritate skin on prolonged exposure. Ingestion produces same symptoms as inhalation. (USCG, 1999)

Sulfuric acid is a colorless oily liquid. It is soluble in water with release of heat. It is corrosive to metals and tissue. It will char wood and most other organic matter on contact, but is unlikely to cause a fire. Density 15 lb / gal. Long term exposure to low concentrations or short term exposure to high concentrations can result in adverse health effects from inhalation. It is used to make fertilizers and other chemicals, in petroleum refining, in iron and steel production, and for many other uses.

Rate of onset: Immediate

Persistence: Hours, days

Odor threshold:

Source/use/other hazard: Battery/dyes/paper/glue/metals industries; volcanic gas; toxic fumes when heated. Chemical health hazards include Corrosive to all body tissues. Inhalation of vapor may cause serious lung damage. Contact with eyes may result in total loss of vision. Skin contact may produce severe necrosis. Fatal amount for adult: between 1 teaspoonful and one-half ounce of the concentrated chemical. Even a few drops may be fatal if the acid gains access to the trachea. Chronic exposure may

cause tracheobronchitis, stomatitis, conjunctivitis, and gastritis. Gastric perforation and peritonitis may occur and may be followed by circulatory collapse. Circulatory shock is often the immediate cause of death. Those with chronic respiratory, gastrointestinal, or nervous diseases and any eye and skin diseases are at greater risk. (EPA, 1998)

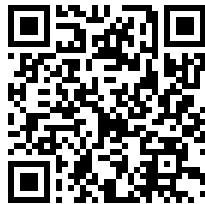
See attached Safety Data Sheet (SDS) for more details on chemical hazards.

See the CTEH® Air Sampling and Analysis Plan for site-specific action levels.

5.2 Physical Hazards

5.2.1 Weather Information

Responders should always maintain situational awareness of changing weather conditions through their CTEH® provided handheld device. Additionally, a safety briefing will occur prior to the beginning of each shift and weather information should be presented at that time. The current weather for the incident site can be accessed via the QR code below:



[Link to current weather](#)

5.2.2 Thermal Stress

Thermal stress (heat stress or cold stress) hazards and strategies for mitigating impact on worker safety and health can be addressed based on information obtained in the OSHA-NIOSH Heat App. An addendum to this document may be added if deemed necessary by the project manager and corporate safety officer.

5.2.3 Severe Weather Hazard

In the event that a severe weather event disrupts work activity, seek shelter immediately. Egress work areas to the nearest enclosed shelter and stay away from windows if possible. Alert the CTEH® division supervisor or project manager as soon as possible, and provide a situational update.

If a lightning strike is observed within 10 miles of the work site, a mandatory 30-minute stand down will be in effect. Seek shelter indoors or in a vehicle. The stand down will continue to restart until the last lightning strike within 10 miles is observed. Stay indoors or in a vehicle until the entire 30-minute stand down period expires.

5.2.4 Moving Vehicles

Be cautious of all motor vehicles on site as well as in the community. As a pedestrian, look 360° before walking to identify any moving vehicles in your nearby vicinity. Personnel should wear reflective safety gear as the outermost layer of clothing on site, day or night.

5.2.5 Distracted Driving and Driving Safety

CTEH® personnel must abide by CTEH®, client, state, and local regulations and guidelines regarding driving while using cell phones. Under no circumstances are CTEH® personnel permitted to text or email while driving. In most cases, CTEH® personnel should pull over safely, away from traffic, to conduct cell phone or radio communications.

CTEH® personnel are not permitted to operate a motor vehicle without seatbelts being properly worn. Once you have secured your seatbelt, please adjust your window and driver mirrors. Do not block windows with contents such that your view is obstructed while driving.

5.2.6 Motor Vehicle Hazards

When operating a motor vehicle, look both ways before entering a roadway or crossing intersections. Look for pedestrians on or near roadways. Do not email or text while operating a motor vehicle. Driving at dusk and dawn or low light conditions decrease driver visibility, and be aware that animals are much more active during these times. Driving on wet, snowy, gravel, or dirt roads warrant operation of the vehicle at a conservative speed. Not all gravel road crossings are controlled crossings; some do not have stop signs. In addition to lack of signage, high grasses may obstruct a driver's view at crossings

5.2.7 Heavy Equipment

Track hoes, bulldozers, dump trucks, vacuum trucks, commercial pickup trucks, and other heavy machinery may be present at the site during remediation activities. Stay outside of the boom radius of any lever-based heavy machinery.

5.2.8 Electrical

Underground power lines, generators, light plants, and plug-in power sources may create the potential for electrical shock or electrocution. Assess all CTEH® power equipment and power cords for defects. If

any electrical equipment is defective, remove from service. For your own safety, maintain awareness of other site personnel and equipment that may cause electrical issues.

5.2.9 Fire & Explosion

The nature of the site and existence of an ignition source, fire, variable pressures, and variable unknown sources may create explosion hazards either indoors or outdoors. Containers may explode when heated. CTEH® personnel will don flame resistant clothing (FRCs) when in the work area.

Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (basin, sewers, basements, tanks). Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Many liquids are lighter than water.

The flammability hazards associated with vinyl chloride are as follows. Highly flammable. Burns readily. Rapidly or completely vaporizes at atmospheric pressure and normal ambient temperature. Special Hazards of Combustion Products: Forms highly toxic combustion products such as hydrogen chloride, phosgene, and carbon monoxide.

Behavior in Fire: Container may explode in fire. Gas is heavier than air and may travel considerable distance to a source of ignition and flash back. (USCG, 1999).

The flammability hazards associated with liquefied petroleum gas are as follows. Excerpt from GUIDE 115 [Gases - Flammable (Including Refrigerated Liquids)]:

EXTREMELY FLAMMABLE. Will be easily ignited by heat, sparks or flames. Will form explosive mixtures with air. Vapors from liquefied gas are initially heavier than air and spread along ground. CAUTION: Hydrogen (UN1049), Deuterium (UN1957), Hydrogen, refrigerated liquid (UN1966) and Methane (UN1971) are lighter than air and will rise. Hydrogen and Deuterium fires are difficult to detect since they burn with an invisible flame. Use an alternate method of detection (thermal camera, broom handle, etc.) Vapors may travel to source of ignition and flash back. Cylinders exposed to fire may vent and release flammable gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket. (ERG, 2016).

The flammability hazards associated with isobutylene are as follows. Highly flammable. Burns readily. Rapidly or completely vaporizes at atmospheric pressure and normal ambient temperature. Behavior in Fire: Containers may explode in fire. Vapor is heavier than air and may travel a long distance to a source of ignition and flash back. (USCG, 1999).

The flammability hazards associated with benzene are as follows. Highly flammable. Can be ignited under almost all ambient temperature conditions. Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. (USCG, 1999).

The flammability hazards associated with ethylene glycol are as follows. This chemical is combustible. (NTP, 1992).

The flammability hazards associated with 2-ethylhexyl acrylate are as follows. Must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Behavior in Fire: Heat can result in a severe polymerization with rapid release of energy. Sealed containers may rupture explosively if hot. (USCG, 1999).

The flammability hazards associated with sulfuric acid are as follows. Will not burn under typical fire conditions. It is highly reactive and capable of igniting finely-divided combustible materials on contact. When heated, it emits highly toxic fumes. Avoid heat; water and organic materials. Sulfuric acid is explosive or incompatible with an enormous array of substances. Can undergo violent chemical change at elevated temperatures and pressure. May react violently with water. When heated, it emits highly toxic fumes. Hazardous polymerization may not occur. (EPA, 1998).

Refer to the attached CTEH® Air Sampling and Analysis Plan (SAP) for information regarding site-specific action levels for flammable atmospheres.

5.2.10 Hot Work

Response operations may include hot work (i.e. cutting or grinding). Due to the potential fire and explosion hazards of VINYL CHLORIDE, LIQUEFIED PETROLEUM GAS, ISOBUTYLENE, BENZENE, ETHYLENE GLYCOL, 2-ETHYLHEXYL ACRYLATE, SULFURIC ACID constituents, **WELDING OR USE OF TORCHES IS NOT PERMITTED UNLESS A HOT WORK PERMIT OR OTHER WRITTEN PERMISSION IS OBTAINED FROM THE SITE HEALTH AND SAFETY OFFICER - NO EXCEPTIONS.** CTEH® employees will not participate or assist in the performance of hot work if this condition is not met. If hot work occurs and CTEH® is tasked with providing air monitoring for the hot work permit, LEL monitoring (confirmed by VOC readings) will be performed to determine whether combustible vapors are detected at or near the relevant Action Levels. See the CTEH® hot work policy or speak with the Corporate Safety Officer for clarification.

5.2.11 Trip Hazards

Uneven or slick terrain provides an environment in which slips, trips, and falls should be considered. Be aware of your travel path prior to walking or changing directions. Search for any obstructions that may present as a trip hazard.

5.2.12 Noise

Emergency Response work sites are considered non-traditional and often difficult to characterize noise exposures. Please keep hearing protection readily accessible. For work areas experiencing high noise levels (greater than 90 dB) and/or impact noise (greater than 140 dB), please utilize hearing protection.

5.2.13 Eye Protection

The site may include dusty conditions or particulate hazards from other sources. If dusty conditions are present, helmet-mounted goggles should replace safety glasses to further protect your eyes from particulate-induced eye injury.

5.2.14 Dermal Contact Hazards

VINYL CHLORIDE, LIQUEFIED PETROLEUM GAS, ISOBUTYLENE, BENZENE, ETHYLENE GLYCOL, 2-ETHYLHEXYL ACRYLATE, SULFURIC ACID may cause contact dermatitis if exposed to skin for prolonged periods. Avoid skin contact with constituents with use of appropriate chemical resistant gloves, boots, and coveralls. If skin contact occurs, wash with copious amounts of water for at least 15 minutes. Remove any contaminated clothing and discard. If redness or other irritation symptoms persist, seek medical attention. Poison Oak and Poison Ivy may be present in areas encountered by field personnel. Use caution to avoid contact with these plants, this includes equipment as well.

5.2.15 Water Hazards

Employees working in areas unprotected by passive fall protection systems (OSHA specified railings or nets), where the danger of drowning exists, must wear U.S. Coast Guard approved life jacket or buoyant work vest, commonly referred to as personal flotation device (PFD). However, this regulation can be superseded with the use of fall protection. If an employee cannot fall into the water as a result of use of active or passive fall protection, there is no danger of drowning, and a PFD is not required. Safety lines that prevent employees from reaching the water eliminate the danger of drowning, and negate the need for a PFD. The same is true when working on a barge or floating platform with an approved railing system.

5.2.16 Biological Hazards

CTEH has adopted the following guidelines based on current CDC recommendations. All employees, both vaccinated and unvaccinated, will wear a facial covering in accordance with the poster shown below:

	No One Within 6 Feet	Someone Within 6 Feet
Stationary / Seated	 No Mask Required	 Mask Required
Mobile / Walking	 Mask Required	 Mask Required

NOTES:

CTEH employees must adhere to any city, county, and state mask regulations.

Masks are not required for offices in **Low** and **Medium** COVID-19 Community Levels.

Talk to your healthcare provider about mask recommendations if you are immunocompromised or at high risk for severe illness.

**Check Your
Community Level**



updated 3/9/2022

Additional precautions should be taken to aid in prevention of transmission of COVID-19. CTEH employees should observe the following:

- When possible, put 6 feet of distance between yourself and people who don't live in your household. Remember that some people without symptoms may be able to spread the virus. Keeping distance from others is especially important for people who are at higher risk of getting very sick.
- Wash your hands often with soap and water for at least 20 seconds especially after you have been in a public, or after blowing your nose, coughing, or sneezing. If hand washing is not available use an alcohol-based hand sanitizer with at least 60% ethyl alcohol.
- If you have been exposed or potentially exposed to SARS-CoV-2, contact the CTEH Nurse Hotline at 1 (800) 699-3083 for guidance related to isolation, quarantine, or healthcare. If you have symptoms of COVID-19 (including fever greater than 100.4°F or 38°C and additional symptoms, such as coughing or difficulty breathing) it is important to stay away from other people.
- Monitor your health daily. Be alert to symptoms and complete your daily wellness report. If you are sick, do not come to work. Contact the Nurse Hotline for guidance on isolation and testing

requirements. Each employee is required to their wellness daily, and if yes to any of the 4 wellness questions, submit a report at www.cteh.com/wellness.

CTEH personnel will adhere to the most current CDC guidelines for mask usage or requirements outlined by the client for which they are working, whichever is more protective.

6.0 EXPOSURE CONTROL

6.1 Personal Protection Requirements

The following is the default level of PPE required. This level may be modified depending on specific site conditions or job tasks as determined by the Project Manager. Prior to beginning any work task determine the appropriate level of PPE through consultation with the PM or Site Safety Officer.

Level D - Hardhat, eye protection, foot protection, hearing protection, and fire resistant clothing (FRC). Level D PPE may also include helmet-mounted eye protection goggles.

6.2 Respiratory Protection Guidelines

Refer to the attached CTEH® Air Sampling and Analysis Plan or specific Job Safety Analysis (JSA) for recommendations. Additionally, if CTEH® elects or is requested to engage in operations necessitating respiratory protection, an addendum to this document may be produced.

6.3 Regulated Area & Critical Operations

Based on the potential presence of benzene vapor, and as per OSHA 29 CFR 1910.1028, a regulated area will be established for locations where >0.5 ppm (OSHA Action Level) benzene vapor is sustained. This regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to levels above the action level. Signs shall be posted at entrances to the regulated area. Respiratory protection must be used for those entering the regulated area. At a minimum, **a full-faced APR equipped with cartridges compatible for protection against benzene is required for CTEH® entrants into the regulated area.**

7.0 EDUCATION & TRAINING

Personnel are required to be trained in accordance with OSHA 29 CFR 1910.120 for the level at which they are performing duties.

7.1 Facility to perform medical testing/monitoring:

If medical monitoring is to be performed, representatives from CTEH® will locate the nearest qualified healthcare facility.

7.2 Site specific training required:

In addition to the training requirements above, the following site-specific training topics may be reviewed prior to work on the site:

- Site Hazards (material released, physical hazards, etc.)
- Work areas / activities identified
- Site Emergency Alerting / Contingency Plan
- Evacuation Route / Assembly Areas
- Required PPE
- Obtaining Medical Treatment / First Aid
- Decontamination procedures
- Buddy System
- Confined Space
- Other: _____
- Other: _____

7.3 Safety Briefing/Hazard Communication

A safety briefing will occur prior to the beginning of each shift and anytime that work conditions change. Site safety briefings will be completed each day and kept on file.

