ENBRIDGE

Enbridge Line 6B MP 608
Marshall, Michigan Pipeline Release
Health and Safety Plan (HASP)

April 2012
Revision #6.2

CONTROLLED BINDER
#1

Management of HASP Updates - 2012

Date	HASP Revision Detail	Page # Removed	Page # Inserted	Signature
Example				
12/12/2012	Updates for Work Practices Section 3.06 Safety for UTV	45	✓	John A. Smith
2/13/2012	Decontamination procedure update	Appendix B.3	✓	
4/17/2012	Appendix K: River Reopening Safe Work Practices added	N/A	✓	

Health and Safety Policy

Liquids Pipelines

- The health and safety of employees are paramount in the conduct of our business.
- Risks present in all operations must be managed to prevent occupational injuries and illnesses, through planning, organizing and hazard identification, as well as ongoing monitoring and investigation of close calls and incidents.
- All levels of management are responsible and accountable for providing a healthy and safe working environment and fostering a safety culture for our employees and contractors.
- Management is responsible for establishing rules and procedures, as well as providing proper equipment and appropriate training to ensure employees understand their responsibilities.
- Company rules and procedures for health and safety will comply with government regulations and standards, and will be consistent with industry codes and guidelines.
- Employees must be aware of and comply with all health and safety policies and follow all established rules and procedures.
- Our contractors will follow industry and company health and safety policies to enhance their own safe work practices.
- It is the responsibility of all employees to achieve excellence in health and safety performance by working in a manner that ensures their personal health and safety as well as those of fellow workers and contractors.

Steve Wuori
Executive Vice President
Liquids Pipelines

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PART 1: GENERAL

1.01 OVERVIEW

The Company is committed to excellence in safety performance. We strive for continuous improvement in safety performance, and require, as a minimum, industry standards and legislative requirements be met. All response, company, contract, and regulatory personnel share in the successful implementation of this philosophy.

This Health & Safety Plan has been developed to present a consolidated set of rules, safe work practices, and procedures related to the response activities. These rules and procedures were drawn from the various responding entities, government regulations and accepted industry standard practices.

It is not possible to address all work activities or potentially hazardous situations in a procedures manual. However, it is the intent to present key procedures and methods which the Company expects to be utilized in accomplishing the work. In addition, the Company expects all contractors, employees and responders to bring a safe work attitude to the job site.

The Company Safety Program is a minimum standard and - where exceeded by Government Safety Acts, Regulations, and Codes - the more stringent shall apply. Conversely, where the plan is more stringent than regulatory requirements, this plan shall govern.

The Company is committed to working together with all responders to ensure all workers arrive home safely.

Lifesaving Rules

Definition:
At Enbridge we value the safety of our communities, customers, contractors and employees, and believe that all injuries are preventable. Compliance with all policies, procedures and regulations is a requirement. Lifesaving Rules are key focus areas which will protect you – even save your life.

Working for Enbridge means work safely

Origin:
Lifesaving Rules are founded on real life incidents at Enbridge and focused on areas of high risk and high consequence. They are intrinsic to our business, applicable to all employees and contractors, and are communicated, clarified and reinforces across all Business Units at Enbridge

Outcome:
All safety rules must be followed. Violating any policy or procedures will result in appropriate disciplinary action, up to and including dismissal. Violation of a Lifesaving Rule will result in dismissal as a first consideration.

Compliance with these rules is mandatory while employed by Enbridge – if you choose not to follow the Lifesaving Rules; you are in effect choosing not to work for Enbridge.

Lifesaving Rule #1 – Hazard Management
Always ensure an analysis of potential hazards has been completed and proper authorization received prior to starting the work.

Lifesaving Rule #2 – Driving Safety
Only drive a vehicle or operate equipment when not under the effect of alcohol or any substances that cause impairment.

Lifesaving Rule #3 – Confined Space Entry
Always follow procedures for Confined Space Entry.

Lifesaving Rule #4 – Ground Disturbance
Always follow procedures for location, positively identifying and excavating buried facilities.

Lifesaving Rule #5 – Isolation of Energized Systems
Always follow procedures for Lockout/ Tagout.

Lifesaving Rule #6 – Reporting of Safety Related Incidents
Always report significant safety related incidents.

1.02 APPLICABILITY

To ensure consistent and comprehensive health and safety compliance this plan is applicable to all Enbridge employees, contractors of any company or agency, regulators, responders or any other individual accessing the affected areas being managed within this response.

START–ERRS (Weston) Contractors/Workers will operate under their response specific Health & Safety Plans attached as Appendices.

1.03 SCOPE OF WORK

For the purposes of responder, regulator, employee and contractor protection the following work categories have been developed and are covered in more detail in the Work Practices Section and Hazard Assessment (Appendix B). These work practices will be evaluated using the Enbridge Safe Work Permit / Hazard Assessment process when applicable.

Work Practices:

- **Crude Oil Recovery (subtasks)**
  - Vacuum Truck Operations
  - Booming
  - Skimming
  - Shoreline/Adjacent Lands Cleanup
  - Swamp/Wetland Cleanup
- Heavy Equipment Operation
- Sampling and Observation/Documentation related activity
- Decon
- Soil Reconditioning
- Boating Operations

Job Tasks not covered within this document should be evaluated and documented through the Enbridge Safe Work Permit / Hazard Assessment process.

1.04 APPLICABLE STANDARDS

A. United States Department of Labor Publications
   - 29 Code of Federal Regulations (CFR) Part 1910 Occupational Safety and Health Standards for General Industry
   - 29 CFR Part 1926 Occupational Safety and Health Regulations for Construction
   - 49 CFR Part 195 Department of Transportation Pipeline and Hazardous Materials Safety

B. State and Local Publications
   - MIOSHA Regulations
   - MDEQ Regulations
   - MDNRE Regulations

C. Enbridge O&MPs
   - Book 1 – General Reference
   - Book 2 – Safety
   - Book 7 – Emergency Response / Region Specific / ERD

D. Contractor Safety Program
   - Safety and Environmental Guidelines for Contractors Handbook, 2010

1.05 DOCUMENTATION

This Health & Safety Plan will be maintained by the Safety Officer under the control of the incident commander in the Company.

Working copies shall be maintained in the Operation Command. These copies will be the working copies utilized in the field. The working copies will be maintained by Enbridge employees, responders, regulators and contractors during all on-site activities. Additionally, the Health and Safety Plan will be communicated to contractors, responders and regulators during the contractor safety orientation to ensure that they will become familiar with the plan and site hazards.

1.06 RESPONSIBILITIES

Responsibilities will follow the Incident Command System per the Incident Command Structure established by the Company.

1.07 SITE HISTORY

On July 26, 2010, Enbridge Energy Limited Partnership reported that a leak was detected on a pipeline on its Lakehead System near the company's Marshall, Michigan pump station. The pipeline was shut down and isolation valves were closed, stopping the source of the oil. Oil was released into Talmadge Creek, a tributary of the Kalamazoo River, and entered the river. Initial estimates at the time indicated that approximately 19,500 barrels of crude oil leaked from the pipeline.

Enbridge crews, emergency response, containment personnel and water quality specialists were dispatched to the site and deployed oil skimmers and absorbent booms on the creek and river to minimize environmental impacts.

On August 7, 2010, the ruptured section of pipeline was removed and transferred into the custody of the National Transportation Safety Board. The section of pipeline was replaced and tested, using water at a higher pressure than the pipeline will normally operate, before being returned to service at a reduced pressure per the Final Corrective Action Order issued by PHMSA on September 22.

As of November 7, 2010, we have completed initial cleanup at the source site, Talmadge Creek and Kalamazoo River and submerged oil sites. Work continues on active maintenance sites, locations where cleanup efforts are ongoing, and monitoring sites to monitor locations where we have known product and sheen to determine next steps.

1.08 SITE DESCRIPTION

The location of the release is Milepost 608 on Enbridge's Line 6B, near the town of Marshall in Calhoun County, Michigan. From the site of the release, crude oil flowed through a marshy area into Talmadge Creek, a tributary to the Kalamazoo River. Enbridge established control points in the marshy area, along Talmadge Creek and the Kalamazoo River. These control points were divided into five divisions with Division A being the leak site itself extending to Division E in Kalamazoo County terminating at the West end of Morrow Lake. At the height of the response, there were more than thirty control points ranging from earthen berm/flume configurations to containment and absorbent boom sites with vacuum trucks and skimmers. Enbridge worked extensively with regulators and consultants to determine the most effective sites to use as control points and to deploy the most appropriate containment and collection equipment at these sites.

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PART 2: EXECUTION

2.01 INTRODUCTION

The purpose of the plan is to provide guidance in order to prevent incidents and injuries to site workers/responders. Any employee, responder, regulator or contractor is responsible to stop any work that they believe places any worker in danger

The Project Safety Officer and Safety Inspectors shall discuss/delegate compliance with the Health and Safety Plan to all emergency response personnel who shall be working at the site(s) (affected areas) during assessment and recovery operations. All site workers and responders and regulators shall sign the log to signify they understand the Health and Safety Plan through their management structure. The Contractor shall ensure that each worker has received the annual Company safety orientation prior to commencing work. For Construction projects, the Company's video *"Your Safety is On the Line"* must be viewed. The subjects covered in a safety orientation shall include, but are not limited to, the following:

- The annual Company safety orientation is required each calendar year.
- Review of the Company's safety and environmental requirements (for example "Safety and Environmental Guidelines" and "Your Safety is On the Line" videos).
- Safety and Environmental Guidelines for Contractors handbook.
- Safety responsibilities of Contractor personnel.
- Potential hazards and special safety requirements.
- The worker's right to refuse to do unsafe work or work in unsafe conditions.
- No work to be performed without a work permit that has been authorized and approved.
- All work permits will follow the CSP guidelines set forth by Enbridge.

Upon completion of the annual Company safety orientation, each worker must complete the quiz, sign, and return the last page of the *"Safety and Environmental Guidelines for Contractors"* handbook to the Company Site Inspector. A hardhat decal will be issued by the Company Site Inspector to indicate that the handbook information has been issued and accepted by the worker.

2.02 POTENTIAL HAZARDS

Some potential hazards that field personnel may be exposed to during field activities are chemical and physical. The potential chemical hazards at the site are petroleum vapors, hydrogen sulfide, carbon monoxide, benzene, and n-hexane. Chemical hazards are those typically associated with the following products, for which the Material Safety Data Sheets (MSDS) are included in **Appendix A**:

- Crude Oil - Western Canadian Select

Exposure pathways to chemical hazards include skin contact, inhalation of vapors, and ingestion.

Potential physical hazards include excavation around buried utilities, overhead power lines, all hazards associated with heavy equipment operations, vacuum trucks, and the recovery of contaminated soil, vegetation, and surface/groundwater. Additional physical hazards are manual lifting of booms and other containment equipment; slips, trips, and falls from uneven terrain; and fire.

Other hazards that employees and contractors may be exposed to at the site include heat stress, heat exhaustion, and heat stroke, ice, snow, cold stress; plants (poison ivy, poison oak, poison sumac), animals, insects (mosquitoes, ticks, chiggers), hazards from exposure to sunlight (sunburn); hazards associated with operating a motorized vehicle; water hazards (i.e. drowning) associated with working adjacent to the river, including fast moving water; and hazards from animals and insects (see Incident Command Site Safety Plan) boating, confined spaces, falls from elevation.

A job hazard assessment (Appendix B) is developed to cover the overall job's hazards however, work site hazards will be identified with appropriate control measures documented and maintained on the field level hazard assessment/safe work permit maintained at each site.

Cold work (work that does not involve risk of product ignition) activities that do not agitate the crude oil may be exempt from FR clothing based on the site hazard assessment.

2.03 SITE CONTROL

Training:

- Workers engaged in activities to stop or contain the release shall have received at least 24 hours of training.
- Workers engaged in recovery operations such as contaminated soil removal shall have received at least 40 hours of training.
- Workers on site only occasionally for a specific limited task (such as sampling and surveying) and who are unlikely to be exposed over permissible exposure limits shall have received a minimum of 24 hours of training.
- Workers in areas where respirators are not required in which hazards have been fully characterized shall have received a minimum of 24 hours of training.

Only personnel with appropriate training may enter the hot work zones.

General Rules:

- Contractors, employees and regulators that are recovering oil shall use caution tape/barricades/fencing, etc. to cordon off sufficient space around the work area, as defined by initial and periodic atmospheric testing for lower explosive limit, to prevent unprotected or unauthorized personnel from entering the work area.
- No eating, drinking, smoking, gum or tobacco chewing, or any other practice in the work area that increases the probability of hand-to-mouth transfer of contaminants is permitted.
- The site supervisor shall designate safe areas away from the work area where eating, drinking, gum and tobacco chewing can be done.
- Hands shall be thoroughly washed upon leaving the work area and before eating, drinking, chewing gum or tobacco or any other non-working activity can commence.
- Entrance and exit locations shall be designated and emergency escape routes away from the operations areas shall be delineated by the site supervisor.

The following hand signals will be used where verbal communications cannot occur or are not practical:

Signal	Translation
Hand gripping throat	**Out of air/can't breath**
Grip partners wrist or both hands around waist	**Leave area immediately**
Hands on top of head	**Need assistance**

Thumbs up	**O.K., I'm all right, I understand**
Thumbs down	**No, negative**
Raised clenched fist	**Stop**

- Potable water shall be available on-site for drinking and cleaning purposes.
- There shall be at a minimum of two 30#, or four 20# ABC dry-chemical fire extinguisher on-site at each operational area.
- All excavations shall be in accordance with Enbridge and all applicable government regulations.
- Employees will not be permitted to work alone in a deemed "hot zone" or adjacent (within ten feet) to water.
- When employees are working during hours of darkness, light plants will be utilized to ensure the site is appropriately illuminated.

Working Near Water:
OSHA Construction Industry Standards (1926) state: "employees working over or near water, where the danger of drowning exists, shall be provided a Coast Guard-approved PFD (Personal Flotation Device)." An approved PFD will be required to be worn any time an employee is in a boat or when working over water or within 10 feet of water. The only exception to the required use of a PFD while working over or within 10 feet of water is if the hazard control of a PFD will not mitigate the risk of drowning, nor provide any effective protection (i.e., use of a PFD in very shallow water). It must be identified in the hazard assessment that drowning is not a risk, and it must be approved by the designated Safe Work Permit / Hazard Assessment approver. (Please reference Section 2.17.10 for PPE requirements.)

Monitoring:
Ambient air monitoring will be performed when the hazard assessment deems as necessary (see Safe Work Permit and/or Appendix D) with a personal/area four gas monitor [Lower Explosive Limits (LEL), Hydrogen sulfide (H_2S), Carbon monoxide (CO), Oxygen (O_2)]. Periodic samples will be performed with a PID, Drager CMS, or Ultra Rae devices in the breathing zone and area of the workers for benzene where there is a risk of exposure.

Where determined, personal samples will be taken in representative locations based on the IH plan.