8.0 MEDICAL SURVEILLANCE

8.1 Special Medical Monitoring Required:

1910.1017(k) Medical surveillance. A program of medical surveillance shall be instituted for each employee exposed, without regard to the use of respirators, to vinyl chloride in excess of the action level. The program shall provide each such employee with an opportunity for examinations and tests in accordance with this paragraph. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee.

1910.1017(k)(1) At the time of initial assignment, or upon institution of medical surveillance;

1910.1017(k)(1)(i) A general physical examination shall be performed, with specific attention to detecting enlargement of liver, spleen or kidneys, or dysfunction in these organs, and for abnormalities in skin, connective tissues and the pulmonary system (See appendix A).

1910.1017(k)(1)(ii) A medical history shall be taken, including the following topics:

1910.1017(k)(1)(ii)(A) Alcohol intake;

1910.1017(k)(1)(ii)(B) Past history of hepatitis;

1910.1017(k)(1)(ii)(C) Work history and past exposure to potential hepatotoxic agents, including drugs and chemicals;

1910.1017(k)(1)(ii)(D) Past history of blood transfusions; and

1910.1017(k)(1)(ii)(E) Past history of hospitalizations.

1910.1017(k)(1)(iii) A serum specimen shall be obtained and determinations made of:

1910.1017(k)(1)(iii)(A) Total bilirubin;

1910.1017(k)(1)(iii)(B) Alkaline phosphatase;

1910.1017(k)(1)(iii)(C) Serum glutamic oxalacetic transaminase (SGOT);

1910.1017(k)(1)(iii)(D) Serum glutamic pyruvic transaminase (SGPT); and

1910.1017(k)(1)(iii)(E) Gamma glustamyl transpeptidase.

1910.1017(k)(2) Examinations must be provided in accordance with this paragraph at least annually.

1910.1017(k)(3) Each employee exposed to an emergency shall be afforded appropriate medical surveillance.

1910.1017(k)(4) A statement of each employee's suitability for continued exposure to vinyl chloride including use of protective equipment and respirators, shall be obtained from the examining physician promptly after any examination. A copy of the physician's statement shall be provided each employee.

1910.1017(k)(5) If any employee's health would be materially impaired by continued exposure, such employee shall be withdrawn from possible contact with vinyl chloride.

1910.1017(k)(6) Laboratory analyses for all biological specimens included in medical examination shall be performed by accredited laboratories.

1910.1017(k)(7) If the examining physician determines that alternative medical examinations to those required by paragraph (k)(1) of this section will provide at least equal assurance of detecting medical conditions pertinent to the exposure to vinyl chloride, the employer may accept such alternative examinations as meeting the requirements of paragraph (k)(1) of this section, if the employer obtains a statement from the examining physician setting forth the alternative examinations and the rationale for substitution. This statement shall be available upon request for examination and copying to authorized representatives of the Assistant Secretary and the Director., No medical surveillance guidance available., No medical surveillance guidance available.,

1910.1028(i)(1) General.

1910.1028(i)(1)(i) The employer shall make available a medical surveillance program for employees who are or may be exposed to benzene at or above the action level 30 or more days per year; for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year; for employees who have been exposed to more than 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by their current employer; and for employees involved in the tire building operations called tire building machine operators, who use solvents containing greater than 0.1 percent benzene.

1910.1028(i)(1)(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician and that all laboratory tests are conducted by an accredited laboratory.

1910.1028(i)(1)(iii) The employer shall assure that persons other than licensed physicians who administer the pulmonary function testing required by this section shall complete a training course in spirometry sponsored by an appropriate governmental, academic or professional institution.

1910.1028(i)(1)(iv) The employer shall assure that all examinations and procedures are provided without cost to the employee and at a reasonable time and place.

1910.1028(i)(4) Emergency examinations.

1910.1028(i)(4)(i) In addition to the surveillance required by (i)(1)(i), if an employee is exposed to benzene in an emergency situation, the employer shall have the employee provide a urine sample at the end of the employee's shift and have a urinary phenol test performed on the sample within 72 hours. The urine specific gravity shall be corrected to 1.024.

1910.1028(i)(4)(ii) If the result of the urinary phenol test is below 75 mg phenol/L of urine, no further testing is required.

1910.1028(i)(4)(iii) If the result of the urinary phenol test is equal to or greater than 75 mg phenol/L of urine, the employer shall provide the employee with a complete blood count including an erythrocyte count, leukocyte count with differential and thrombocyte count at monthly intervals for a duration of three (3) months following the emergency exposure.

1910.1028(i)(4)(iv) If any of the conditions specified in paragraph (i)(5)(i) of this section exists, then the further requirements of paragraph (i)(5) of this section shall be met and the employer shall, in addition, provide the employees with periodic examinations if directed by the physician., No medical surveillance guidance available., No medical surveillance guidance available., No medical surveillance guidance available.

9.0 SAFETY EQUIPMENT, LOCATION, RESPONSIBILITY

First Aid Kit	All Sites	First Aid/CPR trained personnel may use this kit to administer first aid as necessary.
Fire Extinguisher	Ask Site Safety Officer	Fire Extinguisher trained personnel may use this to extinguish small, manageable fire. Do not attempt to extinguish chemical fires based on compatibility, nor large fires for which the extinguisher is incapable of mitigating. For chemical fires or large fires, contact the fire dept.
Communication	Throughout site	Cell phones shall be used to maintain communication for all personnel.
Sanitation	Throughout site	Portable latrines or designated restroom facilities should be used accordingly.
Lighting	Throughout site and on personnel	Portable light plants should be used to illuminate the work area during dark or night operations. Personnel should also be equipped with flashlights or headlamps during dark or night operations.

10.0 Decontamination

General Guidelines: Effective decontamination procedures should be practiced to minimize secondary contamination of workers or the environment. Utilize available PPE at each site and always discard PPE onsite in appropriate containers. Bags of contaminated PPE should be taken to the nearest designated disposal area, as identified by the site supervisors.

General Decontamination Solutions: The use cleaning solutions should be appropriate for cases of severe contamination. Environmental and Safety personnel will permit solvents for use on personnel, equipment, and tools upon review of the SDS. All decontamination solutions are to be contained and collected for proper disposal.

11.0 CONTINGENCY PLANS

In the event of an emergency (at this incident site) the person first noticing the emergency should notify other workers in the immediate area. Evacuation should commence at once if the emergency poses any threat to the safety of the workers. Upon receiving notification of an emergency, the individual in charge of the work area should take appropriate measures to protect human life, the environment (including wildlife), and property.

11.1 Escape Routes:

Evacuate to crosswind and upwind locations.

11.2 Evacuation Procedures:

Evacuate up or crosswind to an upwind location.

11.3 Alerting Method:

Due to the nature of an emergency response, be aware of alerting methods, such as air horns, whistles, etc., that may indicate site conditions are no longer safe and workers should egress as directed in section 11 above. Communication will be through two-way radios and/or cell phones.

12.0 AMENDMENTS TO SITE SPECIFIC HEALTH & SAFETY PLAN

This Site-Specific Health and Safety Plan is based on information available at the time of preparation. Unexpected conditions may arise which necessitate changes to this plan. Unplanned activities and/or changes in the hazard status should initiate a review of major changes in this plan.

Changes in the hazard status or unplanned activities are to be submitted on “Amendments to Site-Specific Health and Safety Plan” which is included as Page 12 of this plan.

Amendments must be approved by the Project Manager prior to implementation.

All notes, documentation, and records must NOT be discarded after their use. Documents are to be submitted to designated personnel for record retention.

Health & Safety Plan Management of Change

Change 001			
Description of Change (include sections & page numbers):			
Name/Position	Signature	Date Signed	
Prepared By:			
Approved By:			

Change 002			
Description of Change (include sections & page numbers):			
Name/Position	Signature	Date Signed	
Prepared By:			
Approved By:			

Change 003			
Description of Change (include sections & page numbers):			
Name/Position	Signature	Date Signed	
Prepared By:			
Approved By:			



Addendum A

Hospital Map

Addendum B

SDS

Addendum C

CTEH Hot Work Policy

CTEH® 0011

Welding, Cutting, & Hot Work

Introduction and Purpose:

Hot work is defined as work involving burning, welding, or other operations that are capable of producing sparks and initiating fires or explosions. Similar operations include, without limitation, cutting, brazing, grinding and soldering.

CTEH® employees do not perform hot work, but may be called upon to work in settings where related hazards exist such as the presence of potentially explosive atmospheres or other flammable materials. CTEH® also does not authorize the performance of hot work, or prepare, verify or execute hot work permits. CTEH® may, upon request, perform lower explosive limit (“LEL”) air monitoring for clients or their other contractors as part of the safety protocols established by the responsible parties in connection with hot work. Only employees that have been trained as set forth below shall perform this service.

This hot work policy applies to CTEH® projects in which hot work is being performed by other employers. Because CTEH® employees may be exposed to related hazards and work in the immediate vicinity of hot work, relevant information is provided for situational awareness regarding the procedures and protocols being implemented by the responsible parties. The **CTEH® Project Manager or staff** should consult with the **Director of Health & Safety Services** or senior management regarding any questions or uncertainties.

CTEH® SPECIFIC POLICIES:

1. Before air monitoring for hot work is started, a **CTEH® qualified person** and other contractors or personnel involved shall discuss the planned project completely, including the type of hot work to be conducted, the hazards in the area, and the provisions of the permit (if applicable). CTEH® personnel will advise the responsible party(ies) of the air monitoring results and make clear that it has no other responsibility for compliance with hot work regulations or other guidance.
2. If at any time lower explosive limit instrument readings are identified, CTEH® employees will immediately advise the involved party(ies) and personnel performing the hot work to discontinue those operations until the situation can be assessed by qualified personnel.

3. CTEH[®] personnel will, when performing air monitoring for hot work or around potentially flammable atmospheres, wear appropriate PPE including, without limitation, flame resistant clothing.
4. CTEH[®] policy will be to **not** perform air monitoring in connection with hot work unless an appropriate permit is prepared by the responsible party. However, as a limited exception, air monitoring for hot work without a permit may be performed in an area designated, designed, or approved for hot work that has been verified as such by the facility owner to the **CTEH[®] Project Manager** (see NFPA 51B §5.2.2). A sample permit is located in NFPA 51B.
5. CTEH[®] employees must consult with the **CTEH[®] Project Manager** prior to the performance of LEL monitoring in connection with hot work.

PERMIT REQUIRED? **Yes.** The party responsible for authorizing hot work must designate appropriate precautions preferably in the form of a written permit following an inspection of the area. See §1910.252(a)(2)(iv) and §1910.119(k).

DEFINED TERMS: Defined terms (bold faced in this policy) are set forth in §1910.251, Definitions. NFPA 51B Ch. 3, Definitions; and API 2201 Ch. 3, Definitions.

TRAINING: CTEH[®] employees will be provided with training regarding potential ignition risks associated with hot work and, separately, operations training regarding the lower explosive level of hazardous materials and measurement thereof using appropriate equipment. CTEH[®] personnel that may participate in air monitoring in support of Permit Required Hot Work will complete the following annual training:

1. LEL monitoring
2. Permit Required Hot Work Safety

The CTEH[®] **Project Manager** will confirm that all employees performing LEL air monitoring for, or otherwise working near, hot work have the required training.

SITUATIONAL AWARENESS: The responsible party(ies) planning and performing hot work and preparing appropriate permit(s), should consider among other matters the information set forth below. It is provided in this policy for the situational awareness of CTEH[®] personnel and to inform their discussions with such party(ies):

Regulatory requirements and materials incorporated by reference:

1. Basic Precautions from §1910.252(a):
 - a. If the object that is the subject of the hot work cannot be moved, all movable fire hazards in the vicinity shall be taken to a safe place.
 - b. If all of the fire hazards cannot be removed, then guards shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards.
 - c. If the foregoing precautions cannot be met and any welding or cutting is unable to be conducted safely, then hot work should not be performed.
 - d. Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use and may consist of pails of water, buckets of sand, hoses or portable fire extinguishers depending upon the nature and the quantity of combustible material exposed.
2. Specific requirements of §1910.252 and, for elaboration, and delineation of the responsibilities of welders and cutters, their supervisors, and those in management on whose property the hot work is to be performed, NFPA Standard 51B.

Key Lessons from Hot Work Accidents (adapted from 2010 Chemical Safety Board):

1. Use alternatives: Whenever possible, avoid hot work and consider alternative methods.
2. Analyze the hazards: Prior to the initiation of hot work, perform a hazard assessment that identifies the scope of the work, potential hazards, and methods of hazard control.
3. Monitor the atmosphere: Conduct effective gas monitoring in the work area using a properly calibrated combustible gas detector prior to and during hot work activities, even in areas where a flammable atmosphere is not anticipated.
4. Test the area: In work areas where flammable liquids and gases are stored or handled, drain and/or purge all equipment and piping before hot work is conducted. When in the vicinity of storage tanks and other containers, properly test and if necessary continuously monitor all surrounding tanks or adjacent spaces (not just those being worked on) for the presence of flammables and eliminate potential sources of flammables.
5. Use written permits: Ensure that qualified personnel familiar with the specific site hazards review and authorize all hot work and issue permits specifically identifying the work to be

conducted and the required precautions.

6. Train thoroughly. Train personnel on hot work policies/procedures, safety equipment, and job specific hazards and controls in a language understood by the workforce. Workers assigned to maintain the equipment and their supervisors should be suitably trained and qualified in the safe operations of their equipment and the safe use of the process.

Supervise contractors: Safety supervision for outside contractors conducting hot work should be provided by a competent person. Inform contractors about site-specific hazards including the presence of flammable materials.