Permissible exposure limits (PEL)

Petroleum Vapors	Not Established (500 ppm reference petroleum distillates)	Inhalation
Hydrogen Sulfide (H_2S)	10 ppm	Inhalation
Benzene	1 ppm	Inhalation, ingestion, absorption
n-hexane	500 ppm	Inhalation, absorption

Should levels exceed the established PELs all personnel shall stop work activities, move upwind, and contact the site supervisor and safety officer in that specific recovery area. The Company Safety Officer will be notified in ALL PEL excursions through the daily Personnel Air Monitoring report.

Respiratory Protection:
A respiratory protection program will be followed as per OSHA regulations in 1910.134.

- *Medical Evaluations*
  - All new field employees who may be required to wear a tight fitting respirator must have an initial medical evaluation that is reviewed by a physician (i.e., baseline pulmonary function test or spirometry examination).
- *Respirator Fit*
  - Physical conditions (e.g., facial hair or temple pieces on glasses) must allow an effective facial seal with the respirator.
  - Specifically, all workers who may be required to wear respiratory protection that depends on an effective seal must be clean-shaven where the face piece contacts the skin; this may require trimming or removing mustaches.
- *Fit-Testing*
  - Before wearing a respirator, all workers must be fit-tested for the brand and model used. This test will be quantitative/ qualitative and will be specific for the type of respirator required (i.e. half mask, full face, etc.). Specific workers and Safety Inspectors will be fit test for full face respirators to allow for work and sampling in environments requiring that level or protection.
  - Before each use of a respirator, all workers must perform a positive and negative pressure field fit-test to check the seal of the face mask.
- *Inspection and Maintenance*
  - Inspect and maintain respiratory equipment in accordance with the manufacturer's specifications.
  - Visually inspect all respirators before and after each use.
  - For shared respiratory equipment, disinfect after each use and clean as necessary. For all other respirators, sanitize after each use and clean as necessary.
  - Workers may perform minor maintenance on hose line breathing equipment (e.g., replace headbands, valves, gaskets, hoses, and clamps). Major maintenance and repairs must be performed by (a) a qualified worker (i.e., trained in cleaning, inspecting, and maintaining respirators), or (b) a certified technician from the supplier or manufacturer.
- *Cartridges*
  - Replace organic vapor (OV) cartridges and organic vapor/acid gas (OV/AG) cartridges after a total of 8 hours of use.
  - Immediately replace OV/AG cartridges if:
    - used for escape from H_2S concentrations >10 ppm
    - damaged
    - there is odor breakthrough
- Replace filters when plugged, damaged, soiled, when breathing is difficult or if filter is utilized for eight (8) hours.

Enbridge
Respiratory Protection for Exposure Concentrations

Breathing Hazard	Exposure Concentration	Respiratory Protection	Model
Benzene	0 to 0.5 ppm	None	
	0.6 to 5 ppm	Half-mask APR with OV cartridge	3M 6000 with 6003 cartridge
	6 to 25 ppm	Full-face APR[1] with OV cartridge or SAR	3M 6000 or 7000 full-face with 6003 cartridge
	Greater than (>) 25 ppm	SCBA or SAR	Scott Air-Pak
	Greater than (>) 500 ppm (IDLH)[2]	Planned work is not permitted[3]	
Carbon Monoxide	25 ppm to 500 ppm	SCBA or SAR	Scott Air-Pak
	Greater than (>) 500 ppm	Planned work is not permitted[3]	
Hydrogen Sulfide (H_2S) [4]	0 to 10 ppm	None	
	11 to 99 ppm	SCBA or SAR with escape pak[6]	Scott Air-Pak or Type C SAR
	Greater than (>) 100 ppm (IDLH)	Planned work is not permitted[3]	
Oxygen Deficiency	Less than (<) 19.5%	SCBA	Scott Air Pak
Gasoline	Less than (<) 300 ppm	None	
	Greater than or equal to (≥) 300 ppm to less than (<) 10,000 ppm	Half-mask APR with OV cartridge	3M 6000 with 6003 cartridge
	Greater than or equal to (≥) 10,000 ppm to less than (<) 20,000 ppm	SCBA (or equivalent) for cold work; hot work is not permitted	Scott Air-Pak
	Greater than or equal to (≥) 20,000 ppm	Planned work is not permitted[3]	

NOTES:

1 If quantitative fit test performed.
2 Immediately dangerous to life and health.
3 Emergency work is allowed if SCBA or SAR with escape pack is used and all ignition sources are eliminated.
4 If the concentration exceeds the maximum detection limit of the H2S detector, planned work is not permitted until the concentration has been verified.
5 Where possible, reset gas detectors monitoring H2S to alarm at 10 ppm (low level) and 100 ppm (high level).
6 A safety watch with SCBA or SAR must be present.

Hearing protection:
Hearing protection will be utilized during recovery operations when noise levels exceed 85- decibels.

2.04 EQUIPMENT

Operation of vacuum trucks and other equipment:
Verification must be performed on the site to confirm understanding of site safety plan by the individual in charge of the site.

- A JHA/hazard assessment must be performed to identify specific hazards and controls at the site prior to work beginning.
- All vacuum trucks and other similar equipment utilized when collecting crude will be appropriately grounded and bonded.

Operation of Boats:
When operating boats during the day, the following criteria must be met:

- Verification must be performed of the site to confirm understanding of site safety plan by the individual in charge of the site.
- A JHA/hazard assessment must be performed to identify specific hazards and controls at the site prior to work beginning.
- Boats shall not be overloaded.
- When a shore watch is required a 90 ft. rope and life ring will be with the shore watch at all times.
- No single person boating; minimum of two people per boat shall be used.
- A single boat operating must be equipped with a Push To Talk (P.T.T.) radio.
- SEE APPENDIX H

Operation of Boats after Dusk:
Boats may be operated after dusk only if it is necessary to deploy boom, or in the event that damages to boom will need to be repaired. In the event a boat is operated after dusk, all of the above items must be met in addition to the following conditions:

- Only sites that have already been confirmed to be free of underwater obstacles and other hazards through a job hazard assessment during daylight hours will be allowed to have boats operating on them at night.
- Ensure adequate lighting is provided.
- A stable boat, preferably a flat bottom, will be utilized if possible.
- A secondary manned boat must be in the water at the location to potentially act as a rescue boat.
- Boats must be equipped with running lights appropriate for night use and a spotlight.
- All employees must wear appropriate PPE, including a Coast Guard-approved PFD, illumination devices will be attached to PFD's when operating at night.
- Radio contact must be maintained between the shore watch and boats.
- No single person boating; minimum of two people per boat shall be used.
- Boats shall be equipped per State and USCG rules and regulations for all night operations.
- SEE APPENDIX H

2.05 EMERGENCY PROCEDURES AND FIRST AID

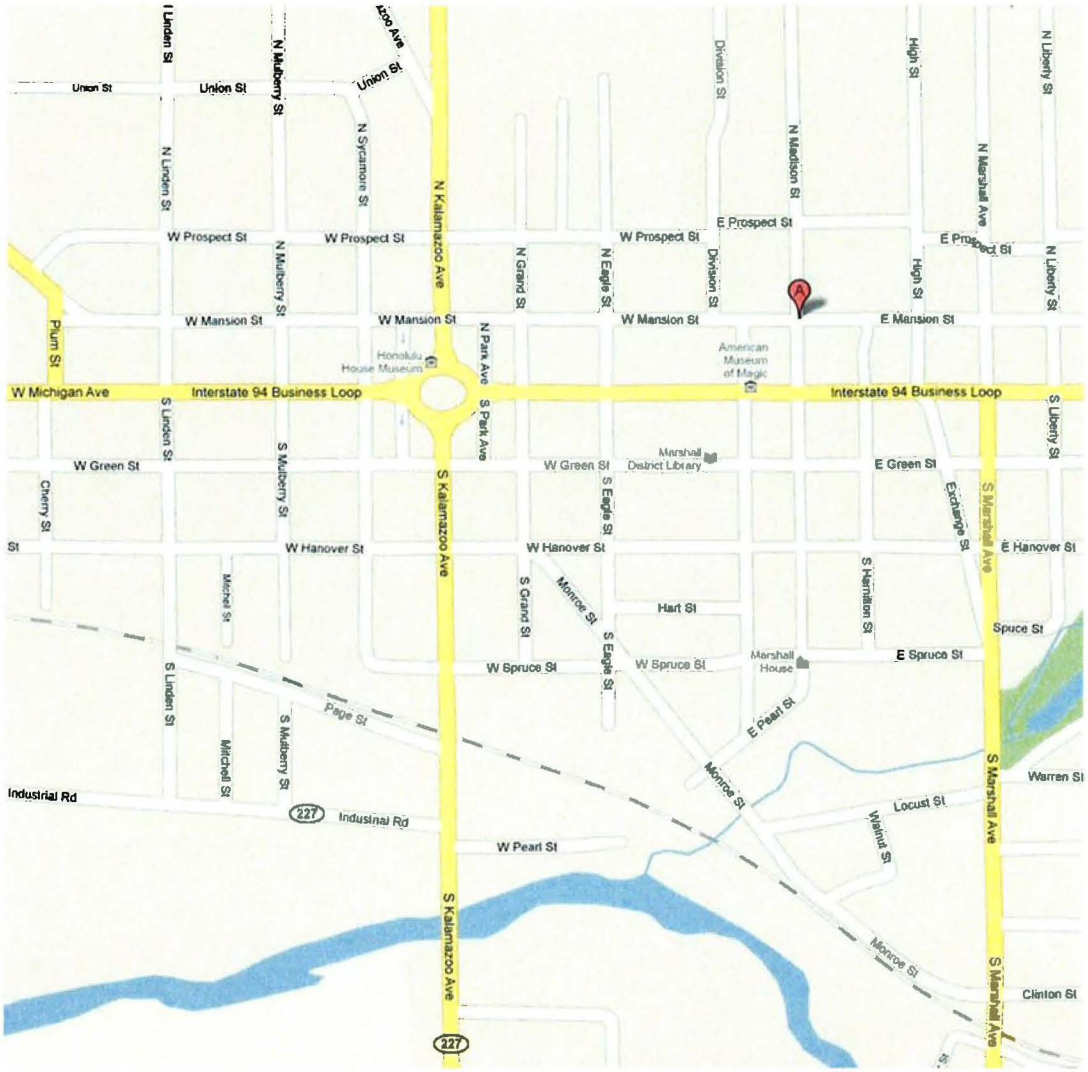
During containment and recovery activities, should the need arise; a EMS will direct workers requiring specialized services such as decontamination or Emergency Room treatment to the appropriate locations. **Contact Enbridge Safety office for EMS (269) 781-1913**. The exact address/ location is required with

details of the emergency. This information will be communicated to the appropriate EMS location if applicable.
The following emergency contacts shall be maintained for problems at the site. Each respective site will have site specific safety plans, which include Site Safety Plot Plans, Maps to Medical Facilities, Safe Work Permits and other miscellaneous safety materials.

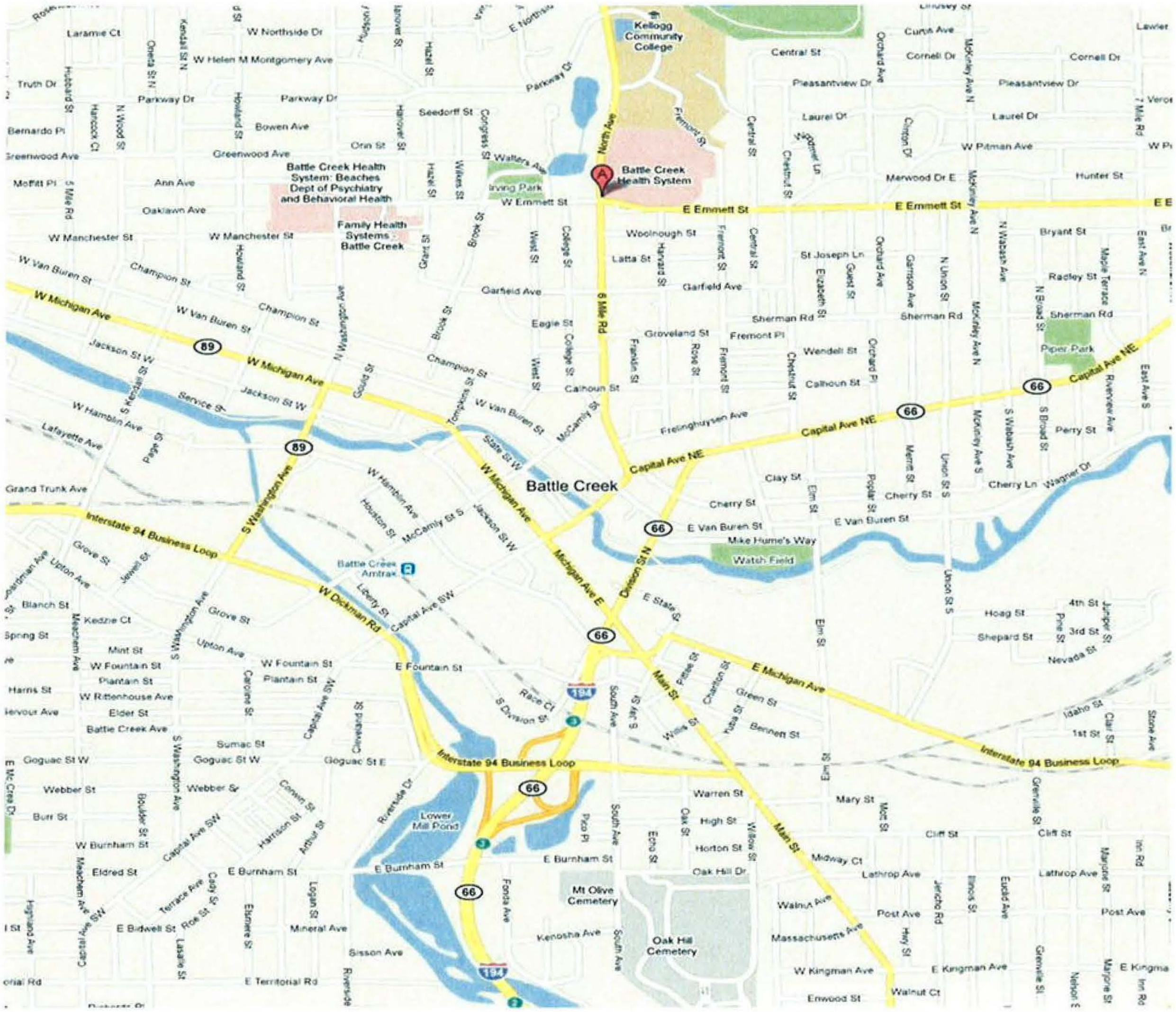
A. Emergency Communication:

Call 911

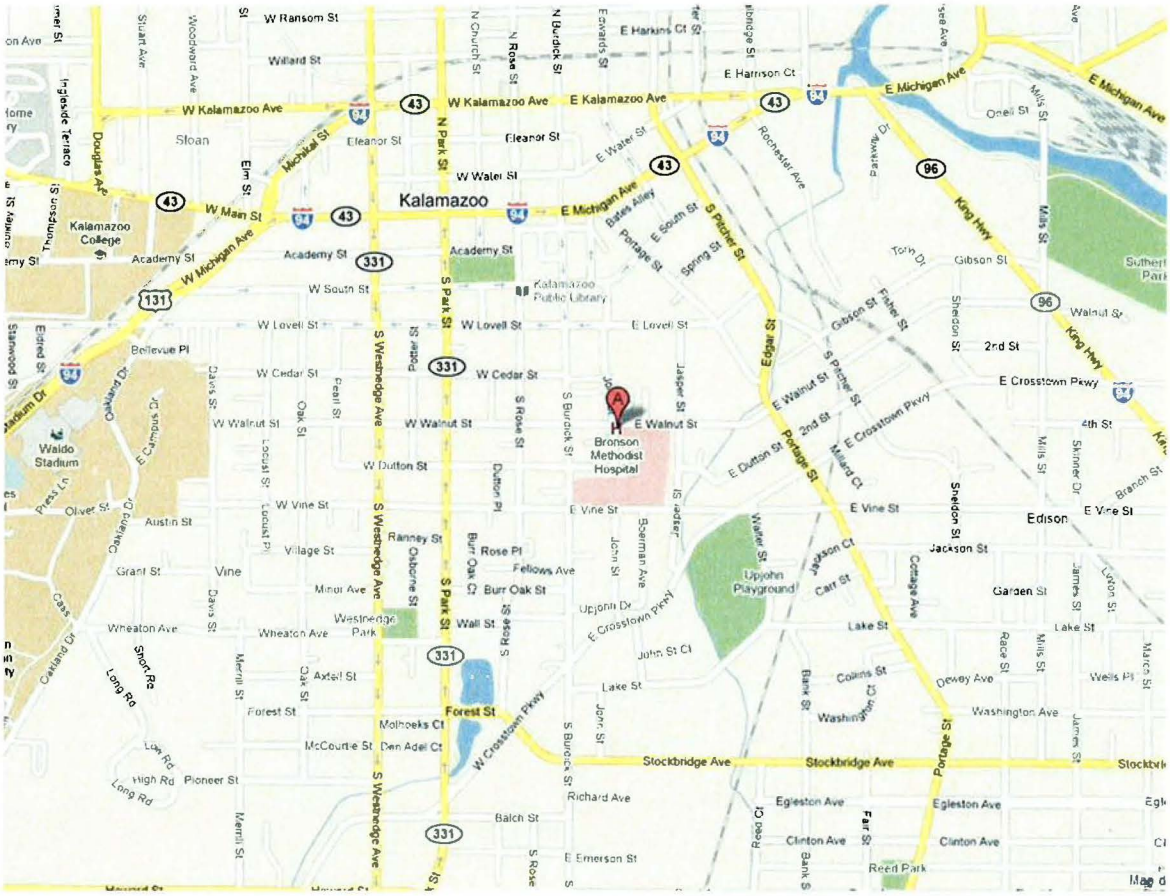
Oaklawn Hospital (269) 781-4271
200 N. Madison, Marshall, MI
Emergency Room (269) 789-3916



Battle Creek Health System
300 North Avenue Battle Creek, MI 49017
(269)-966-8000



Bronson Methodist Hospital
601 John Street , Kalamazoo, MI 49007
Phone: (269) 341-6386



B. Injury

If appropriate, injuries sustained shall be initially assessed and based on the nature of the illness/injury may be treated on-site. If required an ambulance shall be called (911) for emergencies and transportation to a hospital. All efforts will be made to ensure that there is at least one individual trained in first aid/CPR at each location. In the event of an injury the Safety Inspector must be notified by calling the on-duty inspector (per the roster). If the Safety Inspector is unavailable, call the Safety Office at Incident Command at 269-781-1913.

The following procedures shall be followed for correct first aid treatment on-site:

1. SKIN - Prolonged or repeated exposure to contaminated soil or fluid may cause skin irritation. Repeated contact may cause drying or flaking of the skin.

   If a worker's skin is irritated, the area shall be washed for 15 minutes before applying dressings secured by adhesive tape. Keep contaminated material away from open wounds.

2. BREATHING - Excessive inhalation of vapors can cause nasal and respiratory irritation; central nervous system effects including dizziness, weakness, fatigue, nausea, headache and possible unconsciousness, and even death.

   If a worker experiences dizziness, headache, or nausea from inhalation of vapors, they shall leave the work area immediately. If dizziness, headache or nausea persists obtain medical attention. If breathing stops, administer CPR and obtain medical attention.

3. EYES - Contaminants may cause pain and slight corneal injury. Vapors may irritate the eyes. Wash irritated eyes with abundant amounts of clean water by holding the eye open and flooding it with water. All surfaces shall be washed thoroughly, then repeat the process. Seek medical attention.

4. SWALLOWING - Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal. If aspirated, material may be rapidly absorbed through the lungs and result in injury to other body systems.

5. GENERAL SAFETY - Immediately report all safety problems to the Site Supervisor. The Site Supervisor shall keep a permanent record of all such occurrences and shall report serious problems to the Safety Inspector. All occurrences shall be documented by the completion of an accident report.

In the state of Michigan, First-Aid is defined as follows:

- Using a non-prescription medication at nonprescription strength;
- Administering tetanus immunizations
- Cleaning, flushing or soaking wounds on the surface of the skin;
- Using wound coverings such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™
- Using hot or cold therapy;
- Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc.
- Using temporary immobilization devices while transporting an accident victim
- Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister;
- Using eye patches;
- Removing foreign bodies from the eye using only irrigation or a cotton swab;
- Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means;
- Using finger guards;
- Using massages
- Drinking fluids for relief of heat stress

C. Evacuation

If the site activities require evacuation because of fire, security purposes, personnel injury, excessive vapors, lightning hazards, or any reason deemed necessary for evacuation by the site supervisor, the site supervisor shall immediately direct the personnel along the evacuation routes. These evacuation routes are posted all throughout the Incident Command Post and surrounding

trailers. This evacuation route is also located within this HASP under Appendix C: Thunderstorm and Tornadoes. Workers shall observe wind direction such as smoke movement, and then proceed upwind for a sufficient distance to be out of range of the incident. All personnel shall assemble at a point established by the site supervisor, and await further instructions.

D. Inclement Weather

Check weather reports before issuing and approving safe work permits. If potential or imminent weather is in the forecast, these hazards need to be identified and controls implemented in the hazard assessment. Lighting detection will also be deployed to strategic locations in the response area.

The 30-30 rule is recommended when working outside with lightning in the area.

- When you can count 30 seconds or less between lightning and thunder, head for safe shelter.
- Remain sheltered for 30 minutes after the last thunder

REMEMBER: When Thunder Roars – Go Indoors!

If lightning is encountered, it is further recommended to:

- Go inside a fully enclosed building or vehicle (rubber tires)
- Avoid water and boats
- Stay away from doors, windows, metal indoor fixtures and electrical devices
- Stay off landline telephones
- Avoid open high ground and isolated large trees
- Avoid contact with metal objects, such as vehicles

See Appendix C – Enbridge Pipeline Line 6B Severe Weather Plan

E. Fire Prevention

The Contractor shall prepare a Fire Prevention Plan for the project where applicable.

Good housekeeping is an important part of fire prevention. Garbage shall be collected and secured daily until it can be properly disposed of.

The Contractor shall take all necessary precautions to prevent fires, including but not limited to the following:

- Fuels, volatile solvents or any other flammable substances must be stored in containers that are clearly labeled, approved for their contents and located in a safe place away from any source of ignition.
- Flammable liquid containers shall be electrically bonded when liquids are being transferred from one to another.
- Flammable substances and quantities of chemical in excess of that needed for one day's work shall be stored in an approved storage facility, isolated from the actual work areas.
- Where flammable substances are stored or used, conspicuous signs must be posted stating "No Smoking or Open Flames within 25 Feet of This Area".
- Workers shall guard against any part of their clothing becoming contaminated with flammable liquids.
- Clean up spills promptly.

- Rags contaminated with flammable substances shall be stored in an approved metal container with a tight fitting lid.
- Smoking is permitted only in designated smoking areas.
- A designated fire watch is required under the following circumstances and as per the completed Hazard Assessment
  - A fire watch is required when engaged in hot work activities such as:
    - Welding, flame cutting or grinding in hazardous areas;
    - Any hot work on or around open systems;
    - Any hot work where product or vapors are present.

For each work area the Contractor is required to supply and maintain adequate firefighting equipment sufficient to handle expected fire emergencies that might occur during the work activity. The Contractor shall ensure that workers are competent in the proper use of site Fire Fighting equipment.

Each fire extinguisher shall have a tag or label securely attached that indicates the month and the year the maintenance was performed and that identifies the person (or company) performing the service.

All work activities in the general vicinity of the fire shall be stopped and site / operations management shall be notified immediately. Workers may attempt to extinguish a fire only if safe to do so and they are confident in their abilities to effectively fight the fire. If workers cannot ensure their own safety or if there is a risk of being trapped in the fire, workers must immediately evacuate.

F. TRAINING REQUIREMENTS

All workers shall be up-to-date on the requirements set forth in 29 CFR 1910.120. It is the responsibility of all recovery workers to take and maintain the required training, including the annual 8 hours of refresher training. If requested, workers shall identify required training and provide documentation.

2.06 SITE SAFETY PLANS / TAILGATE MEETINGS

All workers must receive a project orientation, covering specific health, safety, and environmental policies, site specific hazards and project requirements. Site specific orientations for operations projects will be provided to the Contractor by the Company

Site/Project Specific Orientation is required for each Contractor/Subcontractor worker prior to work commencing. The Site/Project Specific Orientation includes a review of the following pertinent information:

- Enbridge 6 Lifesaving Rules
- Importance of safety to Company
- Safety objectives and zero tolerance of rules violations
- Work permits requirements
- Right and responsibility to refuse dangerous work
- Parking and backing-in policy
- Security requirements and restricted access areas
- Location of designated smoking areas

- Cellular phones are not allowed in hazardous or restricted areas
- Location of hazardous areas as specified on the site safety plot plans (i.e., NGL facilities, sump tanks, etc.)
- Location of nuclear devices on site
- Required personal protective equipment
- Vehicles and equipment requirements, i.e. backup alarms, positive air shutoffs, and spark arrestors
- Specific work site hazards
- Appropriate safe work procedures or practices for project
- Location of government regulations, safety manuals, and copy of all safe work practices and procedures
- Stop work if an incident occurs and where to report it
- Review of following emergency procedures:
    - Review of site safety plot plan
    - Location of control room to report emergencies
    - Evacuation procedures
    - Evacuation alarms, sirens, or horns
    - Requirement and location of firefighting equipment
    - Emergency phone numbers
    - Location and distance of nearest hospital
    - Identify first aid attendants and location of first aid station
    - Location of wind socks
    - Location of emergency exit gates/gate override locations
    - Location of assembly areas and;
    - Smoking is not allowed in the assembly areas.

NOTE: Contractors brought in for emergency work shall be given a safety orientation going over the specifics of the situation before starting work.

Contractor Working In an Office

Safety orientation for contract office workers must include a review of the building's emergency procedures and the Safety and Environmental Guidelines for "Contractors" handbook.

Contractor Safety Orientation Records

Completed Contractor's orientation records shall be filed onsite or forwarded to the Project Execution Lead or Equivalent, and retained as part of the appropriate regional/project files.

Where the orientation includes a review of the topics listed on the Contractors Site/Specific Orientation Record, each contract worker employed onsite shall sign the Contractor's Site/Specific Orientation

Record. Completed Contractor's Site/Specific Records shall be retained as part of the appropriate regional/project files.

2.07 PERSONAL CONDUCT

Horseplay, fighting and disregard for the safety requirements will result in removal of those involved from the Site.

2.08 SMOKING

Smoking in hazardous or restricted areas of the project/spill response area will only be permitted in outdoor areas that are posted. Designated smoking areas shall be kept clean and equipped with a proper waste container and at a minimum of one 20lb ABC fire extinguisher. Ensure that the location of the designated smoking location is not located near any doors or windows.

2.09 VISITORS TO THE SITE

The Contractor shall provide the Company notification of their intent to bring visitors on site. Unauthorized persons will not be allowed in command centers, at areas affected by the spill or in the immediate area of the spill response activities.

Prior to visiting any field locations visitors shall check in with their The Company sponsor and complete safety orientation. When visiting the field all visitors shall report to the Division security guard or site supervisor and identify themselves and purpose of visit prior to entering the hot zone or warm zone.

All visitors are subject to the same regulations related to conduct and protective equipment as other Contractor workers. Visitors may be exempt from safety boot requirements provided the following conditions are met:

- Visitors are accompanied by a company representative at all times while on site.
- Visitors are not permitted to enter work areas where there is a danger of foot injuries due to falling or rolling objects, objects piercing the sole, and/or exposure to electrical hazards.
- The exemption is approved by the Safety Officer.
- Where exempt, the visitor must not wear open toed or high heeled footwear.

The Contractor shall provide visitors all necessary control and guidance to ensure their protection and, where necessary, provide appropriate personal protective equipment for their use. Visitors to any site will be for work specific purposes only. All workers and visitors shall have site specific orientation before entry into work area and wear visible visitor identification at all times. Visitors will sign in to sites using the site specific orientation and/or the Safe Work Permit. This sign in will be used for site visitor accounting.

2.10 FATIGUE MANAGEMENT

A. Fatigue Risk Factors Present

The Contractor shall implement a Fatigue Management Plan when workers are at an increased risk from fatigue-related effects. This increased risk can be due to:

- Extended length of shift worked (beyond 12 hours).

- Extended consecutive days worked (beyond 10 consecutive days).
- Extended travel time to and from the work site (total work day, including travel, exceeds 14 hours).
- Excessive physical effort required as part of normal work activity.
- Environmental extremes (heat, cold, noise, vibration, lighting, etc.)
- The fatigue management program should consider the following:
  - Identification of the factors that lead to fatigue.
  - Assessment of the risks associated with the workplace factors that contribute to fatigue.
  - Identification of control measures to manage exposure to fatigue.
  - Implementation of the selected control measures.
  - Rehabilitation/Return to work.
  - Management approval processes.

B. Exposure to Heat Stress – Prevention Methods

- Observe the climatic condition reports from the Safety Department. The Heat Index will be communicated for the local areas.
- Consult Table 3 to determine amount of cloud cover, the exertion level of the work being conducted, and the type of clothing being worn to calculate the Correction Factor.
- Consult Table 1 and apply the Correction Factor to the originally communicated Heat Index in order to determine the final heat index (original Heat Index + Correction Faction = final Heat Index)
- Consult Table 2 to determine the regimen of work/rest ratio and the amount of fluid intake (hydration).
- Repeat the assessment process whenever climatic conditions change

C. Exposure to Heat Stress – Other Administrative Controls

The following administrative controls can be used to reduce heat stress:

- Reduce the physical demands of work, e.g., excessive lifting or digging with heavy objects;
- Provide recovery areas, e.g., air-conditioned enclosures and rooms;
- Use shifts, e.g., early morning, cool part of the day, or night work;
- Use relief workers;
- Use worker pacing; and
- Assign extra workers and limit worker occupancy, or the number of workers present, especially in confined or enclosed spaces.