Additional Considerations:

1. First aid equipment must be available at all times.
2. Oxygen cylinders must be stored in an upright, secured position at least 20 feet from any flammable gases or petroleum products.
3. In addition to other precautions, a fire watch should be established where advisable or required when any of the following conditions exist:
 - a. Locations where other than a minor fire might develop.
 - b. Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operation.
 - c. Appreciable combustibles are more than 35 feet away, but are easily ignited by sparks.
 - d. Wall or floor openings within a 35-foot radius that expose combustible material in adjacent areas including concealed spaces in walls or floors.
 - e. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.
4. Fire watch personnel should have fire extinguishing equipment readily available and be trained in its use by a competent person. The fire watch will also be required to be able to:
 - a. Watch for fires in all exposed areas
 - b. Only attempt to extinguish fires that are obviously within the capacity of the available equipment
 - c. Sound the alarm should they be unable to extinguish a fire or judge it unsafe to do so

- d. Continue the fire watch for at least a half hour after completion of welding or cutting operations.
5. Any hot work to be performed in confined spaces should conform to Permit-required Confined Space procedures and the following requirements:
- a. Adequate ventilation is a prerequisite to work in confined spaces.
 - b. When welding or cutting is being performed in any confined spaces, the gas cylinders and welding machines will be kept outside of the space.
 - c. If entry is through a small opening, a method for quickly removing the welder in case of emergency will be provided. Such lifelines will be attached to the welder's body such that his or her body cannot be jammed in the exit opening.
 - d. If any arc welding is to be suspended for a substantial period of time, such as lunch or overnight:
 - 1. All electrodes will be removed from the holders.
 - 2. The holders will be moved such that accidental contact cannot occur.
 - 3. The machine will be disconnected from its power source.
 - e. When a gas welding or cutting torch is not going to be used for a substantial amount of time, such as during lunch or overnight, the torch valves will be closed and the fuel-gas and oxygen supply positively shut off at a point outside of the confined area. The torch will be removed from the confined area as well if practical.
 - f. Following the completion of welding operations, the welder will mark the hot metal or provide some other form of warning sign to warn other workers.
6. Welding, cutting, or burning of metals containing lead, zinc, cadmium, mercury, beryllium, or other exotic metals, paints, coatings, or preservatives will require appropriate ventilation or respiratory protection.
7. If the possibility exists during hot work for the creation of hazardous fumes, gases, or dust according to the metals involved, then local exhaust or general ventilating systems will be arranged to keep the amount of toxic fumes, gases, or dusts below the maximum allowable concentrations as specified in §1910.1000.

8. The operator of any hot work equipment should report any equipment defects or safety hazards to his supervisor and discontinue use of the equipment until its safety has been assured and, if needed, repaired by a qualified person.
9. Any welding or brazing materials used in hot work which might possibly generate hazardous fumes, gases, or dusts due to the metals involved should be suitably labeled to indicate the hazard, and appropriate measures for ventilation or respiratory protection provided to ensure that no employee is exposed to higher than permissible levels of hazardous fumes.

References

29 CFR §1910.252; 2009 NFPA 51B Standard for Fire Prevention During Welding, Cutting and Other Hot Work (incorporated by reference by §1910.252(a)(1)); 2003 API 2201 Safe Hot Tapping Practices in the Petroleum and Petrochemical Industries (incorporated by reference in §1910.252(d)(1)(vi)). For additional information, see 2010 Chemical Safety Board – Seven Key Lessons to Prevent Worker Deaths During Hot Work in and around Tanks; 2010 NFPA 326 Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning or Repair.

Revision History

Original Document: 11/21/2013

Revision 1: 1/31/2019 – removal of CSB Video as a training requirement, adjustment to definition of hot work, and addition of Revision History

CTEH® Policy Review

Reviewing Official Responsibilities:

1. The Reviewer. The reviewer should use informal methods to recommend changes or corrections whenever practicable. These methods, however, are not a substitute for a formal response when requested by the initiating office. The reviewer is obligated to make a prompt response indicating either:
 - a. Concurrence (approval);
 - b. Concurrence with comments (reservations);
 - c. Non-concurrence (disagreement) with attached comments; or
2. Concurrence by Reviewers. Concurrence by reviewers indicates that the material is:
 - a. Legal, correct, and complete.

Consistent with regulations, directives and policies, or is an approved change thereto and will be incorporated into the directives for which they are responsible.



Norfolk Southern Train derailment East Palestine, OH

East Palestine, OH

Cold Stress Management Plan

Version 1.0

Prepared By:

CTEH®, LLC

5120 Northshore Drive

North Little Rock, AR 72118

501-801-8500

February 4, 2023

CTEH PROJECT NUMBER #024579

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1.0 Work Environment and Weather Conditions

The American Conference of Industrial Hygienists has developed a wind chill chart that estimates the equivalent wind chill temperature (in degrees Celsius) based on ambient temperature vs wind. Please use the chart below to determine the wind chill for each work shift.

Table 1 ACGIH TLV Wind Chill Chart

		WIND CHILL CHART								
		Ambient Temperature (°C)								
		4	-1	-7	-12	-18	-23	-29	-34	-40
Wind km/h	Velocity mph	Equivalent Chill Temperature (°C)								
Calm										
0	0	4	-1	-7	-12	-18	-23	-29	-34	-40
8	5	3	-3	-9	-14	-21	-26	-32	-38	-44
16	10	-2	-9	-16	-23	-30	-35	-43	-50	-57
24	15	-6	-13	-20	-28	-36	-43	-50	-58	-65
32	20	-8	-16	-23	-32	-39	-47	-55	-63	-71
40	25	-9	-18	-26	-34	-42	-51	-59	-67	-76
48	30	-16	-19	-22	-36	-44	-53	-62	-70	-78
56	35	-11	-20	-29	-37	-46	-55	-63	-72	-81
64	40	-12	-21	-29	-38	-47	-56	-65	-73	-82

Adapted from: Threshold Limit Values (TLV™) and Biological Exposure Indices (BEI™) booklet; published by ACGIH, Cincinnati, Ohio

Little danger in less than one hour exposure of dry skin

DANGER – Exposed flesh freezes within one minute

GREAT DANGER – Flesh may freeze within 30 seconds

Maximum danger of false sense of security

2.0 Description of Cold Stress Hazards, Symptoms & First Aid

The information included in Section 2 is from the Centers for Disease Control Workplace Safety & Health Topics for Cold Stress.

2.1 Hypothermia

When exposed to cold temperatures, your body begins to lose heat faster than it can be produced. Prolonged exposure to cold will eventually use up your body's stored energy. The result is hypothermia, or abnormally low body temperature. A body temperature that is too low affects the brain, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening and will not be able to do anything about it.

2.1.1 Symptoms

Symptoms of hypothermia can vary depending on how long you have been exposed to the cold temperatures.

Symptoms include:

- Shivering
- Fatigue
- Loss of coordination
- Confusion and disorientation
- No shivering
- Blue skin
- Dilated pupils
- Slowed pulse and breathing
- Loss of consciousness

2.1.2 First Aid

Take the following steps to treat a worker with hypothermia:

- Alert the supervisor and request medical assistance.
- Move the victim into a warm room or shelter.
- Remove their wet clothing.
- Warm the center of their body first—chest, neck, head, and groin—using an electric blanket, if available; or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets.
- Warm beverages may help increase the body temperature, but do not give alcoholic beverages. Do not try to give beverages to an unconscious person.
- After their body temperature has increased, keep the victim dry and wrapped in a warm blanket, including the head and neck.
- If victim has no pulse, begin cardiopulmonary resuscitation (CPR).

2.2 Cold Water Immersion

Cold water immersion creates a specific condition known as immersion hypothermia. It develops much more quickly than standard hypothermia because water conducts heat away from the body 25 times faster than air. Typically people in temperate climates don't consider themselves at risk from hypothermia in the water, but hypothermia can occur in any water temperature below 70°F. Survival times can be lengthened by wearing proper clothing (wool and synthetics and not cotton), using a personal flotation device (PFD, life vest, immersion suit, dry suit), and having a means of both signaling rescuers (strobe lights, personal locator beacon, whistles, flares, waterproof radio) and having a means of being retrieved from the water.

2.3 Frostbite

Frostbite is an injury to the body that is caused by freezing. Frostbite causes a loss of feeling and color in the affected areas. It most often affects the nose, ears, cheeks, chin, fingers, or toes. Frostbite can permanently damage body tissues, and severe cases can lead to amputation. In extremely cold temperatures, the risk of frostbite is increased in workers with reduced blood circulation and among workers who are not dressed properly.

2.3.1 Symptoms

Symptoms of frostbite include:

- Reduced blood flow to hands and feet (fingers or toes can freeze)
- Numbness
- Tingling or stinging
- Aching
- Bluish or pail, waxy skin

2.3.2 First Aid

Workers suffering from frostbite should:

- Get into a warm room as soon as possible.
- Unless absolutely necessary, do not walk on frostbitten feet or toes-this increases the damage.
- Immerse the affected area in warm-not hot-water (the temperature should be comfortable to the touch for unaffected parts of the body).
- Warm the affected area using body heat; for example, the heat of an armpit can be used to warm frostbitten fingers.
- Do not rub or massage the frostbitten area; doing so may cause more damage.
- Do not use a heating pad, heat lamp, or the heat of a stove, fireplace, or radiator for warming. Affected areas are numb and can be easily burned.

2.4 Trench Foot

Trench foot, also known as immersion foot, is an injury of the feet resulting from prolonged exposure to wet and cold conditions. Trench foot can occur at temperatures as high as 60 degrees F if the feet are constantly wet. Injury occurs because wet feet lose heat 25-times faster than dry feet. Therefore, to prevent heat loss, the body

constricts blood vessels to shut down circulation in the feet. Skin tissue begins to die because of lack of oxygen and nutrients and due to the buildup of toxic products.

2.4.1 Symptoms

Symptoms of trench foot include

- Reddening of the skin
- Numbness
- Leg cramps
- Swelling
- Tingling pain
- Blisters or ulcers
- Bleeding under the skin
- Gangrene (the foot may turn dark purple, blue, or gray)

2.4.2 First Aid

Workers suffering from trench foot should:

- Remove shoes/boots and wet socks.
- Dry their feet.
- Avoid walking on feet, as this may cause tissue damage.

2.5 Chilblains

Chilblains are caused by the repeated exposure of skin to temperatures just above freezing to as high as 60 degrees F. The cold exposure causes damage to the capillary beds (groups of small blood vessels) in the skin. This damage is permanent and the redness and itching will return with additional exposure. The redness and itching typically occurs on cheeks, ears, fingers, and toes.

2.5.1 Symptoms

Symptoms of chilblains include:

- Redness
- Itching
- Possible blistering
- Inflammation
- Possible ulceration in severe cases

2.5.2 First Aid

Workers suffering from chilblains should:

- Avoid scratching
- Slowly warm the skin
- Use corticosteroid creams to relieve itching and swelling
- Keep blisters and ulcers clean and covered

3.0 Controls for Protection Against Cold Stress & Hypothermia

This section outlines reasonable control measures designed to prevent cold stress and hypothermia. This section only includes recommendations; therefore, field judgment may be required for circumstances that do not clearly meet the constraints provided herein. The control measures stated below have been derived from the ACGIH TLV Manual.

- For exposed skin, continuous exposure should not be permitted when the wind speed and the ambient temperature produce a resultant equivalent wind chill temperature of -32 degrees C.
- For workers who have become wet or immersed in water at temperatures of 2 degrees C or less, treatment for hypothermia must be administered. This includes a complete exchange of wet clothes for dry clothes. Workers should be kept in a warm, dry area during their hypothermia treatment.

3.1 Prevention of Cold Stress to Bare Hands

- For fine work in temperatures below 16 degrees C, auxiliary heating units such as warming fans, radiant heaters or contact warm plates should be used.
- For work in temperatures below 16 degrees C for sedentary, 4 degrees C for light, and -7 degrees C for moderate work, gloves must be worn.

3.2 Prevention of Frostbite

- When work is being performed on surfaces that are below -7 degrees C, contact with bare skin should be prevented. Gloves are required.
- If the air temperature is -17.5 degrees C or below, hands should be protected with mittens (gloves are not sufficient).

3.3 Prevention of Total Body Cold Stress

- Based on the forecasted temperatures and the likely presence of above average wind speeds, workers should use wind-blocking garments, such as Gore-Tex®. Wind blocks may be provided as well.
- In the presence of high humidity, snow, rain, ocean-spray, or mist, workers should be equipped with a waterproof outer layer. Workers should not be permitted to work in wet environments with non-waterproof outer garments.
- Workers should not work at a work rate, nor wear such insulation that causes sweating. Garments should be equipped with ventilation such that a vigorous work rate does not cause sweat to dampen the layers of clothing closest to their body.
- Workers handling evaporative liquids (such as gasoline, alcohol, or solvent-based cleaning fluids) should take special precautions not to soak their gloves or clothing. If soaking occurs, the impacted gloves or garments must be replaced immediately.

4.0 Work-Warming Regimen

This section includes recommendations for providing a warm-up schedule for workers exposed to cold environments. In each work area, shelter should be provided in a manner that provides easy access and is reasonably close to the area(s) where work is to be performed. Controlled indoor environments are preferred; however, if a controlled indoor environment is not available, special heating shelters should be provided. The following items should be considered:

- A buddy system should be used so that workers can monitor each other's signs and symptoms of imposing cold stress.
- The work rate should not be so high that workers begin to sweat. If heavy work must be done, rest periods should be considered to avoid excessive sweating and provide workers opportunities to change from dampened clothes to dry clothes.

The ACGIH TLV manual provides a work-warming schedule designed to reduce worker exposure to conditions conducive to cold stress or hypothermia. Special considerations should be given to establishing a work-warming schedule that meets or exceeds the conditions included in Table 2 below.

Table 2 ACGIH TLV Work/Warm-Up Schedule for a 4-Hour Shift

Air temperature – Sunny sky		No noticeable wind		8 km/h wind		16 km/h wind		25 km/h wind		30 km/h wind	
°C (approx.)	°F (approx.)	Max. work period	No. of breaks	Max. work period	No. of breaks	Max. work period	No. of breaks	Max. work period	No. of breaks	Max. work period	No. of breaks
-26° to -28°	-15° to -19°	(Norm. breaks) 1	1	(Norm. breaks) 1	1	75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	(Norm. breaks) 1	1	75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease	
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-emergency work should cease					
-40° to -42°	-40° to -44°	30 min	5	Non-emergency work should cease							
-43° & below	-45° & below	Non-emergency work should cease									

- Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of 10 minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location. For light-to-moderate work (limited physical movement), apply the schedule one step lower in the table. For example, at -35° C (-30° F) with no noticeable wind (Step 4), a worker in a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
- The following is suggested as a guide for estimating wind velocity if accurate information is not available: 8 km/h – light flag moves; 16 km/h – light flag fully extended; 25 km/h – raises newspaper sheet; 30 km/h – blowing and drifting snow.
- If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factor given above would be: (1) special warmup breaks should be initiated at a wind chill cooling rate of about 1750 W/m²; (2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m². In general, the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart over-compensates for the actual temperatures in the colder ranges because windy conditions rarely prevail at extremely low temperatures.
- TLVs apply only to workers in dry clothing.
- Refer to the “Cold Stress” section of the current Threshold Limit Values and Biological Exposure Indices publication for further information



Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Air (Atmospheric) Monitoring

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input checked="" type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input checked="" type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input checked="" type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input checked="" type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input checked="" type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input checked="" type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Don necessary PPE</p> <p>Collect PID/LEL meter Readings</p>	<p>Exposure to site Contaminants</p> <p>Slips, trips, and falls</p> <p>Ladder safety</p> <p>Errant Reading</p>	<p>Wear appropriate PPE (i.e., safety glasses, nitrile gloves, steel-toed shoes, highly visible clothing, and level D attire).</p> <ul style="list-style-type: none"> • Review and understand action levels noted in the HASP. • Monitor (evaluate) breathing zone of workers with PID. • Monitor (evaluate) any enclosure with a PID. • If action levels are met, either Level C PPE must be donned or the space must be ventilated. • If IDLH action levels are met, SCBA must be donned and PPE must be reevaluated <p>Maintain all equipment and tools in designated areas and out of pathways.</p> <ul style="list-style-type: none"> • Identify and protect all air lines, water lines, electrical cords, and cables. <p>Use the proper type of ladder (i.e., step ladder expanded or straight ladder with a 4:1 pitch).</p> <p>Calibrate/Bump Test at appropriate time intervals (daily calibration, daily bump test)</p>



Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Air Knifing

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input checked="" type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
Air Knifing	<p>Staging Equipment (Air Compressor)</p> <p>Trip Hazards (Air Hoses)</p> <p>Failure of Air Hose Connections - Personnel stuck-by "whipping" hoses</p> <p>Flying Debris</p> <p>Noise Above 85 dBA</p> <p>Dermal Exposure/Contact</p>	<p>Staging Equipment – Use wheel chocks on parked equipment to prevent unexpected rolling or movement when disconnected from tow vehicle.</p> <p>Trip Hazards – Implement good hose management (keeping runs together and out of walking paths, to the extent possible). Use caution tape and/or safety cones to mark areas where the hose could present a trip hazard.</p> <p>Failure of Air Hose Connections - All air line connections must be secured using safety pins/clips and "whip check" cables or straps.</p> <p>Flying Debris - Unless wearing a full-face respirator, an impact-resistant face shield (with safety glasses) shall be worn by the air knife operator and anyone else in the immediate work area to prevent soil and debris from striking the employee's face and/or entering eyes.</p> <p>Noise Above 85 dBA - Hearing Protection shall be worn by the knife operator and anyone else in the work area.</p> <p>Dermal Exposure/Contact – Knife operator and anyone else in the immediate work area shall wear TyVek Covealls.</p>



Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Boom Deployment from Shoreline

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input checked="" type="checkbox"/> PFD (Personal Flotation Device) – USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Other: <u>Over boots that are high enough for water conditions and or waders if needed.</u>

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<ol style="list-style-type: none"> 1. Review "General Site Activities" JHA 2. Review "Boat operations" JHA if applicable 3. Review project HASP and Tailgate 4. Review Working on or Near Active Waterways Procedure 5. Working Near the Waterway 6. Boom Deployment 7. Boom Securement 8. Boom Recovery 	<p>Falling into waterway</p> <p>Lifting injuries</p> <p>Slips / Falls</p> <p>Wildlife</p>	<p>No employees will be permitted to work near a waterway for any reason until the waterway has been checked for depth, width and flow, and these items must be identified prior to proceeding.</p> <p>The flow or current of the waterway must be investigated prior to work being initiated.</p> <p>-The crew can only work near a waterway, which has standing or calm water, if water is visually turbid boom should be placed in an alternate location.</p> <p>-In addition to determining if water is standing or calm, the depth of the waterway must be investigated prior to work being initiated.</p> <p>-The employee must be equipped with a life vest. The life vest must be rated for the employee's weight.</p> <p>-The field crew must be comprised of at least two individuals. One will secure the boom and the attendee will watch for the safety of the employee.</p> <p>- First Aid: The attendee must be trained in both first aid and CPR and a first aid kit must be made readily available.</p> <p>At least two individuals or employees are required, and both shall be equipped with a life vest, and other appropriate Personal Protective Equipment dictated by the atmosphere and other hazards.</p> <p>-If one individual must lean outside of the boat or enter the water from the shoreline to perform a task, a lifeline must be attached to the individual. If the individual falls into the water, the lifeline will permit the individual from floating away from the immediate work area and permit a less hazardous rescue.</p> <p>Note: If the passenger of the boat should fall into the waterway, the boat operator should never attempt a rescue by leaving the boat.</p> <p>Unless the boat is anchored, the operator of the boat shall always remain at the steering controls.</p> <p>-The boat operator must possess sufficient experience for the boat operation and trained in the following:</p> <ul style="list-style-type: none"> • Know the hazards that may be faced during the operation. • Proper use of all equipment. • Recognizes any warning signs of a dangerous or prohibited situation.

		<ul style="list-style-type: none">• Safety requirements for boat launching and exiting from the waterway.• Knowledgeable in how to summon rescue and other emergency services as soon as the operator determines that the boat occupants may need assistance to escape from the waterway hazards. <p>-Conditions that exist that prevent boating operations consist of the following:</p> <ul style="list-style-type: none">• Small craft weather advisory• Ice packs are observed on the waterway• Severe weather warning that includes but not limited to thunderstorms and winter weather <p>When recovering the boom proper lifting techniques should be used to prevent injury</p> <ul style="list-style-type: none">• Be aware of slick surfaces and sharp edges when handling boom.
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Covering Spoils Piles (Manually handling and carrying sandbags on uneven terrain) **If possible, the use of personnel on uneven ground or terrain should be avoided. Equipment should be used in place of personnel manually handling any material (sandbags, poly sheeting, etc.)**

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input checked="" type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input checked="" type="checkbox"/> Glove Type: Inner Nitrile/Outer PVC
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input checked="" type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Preparing to move materials.</p> <p>Moving materials.</p> <p>Moving materials by hand</p> <p>Moving materials with machinery.</p>	<p>Muscle strains, pulls and repetitive motion injuries.</p> <p>Exposure to contaminated materials</p> <p>Injuries resulting from lack of communication, or miscommunication.</p> <p>Foot or leg injuries.</p> <p>Finger or hand injuries.</p> <p>Vehicle or machinery damage, operator injury, or injury to others working around machinery.</p>	<p>-Each employee should be provided training on the safe and proper use of the most important, primary tool—their bodies</p> <p>Proper techniques of stretching, lifting, bending, moving, rolling rocks, securing good footing, the importance of good nutrition and hydration, etc., should be addressed.</p> <p>-Each employee will be given time on the job to properly stretch and warm-up before and during physical activity for a period of time deemed appropriate by the crew leader, or on-site supervisor.</p> <p>-Employees will be encouraged to switch hands often and vary the types of activities performed to limit exposure to repetitive motion injuries.</p> <p>-The appropriate number of workers should be used to move materials. This decision may vary between individuals.</p> <p>Review SDS for possible chemical contaminants in soil and on equipment.</p> <p>Don the proper PPE (Chemical Protective Gloves)</p> <p>Perform Atmospheric Monitoring and don respirator when necessary (review atmospheric monitoring JHA)</p> <p>-Crew leaders will conduct tailgate safety talks to provide orientation, discuss project, safety concerns, assign work, etc.</p> <p>-Good communication between crewmembers should reinforce individual awareness of real and potential hazards.</p>

		<ul style="list-style-type: none">-Communication methods should be discussed and agreed upon prior to moving materials.-The plan of attack should be discussed before attempting to move materials.-Instructions should come from one person when working in teams of two or more. -Workers need to maintain constant awareness of their feet and foot placement in relation to objects being moved and avoid placing them under materials or on material that may slide, give way, crumble, etc.-It is recommended that workers use lifting techniques to minimize the potential for injuries to hands.-If hands are absolutely necessary use extreme caution and 100% communication with other workers should follow. -Refer to JHA—Equipment Use and Maintenance.
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Handling Drums (55-Gal, Hazardous Waste, Drum Dolly, By Hand)

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Examine the rim of the drum, lid, and sealing ring to be sure they will sit properly.</p> <p>Place the lid on the drum, sit the ring, and tighten the bold using a wrench</p> <p>Attach the ring clamp for hard to sit rings, and torque into place by turning the handle</p> <p>Secure and tighten the nut on the ring bold using the pneumatic hammer drill</p> <p>Tilting it toward you about 30° after ensuring that the drum is closed</p> <p>Rolling the drum on the edge of the base</p> <p>Releasing the Drum</p>	<p>Pinch hand while handling parts</p> <p>Cuts or abrasions from burrs on metal part</p> <p>Abrasion or impact from tightening the bolt</p> <p>Impact and pinch while positioning the ring clamp</p> <p>Muscle strain from tightening the clamp</p> <p>Muscle strain from tightening the ring bolt</p> <p>Back or muscle strain</p> <p>Abrasions from sharp edges or burs</p> <p>Back or muscle strain</p>	<p>Wear leather or similar gloves</p> <p>Use care (don't grab) while examining parts</p> <p>Wear leather or similar gloves</p> <p>Keep your hands open (don't grab) while examining parts</p> <p>Position your body so the wrench can be easily turned</p> <p>Hold the clamp so the components don't slip over the threaded shaft</p> <p>Position your body so the clamp tightening handle can be easily turned.</p> <p>Seat the drill properly on the nut. Position your body to stabilize the position of the drill prior to pulling the trigger.</p>
<p>Drum Dolly Usage:</p> <p>Pushing the dolly up to the drum and position the dolly's feet at the drum's base</p> <p>Tipping the dolly forward and engaging dolly-drum-lock</p> <p>Pulling the dolly and the drum back until the dolly rests on the wheels</p>	<p>Foot injury</p> <p>Pinch Points</p> <p>Drum Dolly Usage:</p> <p>Tripping or falling</p> <p>Hand and Finger Injuries</p> <p>Back Strain</p>	<p>Clear path before moving the drum</p> <p>Do not wear loose clothing</p> <p>Test weight of the drum before tilting, use team lift if possible</p> <p>Brace feet apart, one against the drum's base and the other behind you</p> <p>Use your weight, rather than your muscles, to tilt the drum. Do not jerk the drum</p> <p>Maintain control of the drum</p> <p>Roll the drum slowly</p> <p>Do not cross legs. Take side steps</p>

		<p>Wear safety boots with toe protection</p> <p>Keep feet clear of drum</p> <p>Do not allow hand to be pinched between other drum or objects</p> <p>Maintain control of drum</p> <p>Release the drum slowly</p> <p>Wear safety boots with toe protection</p> <p>Keep feet clear of drum</p> <p>Drum Dolly Usage:</p> <p>Ensure that the drum is fully closed</p> <p>Clear path in front of the moving dolly</p> <p>Be aware of the other workers in the area</p> <p>Make sure the lock is properly engaged</p> <p>Hold the dolly in position with left hand; engage the lock with right hand (Reverse if left-handed)</p> <p>Use a single, smooth pulling motion</p> <p>Get assistance if available</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Drum Vac Operations (Electrical & Pneumatic)

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input checked="" type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>General Use (Electrical)</p> <p>General Use (Pneumatic)</p>	<p>Eye Injury</p> <p>Ergonomic Hazards/Strains</p> <p>Foot Injury</p> <p>Electric Shock/Explosion</p> <p>Static Electricity</p> <p>Eye Injury</p> <p>Noise</p> <p>Chemical Incompatibility</p> <p>Pressure-related hazards (Pneumatic)</p>	<p>Goggles (for handling exposed chemicals)</p> <p>Situational awareness, Wear proper PPE</p> <p>Use two people to move/lift heavy drums.</p> <p>Read and understand Safety Data Sheet for chemical being handled.</p> <p>Know where the nearest emergency eye wash/shower is and ensure a clear path.</p> <p>Ground/Bond prior to use and use conductivity meter to check resistance (< 10 Ohms)</p> <p>Plan movement route to avoid hazards and minimize exposure to chemicals.</p> <p>Use mechanical means to handle drums if available.</p> <p>Secure drums when in transit to avoid tipping and spilling contents. Use proper body mechanics when handling heavy/awkward loads.</p> <p>Only move drums when properly closed (Unless empty and purged).</p> <p>Push drums versus pulling them on a dolly to prevent them from falling on worker in case of a fall.</p> <p>Operate all equipment in strict accordance with Manufacturer's instructions.</p> <p>Do not use electrical (not intrinsically safe) drum vacuums in an explosive environment where any LELs are present.</p>

		<p>Conduct atmospheric monitoring prior to use.</p> <p>Only authorized users can operate equipment.</p> <p>Operate equipment in strict accordance with Manufacturer's instructions.</p> <p>Report any observed defect or safety hazard to your supervisor immediately. Where any object handled would possibly cause injury to feet if dropped, safety shoes will be worn.</p> <p>Where any object handled could possibly cause cuts, punctures or abrasions to hands, appropriate gloves will be worn. (Exception: where rotating machinery presents a greater hazard of entangling gloves, they are optional with written justification).</p> <p>Keep hands, hair and loose clothing clear of all moving parts.</p> <p>Ensure that the proper drum material (poly/steel) is being used for the substance/chemical to be vacuumed.</p> <p>Ensure that the proper hoses are being used for the substance/chemical to be vacuumed</p> <p>Turn off all compressed air connections to the compressed air source at the nearest valve.</p> <p>Ensure whipchecks are in place on all quick-connect connections.</p> <p>Disconnect compressed air connections only after the compressed air supply has been turned off and the air supply hose has been vented by opening the valve on the vacuum head</p> <p>Always ground/bond a drum vac, regardless of power source (Electrical/Pneumatic)</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Equipment Refueling

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
Turn off Vehicle and/or Equipment.	Potential for fires or explosion resulting in personal injury, property damage and/or death. Fuels spills may also create slip, trip & Fall Hazards as well as environmental clean-up responsibilities and potential fines.	<ol style="list-style-type: none"> 1. Turn off engine(s). 2. Do not smoke while refueling equipment/ filling fuel containers. 3. Do not use your cell phone – turn it off while refueling or filling containers. 4. When exiting the vehicle, avoid spilled fuels, where possible, that may create a slippery surface. Note: Some equipment requires a “cool down” period before refueling. Ensure these instructions are understood for all equipment being used, prior to refueling.
WHEN AT THE PUMPS - Refueling Equipment - Remove nozzle from pump and insert into equipment tank.	Potential for fires or explosion resulting in personal injury, property damage and/or death	<ol style="list-style-type: none"> 1. Do not re-enter vehicle or climb on equipment after pumping has begun – This can create static electricity buildup that has been proven to cause fires and explosions. 2. Do not leave a fueling piece of equipment unattended for any reason. 3. Do not “top-off” tanks – This can lead to overflow and excessive vapor release. 4. Ensure the proper fuel type is chosen, i.e. Gas or diesel.
WHEN AT THE PUMPS -Filling fuel containers - Remove nozzle from pump and insert into approved container.	Potential for fires or explosion resulting in personal injury, property damage and/or death.	<ol style="list-style-type: none"> 1. Ensure that the container is an approved container, meeting OSHA or DOT requirements. Note: plastic gas cans or containers are not allowed for storing any fuels unless the container specifically states that it meets OSHA or DOT requirements. 2. Do not fill containers while in the back of truck beds with plastic liners or inside vehicles or trunks with carpeted floors. 3. After placing the container on the ground, release vapor pressure slowly. Do this prior to removing nozzle from pump.