IMPORTANT: NEVER ignore anyone's signs or symptoms of heat-related disorders regardless of heat stress assessment results.

Heat Index Chart

How to use: Find the temperature on the left handed side, move to the right and find the relative humidity value on top. Where the two columns meet is the Heat Index value. *Example: A temperature of 95` and a relative humidity of 50% will "feel like" a Heat Index of 107`* **Add up to 15` in direct sun with no available shade.**

1 White Flag Low Risk	2 Green Flag Caution	3 Yellow Flag Extreme Caution	4 Red Flag Risk	5 Black Flag High Risk

		RELATIVE HUMIDITY %																				
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
T	140	125																				
E	135	120	128																			
M	130	117	122	131																		
P	125	111	116	123	131	141																
E	120	107	111	116	123	130	139	148														
R	115	103	107	111	115	120	127	135	143	151												
A	110	99	102	105	108	112	117	123	130	137	143	150										
T	105	95	97	100	102	105	109	113	118	123	129	135	142	149								
U	100	91	93	95	97	99	101	104	107	110	115	120	126	132	138	144						
R	95	87	88	90	91	93	94	96	98	101	104	107	110	114	119	124	130	136				
E	90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122		
	85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108
F	80	73	74	75	76	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91
	75	69	69	70	71	72	72	73	73	74	74	75	75	76	76	77	77	77	78	79	79	80
	70	64	64	65	65	66	66	67	67	68	68	69	69	70	70	70	71	71	71	71	71	72

Work/Rest and Water Consumption Table

Applies to average size, heat acclimated person wearing long sleeved shirt and pants (or cloth overalls)

Easy Work	Moderate Work	Hard Work
• Walking/working on hard surface at 2.5 mph < 30lb load	• Walking/working in loose sand, water, reeds at 2.5mph, minimal load • Walking hard surface at 3.5mph < 40 lb. load	• Walking/working on hard surface at 3.5 mph > 40 lb. load • Walking/working on loose sand, at 2.5 mph with minimal load • Wearing protective overalls (i.e. Tyvek) and/or respirator

Heat Category	Easy Work		Moderate Work		Hard Work	
	Work/rest (min.)	Water intake (qt./hr.)	Work/rest (min.)	Water intake (qt./hr.)	Work/rest (min.)	Water intake (qt./hr.)
1 White Flag	NL	½	NL	¾	40/20 min.	3/4
2 Green Flag	NL	½	50/10 min.	¾	30/30 min.	1
3 Yellow Flag	NL	¾	40/20 min.	¾	30/30 min.	1
4 Red Flag	NL	¾	30/30 min.	¾	20/40 min.	1

- The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specific heat category. Fluid needs can vary based on individual differences (-/+ ¼ qt./hr.)
- NL = no limit to work time per hour
- Rest = minimal physical activity (sitting or standing) accomplished in shade
- ***Caution*** *Hourly fluid intake should not exceed 1-1 ½ quarts. Daily intake should not exceed 12 quarts.*
- Operational requirements should be considered in the application of this heat management tool. Contact site deputy branch director for clarification.

Table 3: Correction Factor (in ^{0}F) for Radiation Heat, Clothing, and Workload

**The

	100% cloud cover	60% cloud cover	30% cloud cover	0% cloud cover	
FR + Vest	1	2	4	4	Light work
	2	3	4	5	Moderate work
	4	4	7	8	Heavy work
Street Clothing + FR + Vest	2	3	5	6	Light work
	4	5	6	8	Moderate work
	6	8	10	13	Heavy work
FR + Regular Tyvek[1] + Vest	4	6	8	9	Light work
	6	8	9	11	Moderate work
	9	10	12	15	Heavy work
Street Clothing + Regular Tyvek + Life Vest (PFD)	4	6	8	9	Light work
	6	8	9	11	Moderate work
	9	10	12	15	Heavy work
Street Clothing + Regular Tyvek + Life Vest (PFD) + Wader	5	7	9	10	Light work
	7	9	10	12	Moderate work
	11	13	15	17	Heavy work
Street Clothing + Chemical resistant suits[2] + Life Vest (PFD)	15	17	19	20	Light work
	17	19	20	22	Moderate work
	20	21	23	26	Heavy work
Street Clothing + Chemical resistant suits + Life Vest (PFD) + Wader	16	18	20	21	Light work
	18	20	21	23	Moderate work
	22	24	26	28	Heavy work

Numbers in Table-3 indicate an increase in the heat index as a correction factor to reflect cloud coverage, clothing and type of work. For example; performing heavy work with FR clothing + vest with 100% cloud coverage would add 6°F to the heat index to obtain the final heat index. The work rest schedule would have to be determined based on the final heat index.

[1] Regular Tyvek suit is made of polypropylene. This is considered a breathable fabric.
[2] Chemical resistant suits are coated with polyethylene. This type of garment is impermeable with no breathability.

2.11 WORK IN THE DARK

Work after dusk (with the exception of security) generally is not permitted and, if necessary, will only be allowed if the following conditions are met:

1. Prior approval from The Company.
2. There is a minimum of two workers, or communications exist to outside areas to request assistance if required.
3. Adequate lighting is provided to illuminate the work area that meets OSHA standard 29 CFR 1926.56(a) of 5 foot candles. Additionally light stands and lighting shall have proper electrical connections per OSHA standards.
4. Regular "night shift" work will require prior approval from the Company.
5. For night security work, one person shall be allowed to work alone so long as they have adequate communication to outside areas and approval by The Company. Communications must be maintained and checked at least every two hours with the Site Supervisor or designate.

2.12 WORKING ALONE

The Company will take specific precautions for those workers working alone, both during normal and unexpected work situations. This would include workers required to travel alone to remote location or where there is no routine interaction with other people.

The Company must ensure that the required hazard assessments have been completed prior to the work taking place.

Where any worker is required to work alone, The Company must ensure that all legislated requirements are adhered to. Measures can include, but are not limited to the following:

- Effective radio, telephone or other electronic communications shall be provided.
- Workers shall not work alone in hazardous conditions (e.g. potential for exposure to hazardous gases, severe weather, and dangerous water conditions) without first making certain that appropriate safety precautions are taken.
- Workers shall not work alone under conditions which are deemed to be immediately dangerous to life and health (IDLH).
- Safe work procedures shall be in place and workers must be suitably trained.
- Equipment shall be in safe condition and workers are to have appropriate first aid and emergency supplies.
- Workers working alone shall inform co-workers of their whereabouts and expected movement/travel.

An area or site supervisor shall periodically make contact (no longer than 2 hours) with those who are working alone and should be alert for any unusual delays in re-establishing contact.

2.13 SECURITY

The Company must communicate Security expectations to all personnel and compliance will not be compromised.

Vehicles and trailers belonging to workers are subject to unannounced searches while performing work related to the spill response activities.

Special attention is necessary when any of the following are present:

- Protests and/or picket lines
- Historical safety / security issues (known criminal activity, evidence of unauthorized access, missing or stolen equipment)
- Threats received
- Elevated security threat levels by DHS

2.14 DRUG AND ALCOHOL USE

The use, possession or being under the influence of alcoholic beverages or illicit drugs, by any worker (Inspector, Contractor or Contract worker) is strictly prohibited. Violators will be removed from the project site immediately.

The Company reserves the right to request any worker or visitor have drug and alcohol tested based on reasonable cause

Workers under the influence of any drug that can impair judgment may also be removed from the site and may be subject to the disciplinary measures. This includes, but is not limited to, prescription drugs, synthetic cannabis ("K2", "Spice") etc.

2.15 DISCIPLINARY MEASURES

The Company expects and will enforce compliance with the Health and Safety Plan. Contractors shall ensure compliance by all Contractor and Subcontractor personnel with the Contractor's Safety Manual, as well as the Health and Safety Plan accepted by The Company.

Any personnel involved in the spill response effort is authorized to halt a construction / work activity in circumstances where, in the judgment of that person, the construction / work activity is not being conducted in accordance with the Health and Safety Plan, federal, state or local regulations and codes, or is creating a hazard to any person or facility infrastructure at the construction site.

In addition, the Company has the authority to request any worker who blatantly violates the Health and Safety Plan to leave the site permanently. Disciplinary measures for non-compliance will be strictly enforced.

There are two levels of action that may be initiated depending on the severity of the infraction.

Level One

Includes offenses which will result in the immediate removal of the worker from the work site:

- Workers under the influence of alcohol or illicit drugs.
- Workers possessing, using or distributing illegal substances or alcohol during spill response activities.
- Fighting or uttering threats.
- Any instance of sexual harassment.
- Criminal activity
- Actions of gross negligence which results in injury, fatality or property damage.
- Behavior or attitude which could cause severe injury or damage.
- Blatant disobedience of any of the Health and Safety Plan's policies and procedures.
- Failure to wear and use the required personal protective equipment (PPE/PFD).
- Failure to use the necessary safety equipment when needed, required or prescribed.
- Smoking in an area not designated as a smoking area.

- Possessing a firearm on site (on person or inside a vehicle).

Level Two

Includes offenses which require use of a formal disciplinary system:

- All actions in which the worker willfully disregards the Health and Safety Plan or federal, state, or local safety regulations and recommendations.

Discipline:

- **First Offense** – not limited to a documented verbal or written warning.
- **Second Offense** – REMOVAL FROM THE PROJECT.

Written warnings and removal letters for projects shall be issued by The Company.

2.16 INCIDENT REPORTING

The Company and Enbridge are committed to ensuring a safe and healthy work environment for its workers, contractors and subcontractors. The goal of any investigation is not to establish blame but rather to put the necessary controls in place to remove or reduce the hazards and potential for a recurrence.

In the event of any incident or close call, a detailed investigation identifying both the immediate and all underlying causes will be completed.

All incidents must be reported to Enbridge Safety Office immediately (269)781-1913. The incidents will be documented and reviewed by The Company. Findings of the review and incident investigation will be distributed to necessary personnel.

Verbal Report - Immediately

Any incident resulting in personal injury *(first aid incident - refer below),* close call, or property damage shall be reported verbally to the Site Inspector / Project Safety Inspector or Operations Project Coordinator.

Enbridge will be notified of any off site serious incident such as a motor vehicle incident or personal injury that is an indirect result of the project. The purpose of the notification is a courtesy for information only, as it may or may not be recordable to the project. Internal notification may be required depending on incident severity. The decision will be made by the respective Safety Coordinator or designate.

Preliminary Report – by end of day

A preliminary report shall be completed and provided to the Company by the end of the day that the incident happened on. This report must include the preliminary details of the incident including but not limited to:

- Date/Time/Location of the Incident
- Type of occurrence
- Who was involved
- Treatment provided
- Contractor
- Contractor Representative
- Enbridge Representative

Written Report – within 48 hours

A written report shall be completed and provided to the Company Safety Coordinator or its designee within 48 hours of the incident. This report must include all details of the incident including but not limited to:

- Date/ Time / Location of the incident
- Type of occurrence
- Who was involved
- Injured worker information
- Nature of injury
- Body part and location
- Root Cause or Systems need
- Detailed incident description
- Loss of Company property or other property damage
- Immediate causes
- Substandard practices or conditions
- Basic cause including personal and job factors
- Preventative actions
- Statements, photographs and drawings
- Follow up actions
- Signatures

The Enbridge or Contractor safety coordinator, as applicable, shall report incidents to the applicable Authorities Having Jurisdiction, e.g. OSHA, Workers' Compensation Board, etc., where required by legislation.

The safety coordinator shall regularly update The Company on the status of follow-up actions. In addition, the Contractor and Enbridge shall cooperate and provide all required information to assist the internal investigation of any incident.

Contractors are responsible for their Sub-Contractors and shall conduct a detailed incident investigation when necessary. A copy of the report shall be submitted to the Joint Command Safety Officer/ Operations Safety Officer /Safety Inspector within the required time frame.

* For First Aid incidents, a First Aid Log will be maintained and an incident report will be completed.

The Company reserves the right to request any Contractor / Subcontractor worker to be Drug and Alcohol Tested following any incident or close call. The Drug and Alcohol Test shall be conducted in accordance with the approved Drug and Alcohol policy of Enbridge.

2.17 PERSONAL PROTECTIVE EQUIPMENT / APPAREL

General Personal Protective Equipment:

Based on the evaluation of potential hazards, the level of protection deemed appropriate for this site is general Level D for all operations as follows (unless air monitoring dictates that PPE upgrades or ventilation are required):

- Hard Hat
- Safety Glasses
- Safety Boots (ANSI/CSA)
- Disposable suits (e.g. Tyvek)/booties, as needed
- Rubber or Latex Gloves, as needed
- Full length pants

The level of protection may be increased to include fire retardant (FR) clothing if atmospheric monitoring results are equal to or greater than 3% of the LEL, as a minimum, the hot zone is defined by initial and periodic atmospheric testing that is equal to or greater than 3% of the lower explosive limit. Work within the hot zone requires FR clothing. Refer to 2.17.7 "Fire Retardant Clothing" for specific requirements on when FR should be worn.

Any items that come into contact with contaminants shall either be disposed of properly or thoroughly washed before reuse.

The Company will ensure workers are trained in proper fitting, use, limitations, cleaning, maintenance, and storage of personal protective equipment.

Unless otherwise exempted by the Safety Officer, the minimum Personal Protective Equipment/appropriate apparel required for all company sites and projects shall be:

- Safety glasses or prescription safety glasses with fitted side shields and protective lenses
- Safety boots (ANSI/CSA)
- Full length pants
- Approved Hard Hat
- Additional PPE/Apparel may be required depending on the specific site requirements or activities (Flame Resistant Clothing).

Note: Muscle shirts, tank tops, and cut offs are not permitted on any work site.
Hard hats must be worn when there is an overhead hazard while a boat is in motion. Also when control point management workers are in the middle of the river placing boom or doing boom maintenance. However, when closer to the river bank a hard hat must be worn due to trees, limbs, etc. that could cause harm.

2.17.1 Eye and Face Protection

Approved eye protection such as safety glasses with side shields or appropriate goggles shall be worn at all times. Additional eye and face protection shall be worn when performing any work or in any area where there is danger of injury or irritation of a worker's eyes or face. This may include safety glasses with side shields, impact goggles, or splash goggles as per the completed Task Hazard Assessment. All protective equipment shall meet ANSI standards.

All workers shall ensure that the protective eyewear fits properly is clean and in good condition. Prescription safety glasses shall have fitted ANSI approved side shields attached while on site.

The following is a list of activities where there is exposure to eye and face hazards, and the minimum eye and face protection required:

Table 1: Minimum Requirements for Eye and Face Protection	
Activity	**Protection Required**
Abrasive blasting	Blasting hood complete with supplied air
Chipping, hammering metal, sledge hammering, jack hammering, using compressed air, using electric and/or hand saws, concrete work, material handling of particles, and in windy/dusty conditions	• Safety glasses with side shields or • Impact goggles • Face shield when using a chipping hammer
Handling hazardous substances	• Chemical splash goggles ***and*** • Any additional protective equipment indicated on container labels or MSDS, and face shield when handling large quantities, exposed to liquid spray, or transferring liquids
Operating chainsaws, using weed trimmers	• Full face shield and safety glasses with side shields or impact goggles (mesh face shields are recommended when operating chainsaws)
Working in windy conditions	• Protection as required
Pressure washing	• Face shield

2.17.2 Foot Protection

Safety footwear must have a minimum CSA Grade I (ANSI Class 75) safety toe, a puncture resistant sole, and have a minimum 6" in height.