<p>WHILE IN "FIELD" LOCATIONS - Refueling Equipment/Filling Containers.</p>	<p>Static electricity combined with sudden vapor release may ignite vapors, resulting in fire and/or explosion, which may cause injury, property damage and/or death.</p>	<ol style="list-style-type: none"> 4. One all vapor has been released from the container, remove nozzle from pump and insert nozzle into container for fueling. 5. Fill the container slowly to avoid excessive vapor and static electricity buildup. 6. Do not overfill – Fill fuel containers to approximately 95% capacity to allow for vapor expansion. 7. Place cap on tightly. 8. Any gasoline that spills on the container must be allowed to evaporate or be cleaned off prior to placing the container inside the vehicle, in the bed of the vehicle or on the trailer. 9. Secure containers against tipping and sliding and out of direct sunlight exposure or excessive heat from the trunk of a car. Ensure the proper fuel type is chosen, i.e. Gas or diesel. <ol style="list-style-type: none"> 1. Only use approved Safety Cans, meeting OSHA or DOT requirements for refueling equipment. Ensure that gas cans have not been left in direct sunlight. 2. Ensure that equipment has had plenty of time to cool down before refueling. Some equipment requires a "cool down" period before refueling. Ensure these instructions are understood for all equipment being used, prior to refueling. A Minimum of 10minutes is recommended unless otherwise specified by the manufacturer. 3. Slowly release spring loaded handle to release gasoline vapors. Complete this step away from equipment and other potential ignition sources. 4. Where necessary, insert funnel into tank to avoid spilling fuel on equipment. 5. Once positioned, again release spring-loaded handle to allow vapors to escape prior
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<p>Emergencies – Fire, explosion or other</p>	<p>Potential for mild to severe burns, other injuries and/or death.</p>	<p>to touching any metal surface on the equipment that is being refueled.</p> <p>6. Fill the equipment slowly to avoid excessive vapor and static electricity buildup. This will also decrease splattering and spilling.</p> <p>7. Do not overfill – Fill fuel containers to approximately 95% capacity to allow for vapor expansion.</p> <p>8. Place cap on tightly.</p> <p>9. Any gasoline that spills on the equipment must be allowed to evaporate or be cleaned off prior to engine start-up.</p> <p>10. Where possible, store fuel container in a location away from excessive heat and/or direct sunlight.</p> <p>1. Move away from the hazard immediately. Warn others as you swiftly and safely seek a safer location.</p> <p>2. If possible, press the emergency cut-off switch and then call 911. In field locations, call 911 immediately.</p> <p>3. At the pumps - Use portable extinguishers only after the cutoff switch has been activated and only if the fire is away from the vehicle. Do not approach a burning vehicle or equipment! In field locations – Use portable extinguishers only when the fire does not appear to be coming from the tank itself, such as may be the case, where fuel may have leaked onto the engine and ignited. Do not approach an engulfed piece of equipment!</p> <p>4. Remember the “STOP, DROP and ROLL” technique should you or someone else catch on fire. Immediately try to find a water source and/or another non-flammable and non-hazardous liquid that could also be used to help extinguish the fire.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Confined Space Entry – Cleaning Frac Tank w/ 9” of Sediment. The frac tank has 9 inches (~1800 gals) of sediment in it from dewatering operations for this site. We will be using a liquid-vac truck to remove the sediment from the tank. We will dump the sediment on a stabilization pad onsite and solidify it for offsite disposal. We then will pressure wash the inside of the tank and vac out the wash water. The wash water will be blown off into another tank we have onsite.

*NOTE: TASK/ATMOSPHERE/HAZARDS WITHIN THE SPACE MAY DICTATE A HIGHER LEVEL OF PPE** If, as we work with the sediment, LELs or other Atmospheric Hazards arise, we will exit the space and perform ventilation or other mitigation to prevent hazards associated with atmospheric hazards.

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input checked="" type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input checked="" type="checkbox"/> CPC Type: TyChem 4000
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input checked="" type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input checked="" type="checkbox"/> Glove Type: Inner Nitrile/Outer Nitrile
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both) Double Hearing Protection above 95dB	<input checked="" type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input checked="" type="checkbox"/> Cartridges: Organic Vapor Cartridges (Defender Combo Cartridges)
<input checked="" type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) – USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Entry into a Confined Space</p> <p>Vac Truck Operation (removal of sediment)</p> <p>Pressure Wash tank and Remove Rinsate</p>	<p>Chemical Hazards (i.e. Inhalation, Ingestion, Dermal Contact, etc.)</p> <p>Actual or Potential Hazardous Atmosphere (i.e.: oxygen deficiency, flammable, explosive, toxic)</p> <p>Physical Hazards (i.e.: electrical, mechanical, pressure, moving parts, engulfment, internal configuration, temperature extremes, slips/trips/falls, low clearances, poor lighting, noise)</p> <p>Entrant unable to exit the space under their own power (Confined Space Rescue)</p> <p>Vacuum Truck Hazards</p> <p>Pressure Washer Hazards</p>	<p>Chemical Hazards (i.e. Inhalation, Ingestion, Dermal Contact, etc.) · Actual or Potential Hazardous Atmosphere (i.e.: oxygen deficiency, flammable, explosive, toxic) Physical Hazards (i.e.: electrical, mechanical, pressure, moving parts, engulfment, internal configuration, temperature extremes, slips/trips/falls, low clearances, poor lighting, noise) Entrant unable to exit the space under their own power (Confined Space Rescue). HEPACO treats all Confined Spaces as Permit- Required. The Entry Supervisor must review and approve the entry documentation (i.e.: entry permit, plans to isolate the space, purging procedures, monitoring equipment, equipment calibration records, communications methods, training records, coordination procedures, and authorizations) and concur on their adequacy. Ensure Confined Space warning signs are posted where entry is possible.</p> <p>Chemical Hazards/Hazardous Atmosphere: Analyze and eliminate through continuous forced ventilation, all atmospheric hazards and confirmed through continuous air monitoring as acceptable. Calibrate and bump test atmospheric monitoring equipment before each use. Review SDS for additional information. No Entry shall be made in oxygen enriched or flammable atmospheres (>10% LEL). Supplied Air Respirators shall be worn in oxygen deficient atmospheres (<19.5% O₂), toxic atmospheres (> IDLH or MUC for vapor cartridges), or as directed by the SDS for that chemical. Review Analytical Document Provided by ROUX</p> <p>Physical Hazards: Analyze and eliminate or control all physical hazards (e.g. Energy Isolation).</p> <p>Confined Space Rescue: For all permit entries into a Confined Space, HEPACO shall provide for stand-by emergency rescue capabilities and personnel as required by OSHA.</p> <p>Review Vacuum Truck JHA & Pressure Washer JHA (SEPARATE)</p>



Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

General Site Work Activities

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
General Site Work Activities	<p>Slips/Trips/Falls</p> <p>Biological Hazards (i.e. poison ivy, ticks, bees, mosquitoes)</p> <p>Heat Stress</p> <p>Noise</p> <p>Severe Weather Conditions</p> <ul style="list-style-type: none"> - Rain - Lightning - Tornado <p>Pinch Points/Cuts/Abrasions (Hands)</p> <p>Manual Lifting/Handling</p> <p>Vehicle Traffic</p>	<p>Slips/Trips/Falls – Maintain good housekeeping procedures to prevent slip/trip/fall hazards. Steps, heavy debris, and other protruding obstructions may be marked with flagging, cones or high visibility paint. If necessary, vehicle pathways will be delineated around dangerous terrain. Watch your footing placement when traversing the worksite.</p> <p>Biological Hazards - Avoid contact with poisonous vegetation, snakes, mosquitoes, ticks and bees. If stung or bitten, take necessary first aid measures and call for emergency services, if needed. Utilize insect repellents or barrier creams as/if needed. Inspect for ticks at the end of each work shift. Report any stings or bites.</p> <p>Heat Stress - Dress appropriately. Stay hydrated – water, ice, & sports drinks shall be made available to employees. Monitor yourself and other employees for signs of fatigue or other heat stress symptoms. Take breaks and rest as needed. Wear sun block as needed to protect skin from sun exposure.</p> <p>Noise – Workers must wear approved hearing protection when working around equipment that produces sound levels in excess of 85 decibels, whenever signs/labels indicate that hearing protection is required, and/or whenever voices must be raised to be heard at a distance of three feet or less.</p> <p>Severe Weather Conditions – Site Supervisor must monitor weather forecasts. Ensure equipment, fuel tanks, and portable buildings are secured. Stop Work and immediately seek shelter until severe weather passes (30 minutes after last observed lightning strike/lightning strike within 10-mile radius of</p>

		<p>work location).</p> <p>Pinch Points/Cuts/Abrasions – Employees shall wear the appropriate gloves for the task. Gloved hands can still be injured, keep your hands away from areas where they may become caught-in or between objects.</p> <p>Manual Lifting/Handling – Use mechanical equipment to perform lifting activities whenever possible. If you must lift, bend at the knees and use leg muscles when lifting. Ask for assistance when lifting heavy/awkward loads. Use tools (e.g. wheelbarrows) to assist in lifting/carrying heavy loads. Avoid prolonged awkward/unnatural body postures.</p> <p>Vehicle Traffic – Traffic patterns shall be delineated to keep traffic away from ground personnel to the extent possible. Utilize spotters when backing, negotiating around obstacles, or other confined/congested areas.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Hand & Power Tool Use

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
Hand Tools – Non-Electrical	Faulty Operation Operating Accident Flying Fragments Worn Tools Muscle Strains Mislaidd Equipment Slip/Trip/Fall Cuts-Abrasions-Punchers Overexertion Accidental Movement	Tools Appropriate for jobs Good House Keeping Correct Work Surface and clamps Proper Balance, Stance & Grip Training on Use of Equipment Use Proper Leverage and Body Positioning Eye Injury, flying chips and slivers Identification of hazardous activities and materials; Correct eye protection; tool guards Hand tools, cuts, impacts, punctures and abrasions tools appropriate for jobs, well maintained, sharpened and lubricated. Hand tools, repetitive stress injury Symptom awareness; Regular breaks; Vary work type
Hand Tools – Electrical	Slip/Trip/Fall due to Bad House Keeping Cracked or Broken Tools Cracked or Broken Bits/Wheels Cuts/Lacerations/Amputations Drop Tools on Feet Loud Noise Electrical Shock Electrical Wires Exposed Ground Missing From Plug Bad Electrical Cords	Place away from walkways Good House Keeping Keep Hands Clear Be sure to always cut away from body Ensure Tools are in Good Condition Inspect Tools Prior to Each Use Ensure Dry Working Area Ensure Guards are in Place Tools are plugged into a GFCI Outlet Always use Proper PPE <ul style="list-style-type: none"> - Safety Glasses - Steel Toe Boots - Gloves - Ear Plugs - Long Pants/Shirt
Hand Tool – Grinder	Grinding Wheel Failure Cracked or Broken Wheel Slip/Trip/Fall Cuts/Lacerations/Amputations	Place away from walkways Ensure Guard is in place Fire Extinguisher Keep Hands Clear

<p>Hand Tool - Saw</p>	<p>Noise Fire Fumes Burns</p> <p>Faulty Operation Wrong Blade Size Operating Accident Flying Fragments Saw Kick-Back Blade Falling Off Excessive Noise Electrocution Slip/Trip/Fall Accidental Movement Cuts/Lacerations/Amputations</p>	<p>Ensure proper grinding wheel is in place and is in good condition</p> <p>Ensure power cord is unplugged at all times when installing/changing disks/wheels</p> <p>Ensure that all loose clothing, hair, jewelry etc., is contained</p> <p>Maintain control and a firm grip on tool</p> <p>Be aware of adjacent surfaces and disk's rotation direction</p> <p>Ensure that disk/wheel has stopped rotating before placing hand(s) near disk/wheel area and before placing tool on any surface</p> <p>Good ventilation</p> <p>Notify Everyone in Work Area</p> <p>Ensure guard is in place</p> <p>Fire extinguisher</p> <p>Keep hands clear</p> <p>Good housekeeping</p> <p>Inspect power cord</p> <p>Recommended PPE</p> <ul style="list-style-type: none"> - Safety Glasses - Sturdy Work Boots - Leather Gloves - Face Shield - Long Pants/Shirt - Hearing Protection
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Heavy Equipment Operations (Clearing and Grubbing)

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input checked="" type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
Heavy Equipment Operations (Clearing & Grubbing)	<p>Equipment Damages/Deficiencies</p> <p>Ground Personnel Struck-By Equipment</p> <p>Equipment Contact with Overhead Utilities</p> <p>Equipment Contact with Underground Utilities</p> <p>Refueling Equipment</p> <p>Vehicle/Equipment Traffic</p> <p>Working on Steep Slopes</p> <p>Biological Hazards</p> <p>Flying Debris</p>	<p>Equipment Damages/Deficiencies - Operator must inspect equipment each day, prior to use. Any deficiencies must be reported to the Site Supervisor before use. If any deficiencies reported are "safety sensitive" (e.g. back-up alarm, steering, brakes, etc.), the equipment must be removed from service until repaired/replaced.</p> <p>Struck-By Equipment - Ground Personnel must remain a safe distance away from equipment in operation. If you must approach equipment in operation, make eye contact with the operator and signal for him to stop. Wait for operator to "ground & disengage" equipment before approaching. Ground personnel shall wear high-visibility vests/clothing, so they are easily seen by equipment operators. A spotter shall be utilized when loading/unloading equipment from trailers, or equipment is backing/negotiating tight turns around obstructions, obstacles, or other ground personnel.</p> <p>Overhead Utilities - Before work begins, inspect work area for Overhead Utilities. Ensure equipment remains at least 10' from overhead powerlines, follow OSHA's "Minimum Approach Distance" guidelines. If overhead powerlines are present, a spotter must be utilized to ensure the equipment does not encroach the minimum approach distance.</p> <p>Underground Utilities - Before work begins, inspect work area for Underground Utilities. When excavating below existing grade,</p>