All workers performing electrical work or any worker entering within a substation require safety footwear marked with EH (Electrical Hazard) designation that incorporates an electric shock resistant sole.

Metatarsal/shin guards shall be used where workers are exposed to impact by portable compactors such as jumping jacks and jackhammers, etc.

2.17.3 Head Protection

As dictated by the applicable ANSI Z89.1-2003 Type 1, Class E, approved hard hats will be worn at all times, except when in a vehicle or equipment with enclosed cabs or while in control rooms, offices, lunch rooms, or change rooms, or welders actively engaged in welding.

NOTE: Cowboy style hardhats are prohibited on the work site.

2.17. Hearing Protection

Workers will follow their company Hearing Protection program as outlined in their company H&S programs. The following guidelines will be used for the determination of hearing protection applicability. When performing jobs where hearing thresholds may be exceeded, all personnel will be provided with appropriate hearing protection.

When equipment is operating or when operating any tool or piece of equipment where the noise level at the operator's location exceeds occupational exposure limits (85 dBA), plug and/or muff-type hearing protection must be worn. Hearing protection must be worn in all posted areas.

2.17.5 Limb and Body Protection

Where there is a danger of injury to worker's hands, arms, legs or the trunk of the body, workers shall wear proper hand, arm, leg, or body protection equipment that is appropriate to the work being done and the nature of the hazard involved.

Workers that handle rough, sharp-edged abrasive materials or are performing work activities that subject the workers' hands to lacerations, punctures, burns, vibration/impact, chemical absorption, must wear appropriate hand protection suitable for the work being performed.

2.17.6 High-Visibility Apparel

High-visibility apparel must meet or exceed the Class 2 standard as specified in ANSI/ISEA Standard 107-2004. Such high-visibility apparel must be worn when a worker is a designated signaller or spotter, when working on or adjacent to roadways, while working around mobile earth moving/heavy equipment, or working around any moving equipment and as determined

2.17.7 Respiratory Protection

Workers will follow their company Respiratory Protection program as outlined in their company H&S programs. Workers under the direction of Enbridge will operate in accordance with OSHA Respiratory Protection regulations 1910.134. The following guidelines will be used for the determination of respiratory protection applicability. When performing jobs where breathing hazards may be encountered, all personnel will be provided with appropriate respiratory protection.

Appropriate respiratory protection shall be selected based on the completed Task Hazard Assessment which must consider gas/particle monitoring results, physical conditions or when the potential hazard level is unknown.

The Company and Contractor shall:

- Ensure workers who have passed a medical evaluation.
- Have had a respirator fit-test for each tight fitting respirator that will be used.
- Received training in the use of respiratory protection.
- Review and understand the completed Hazard assessment
- The contractor shall make available upon request fit test documentation and training documentation.

All Respiratory Protection training will meet or exceed all applicable legislation.

Workers shall be clean-shaven where the respiratory equipment forms a seal with the face.

Only NIOSH approved respiratory protection shall be used and all respiratory equipment must be cleaned and inspected after each use.

Guide to Respiratory Selection:
Air Purifying Respirator (APR), Self-Contained Breathing Apparatus (SCBA), High-Efficiency Particulate Air Filter (HEPA), Supplied Air Respirator (SAR).

Task/Exposure	Hazards	Respiratory Protection	Comments
Confined Space Entry	Hazardous atmospheres due to materials or substances present or the task (e.g., oxygen deficiency, mists, fumes, dusts, toxic vapors or gases)	Mandatory minimum for initial entry: SCBA during initial atmosphere testing from inside the area, and as required during initial air testing from outside the area	See Ventilation, Air Testing and Air Monitoring in Confined Spaces, and Personal Protective Equipment for Confined Spaces, for further requirements.
		Mandatory minimum for ongoing work: protection requirements depend on the results of initial atmosphere testing and the type of atmospheric hazard created by the task	To determine the minimum protection for ongoing work, refer to the appropriate hazard (e.g., petroleum vapors) or task (e.g., abrasive blasting, painting and coating, welding) in this table.
Applying herbicide and pesticides	Toxic organic vapors or mists	Mandatory minimum: half mask APR with organic vapor cartridge and dust/mist pre-filter	Consult product MSDS for additional information.
Cutting, grinding, buffing (metals, plastic, wood)	Dusts and fumes	Recommended minimum: disposable dust mask (see Comments)	Respiratory protection is mandatory if conditions are very dusty or irritating.
Handling acids/caustics (e.g., hydrochloric acid, sulfuric acid, sodium hydroxide)	Corrosive mist or gas	Recommended minimum: half mask APR with acid gas cartridge (see comments)	Respiratory protection is mandatory if activity generates mist or vapor.

Task/Exposure	Hazards	Respiratory Protection	Comments
Painting and coating (not applicable to water-based coatings)	Toxic organic mists (spraying), toxic organic vapors (spraying and brush/ roller application), isocyanates (two-part coatings containing isocyanates)	Mandatory minimum for spraying: half mask APR with organic vapor cartridge and dust/mist pre-filter	A full face piece APR with the same cartridge is recommended where eye irritation occurs. Check MSDS for additional information.
		Recommended minimum for brush/roller application: half mask APR with organic vapor cartridge	Respiratory protection is mandatory in enclosed areas and confined spaces with poor ventilation. Check MSDS for additional information.
		Mandatory minimum for two-part coatings containing isocyanates: SCBA or full face piece SAR if coating is sprayed; half mask APR with organic vapor cartridge if brush or roller application	Check MSDS to determine if catalyst/accelerator contains isocyanates.

2.17.8 Personal Fall Arrest and Travel Restraint Systems

A. Personal Fall Arrest Systems

Where workers are required to install, use or remove a personal fall arresting system, the Contractor performing the work shall prepare a written fall protection plan for the safe installation, use, or removal of the system. The plan must also include the method of rescue appropriate to the work. The Contractor must also have appropriately trained employees to conduct rescue operations.

Personnel that are required to use any fall protection equipment must be trained competent in its correct use and application.

NOTE: Ironworkers will follow Subpart M (Fall Protection) of the OSHA Standards.

Full Body Harness	In situations where a person could fall a vertical distance greater than 6 feet and it is impractical to provide adequate work platforms, scaffolds, staging, and guardrails, ANSI approved fall arresting full body harness shall be used in conjunction with a lanyard.
Lanyard	ANSI approved lanyards shall be arranged in such a way to prevent a person from falling freely for more than 4 feet. These lanyards shall be used to secure persons wearing a full body harness to an approved drop line, lifeline, or fixed anchorage point. Shock absorbers are required on a personal fall arrest system unless if by adding the device the worker can hit the ground when he or she falls.
Anchorage Points	Fixed anchorage points must be capable of withstanding a force of 5,000 pound-force minimum, or as otherwise required by applicable Regulations.
Horizontal Lifelines	The contractor must ensure that, before using a horizontal lifeline system that they installed, a professional engineer, a competent person authorized by the professional engineer, the manufacturer, or a competent person authorized by the manufacturer, certifies that the system has been properly installed according to the manufacturer's specifications or to specifications certified by a professional engineer.

Safety harnesses and shock absorbing lanyard devices exposed to a fall impact load shall be immediately removed from service and all components destroyed. The user shall visually inspect fall arresting equipment prior to each use.

B. Travel Restraint Systems

"Travel Restraint System" means a type of fall protection system, including guard rails or similar barriers that prevent a worker from travelling to the edge of a structure or to a work position from which the worker could fall.

Safety Belts	**SHALL NOT BE USED UNDER ANY CIRCUMSTANCES**
Lifelines	Temporary lifelines used for worker restraint shall be independently secured to suitable attachment points having adequate strength of at least 5000 pounds per worker attached. Lines must be padded at points of attachment and elsewhere, as necessary, to protect against chafing or abrasion caused by contact with sharp edges.

2.17.9 Lifejacket / Personal Flotation Devices

Lifejackets and/or Personal Floatation Devices (PFD) shall be worn when working over water (ponds, rivers, creeks, etc.) adjacent to water (within 10 feet or based on the Hazard Assessment of the site) and where there is a danger of drowning. When working at night illumination devices shall be attached to PFD.

- PFD must be US Coast Guard approved and in "good and serviceable condition". They should be the appropriate size for each person wearing them.
- The only exception to the required use of a PFD while working over or within 10 feet of water is if the hazard control of a PFD will not mitigate the risk of drowning, nor provide any effective protection (i.e., use of a PFD in very shallow water). It must be identified in the hazard assessment that drowning is not a risk, and it must be approved by the designated Safe Work Permit / Hazard Assessment approver.

2.17.10 PPE Levels of Protection

When response activities are conducted where atmospheric contamination is known or suspected to exist, personal protective equipment must be worn.

Personal protective equipment is designed to prevent/reduce skin and eye contact as well as inhalation or ingestion of the chemical substance.

Protective equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories.

The following levels of protection will be considered when establishing PPE through the Hazard Assessment Process and documented on the Safe Work Permit. Standardized PPE requirements have been established for the Hot and Warm Zones but will vary dependent on air

contaminates as established in the Industrial Hygiene Section and local work tasks and hazards.

LEVEL A

Level A protection should be worn when the highest level of respiratory, skin, eye and mucous membrane protection is needed.

Personal Protective Equipment

- Positive pressure (pressure demand), self-contained breathing apparatus (NIOSH approved), or positive-pressure supplied air respirator with escape SCBA.
- Fully encapsulating chemical protective suit.
- Gloves, inner, chemical resistant.
- Gloves, outer, chemical resistant.
- Boots, chemical resistant, steel toe and shank; (depending on suit boot construction, worn over or under suit boot.)
- Underwear, cotton, long-john type.*
- Hard hat (under suit).*
- Coveralls (under suit).*
- Two-way radio communications (intrinsically safe/non-sparking).*

*** Optional**

LEVEL B

Level B protection should be selected when the highest level of respiratory protection is needed, but a lesser level of skin and eye protection. Level B protection is the minimum level recommended on initial site entries until the hazards have been further identified and defined by monitoring, sampling, and other reliable methods of analysis, and equipment corresponding with those findings utilized.

Personal Protective Equipment

- Positive-pressure (pressure-demand), self-contained breathing apparatus (NIOSH approved), or positive-pressure supplied air respirator with escape SCBA.
- Chemical resistant clothing (overalls and long-sleeved jacket, coveralls, hooded two-piece chemical splash suit, disposable chemical resistant coveralls.)
- Coveralls (under splash suit).*
- Gloves, outer, chemical resistant.
- Gloves, inner, chemical resistant.
- Boots, outer, chemical resistant, steel toe and shank.
- Boot-covers, chemical resistant (disposable).*
- Two-way radio communications (intrinsically safe).*
- Hard hat. *
- Faceshield.*

*** Optional**

LEVEL C

Level C protection should be selected when the type of airborne substance is known, concentration measured, criteria for using air-purifying respirators met, and skin and eye exposure is unlikely. Periodic monitoring of the air must be performed.

Personal Protective Equipment

- Full-face or half-mask, air-purifying respirator (NIOSH approved).
- Chemical resistant clothing (one piece coverall, hooded two piece chemical splash suit, chemical resistant hood and apron, disposable chemical resistant coveralls.)
- Gloves, outer, chemical resistant.
- Gloves, inner, chemical resistant.
- Boots, steel toe and shank, chemical resistant.
- Boot-covers, chemical resistant.*
- Cloth coveralls (inside chemical protective clothing).*
- Two-way radio communications (intrinsically safe).*
- Hard hat. *
- Escape mask. *
- Faceshield.*

*** Optional**

LEVEL D

Level D is primarily a work uniform and is used for nuisance contamination only. It requires only coveralls and safety shoes/boots. Other PPE is based upon the situation (types of gloves, etc.). It should not be worn on any site where respiratory or skin hazards exist. Refer to The Office of Emergency and Remedial Response. Environmental Response, Division. See "Interim Standard Operating Safety Procedures" for full details.

The type of environment and the overall level of protection should be re-evaluated periodically as the amount of information about the site increases and as workers are required to perform different tasks.

Reasons to upgrade to a higher level (D is lowest, A is highest)

- Known or suspected presence of dermal hazards
- Occurrence or likely occurrence of gas or vapor emission
- Change in work task that will increase contact or potential contact with hazardous materials
- Request of the individual performing the task

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally thought
- Change in site conditions that decreases the hazard
- Change in work task that will reduce contact with hazardous materials

2.18 CONTRACTOR SAFETY QUALIFICATION

Proper Health and Safety Qualification will be required for response workers per contracting company/agency guidelines.

Enbridge is requesting safety qualification information from response workers upon arrival at site. Response workers shall self-certify training levels and certification dates for use in determining qualifications during the Emergency Response stage.

Enbridge may conduct an audit to verify any individuals training record / certificates.

As response activities progress training certifications verification will be reevaluated.

2.19 MOBILE LIFTING EQUIPMENT

This section focuses on the following types of mobile hoisting equipment; cranes with a lifting capacity of 15 tons or greater, boom trucks with a lifting capacity of 5 tons or greater, and all side boom tractor pipe layers.

The Contractor shall ensure all lifting practices meet or exceed all applicable legislative requirements.

General

- The Contractor shall ensure that only competent and qualified workers operate Mobile Hoisting Equipment.
- The Contractor shall assign a competent worker to be the rigger. The employee must be properly trained in rigging and copies of the training and certification shall be given to the Company Site Inspector prior to the lift. The level of training and experience shall be consistent with the requirements of the lift to be made.
- Only authorized competent and qualified workers assigned by the site supervisor shall operate mobile hosting equipment.
- Prior to performing any lift, the operator shall determine the weight of the lift (including the load and rigging) and ensure that the lifting device and all components are of sufficient size and strength to support the weight of the load. The operator shall ensure that the planned lift does not exceed the manufactures recommendations based on the current operating conditions. Under no circumstances shall the Manufacturers' ratings be exceeded.
- The Contractor shall ensure that operation of a crane is suspended when the wind velocity at the elevation of the crane exceeds the limit recommended by the manufacturer or when the ambient temperature is below that recommended by the manufacturer. Contractors shall have a policy of de-rating capacities of the crane below certain temperatures.
- All lifting devices shall be properly assembled using the appropriate rigging components as required for the intended lift, (i.e. four-part vs. a two-part line).
- Each piece of lifting equipment shall be equipped with a load and radius chart that can be easily read by the operator from his operating position. This chart shall be permanently attached to the equipment.
- A preventative maintenance program shall be in place for all lifting or hoisting devices to ensure that components are in safe operating condition (i.e. brakes, cables, connections, sheaves, etc.). All load bearing components shall be non-destructive tested under the direction and control of a Professional Engineer in accordance with the manufacturers' specifications.

- Written records including certifications, maintenance records, and inspection results for each crane, hoist, side-boom, etc. intended for lifting materials shall be available upon request.
- Operators shall perform daily equipment checks to verify that the lifting device and all components are in safe condition, and shall maintain a written record (logbook) of these inspections.
- All hoisting hooks shall be free of bends, cracks, corrosion, and enlarged throat openings. Hook swivel action shall be free and the hook shall be equipped with an operational safety latch.
- Winch lines shall be free of knots.
- When lifting a load, the operator of the lifting equipment shall ensure the hoisting line is in a vertical position and is over the center of the load in such a manner as to reduce the danger to workers from a swing or uncontrolled movement of the load.
- Loads shall never be moved, carried, or swung over workers.
- Loads shall never be picked up or lowered while any worker is between the machine and the load.
- No person shall be allowed to ride on any part of the equipment except in the seats provided.
- No worker is to be in the ditch, on the pipe, or between the pipe and the ditch when lowering the pipe (or anything else) into the ditch.
- Booms shall be kept clear of overhead power lines and maintain the safe limits of approach to any utility at all times.
- The operator of any lifting device shall remain at the controls while equipment is holding a suspended load. If it is necessary for the operator to leave the controls, the suspended load shall be secured (e.g. skidded or blocked up). All locking and safety devices shall be set as necessary to safely secure the machine.
- Where rotation or uncontrolled motion of a load being hoisted is anticipated, one or more tag lines shall be used. Tag lines shall be knot free and shall never be wrapped or secured in any form to a worker's hands.

NOTE:	**At no time shall the worker physically contact a suspended load unless the load is in place and must be guided by hand. At no time shall the worker physically contact a suspended load unless tag line use creates an unsafe condition as determined by the hazard assessment.**

Signalers/spotters shall be used when:

- The operator cannot clearly see the work.
- Equipment is backing up or moving, and the operator cannot see all parts of the machine and its path of travel; and/or
- The fully extended boom may come within the safe limit of approach distance to an overhead power line.
- When the view of the operator is obscured, the signaler will alert workers to any hazards that arise while material is being moved.

- The signaler shall be able to communicate with the operator, either verbally or through standard hand or horn signals.
- The operator shall take direction from only one signaler. The signal person shall be clearly identified and distinguishable from other workers (i.e. high-visibility vest of a different color and/or reflective arm bands) and shall be competent in crane and hoisting hand signals.
- The operator shall be protected from the danger of flying cables by a suitable cable guard when working on tractors and other equipment with a winch.
- All hydraulic hoses, fittings, and tubing, shall be inspected prior to use each day. Equipment showing Leakage at the surface of flexible hoses, blistering of hoses, evidence of abrasion, or scrubbing on outer surfaces of hoses, tubing, and fittings shall be immediately replaced or repaired.

NOTE: Any worker can give the STOP signal and the operator must comply.

Cranes and Boom Trucks

- The operator shall be competent in the equipment in which they are operating.
- The operator shall possess and keep available for inspection, an operator's license or certificate.
- All machine ratings are based on the machine being level in both directions and outriggers extended. If this is not possible, the operator shall take this into account when loading and handling.
- Avoid two-blocking, which may cause the load line to fail. Cranes will be equipped with an anti-two-block warning device.
- Whenever possible, cranes traveling with suspended loads shall be avoided. If travel is necessary, the load shall be carried as close to the ground as possible, and the boom carried in line with the direction of travel. In addition, tag lines shall be used to control any load swing.
- Loads carried on boom trucks shall be adequately secured. Boom lines are not to be used for securing the loads.
- Whenever cranes and boom-trucks are traveling around the site, booms, knuckles, etc., shall be in its proper resting position to avoid damage to overhead power lines, cable trays, etc.

PART 3: WORK PRACTICES

The following work practices identify the typical hazards associated with these activities. However, a task specific hazard assessment will be conducted before conducting these activities and Safe Work Permits will be issued when applicable.

3.01 BOOM DEPLOYMENT

Boom deployment consists of accessing the water body and deploying boom across the water body. Accessing the water body could involve the use of motor vehicles, trailers, boats, and clearing equipment/heavy machinery. Once the access point is established, a boom trailer is typically backed into position to allow the boom to be pulled into place. Workers near the shoreline or walking across shallow rivers and creeks may require knee boots, hip boots or waders. Workers must have appropriate Personal Floatation Devices (PFD). Boats may be required to pull the boom across larger bodies of water, and the appropriate level of training and PPE are required for workers involved in those activities.

Boom sites may have contamination from crude oil, and as such must be assessed for hazards and the appropriate level of respiratory protection per the Industrial Hygiene Plan in Appendix D.

Boom sites may also include vacuum trucks, skimmers, light plants, compressors, and decontamination stations. Employees involved in the use of such equipment shall have orientation in their proper operation and have appropriate personal protective equipment per the task hazard assessment.

3.02 VACUUMING AND SKIMMING

Once booms are set in place, skimmers and vacuum trucks may be employed to collect crude oil and contaminated water from waterways. These activities may also be conducted in low lying areas and in locations where oil has pooled. This work involves operating the equipment, lifting hoses and fittings, moving in contaminated areas that are often slippery with uneven footing, and repositioning equipment to maximize collection efforts. Sites may have contamination from crude oil, and as such must be assessed for hazards and the appropriate level of respiratory protection.

The following PPE and operational requirements will be adhered to Vacuum Trucks and Hydro Excavators (opening rear hatch doors):

PPE requirements:

- Hard hats
- Safety glasses
- Steel toe safety shoes
- Approved hearing protection (if sound is over 85dB)
- Hard hat attached face shield with a half face respirators or a full face shield respirator must be worn in the Hot Zone while operating or driving your equipment.
- Respirator cartridges must be dual mode for OVA and Acid gases with P100 filters for particulates.

- Disposable Gloves suitable for operating the contaminated equipment while opening or closing tanks and hatches

Operational requirements:

- Do not enter the open bed of the vacuum truck or hydro excavator after opening the rear hatch door for any reason to avoid unnecessary contact with contaminants or contaminated debris, possible O2 deficient atmosphere, and slip trip and fall hazards from liquid contaminants.
- Beware of loose overhead debris adhering to the inside of the back hatch door surfaces and take precautions against materials/debris falling off of the rear hatch door.
- Do not stand directly behind your equipment while opening the rear hatch door or unloading from the rear hatch/door and do not allow your spotter if present to stand directly behind the equipment either.

3.03 SAMPLING AND OBSERVATION/DOCUMENTATION RELATED ACTIVITY

Throughout the collection and remediation process, sampling and observation will be required at various sites including air sampling, water sampling and soil sampling. This work is typically non-intrusive and involves accessing the desired site and collecting samples. As such, workers involved in sampling and observation must be aware of the hazards of each site and be equipped with proper PPE. Sampling conducted on or in water may require the use PFD. **Note:** See Appendix B for task hazard analysis

3.04 SHORELINE/ADJACENT LANDS CLEANUP

Cleanup of crude oil is anticipated at the leak site and surrounding lowlands, throughout the Talmadge Creek and along affected shoreline of the Kalamazoo River. As such, workers involved in shoreline and adjacent land cleanup must be aware of the hazards of each site and be equipped with proper PPE and PFD. Typical cleanup activity includes water washing of contaminated shoreline, use of absorbent pads and booms and potentially excavation. This work involves operating cleanup equipment such as pressure washers, lifting hoses and booms, moving in contaminated areas that are often slippery with uneven footing, and repositioning equipment to maximize collection efforts. Sites may have contamination from crude oil, and as such must be assessed for hazards and the appropriate level of respiratory protection.

3.05 HEAVY EQUIPMENT OPERATION

Throughout the cleanup and repair efforts, a variety of heavy equipment will be used. This includes trucks, trailers, backhoes, cranes, vacuum trucks, welding trucks, etc. Each worker involved in the use of heavy equipment will have training in the use of that specific piece of equipment. Depending on the location, each worker will be aware of the hazards and utilize the proper PPE.

3.06 SAFETY FOR UTILITY TERRAIN VEHICLES (UTV)

The use of UTV's on Marshall Line 6B worksites shall comply with all applicable legislative requirements. This will include but is not limited to the following:

- Written safe work practices in accordance with the authorities having jurisdiction.
- Only those who are deemed competent and authorized by their employer shall operate a UTV.

- The employer shall keep records of competency (in-house orientation or training and/or from a training agency) for their workers and make these records available to the Company for review upon request.
- The UTV shall be properly registered and insured as per legislative requirements. Copies of insurance and registration shall be carried on each piece of equipment in a water proof container.
- A license plate shall be securely attached in a visible location as per legislative requirements.
- Permission shall be received prior to riding on private property.
- Drivers shall operate at speeds appropriate for the terrain, visibility, conditions and experience.
- Always wear an approved D.O.T. helmet unless a utility type all-terrain vehicle is equipped with a manufacturer approved ROPS (rollover protective structure) and seatbelts.
- Always wear appropriate PPE (protective goggles and/or other suitable devices to prevent eye and face injuries from twigs, flying debris and weather conditions).
- Operators shall wear a high visibility outer vest and clothing suitable for the work site conditions.
- The UTV's shall be inspected prior to use.
- All UTV's shall be equipped with an aerial whip complete with a flag, First Aid kit, tool kit, 5lb ABC fire extinguisher and portable communication equipment, e.g. hand-held radio or cellular phone.

3.07 DECONTAMINATION PROCEDURES

Personnel decontamination areas and equipment decontamination areas have been established on site for the duration of the project. The number of units will vary by needs. The decontamination areas have been established to be strategically near work areas for personnel and equipment. Boat/vessel decontamination areas have been established on-site in areas accessible to boat/vessel launch locations.

1. Personnel:
Entrance and egress from the hot zones will require donning and doffing personnel protective equipment. A decontamination station will be established nearby for areas where the potential for personnel contamination exists. Such stations shall be set up to accommodate individuals entering under their own power or in the event that they become disabled. Contaminated clothing will be removed from the outermost layer and turned inside out while removing. Skin surfaces will be rinsed with a mild detergent and rinsed thoroughly. Gloves will be removed last. Contaminated clothing and debris will be collected and bagged for proper disposal.

Hot Zone (Exclusion Zone)
1. Properly store tools and equipment prior to entering warm (contamination reduction) zone.

Warm Zone (Contamination Reduction Zone)
2. Remove wrist tape, outer gloves and (if double-layered) outer disposable coveralls at entry to warm zone.
3. Wash and rinse boots/boot covers.
4. Remove boot tape and boots and/or boot covers.
5. Remove the following personal protective equipment (PPE) in the order as noted:
   - Hard hat including attached Muff type hearing protection if utilized
   - Face Shield (If APR not being utilized)

- Knee Pads (where used).

Note: Properly clean, store and maintain all reusable PPE.

6. Remove disposable coveralls. Note: Inner layer of disposable coveralls if double layer of protective clothing worn, outer layer of disposable coveralls if single layer of clothing worn.
7. Remove half face or full face air purifying respirator (APR). Note: Properly clean and store APRs after each use.
8. Remove inner nitrile gloves.

Cold Zone (Support Zone)

9. Enter cold zone (support zone) and wash, redress and rehydrate.

These decontamination stations are also to be utilized for emergency decontamination of workers should an incident occur. Local EMT members and workers are trained on the procedure to use these locations for public emergency decontamination needs. In the case of an emergency contamination incident within a Hot Zone individuals will be transported to the nearest decontamination area outside of the Hot Zone as EMT personnel will not enter the Hot Zone.

Each personnel decontamination area will be contained within a 20 yard roll off box or a lined and bermed area. These locations will also have at a minimum the following components.

- Sorbent wipers
- Plastic buckets with scrub brush
- Child wading pool
- Labels for disposal containers
- Containment for decontamination waste water

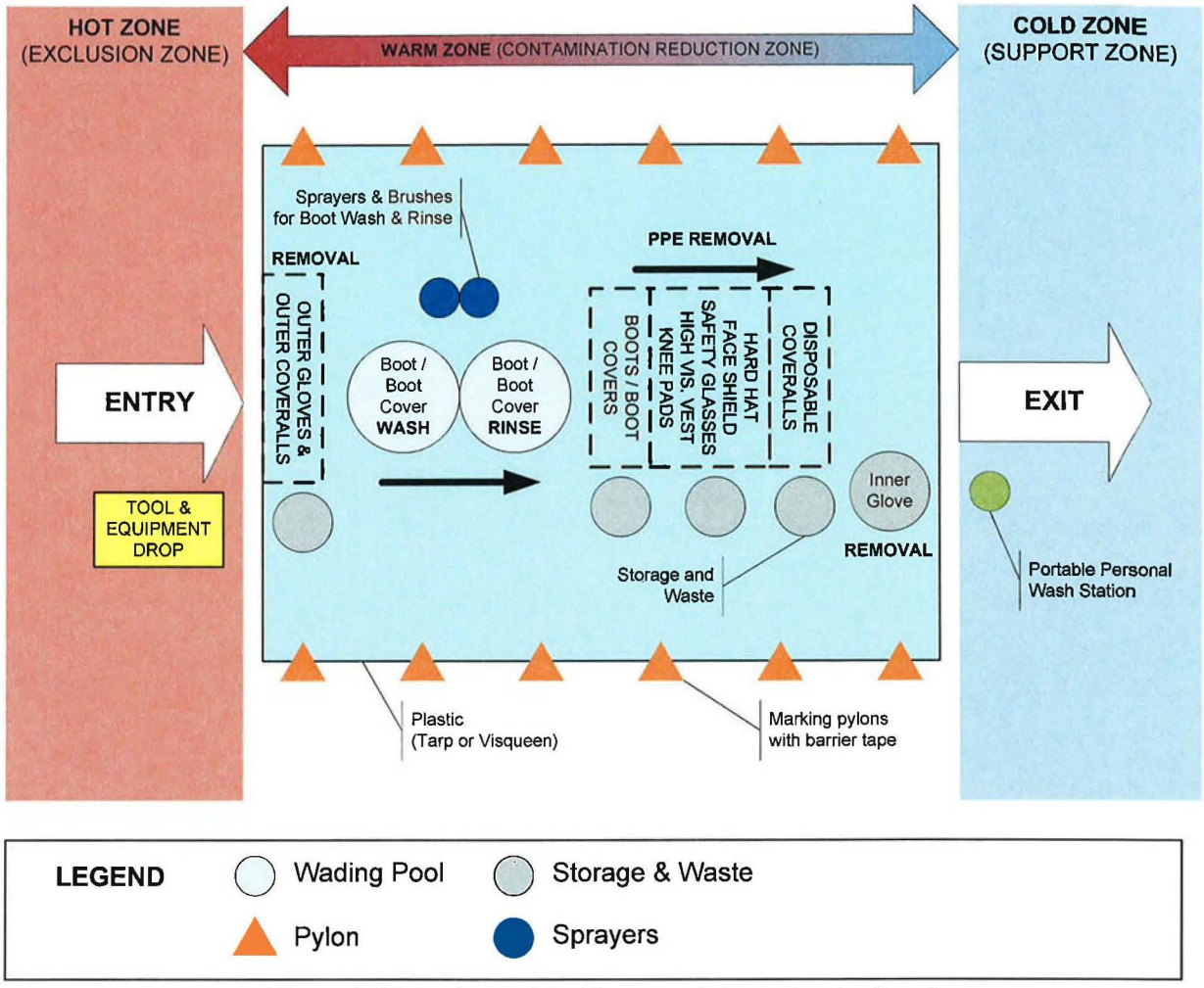


Figure 3.08.1 – Layout for Personnel Decontamination Area

2. Equipment Decontamination Areas:
The Decontamination Unit within the Operation Section will periodically clean equipment during response operations. Cleaning systems for skimmers, hand tools, and heavy machinery are established at the decontamination unit.