		<p>ensure a utility locate (811 or private party) has been completed. Follow regulations and guidelines for excavating around underground utilities.</p> <p>Refueling Equipment - Equipment must be shut off and allowed time to cool prior to refueling. Keep open sparks/flames (including smoking) at least 50' away from refueling area.</p> <p>Vehicle/Equipment Traffic - Traffic patterns shall be established to keep traffic away from ground personnel to the extent possible. Utilize spotters when backing, negotiating around obstacles, or other confined/congested areas.</p> <p>Working on Steep Slopes - Avoid operating on steep slopes whenever possible, follow equipment manufacturer's guidelines when operating on a grade/incline. Avoid traversing slopes perpendicular to the grade. Always keep loads uphill from the machine.</p> <p>Biological Hazards: Be alert for bees, snakes, or other wild animals that may be present. Be alert for poisonous plants. Additional PPE (such as Tyvek disposable coveralls) may be necessary to protect workers in areas where poisonous plants are identified.</p> <p>Flying Debris: Ground personnel must remain a safe distance away from heavy equipment clearing operations as to not be struck by flying debris that may be ejected during clearing.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Heavy Equipment Operations (Excavation of Contaminated Soils)

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Heavy Equipment Operations – Excavation/Trenching</p> <p>Entering Open Excavation/Trench</p>	<p>Equipment Damages/Deficiencies</p> <p>Ground Personnel Struck-By Equipment</p> <p>Equipment Contact with Overhead Utilities</p> <p>Equipment Contact with Underground Utilities</p> <p>Refueling Equipment</p> <p>Dermal Contact with Contaminated Soils</p> <p>Vehicle/Equipment Traffic</p> <p>Working on Steep Slopes</p> <p>Open Excavations (Cave-ins)</p> <p>Working in a Confined Space</p>	<p>Equipment Damages/Deficiencies - Operator must inspect equipment each day, prior to use. Any deficiencies must be reported to the Site Supervisor before use. If any deficiencies reported are "safety sensitive" (e.g. back-up alarm, steering, brakes, etc.), the equipment must be removed from service until repaired/replaced.</p> <p>Struck-By Equipment - Ground Personnel must remain a safe distance away from equipment in operation. If you must approach equipment in operation, make eye contact with the operator and signal for him to stop. Wait for operator to "ground & disengage" equipment before approaching. Ground personnel shall wear high-visibility vests/clothing, so they are easily seen by equipment operators. A spotter shall be utilized when loading/unloading equipment from trailers, or equipment is backing/negotiating tight turns around obstructions, obstacles, or other ground personnel.</p> <p>Overhead Utilities - Before work begins, inspect work area for Overhead Utilities. Ensure equipment remains at least 10' from overhead powerlines, follow OSHA's "Minimum Approach Distance" guidelines. If overhead powerlines are present, a spotter must be utilized to ensure the equipment does not encroach the minimum approach distance.</p> <p>Underground Utilities - Before work begins, inspect work area for Underground Utilities. When excavating below existing grade, ensure a utility locate (811 or private party) has been completed. Follow regulations and guidelines for excavating around underground utilities.</p>

		<p>Refueling Equipment - Equipment must be shut off and allowed time to cool prior to refueling. Keep open sparks/flames (including smoking) at least 50' away from refueling area.</p> <p>Dermal Contact with Contaminated Soils - Chemical-Resistant Boots/Boot Covers and Chemical-Resistant Gloves (such as Nitrile) shall be worn inside of contaminated area. Avoid direct dermal contact with contaminated material. Immediately wash hands, arms, and face with soap and water after exiting the work area prior to eating, drinking, smoking, etc.</p> <p>Vehicle/Equipment Traffic - Traffic patterns shall be established to keep traffic away from ground personnel to the extent possible. Utilize spotters when backing, negotiating around obstacles, or other confined/ congested areas.</p> <p>Open Excavations (Cave-ins) - Open excavations shall be appropriately marked/barricaded to prevent entry by unauthorized personnel. Open excavations deeper than 5 feet shall not be entered without prior inspection and approval by a Competent Person. Excavations deeper than 5 feet which are entered by employees shall be sloped, shored, or protected by some other equivalent means. When employees are required to work in an excavation 4 feet or deeper, a ladder (or some other appropriate means of egress) shall be provided. The maximum horizontal travel distance to the ladder shall be 25 feet. The ladder shall extend a minimum of 3 feet above the excavation and be secured. Air monitoring will be required for the testing of excavations and trenches that are greater than 5' deep or</p>
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		<p>are in close proximity to sewer and gas lines or where hazardous conditions may present.</p> <p>Confined Space – Air Monitoring shall be conducted. A Confined Space Permit & Attendant shall be in place during Confined Space Entry. A trained and equipped 2-person Rescue shall be available in the immediate area during Confined Space Entry.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Mobilization & Demobilization

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Driving to/from Project Site</p> <p>Loading/Unloading Equipment and Trailers</p>	<p>Motor Vehicle Accident</p> <ul style="list-style-type: none"> - Pre-Existing Vehicle Damage/Safety Issues - Distracted Driving - Driving While Fatigued - Other Drivers <p>Escorting equipment from the unloading area to the project site.</p> <p>Removing Equipment Tie-Downs</p> <ul style="list-style-type: none"> - Pinch Points - Stored/Potential Injury <p>Mounting/Dismounting Equipment</p> <ul style="list-style-type: none"> - Slips/Trips/Falls <p>Employees Struck-By or Caught-In/Between Equipment and Cargo</p> <ul style="list-style-type: none"> - Pinch Points <p>Sprains/Strains During Manual Liftin</p>	<p>Motor Vehicle Accident - Plan your travel route. Perform a vehicle inspection before departure (360 walkaround). Use spotters when backing or negotiating tight turns/confined or congested areas. Secure loads properly and inspect frequently.</p> <p>Escorting Equipment - If/when equipment has to be unloaded and escorted to the project site on public roadways, the equipment will be escorted by at least two vehicles (one in front of the equipment, one behind) with emergency lighting/flashers. Spotter(s) must be utilized when traversing under low bridges, powerlines, or any other overhead obstacle/obstruction.</p> <p>Removing Equipment Tie-Downs - Employees must wear gloves when removing equipment tie-downs, binders, chains, etc. Stay alert for stored/potential energy when removing tie-downs as equipment may have shifted during transport.</p> <p>Mounting/Dismounting Equipment - Ensure hand holds, rails, and steps of equipment are stable and free of any dirt/debris that might cause the employee to slip when mounting/dismounting the equipment. Maintain 3-points of contact. Ensure footing and placement on the ground is free from large rocks/debris when dismounting equipment. Do not jump off equipment to dismount.</p> <p>Struck-By or Caught-In/Between Equipment & Cargo - Inspect load conditions prior to removing tie-downs. Inspect equipment (lifting straps, chains, hooks, etc.) before lifting. Ensure lifting & rigging equipment can</p>

		<p>handle the weight of the load(s). Ground personnel must remain out of the "Red Zone" of equipment and loads. Keep hands and fingers out of rigging apparatus when under load. Use tag lines to guide/control loads.</p> <p>Sprains/Strains - Avoid moving heavy/awkward loads by yourself, get help or equipment to assist in lifting & handling. Use proper manual lifting techniques.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Pressure Washing

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input checked="" type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input checked="" type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input checked="" type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input checked="" type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input checked="" type="checkbox"/> Glove Type:
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) – USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Other: Metatarsal Boots or Metatarsal Guard Attachments

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Inspection & Setup of Equipment</p> <p>Use of Pressure Washer</p> <p>Making Repairs/Adjustments</p>	<p>Equipment Damages/Deficiencies</p> <p>Struck-By Pressure Washer Hose/Fitting During Sudden Failure of Hose Connection</p> <p>Contact with High-Pressure Stream</p> <p>Flying Debris, Contact with chemical/substance to be cleaned</p> <p>Electrical Shock</p> <p>Equipment Malfunction / Accidental Discharge of the Pressure Washer, Burns due to high temp water</p>	<p>Equipment Damages/Deficiencies - All hoses, fittings, and other components shall be checked for evidence of damage, wear, or imperfections. The hose and connections shall be checked to ensure that they are rated for use at the pressures to be used, a hose shall not be operated at a pressure exceeding the working pressure. All hoses should be protected from being tripped over or run over and crushed by vehicles, forklift trucks, etc. Hoses should be laid out to avoid or minimize abrasive wear on the hose. Any tools, equipment, or machinery found damaged, defective, or otherwise unsafe should immediately be removed from service and not used until repaired or replaced.</p> <p>Struck-By Pressure Washer Hose/Fitting During Sudden Failure of Hose Connection - Safety connectors (whip checks/cable chokers) shall be used across all hose connections. Do not use any fitting other than a soap nozzle when soap is being used, in order to prevent pressure building and potential hose failure.</p> <p>Contact with High-Pressure Stream - Never use the pressure washer for anything other than its intended use. Never point a pressure washer's wand/gun or direct its pressure stream towards yourself or other individuals. Ensure good footing and firm grip on the pressure washer gun during operation. Use the approved pressure washer attachment tip that is specific to the application or task. Dead-man switches or constant pressure triggers must be equipped on all pressure washer wands/guns to stop flow if the wand is released or dropped and these triggers shall not be tied/locked into place.</p> <p>Flying Debris - Face shield with safety glasses</p>

		<p>with face shield or full-face respirator must be worn to protect operator from flying debris during pressure washing. Review SDS and don the proper CPC for the task at hand.</p> <p>Electrical Shock - Ensure all equipment being washed is deenergized, and never operate pressure washers near electrical panels or energized power sources. Test GFCI equipment prior to use.</p> <p>Equipment Malfunction / Accidental Discharge of the Pressure Washer - No attempt shall be made to tighten or otherwise adjust any nut, hose connection, or other fitting or component of a high-pressure water jetting system while the system is under pressure. The pumps shall be stopped and any pressure in the line discharged before any repair or other adjustment is made. NOTE: If HOTSYS was in use, cycle cold water through the system to purge hot water.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Pump & Pressurized Vessel Operations

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Rig Up</p> <p>Pump Operations</p> <p>PSI Vessel Operations</p>	<p>Equipment Failure</p> <p>Incorrect hoses/connection types</p> <p>Slips/Trips/Falls</p> <p>Overexertion</p> <p>Heat Stress</p> <p>Leaking Lines,</p> <p>Equipment Damage due to not checking fluid levels</p> <p>Running Pump Dry,</p> <p>PSI-related hazards (Trapped/Over Pressurization),</p> <p>Flying Debris,</p> <p>Static Electricity</p>	<p>Always wear the proper PPE for the job</p> <p>See Mob/Demob, General Site Work Activities JSA</p> <p>Inspect all equipment prior to use</p> <p>Ensure the correct hoses/fittings are being used on all hoses/tanks/vessels etc.</p> <p>Prior to starting pumps, ensure that all connections are secured, perform a pressure test, if necessary, communicate with all personnel on each side of the transfer, check all fluid levels prior to starting the equipment. Ensure that water is flowing to pump. Ensure that no hydrocarbons are flowing through hoses/to equipment that is not rated for hydrocarbons</p> <p>Ground all equipment to mitigate static electricity buildup</p> <p>Check to make sure that all PSV devices on tanks, pumps, psi-vessels (carbon filters/filter sock vessels) are in place and functioning.</p> <p>Ensure pump is isolated from system and pressure is relieved before disassembling pump, removing plugs, opening vent or drain valves, or disconnecting piping.</p> <p>Observe proper decontamination procedures. Proper personal protective equipment should be worn. Precautions must be taken to prevent physical injury. Pumpage must be handled and disposed of in conformance with applicable environmental regulations.</p>

		<p>Never operate the pump without liquid supplied to mechanical seal. Running a mechanical seal dry, even for a few seconds, can cause seal damage and must be avoided. Physical injury can occur if mechanical seal fails.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Railcar Transfers

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input checked="" type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input checked="" type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input checked="" type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input checked="" type="checkbox"/> Glove Type:
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input checked="" type="checkbox"/> Air-Purifying Respirator
<input checked="" type="checkbox"/> FR Coveralls/Clothing	<input checked="" type="checkbox"/> Cartridges:
<input checked="" type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input checked="" type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Mob/Demob</p> <p>General Site Work Activities</p> <p>Working on/near railroad</p> <p>Rig up pumps/transfer equipment</p> <p>Begin Transfer</p> <p>Complete Transfer</p>	<p><i>See Mob/Demob JHA</i></p> <p><i>See General Site Work Activities JHA</i></p> <ul style="list-style-type: none"> • Exposure to material to be transferred <p><i>See Working on/Near Railroad JHA</i></p> <ul style="list-style-type: none"> • Moving railcar/on-track equipment <p><i>See Pumping Operations JHA</i></p> <ul style="list-style-type: none"> • <i>Static electricity buildup/discharge</i> <p>Overfill/Spills</p> <p>Equipment Failure / Material Incompatibility / Overpressure of vessel</p>	<p><i>See Mob/Demob JHA</i></p> <p><i>See General Site Work Activities JHA</i></p> <ul style="list-style-type: none"> • Safety equipment, such as safety showers and eyewash stations should be present prior to beginning transfer • Proper PPE must be worn (refer to SDS of material to be transferred) <p><i>See Working on/Near Railroad JHA</i></p> <ul style="list-style-type: none"> • Ensure brakes are set, wheels chocked before any loading/unloading activities are started • Utilize derails, aligned/locked switches, bumper blocks, other apparatus • Inspect car for damage – notify employee in charge if found <p><i>See Pumping Operations JHA</i></p> <ul style="list-style-type: none"> • <i>Tank car containing flammable or combustible gases or liquids should be electrically grounded and bonded during loading and unloading operations. Grounding and bonding of cars carrying other commodities may also be necessary.</i> <p>The tank/vessel to be transferred to must be of sufficient capacity, both by weight and volume to contain the quantity of the product being loaded/unloaded.</p> <p>All fittings, valves, gaskets and fasteners must be in proper condition, i.e. not corroded, torn, worn, stripped or otherwise damaged. Materials contacting the lading must be compatible with the product being</p>

		<p>loaded into the car (refer to SDS for incompatibility).</p> <p>Unless the tank that is being transferred to is cleaned/purged, ensure that the residue in the tank is compatible with the product being loaded into the car. Do not transfer into a vessel that has an unidentified residue.</p> <p>If equipped with a safety vent, the rupture disc must thoroughly inspected. If equipped with a pressure relief valve, the valve must be inspected to ensure no debris is in its discharge area. If a combination pressure relief device is present each detection device (including, for example, telltale indicator or needle valve) should be checked to determine the integrity of the rupture disk. These devices must be closed prior to transportation.</p> <p>During loading continually monitor the car for any signs of leakage.</p> <p>Ensure adequate outage space remains in the car when loading is completed to prevent overloading by volume or by weight and to allow expansion in transit. Refer to applicable regulations for correct outage, filling density and other weight restrictions for the commodity loaded.</p> <p>When loading is complete re-check the car for any signs of leakage. If there are any signs of leakage and if the leak cannot be stopped, the truck must be transported and spill procedures must be followed.</p> <p>Close all valves after car is loaded. Verify there is no detectable leakage from valves, flanges, threaded connections and packing</p>
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		<p>glands. Secure all plugs and outlet caps with a suitable tool. Use non-sparking tools if required</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Roll-off Container Load and Un-load

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<ol style="list-style-type: none"> 1. Review "General Site Activities" JHA 2. Review "RO Box Loading and Unloading" JHA 3. Review project HASP and Tailgate 4. Evaluate site 5. Vehicle Placement 6. Loading 7. Securing the load 8. Off-loading 	<p>Slips, Trips, Falls, Pinch Points</p> <p>Over-head power lines or obstructions</p> <p>Backing</p> <p>Cable Damage / Burr</p> <p>Unexpected box movement</p> <p>Uneven loading / misalignment</p> <p>Load securement</p>	<p>Ensure work area is clear of hazards</p> <p>Use a spotter when available to align the truck with the box</p> <ul style="list-style-type: none"> - Always get out and look prior to backing - Ensure over-head clearance is available prior to lifting rails <p>Wear proper PPE when handling the cable</p> <ul style="list-style-type: none"> - Inspect for damage prior to use <p>Inspect box prior to loading</p> <ul style="list-style-type: none"> - Rear door secured - Tarp condition and securement <p>Clear area around the work zone prior to loading</p> <p>Ensure the truck brakes are engaged</p> <p>Check for alignment while loading</p> <p>After loading is complete</p> <ul style="list-style-type: none"> - Check load securement - Attach load straps and secure <p>Unloading the box</p> <ul style="list-style-type: none"> - Look at the site prior to offloading - Ensure that the box has room to roll off the truck - Watch for overhead obstructions - Apply the parking brake - Remove box securement straps - Raise truck rails - Slowly let winch cable out until box is secure on the ground



Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Trailer Use

Required PPE for Specific Task:

<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Hooking Up</p> <p>Manually Pulling Trailer to Truck</p> <p>Closing Hitch Lock, Safety Chain, Electric Hook-Up</p> <p>Pulling</p> <p>Turning (Area Too Small)</p> <p>Spare Tire</p>	<p>Backing up to Trailer Too Fast; Bump Trailer So It Rolls; Falls Off Jack or Dents Vehicle</p> <p>Body Between Truck and Trailer; Fingers Between Hitch and Bumper; Tolling Over Foot or Onto Leg</p> <p>Muscle Strain; Drop on Foot</p> <p>Pinch points; Dirt in Eyes; Electric</p> <p>Vehicle Not Suited to Pull Trailer; Driver Not Proficient; Changing Road Surfaces; Pavement, Gravel, Dirt, Sand, Snow or Ice, Combined with Grade, Visibility; Heavy Trailer; Slow Uphill and Fast Pushes Downhill; Allow for Longer Stopping Distances; Fishtailing from ruts or hard breaking; Electric Break Pulling left or Right; Load Shift (Tank Type) (Flat Bed for Stake Side); Crush person or body parts – Load falls off trailer or tips trailer over causing damage to towing vehicle or other vehicle on/by roadway; Injury to pedestrians</p> <p>Hit with front outside of truck or rear inside of trailer; Getting stuck on narrow and dead-end roads</p>	<p>a) One person: Align Hitch to bumper then back slowly.</p> <p>b) Two or more persons: Watch Only One Back up Guide. Attach safety chains securely to vehicle.</p> <p>c) Don't get between trailer and truck hitch or bumper while truck is moving. Don't stand behind trailer. Don't let trailer fall or be pushed off jack.</p> <p>Don't Overexert, Get Help, Move Slowly, Keep Proper Balance. Don't let the trailer push you.</p> <p>Be familiar with the type of hitch. Do not use snap-ring/Bolt-on Style hitches. If these are found, trailer is to be taken out of service. Lock correctly, keeping hands clear of pinch points between trailer jack and tongue. Take care in hooking chains under dirt filled bumper or frayed wires. Ensure feet are not under trailer tongue or associated equipment.</p> <p>Before moving, check lights, jack or tongue prop. Remove chock blocks, check tires and lug nuts.</p> <p>Pull trailer with vehicle properly equipped for towing (licensed operators only). Awareness to changing conditions. Adjust speed downward. Practice pulling trailer under controlled "good" conditions. Practice using electric brakes and know how to adjust. Practice on size and type of trailer. No passengers on trailer! Use lower gears to slow vehicle to save vehicle brakes. Tie down all loads or secure with suitable strapping. Plan for extreme vibrations while securing loads and check strapping our tie downs frequently.</p>

		<p>Plan your route. Know the turning radius required for each type of trailer. Turn slowly. Know turning width taken up by truck and specific trailer.</p> <p>Avoid roads that do not provide turning areas for maneuvering the trailer. Avoid going down steep roads unless there is another way out. Use 4WD, if necessary.</p> <p>Ensure that spare tire is available and fully inflated prior to each trailer use.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Vacuum Truck Operations

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input checked="" type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input checked="" type="checkbox"/> Glove Type: Inner & Outer Nitrile
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<ol style="list-style-type: none"> 1. Traffic/Site Control 2. Set up truck, vacuum hose, and stinger pipe (if needed) 3. Removal of liquids/sludge by use of stinger pipe and/or vacuum hose 4. Clear hose, disengage vacuum, remove hose 	<ol style="list-style-type: none"> 1. Traffic Visibility, Truck & Work Area Security, Adjacent Operations 2. Back Injury (Sprains/Strains), Trip Hazards, Spills, Static Electricity Discharge 3. Excessive tank pressure, obstacles in line 4. Trips, straining hazard, line clogging, tank overflow 5. Injury from vacuum/suction 6. Exposure to Chemicals 	<ol style="list-style-type: none"> 1. Proper PPE (safety/reflective vest), safety cone deployment with flags and barricades (or caution tape), proper positioning of vacuum truck, chock wheel, flashers, beacon light at night, constant area observation. 2. Hoses can be heavy and awkward, utilize proper lifting techniques and ask for help, allow necessary space for adequate work area, proper use of various fittings, utilize good hose management to minimize trip hazards, ensure spill pads are available, secure camlock ears on hoses (ensure gaskets are in place and in good condition), ensure truck and hose connections are bonded and grounded (<10 ohms). 3. Proper training in truck/pump operation is critical, initial and constant monitoring of vacuum pressure gauge (PSI), keep end of hose clear of objects when opening inlet, wear hearing protection and face shield, proper training in vacuum hose operation (break surface but don't touch bottom until known or visible), monitor to assure proper pressure and suction, proper lifting techniques, monitor tank fill gauge closely—stop and stick tank if uncertain. 4. Assure hose end is clear of product and pulling air strongly prior to disengaging vacuum (clear lines), keep work area clear—be aware of surroundings. 5. Always use a suction handle connected to the end of the hose to control the hose. The handle should be of sufficient length to allow the operator to stand in a full upright position. The handle must be compatible with the material being transferred. If the material is combustible or flammable the handle must be constructed of conductive material and

		<p>bonded to the hoses and/or truck. Never place hands, feet or other body parts in front of the hoses. Never leave vacuum hoses unattended or lying on the ground. For vacuum trucks capable of producing greater than 3,000 cfm of vacuum/suction, "Safety-T" vacuum breakers or "dead man switches" within immediate reach of the operator at the end of the suction hose must be utilized. These vacuum breaks must be capable of de-energizing the suction to the hose immediately upon activation.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Working around Waterways (Creeks/Streams)

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input checked="" type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input checked="" type="checkbox"/> CPC Type :
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input checked="" type="checkbox"/> Chemical-Resistant Gloves:
<input type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input checked="" type="checkbox"/> Glove Type: Nitrile (Solvex)/Outer PVC
<input checked="" type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input checked="" type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input checked="" type="checkbox"/> Cartridges: Organic Vapor (When Atmospheric Conditions Dictate)
<input checked="" type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input checked="" type="checkbox"/> Supplied Air Respirator (Airline)
<input checked="" type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Other: Chest Waders

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
Working in and around waterways	<p>General emergency</p> <p>Inclement weather</p> <p>Lone working</p> <p>Uneven terrain/Slopes</p> <p>Slips trips and falls</p> <p>Drowning / Hypothermia</p> <p>Creek bank causing Slips trips and falls</p> <p>Submerged objects causing Loss of balance</p> <p>Musculoskeletal injury</p> <p>Exposure to contaminates/Microorganisms in water</p>	<p>Supervisors to be aware of nearest Accident and Emergency hospital; A first aid kit must be on site at all times; A mobile phone should be available at all times (if no/poor signal, all supervisors should know the location of the nearest landline); A safety plan should be completed; All incidents and near misses must be reported to HEPACO Supervisor/Management.</p> <p>Appropriate clothing to be worn for the weather (layers of warm, waterproof clothing (waders); Suncream available; Drink plenty of fluids and take regular breaks; Stop activity if heavy rain/strong wind and site/task becomes dangerous, or participants experience discomfort. Monitor lightning in the area and "cab up" if lightning is observed within 10mi for at least 30 minutes past the last strike.</p> <p>No lone working in or near water under any circumstances.</p> <p>Discuss the terrain during the tailgate safety meeting; wear sensible, sturdy Footwear (railroad compliant or waders) Ensure unused tools are left in a designated place, stored neatly; Mark, or cordon off, any major trip hazards that cannot be removed. Use creekbank access points (Picket anchor point systems)</p>

		<p>No lone-working when in/by water; Buddy system in place so that anyone in the water has a spotter on the bank; ; Only confident swimmers to enter the water; Chest waders to be worn as appropriate for water level; Do not undertake work if water levels abnormally high or fast; Check depth of water along bed using a long pole/stick before entering; No volunteer tasks to be undertaken in water higher than thigh height.</p> <p>Participants briefed to be cautious of uneven ground and vegetation that may be a trip hazard.</p> <p>Carry out a visual survey of the work area beforehand to identify any potential hazards in the water; Warn participants about the possibility of finding something alert supervisors if this is the case; Use a long pole/stick to check for debris when walking through waterway.</p> <p>Avoid water contact, particularly around the face/mouth; Cover all cuts with waterproof dressing and wear gloves; If contact is made, wash area thoroughly with clean water before eating, drinking or smoking and prior to leaving the site; Use anti-bacterial gel after practical tasks; Seek medical attention if symptoms occur.</p>
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Job Hazard Analysis (JHA) Form

Description of Task/Work Activity:

Covering Spoils Piles (Manually handling and carrying sandbags on uneven terrain)

Required PPE for Specific Task:

<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Chemical-Resistant Boots/Boot Covers
<input checked="" type="checkbox"/> Safety Glasses (Clear/Indoor)	<input type="checkbox"/> Tyvek/MicroMAX Coveralls
<input checked="" type="checkbox"/> Safety Glasses (Tinted/Outdoor)	<input type="checkbox"/> Chemical Protective Clothing (CPC)
<input checked="" type="checkbox"/> Steel/Composite-Toe Boots	<input type="checkbox"/> CPC Type:
<input checked="" type="checkbox"/> Hi-Visibility Vest/Clothing	<input type="checkbox"/> Chemical-Resistant Gloves:
<input checked="" type="checkbox"/> Gloves (Leather/General Use/Cut-Resistant)	<input type="checkbox"/> Glove Type:
<input type="checkbox"/> Hearing Protection (Ear Plugs/Earmuffs/Both)	<input type="checkbox"/> Air-Purifying Respirator
<input type="checkbox"/> FR Coveralls/Clothing	<input type="checkbox"/> Cartridges:
<input checked="" type="checkbox"/> Fall Protection (Full Body Harness & Lanyard/Lifeline)	<input type="checkbox"/> Supplied Air Respirator (Airline)
<input type="checkbox"/> PFD (Personal Flotation Device) - USCG-Rated	<input type="checkbox"/> SCBA
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Other:

Sequence of Task Steps:	Potential Hazards:	Controls/Preventative Measures:
<p>Preparing to move materials.</p> <p>Moving materials.</p> <p>Moving materials by hand</p> <p>Moving materials with machinery.</p>	<p>Muscle strains, pulls and repetitive motion injuries.</p> <p>Injuries resulting from lack of communication, or miscommunication.</p> <p>Foot or leg injuries.</p> <p>Finger or hand injuries.</p> <p>Vehicle or machinery damage, operator injury, or injury to others working around machinery.</p>	<p>-Each employee should be provided training on the safe and proper use of the most important, primary tool—their bodies</p> <p>Proper techniques of stretching, lifting, bending, moving, rolling rocks, securing good footing, the importance of good nutrition and hydration, etc., should be addressed.</p> <p>-Each employee will be given time on the job to properly stretch and warm-up before and during physical activity for a period of time deemed appropriate by the crew leader, or on-site supervisor.</p> <p>-Employees will be encouraged to switch hands often and vary the types of activities performed to limit exposure to repetitive motion injuries.</p> <p>-The appropriate number of workers should be used to move materials. This decision may vary between individuals.</p> <p>-Crew leaders will conduct tailgate safety talks to provide orientation, discuss project, safety concerns, assign work, etc.</p> <p>-Good communication between crewmembers should reinforce individual awareness of real and potential hazards.</p> <p>-Communication methods should be discussed and agreed upon prior to moving materials.</p> <p>-The plan of attack should be discussed before attempting to move materials.</p> <p>-Instructions should come from one person when working in teams of two or more.</p> <p>-Workers need to maintain constant awareness of their feet and foot placement</p>

		<p>in relation to objects being moved and avoid placing them under materials or on material that may slide, give way, crumble, etc.</p> <ul style="list-style-type: none">-It is recommended that workers use lifting techniques to minimize the potential for injuries to hands.-If hands are absolutely necessary use extreme caution and 100% communication with other workers should follow. <p>-Refer to JHA—Equipment Use and Maintenance.</p>
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Job Safety Analysis

General

JSA ID	19445c	Status	(4) Revise
Job Name	Environment-Drilling and Soil Sampling Using DPT Rig	Created Date	3/18/2023
Task Description	Soil Sampling Using DPT Rig	Completed Date	
Template	FALSE	Auto Closed	FALSE

Client / Project

Client	Norfolk Southern Corporation
Project Number	30169714
Project Name	NS Hazmat-Palestine OH
PIC	Helmadollar, Rick
Project Manager	Artrip, Jason

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Moyers, Samuel	4/1/2023		McDonald, Andrew	<input checked="" type="checkbox"/>
HASP Reviewer	Matlock, Zachary	3/20/2023	3/20/2023	Matlock, Zachary	<input checked="" type="checkbox"/>

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Working around direct push technology (DPT) rig	1 Slip, trip and falls from poor housekeeping	Wear boots with good tread and ankle support. Keep tools, drill rods, drum lids/rings off ground and stage neatly. If plastic sheeting is placed on ground, exercise caution while working if wet.	
		3 Struck by excavation equipment near or in excavation areas,	Remain 25 ft from excavation equipment including the extended reach of any portion of the equipment unless establishing simultaneous operations plan with the equipment operator(s). Wear high visibility clothing and provide auxiliary lighting at night if drilling near operating heavy equipment. Do not park project vehicles within 25 ft of parked heavy equipment or within 50 ft of active railroad tracks at grade crossing or within 7 ft of an active track (not at grade crossings).	
		4 Struck by train or on-track equipment.	If DPT soil sampling will occur within 25 ft of the track, workers must be Roadway Worker Protection trained and have eRAILSAFE. If track is active, track protection is required.	
2	Collecting soil sample using DPT	1 Cuts or scrapes to hands opening the sampler and DPT liner	Wear hand protection (i.e., leather gloves). Avoid excessive force while attempting to remove soil liner. Use correct cutting tool to open liners. DO NOT USE FIXED BLADE KNIVES TO OPEN SOIL LINERS.	
		2 Repetitive stress opening and sampling tool	Use job rotation while opening and closing DPT sampling tool to reduce stresses on arms and wrists. Do not hurry through task.	
		3 Exposure to potentially chemically impacted soil	Wear protective gloves while handling/mixing/containing soils. Use air monitoring in areas believed to be severely impacted by site constituents. If 8 hr.- TLVs are exceeded follow Level C requirements.	