The equipment decontamination area will have a pool or other diked impoundment for cleaning equipment and, a frac tank for storage of liquids. The cleaning pool or dike area will be lined with secondary containment to capture any spilled material.

Equipment that cannot safely be moved will be decontaminated on-site utilizing an approved cleaning agent. Equipment will be hand wiped of all visible contamination. No water will be utilized due to the overspray. This process will be repeated until visible contamination is removed. Areas used for cleaning will be bermed and lined to prevent additional contamination, and the resulting waste will be collected and properly disposed.

Water equipment and assets will be decontaminated utilizing the vessel/boat decontamination units to avoid contamination due to transportation.

Expendable equipment (e.g., rope mops, brushes, tarps, etc.) will not be decontaminated but will be drummed as waste.

3. Boat/Vessel Decontamination Sites:

Vessel decontamination areas will be designated at boat ramps and access areas where vessels will be removed from waterways. These locations are designated to properly decontaminate the vessels and contain any waste once they are removed from the water. The vessels can be cleaned with an approved cleaning agent by wiping down vessels to remove any adhered product and/or sheen. Site inspector/boat captain will approve condition after the vessel is cleaned prior to removal of the site. If on site wipe down does not properly clean the vessel it will be wrapped in Visqueen plastic wrap to prevent any water from being released. The wrapped vessel will be inspected by the Site Inspector boat captain. Once approved, vessel will then be transported to Frac Tank City or site E4 for a thorough cleaning. Any incidental on site Decon waste, wipes, etc. will be contained in a 5 gallon buckets and or poly bags and transported to Frac Tank City for proper disposal.

3.08 HUNTING SEASON SAFE WORK PRACTICES

Specific controls are required to mitigate the hazards present from working during active hunting seasons.

Public Information

- Public Announcements will provide warning to hunters of the presence of workers along the Kalamazoo River and Morrow Lake.
- Additional warning signage will be placed on access roads leading to the river.
- Orange florescent paint will be added to existing black on white hunting warning signage to increase visibility for the hunters.

Work Instructions

- Workers will be instructed through the operation plan and safety alerts to be aware of hunting activities.
- Workers are instructed to use the buddy system, do not work alone.
- Workers are instructed that if they hear gunshots in the immediate area, they are to leave the area.
- Workers are instructed that if they feel threatened by hunting activities, they are to leave the area, call 911 immediately and then report the occurrence to the Safety office at 269-781-1913.
- Workers will be instructed to release two short blasts from air horn when a boat is landing on shore. To prevent confusion during an emergency, workers will be instructed to release repeated long blasts from air horn
- Workers will be provided with emergency whistles and instructed to periodically use their emergency whistles while working on shore to advise hunters that they are in the area.

Increasing Visibility

- Camouflage hard hats and outer layers of clothing are not permitted on the project.
- Workers must wear orange knit hard hat winter liners to increase visibility at the head level.
- Ongoing observations and inspections to ensure workers are wearing high visibility vests.

Hazardous Materials – Handling and Use

Contractors shall:

- Retain Material Safety Data Sheets (MSDS) for all controlled products that are brought on site.
- Maintain an up to date inventory list of all controlled products on site
- Label all containers of hazardous chemicals with the product name, hazardous chemical ingredients, hazard warnings, and manufacturer, temporary containers shall be labeled with the product name and hazard warnings if used more than one day or by more than one worker.
- Hazcom supplier or workplace label shall be applied to all controlled product containers.
- Provide proof of Hazcom training as per federal regulations for all workers required to work with or in the vicinity of any controlled products. Training shall include information on:
    - Warning labels on containers of hazardous materials:
        - Separate MSDS's providing further detailed information.
        - Worker training on how to use the information contained on labels and MSDS's.
- Individuals transporting regulated products shall comply with HazMat regulations, which include having proper certification, manifests and displaying proper placards on vehicles.
- Contractor vehicles transporting more than 50 gallons of fuel or liquid hazardous materials to unmanned pipeline locations and/ or right of way work sites shall be equipped with; a shovel, 36 sq. yard of 6-ml polyethylene sheeting and 55 lb of absorbent.

Solvents, Paints and Chemical Agents

The Material Safety Data Sheet for each, solvent, paint, cleaning agents or chemical used in the work shall be available at the site and reviewed with each worker involved in their use or storage prior to handling. All requirements for storage, handling, and personal protection shall be followed. When in doubt concerning these requirements, the Company Site Inspector and/ or the Company's Construction Safety Representative shall be consulted.

Solvents, cleaners, and cleaning agents shall not be stored or used in unventilated areas or in immediate proximity to any source of ignition. Quantities of such materials greater than that needed for one day(s) work shall be stored outside work areas in a proper storage facility.

NOTE: ALL MSDS'S THAT ARE UTILIZED IN THE FIELD AND WITHIN THE WAREHOUSE ARE STORED ELECTRONICALLY ON SHAREPOINT; HARD COPIES ARE STORED IN THE SAFETY OFFICE (ICP WAREHOUSE FOR BACK-UP).

MATERIAL SAFETY DATA SHEET

CRUDE OIL

MSDS No. **RS296**

Version: 5

Rev. Date **05/13/2002**

IMPORTANT: Read this MSDS before handling and disposing of this product and pass this information on to employees, customers, and users of this product.

1. PRODUCT and COMPANY IDENTIFICATION

Material Identity Crude Oil

Trade Name(s) Oriente, Cano Limon, Line 63, Shell-Ventura, SJV Light, Rainbow, West Texas Inter-Cushing, Peace River-Canadian, Federated Crude-Canadian, Pembina Crude-Canadian, Forcados, Cabinda, Basrah Light, Basrah, Arab Medium, Elang Crude, Girassol

Other Name(s) Earth Oil, Petroleum Oil, Rock Oil, Zafiro

Chemical Description This material is a C1 to C50 hydrocarbon liquid which contains approximately .9 to 2.8 wt% sulfur compounds

Manufacturer's Address

BP West Coast Products LLC
Carson Business Unit
1801 E. Sepulveda Boulevard
Carson, California 90749-6210

BP West Coast Products LLC
Cherry Point Business Unit
4519 Grandview Road
Blaine, Washington 98230

Telephone Numbers

Emergency Health Information:	1 (800) 447-8735
Emergency Spill Information:	1 (800) 424-9300 CHEMTREC (USA)
Other Product Information:	1 (866) 4BP-MSDS (866-427-6737 Toll Free - North America) email: bpcares@bp.com

2. COMPONENTS and EXPOSURE LIMITS

Component[1]	CAS No.	% Composition By Volume[2]		Exposure Limits ACGIH TLV	Exposure Limits OSHA PEL[3]	Units	Type
CRUDE OIL, PETROLEUM	8002-05-9	EQ	100	N/AP	N/AP		
which contains:							
BUTANE	106-97-8	AP	0.8 to 1	800	800	pm	TWA
HEXANE (N-HEXANE)	110-54-3	AP	0.3 to 1	50 skin	50	ppm	TWA
ISOPENTANE	78-78-4	AP	0.3 to 1.5	N/AP 600	750 600	ppm ppm	STEL TWA
PENTANE	109-66-0	AP	1.5 to 2.5	N/AP 600	750 600	ppm ppm	STEL TWA
Other applicable exposure guidelines:							
COAL TAR PITCH VOLATILES, AS BENZENE SOLUBLES [(4)]	65996-93-2			0.2	0.2	mg/m3	TWA
OIL MIST, MINERAL	8012-95-1			10 5	N/AP 5	mg/m3 mg/m3	STEL TWA
STODDARD SOLVENT	8052-41-3			100	100	ppm	TWA

Stoddard Solvent exposure limits are listed as an exposure guideline for hydrocarbon vapors that may be similar to those derived from crude oil.

Since specific exposure standards or control limits have not been established for this material, the exposure limits shown here are suggested as minimum control guidelines.

[1] Carcinogen displayed after Component Name. Listed by (1) NTP, (2) IARC, (3) OSHA, (4) Other

[2] See Abbreviations on last page

[3] The OSHA exposure limits were changed in 1993 due to a federal court ruling. ARCO has chosen to list the 1989 OSHA exposure limits in this document as they are generally more stringent and therefore more protective than the current exposure limits. (Refer to 29 CFR 1910.1000).

3. HAZARD IDENTIFICATION

IMMEDIATE HAZARDS

DANGER

HIGHLY FLAMMABLE! OSHA/NFPA Class 1B flammable liquid. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME! CONTAINS PETROLEUM DISTILLATES! Avoid breathing vapors or mists. Use only with adequate ventilation. If swallowed, do not induce vomiting since aspiration into the lungs may cause chemical pneumonia. Obtain prompt medical attention.

May cause irritation or more serious skin disorders! May be harmful if inhaled! May cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing. May cause irregular heartbeats. Avoid prolonged or repeated liquid, mist, and vapor contact with eyes, skin, and respiratory tract.

Wash hands thoroughly after handling.

Sulfur compounds in this material may decompose to release hydrogen sulfide gas which may accumulate to potentially lethal concentrations in enclosed air spaces. Vapor concentrations of hydrogen sulfide above 50 ppm, or prolonged exposure at lower concentrations, may saturate human odor perceptions so that the smell of gas may not be apparent. DO NOT DEPEND ON THE SENSE OF SMELL TO DETECT HYDROGEN SULFIDE!

Long-term tests show that similar crude oils have produced skin tumors on laboratory animals.

Crude oils contain some polycyclic aromatic hydrocarbons which have been shown to be carcinogenic after prolonged or repeated skin contact in laboratory animals.

Routes of Exposure	Signs and Symptoms
Inhalation (Primary)	Vapors or mists from this material, at concentrations greater than the recommended exposure limits in Section 2, can cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing. Airborne concentrations above the recommended exposure limits are not anticipated during normal workplace activities due to the slow evaporation of this material at ambient temperatures. Exposure to moderate airborne concentrations of hydrogen sulfide (less than 50 ppm) can result in irritation of the eyes, nose and throat, headache, dizziness, shortness of breath, nausea and nervousness. Exposure to hydrogen sulfide vapor above 200 ppm may cause irritation of mucous membranes, inflammation of the lungs, accumulation of fluid in the lungs, irregular heartbeats, unconsciousness with convulsions or impaired breathing with suffocation. Exposure to higher concentrations of hydrogen sulfide vapor (above 500 ppm) may cause rapid death.
Eye Contact	May cause slight eye irritation.
Skin Contact	Moderate skin irritation may occur upon short-term exposure. Exposure to sunlight may increase the degree of skin irritation. Absorption through the skin may occur and produce toxic effects (see Summary of Chronic Hazards).
Ingestion	May cause irritation of the mouth, throat and gastrointestinal tract leading to nausea, vomiting, diarrhea, and restlessness. May cause headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing. ASPIRATION HAZARD: Aspiration into the lungs may cause chemical pneumonia. This material can enter the lungs during swallowing or vomiting and may cause lung inflammation and damage which in severe cases may be fatal.

Summary of Chronic Hazards and Special Health Effects	Personnel with preexisting central nervous system (CNS) disease, skin disorders, or chronic respiratory diseases should be evaluated by an appropriate health professional before exposure to this material. Prolonged/repeated skin exposure, inhalation or ingestion of this material may result in adverse dermal or systemic effects. Avoid prolonged or repeated exposure. May be harmful if absorbed through the skin. Prolonged or repeated contact may create cancer risk, organ damage, and adversely affect reproduction, fetal development and fetal survival. Avoid all skin contact. Neurotoxic effects have been associated with n-hexane, a component of this material. Avoid prolonged or repeated exposure. See Section 11 for Additional Toxicological Information.

4. EMERGENCY and FIRST AID

Inhalation	Immediately remove personnel to area of fresh air. For respiratory distress, give oxygen, rescue breathing, or administer CPR (cardiopulmonary resuscitation) if necessary. Obtain prompt medical attention.
Eye Contact	Flush eyes with clean, low-pressure water for at least 15 minutes, occasionally lifting the eyelids. If pain or redness persists after flushing, obtain medical attention.
Skin Contact	Immediately remove contaminated clothing. Wash affected skin thoroughly with soap and water. If irritation persists, obtain medical attention.
Ingestion	Do not induce vomiting since aspiration into the lungs may cause lipoid pneumonia. Obtain prompt medical attention.

Emergency Medical Treatment Procedures	See above procedures. Personnel with pre-existing central nervous system disease, skin disorders, chronic respiratory diseases, or impaired liver of kidney function should avoid exposure to this product.

5. FIRE and EXPLOSION

Flash Point (Method)* Based on NFPA Petroleum, Crude		AP 20°F to 90°F
Autoignition Temperature (Method)*		N/DA
Flammable Limits (% Vol. in Air*	**Lower**	AP 1 +
	Upper	AP 8 +

* At Normal Atmospheric Temperature and Pressure
+ Based on NFPA 325

NFPA Hazard Rating:
Health: 2 = Moderate
Fire: 3 = High
Reactivity: 0 = Insignificant
Special:

Fire and Explosion Hazards	HIGHLY FLAMMABLE! This material releases flammable vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, these vapors can burn in the open or explode in confined spaces. Flammable vapors may travel long distances along the ground before reaching a point of ignition and flashing back. Open top tanks involved in a fire have a potential for "boil-over" if water or water-in-oil emulsion is at the bottom of the tank. Boil-over may result in a large expulsion of burning oil from the tank, greatly increasing the fire area.
Extinguishing Media	Foam, Dry chemical, Carbon dioxide (CO2) Water and water fog can cool the fire but may not extinguish the fire.
Special Firefighting Procedures	For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of combustion products and oxygen deficiencies. Cool tanks and containers exposed to fire with water. If firefighters cannot work upwind to the fire, respiratory protective equipment must be worn unless and until atmospheric monitoring indicates that such protection is not required. Improper use of water and extinguishing media containing water may cause frothing which can spread the fire over a larger area. Water fog or spray are of value for cooling tank shells and surfaces exposed to fire, but may not achieve extinguishment.

6. ACCIDENTAL RELEASE MEASURES

Precautions if Material is Spilled or Released

Contain spill, evacuate non-essential personnel, and safely stop flow. On hard surfaces, spilled material may create a slipping hazard. Equip cleanup crews with proper protective equipment (as specified in Section 8) and advise of hazards. Clean up by recovering as much spilled or contaminated materials as possible and placing into closed containers. Consult with an environmental professional for the federal, state and local cleanup and reporting requirements for spills and releases.