		4	Cleaning DPT sampling tool rods	Wear protective gloves during cleaning. Avoid awkward body positions and repetitive stresses if manually washing DPT sampling tool and rods manually. If using a pressure washer to clean DPT tools and equipment wear face shield in addition to safety glasses. Exercise caution and use spoon or similar object without sharp (i.e. knife)/puncturing (i.e. screwdriver) construction to clear nose sampling tool to reduce potential for hand/forearm injury.		
		5	Noise from drill rig while sampling.	Wear hearing protection. Set up soil sample logging, preparation and collection area away from DPT rig to reduce noise hazards to sampling workers. Avoid standing near DPT rig while drill and sampling.		

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Dermal Protection	Coveralls	Tyvek in severely impacted areas	Recommended
	Sleeved shirt/long pants		Required
	High visibility vest, coat - CLASPED	ANSI Class II minimum while working in or around excavations, active track or in public right of ways.	Required
Head Protection	Hard hat	standard hard hat in excavation areas	Required
Hand Protection	Protective gloves	Nitrile for chemical impacts, leather for handling split spoon	Required
Eye Protection	Safety glasses		Required
	Face shield	When using pressure washer	Recommended
Foot Protection	Boots	Steel-toe with defined heel, oil resistant sole, and at least 6 inches in height for ankle support. Lace up boots required.	Required

Supplies			
Type	Supply	Description	Required
Communication Devices	Mobile phone		Required
Decontamination	Decon supplies (specify type)	Soap and water available for hand washing	Required
Miscellaneous	Auxiliary lighting	For night work	Recommended
	First aid kit		Required
	Flashlight	For night work in excavations	Recommended
	Air monitoring in areas of high chemical impacts	Photoionization or flame ionization detector	Required
	Eye wash (specify type)	Bottle	Required

Job Safety Analysis

General			
JSA ID	19445d	Status	
Job Name	Environment-Hand Auger Soil Sampling	Created Date	3/18/2023
Task Description	Collection of soil samples using hand augers (including soil probes)	Completed Date	
Template		Auto Closed	

Client / Project	
Client	Norfolk Southern Corporation
Project Number	30169714
Project Name	NS Hazmat-Palestine OH
PIC	Helmadollar, Rick
Project Manager	Artrip, Jason

User Roles					
Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Moyers, Samuel	4/1/2023		McDonald, Andrew	<input checked="" type="checkbox"/>
HASP Reviewer	Matlock, Zachary	3/20/2023	3/20/2023	Roesler, Jerr	<input checked="" type="checkbox"/>

Job Steps					
Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference	
1	Collecting soil sample using hand auger or soil probe	1	Slip, trip and falls due to uneven, wet or ice/snow covered walking surfaces	Wear boots with good tread and ankle support. Avoid carrying supplies in a manner that obstructs view ahead.	
		2	Collecting soil samples with hand auger or soil probe	Wear hand protection. Avoid repetitive stress if using equipment that screws together by using job rotation. Watch for pinch points at rod connections or head/handle connections to rods when assembling hand auger and probes. Avoid excessive torque while advancing hand auger or probe. Use job rotation to reduce repetitive stress. Use buddy system to withdraw hand auger from depth in wet clay or sand environments. When extracting soil from the hand auger bucket, avoid using sharp edged (like knives) or puncturing type (like screwdrivers) tools. Use of spoons is preferred. Avoid reaching into the nose of a hand auger to reduce risk of hand injury from blades.	
		3	Exposure to potentially chemically impacted soil	Wear protective gloves while handling/mixing/containing soils. Use air monitoring in areas believed to be severely impacted by site constituents. If 8 hr.- TLVs are exceeded follow Level C requirements.	
		4	Cleaning hand augers and soil probes	Avoid awkward body positions or excessive twisting while cleaning hand augers and soil probes. Do not hurry through tasks or create unnecessary splash hazards by dropping devices in washing containers.	

	5	Struck by excavation equipment in excavation areas,	Remain 25 ft from excavation equipment including the extended reach of any portion of the equipment unless establishing eye contact with equipment operator and following communication plan with the operator (hand signals, radios, etc.). If working low to ground consider spotter if excavation work continues in proximity of sample site. Wear high visibility clothing and provide auxiliary lighting at night if moving around in excavation area with operating heavy equipment. Do not park project vehicle within 25 ft of parked heavy equipment or within 7 ft of the track (50 ft of track at rail grade crossings).	
	6	Struck by train or on-track equipment.	In excavation areas and off-site locations where sampling will occur within 25 ft of the track workers must be Roadway Worker Protection trained and have eRAILSAFE. If track is active, track protection is required. Do not park project vehicle within 7 ft of the track (50 ft of track at rail grade crossings).	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Dermal Protection	Coveralls	Tyvek in severely impacted areas	Recommended
	Sleeved shirt/long pants		Required
	High visibility vest, coat - CLASPED	ANSI Class II minimum while working in or around excavations, active track or in public right of ways.	Required
Head Protection	Hard hat	Standard hard hat in excavation areas	Required
Hand Protection	Protective gloves	Nitrile for chemical impacts, leather also suggested if soils are hard	Required
Eye Protection	Safety glasses		Required
Foot Protection	Boots	Steel-toe with defined heel, oil resistant sole, and at least 6 inches in height for ankle support. Lace up boots required.	Required

Supplies			
Type	Supply	Description	Required
Communication Devices	Mobile phone		Required
Decontamination	Decon supplies (specify type)	Soap and water available for hand washing	Required
Miscellaneous	Auxiliary lighting	For night work	Recommended
	First aid kit		Required
	Flashlight	For night work in excavations	Recommended
	Air monitoring in areas of high chemical impacts	Photoionization or flame ionization detector	Required
	Eye wash (specify type)	Bottle	Required

Job Safety Analysis

General

JSA ID	19445b	Status	
Job Name	Environment-Drilling and Soil Sampling Using HSA Drill Rig	Created Date	3/18/2023
Task Description	Split Spoon Soil Sampling Using HSA Drill Rig	Completed Date	
Template		Auto Closed	

Client / Project

Client	Norfolk Southern Corporation
Project Number	30169714
Project Name	NS Hazmat-Palestine OH
PIC	Helmadollar, Rick
Project Manager	Artrip, Jason

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Moyers, Samuel	4/1/2023		McDonald, Andrew	<input checked="" type="checkbox"/>
HASP Reviewer	Matlock, Zachary	3/20/2023	3/20/2023	Roesler, Jerr	<input checked="" type="checkbox"/>

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Working around hollow stem auger (HSA) drill rig	1 Slip, trip and falls from poor housekeeping	Wear boots with good tread and ankle support. Keep tools, drill rods/augers, drum lids/rings off ground and stage neatly. If plastic sheeting is placed on ground, exercise caution while working if wet.	
		3 Struck by excavation equipment near or in excavation areas,	Remain 25 ft from excavation equipment including the extended reach of any portion of the equipment unless establishing simultaneous operations plan with the equipment operator(s). Wear high visibility clothing and provide auxiliary lighting at night if drilling near operating heavy equipment. Do not park project vehicles within 25 ft of parked heavy equipment.	
		4 Struck by train or on-track equipment.	If drilling will occur within 25 ft of the track, workers must be Roadway Worker Protection trained and have eRAILSAFE. If track is active, track protection is required. Do not park project vehicles within 7 ft of the track (within 50 ft of the track at rail grade crossings).	
2	Collecting soil sample using split spoon sampler	1 Cuts or scrapes to hands opening and closing split spoons	Wear hand protection (i.e.. leather gloves while handling split spoon). Watch for pinch points putting the spoon halves together. Avoid excessive force while attempting to remove soil from nose of spoon.	
		2 Repetitive stress opening and closing split spoons	Use job rotation while opening and closing split spoons to reduce stresses on arms and wrists. Do not hurry through task.	
		3 Exposure to potentially chemically impacted soil	Wear protective gloves while handling/mixing/containing soils. Use air monitoring in areas believed to be severely impacted by site constituents. If 8 hr.- TLVs are exceeded follow Level C requirements.	

		3	Exposure to potentially chemically impacted soil	Wear protective gloves while handling/mixing/containing soils. Use air monitoring in areas believed to be severely impacted by site constituents. If 8 hr.- TLVs are exceeded follow Level C requirements.		
		4	Cleaning split spoons	Wear protective gloves during split spoon cleaning. Avoid awkward body positions and repetitive stresses if manually washing split spoons. If using a pressure washer to clean split spoons wear face shield in addition to safety glasses. Exercise caution and use spoon or similar object without sharp (i.e. knife)/puncturing (i.e. screwdriver) construction to clear nose of split spoon to reduce potential for hand/forearm injury.		
		5	Noise from drill rig and while driving split spoons	Wear hearing protection. Set up soil sample logging, preparation and collection area away from rig to reduce noise hazards to sampling workers. Avoid standing near rig while drill and sampling.		

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Dermal Protection	Coveralls	Tyvek in severely impacted areas	Recommended
	Sleeved shirt/long pants		Required
	High visibility vest, coat - CLASPED	ANSI Class II minimum while working in or around excavations, active track or in public right of ways.	Required
Head Protection	Hard hat	standard hard hat in excavation areas	Required
Hand Protection	Protective gloves	Nitrile for chemical impacts, leather for handling split spoon	Required
Eye Protection	Safety glasses		Required
	Face shield	When using pressure washer	Recommended
Foot Protection	Boots	Steel-toe with defined heel, oil resistant sole, and at least 6 inches in height for ankle support. Lace up boots required.	Required

Supplies			
Type	Supply	Description	Required
Communication	Mobile phone		Required
Decontamination	Decon supplies (specify type)	Soap and water available for hand washing	Required
Miscellaneous	Auxiliary lighting	For night work	Recommended
	First aid kit		Required
	Flashlight	For night work in excavations	Recommended
	Air monitoring in areas of high chemical impacts	Photoionization or flame ionization detector	Required
	Eye wash (specify type)	Bottle	Required

Job Safety Analysis

General			
JSA ID	19445a	Status	
Job Name	Environment-Surficial soil sampling	Created Date	3/18/2023
Task Description	Surficial soil sampling using spoon, spade, trowel, scoop or similar hand tool.	Completed Date	
Template		Auto Closed	

Client / Project	
Client	Norfolk Southern Corporation
Project Number	30169714
Project Name	NS Hazmat-Palestine OH
PIC	Helmadollar, Rick
Project Manager	Artrip, Jason

User Roles					
Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Moyers, Samuel	4/1/2023		McDonald, Andrew	<input checked="" type="checkbox"/>
HASP Reviewer	Matlock, Zachary	3/20/2023	3/20/2023	Roesler, Jerr	<input checked="" type="checkbox"/>

Job Steps				
Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Collecting soil sample using spade, scoop, spoon, trowel or other similar hand tool.	1 Slip, trip and falls due to uneven, or ice/snow covered walking surfaces	Wear boots with good tread and ankle support. Avoid carrying supplies in a manner that obstructs view ahead.	
		2 Collecting surficial soil sample	Wear hand protection. Avoid contact stress to knees if kneeling by using padding. Avoid squatting for extended periods. Avoid awkward twists or body postures. If soils are hard with embedded gravel also consider wearing leather gloves to protect hands especially knuckles.	
		3 Exposure to potentially chemically impacted soil	Wear protective gloves while handling/mixing/containing soils. Use air monitoring in areas believed to be severely impacted by site constituents. If 8 hr.- TLVs are exceeded follow Level C requirements.	
		5 Cleaning soil sampling devices	Avoid awkward body positions or excessive twisting while cleaning sampling devices. Do not hurry through tasks or create unnecessary splash hazards by dropping devices in washing containers.	
		3 Struck by excavation equipment near or in excavation areas,	Remain 25 ft from excavation equipment including the extended reach of any portion of the equipment unless establishing eye contact with equipment operator(s) and implementing a communications plan (hand signals, radios, etc.). Wear high visibility clothing and provide auxiliary lighting at night. If working near to ground with operating heavy equipment in vicinity of the sampling area, consider using a spotter. Do not park project vehicles within 25 ft of parked heavy equipment.	
4 Struck by train or on-track equipment.	In excavation areas and off-site locations where sampling will occur within 25 ft of the track workers must be Roadway Worker Protection trained and have eRAILSAFE. If track is active, track protection is required. Do not park project vehicle within 7 ft of the track (50 ft of track at rail grade crossings).			

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required

Dermal Protection	Coveralls	Tyvek in severely impacted areas	Recommended
	Sleeved shirt/long pants		Required
	High visibility vest, coat - CLASPED	ANSI Class II minimum while working in or around excavations, active track or in public right of ways.	Required
Head Protection	Hard hat	Standard hard hat in excavation areas	Required
Hand Protection	Protective gloves	Nitrile for chemical impacts, leather also suggested if soils are hard	Required
Eye Protection	Safety glasses		Required
Foot Protection	Boots	Steel-toe with defined heel, oil resistant sole, and at least 6 inches in height for ankle support. Lace up boots required.	Required

Supplies			
Type	Supply	Description	Required
Communication Devices	Mobile phone		Required
Decontamination	Decon supplies (specify type)	Soap and water available for hand washing	Required
Miscellaneous	Auxiliary lighting	For night work	Recommended
	First aid kit		Required
	Flashlight	For night work in excavations	Recommended
	Air monitoring in areas of high chemical impacts	Photoionization or flame ionization detector	Required
	Eye wash (specify type)	Bottle	Required