7. HANDLING and STORAGE

Handling, Storage and Decontamination Procedures

Store and transport in accordance with all applicable laws. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME! KEEP CONTAINERS CLOSED, PLAINLY LABELED AND OUT OF CLOSED VEHICLES! Containers should be able to withstand pressures expected from warming or cooling in storage. Ground all drums and transfer vessels when handling. Store in cool (80°F or below), well-ventilated location. All electrical equipment in storage and/or handling areas should be installed in accordance with applicable requirements of the National Electrical Code (NEC).

KEEP OUT OF REACH OF CHILDREN!

Empty containers retain some liquid and vapor residues, and hazard precautions must be observed when handling empty containers.

For determining National Electrical Code (NEC) Hazardous (Classified) location requirements for electrical installations, consider this material Class 1, Group D.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Where possible, use adequate ventilation to keep vapor and mist concentrations of this material below the Occupational Exposure Limits shown in Section 2. Electrical equipment should comply with National Electrical Code (NEC) standards (see Section 7).

Respiratory

Where there is potential for exposure to hydrogen sulfide gas in excess of the permissible exposure limit, a NIOSH/MSHA-approved supplied-air respirator operated in positive pressure mode should be worn.

If hydrogen sulfide gas is not present in excess of permissible exposure limits, a NIOSH/MSHA-approved air-purifying respirator with an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations of hydrocarbon vapor may exceed the exposure limits in Section 2. Where work conditions may generate airborne mists of the material, also use a high-efficiency particulate pre-filter. Consult a health and safety professional for guidance in respirator selection. Respirator use should comply with OSHA 29 CFR 910.134.

CAUTION: The protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, if exposure levels are not known, or if concentrations exceed the protection limits of the air-purifying respirator.

Eyes

Eye protection should be worn. If there is potential for splashing or spraying, chemical protective goggles and/or a face shield should be worn. If contact lenses are worn, consult an eye specialist or a safety professional for additional precautions. Suitable eye wash water should be available in case of eye contact with this material.

Skin

Avoid all skin contact with this material. If conditions of use present any potential for skin contact, clean and impervious clothing such as gloves, apron, boots, and facial protection should be worn. Neoprene, Nitrile, Butyl Rubber or Viton glove material is recommended. When working around equipment or processes which may create the potential for skin contact, full body coverage should be worn, which consist of impervious boots and oil-resistant coated Tyvek suit or other impervious jacket and pants.

Non-impervious clothing which accidentally becomes contaminated with this material should be removed promptly and not reworn until the clothing is washed thoroughly and the contamination is effectively removed. Discard soaked leather goods.

Other Hygienic and Work Practices	Use good personal hygiene practices. If skin contact should occur, material should be removed from the skin with a waterless hand cleaner, and the affected area should then be washed with a mild soap and water. Wash hands and other exposed areas thoroughly before eating, drinking, smoking or using toilet facilities.

9. PHYSICAL and CHEMICAL PROPERTIES

Boiling Point:	AP -54°F to 1100°F
Viscosity Units, Temp. (Method):	N/DA
Dry Point:	N/AP
Freezing Point:	N/DA
Vapor Pressure, Temp. (Method):	AP 1 to 2 at 100°F (REID-PSIA)
Volatile Characteristics:	Appreciable
Specific Gravity (H_2O = 1 @ 39.2°F):	AP 0.88
Vapor Sp. Gr. (Air = 1.0 @ 60°F - 90°F):	N/DA
Solubility in Water:	Negligible
PH:	N/AP
Appearance and Odor:	Thick light yellow to dark black colored liquid. Petroleum hydrocarbon odor.
Other Physical and Chemical Properties:	Total sulfur = approx. 1.1% - 2.8% Hydrogen sulfide content is less than 5 ppm dissolved in liquid Vanadium = approx. 210 ppm

10. STABILITY and REACTIVITY

Stability	Stable
Hazardous Polymerization	Not expected to occur.
Other Chemical Reactivity	N/AP

Conditions to Avoid	Heat, sparks, and open flame.
Materials to Avoid	Strong acids, alkalis, and oxidizers such as liquid chlorine and oxygen.
Hazardous or Decomposition Products	Burning or excessive heating may produce carbon monoxide and other harmful gases or vapors including oxides of sulfur and nitrogen.

11. TOXICOLOGICAL INFORMATION

Toxicological Information	The information found in this section is written for medical, toxicology, occupational health and safety professionals. This section provides technical information on the toxicity testing of this or similar materials or its components. If clarification of the technical content is needed, consult a professional in the areas of expertise listed above.
Prolonged/ Repeated Exposures	IARC has determined there is "limited evidence for the carcinogenicity in experimental animals of crude oil" and "inadequate evidence for the carcinogenicity in humans of crude oil." IARC concludes that "crude oil is not classifiable as to its carcinogenicity to humans (Group 3)." Crude oil administered orally to pregnant rats during gestation produced increased number of resorptions and decrease in fetal weight and length.

Exposure to N-hexane at concentrations considerably higher than the current permissible exposure limit has reportedly been associated with peripheral neuropathy.

12. ECOLOGICAL INFORMATION

Not Available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Maximize recovery for reuse or recycling. Consult environmental professional to determine if state or federal regulations would classify spilled or contaminated materials as a hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Comply with all federal, state and local laws pertaining to waste management.

14. TRANSPORT INFORMATION

UN Proper Shipping Name	Petroleum crude oil
UN Hazard Class	3
UN Number	UN1267
UN Packing Group	PGI

15. REGULATORY INFORMATION

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), TITLE III

Section 311/312 Hazard Categories:
Immediate (acute) health hazard
Delayed (chronic) health hazard
Fire hazard

No chemicals in this product exceed the threshold reporting level established by SARA Title III, Section 313 and 40 CFR 372.

TOXIC SUBSTANCES CONTROL ACT (TSCA)
All components of this product are listed on the TSCA Inventory.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)
This material is covered by CERCLA's PETROLEUM EXEMPTION.

(Refer to 40 CFR 307.14)
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 - PROPOSITION 65

PROP 65 WARNING LABEL:
Chemicals known to the State to cause cancer, birth defects, or other reproductive harm are found in gasoline, crude oil, and many other petroleum products and their vapors, or result from their use. Read and follow label directions and use care when handling or using all petroleum products.

WARNING:
This product contains the following chemical(s) listed by the state of California as known to cause cancer or birth defects or other reproductive harm.

MINERAL OILS, UNTREATED [(C)]

Other Prop 65 chemicals will result under certain conditions from the use of this material. For example, burning fuels produces combustion products including carbon monoxide, a Prop 65 reproductive toxin.

[(C)] = Carcinogen

16. OTHER INFORMATION

General Comments The information and conclusions herein reflect normal operating conditions and may be from sources other than direct test data on the mixture itself.

Abbreviations:			
	EQ = Equal	AP = Approximately	N/P = No Applicable Information Found
	LT = Less Than	UK = Unknown	N/AP = Not Applicable
	GT = Greater Than	TR = Trace	N/DA = No Data Available

Prepared by: Product Stewardship

Disclaimer of Liability

The information in this MSDS was obtained from sources which we believe are reliable. **HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.**

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. **FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.**

This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Husky Energy Material Safety Data Sheet

WHMIS	Personal Protection	TDG Road/Rail
		

Section I. Product Identification and Uses

Common/Trade name	**Western Canadian Select (WCS)**		
Synonyms	Not available.	**CAS #**	8002-05-09
Chemical family	Blend of Heavy Petroleum Crude, Medium Sweet Crude and Synthetic Crude.	**DSL**	On the DSL list.
Supplier	Husky Oil Operations Limited PO Box 6525 Station 'D' Calgary, Alberta T2P 3G7 403-298-6111	**Manufacturer**	Husky Oil Operations Limited PO Box 6525 Station 'D' Calgary, Alberta T2P 3G7 403-298-6111
Material uses	Chemical feedstock		

Section 2. First Aid Measures

Eye contact	Flush eyes for at least 15 minutes with clean water. Patch lightly, allowing drainage. Seek medical attention.
Skin contact	Remove contaminated clothing. Wash skin thoroughly with soap and water. Seek medical attention if irritation develops.
Inhalation	Protect rescuer. Move exposed person to fresh air. If breathing has stopped apply artificial respiration. Seek medical attention.
Ingestion	If swallowed, do not induce vomiting or give liquids. Seek immediate medical attention.

Section 3. Hazardous Ingredients

		Exposure Limits						
Name	**CAS #**	**TWA (ppm)**	**TWA (Mg/M3)**	**STEL (ppm)**	**STEL (Mg/M3)**	**CEIL (ppm)**	**CEIL (Mg/M3)**	**% by Weight**
Crude Oil (Hydrocarbons C5 and C6 Rich)	8002-05-09	100	n/av	n/av	n/av	n/av	n/av	100
Hydrogen Sulphide	7783-06-4	10	14	15	21	n/av	n/av	<0.5
Benzene	71-43-2	0.5	n/av	2.5	n/av			0.1-1
Toluene	108-88-3	20	n/av					1-5
Xylene	1330-20-7	100	n/av	150	n/av			1-30

Toxicity values of the hazardous ingredients

Crude oil (Hydrocarbons C5 and C6 Rich) LD50:4,300 mg/Kg (Rat). LC50: Not available.

Hydrogen Sulphide (H2S) LC50 Inhalation Mouse = 673 ppm 1 hour. LC50 Inhalation Rat = 444 ppm for 4 hours

Benzene. LD50 Oral rat= 930-5600 mg/Kg. LC50 Inhalation rat = 13,700 ppm for 4 hrs.

Xylene. LD50 Oral rat= 4300 mg/Kg. LC50 Inhalation rat= 6700 ppm for 4 hrs. LD50 Dermal rabbit >2000 mg/Kg.

Toluene. LD50 Oral rat= 5000 mg/Kg. LC50 Inhalation rat= 8000 ppm for n4 hrs. LD50 Dermal rabbit= 14000 mg/Kg.

Continued on Next Page

Section 4. Physical Data

Physical state and appearance	Liquid. Black/Brown.
Odor	Petroleum Odour
pH (1% soln/water)	Not applicable.
Odor threshold	O.13 ppm H2S
Evaporation rate	Not available.
Freezing point	Not available.
Boiling point	10°C - 1000°C
Specific gravity	0.92 -0.94 (Water = 1)
Volatility	100 (%vol)
Vapor density	Not available.
Vapor pressure	Not available.
Water/oil dist. coeff.	Not available.
Solubility	Not available.
Molecular Weight	Not applicable.
Melting Point	Not available.
Density	Not available.

Section 5. Fire and Explosion Data

Auto-ignition temperature	Not available.
Flash points	CLOSED CUP: -40°C (-40°F)
Flammable limits	Not available.
Extinguishing Media	Use DRY chemicals, CO2, or foam to extinguish fire. Water may not be an effective medium to extinguish fire. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Special fire fighting procedures	Use supplied air or self contained breathing apparatus (SCBA) for large fires or for fires in enclosed areas.
Flammability	Highly flammable liquid. Released vapours may form flammable/explosive mixtures at or above the flash point. Vapours may travel considerable distances to ignition sources and cause a flash fire. All storage containers and pumping equipment must be grounded.
	Remark No additional remark.
Risks of explosion	This material is sensitive to static discharge. This product is not sensitive to mechanical impact.
	Remark No additional remark.

Section 6. Reactivity Data

Stability	The product is stable.
Hazardous decomp. products	Carbon monoxide, carbon dioxide and irritant fumes and gases including sulphur oxides, nitrogen oxides and aldehydes.
Reactivity	Incompatible material: Strong acids, strong oxidizers, chlorine. Hazardous polymerization: Will not occur.
	Remark No additional remark.

Continued on Next Page

Section 7. Toxicological Properties

Routes of entry	Ingestion. Inhalation. Eye contact. Skin contact.
TLV	TLV-TWA 100 PPM (525 mg/m3) for stoddard solvent from ACGIH. Hydrogen Sulfide: TWA: 10 ppm, STEL: 15 ppm, from ACGIH Benzene TWA:0.5 ppm, STEL: 2.5 ppm, from ACGIH, SKIN Toluene TWA: 20 ppm, from ACGIH Consult local authorities for acceptable exposure limits.
Toxicity to animals	**Hydrocarbons C5 and C6 Rich** LD50: Not available. LC50: Not available. **Hydrogen Sulphide (H2S)** **LC50 Inhalation Mouse = 673 ppm 1 hour** **LC50 Inhalation Rat = 444 ppm for 4 hours**
	Remark No additional remark.
Chronic effects	This product may contain benzene. Benzene has been classified by the international agency for research on cancer as a group 1 product indicating sufficent evidence of carcinogenicity. Studies exist which report a link to crude oil and reproductive effects including fetal tumors and menstrual disorders. This product contains small quantities of xylene. High exposure to xylene has produced fetotoxic effects in animal studies. This product contains small quantities of polycylic aromatic hydrocarbons. Prolonged contact with these compound has been associated with the induction of skin and lung tumours. This product may contain toluene which is known to cause visual impairment, narcosis, anxiety, muscle fatigue, insomnia, dermatitis, parathesis, liver and kidney damage and to affect reproduction.
	Remark No additional remark.
Acute effects	Sensitizing Capabiltiy: No effects known. Irritancy: Skin, eye and upper respiratory tract irritant.
Ingestion	Pulmonary aspiration hazard if swallowed and vomitting occurs.
Skin	Prolonged skin contact can cause defatting of the skin resulting in dry cracked skin and dermatitis.
Eyes	Eye contact with product or product vapours may result in eye irritation.
Inhalation	May cause headache, dizziness, loss of appetite and loss of consiousness. Product vapours are irritating to the respiratory tract.
	Remark This product contains small quantities of hydrogen sulphide (H2S) gas which may collect in confined spaces. Acute effects vary with concentration of H2S released from mild eye, nose and throat irritation at approximately 100 ppm to sudden unconsciousness or death at 500 ppm.
Synergistic materials	Not available.

Section 8. Preventive Measures

Waste disposal	Dispose of in accordance with all federal, provincial and local regulations.
Storage	Keep away from all ignition sources. Maintain temperature below the flash point. Head spaces in storage containers may contain hydrocarbon vapours and toxic hydrogen sulphide gas.
Ventilation	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
Spill and leak	Evacuate unecessary personnel. Eliminate all ignition sources. Be alert to the potential for the presence of hydrogen sulphide gas and don appropriate protective equipment. Stop leak if safe to do so. Contain spill and absorb with inert absorbent. Large spills should be removed with explosion proof vacuum equipment. Large pools may be covered with foam to prevent vapour evolution. Comply with federal, provincial, and local requirements for spill notification.

Continued on Next Page

Section 9. Classification/Regulatory Information

TDG road / rail

TDG CLASS 3: Flammable liquid with a flash point less than or equal to 60.5 C (140.9 F). Closed cup test method.

PIN: 1267 - PETROLEUM CRUDE OIL

Remark
No additional remark.

WHMIS

WHMIS CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).

Remark
No additional remark.

Other

This product is on the Domestic Substances List (DSL). TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory.
Refer to federal, provincial, and local legislation for further requirements.

Section 10. Protective Clothing

Eye

Non-vented chemical goggles to prevent eye irritation from the solvent vapours.

Skin

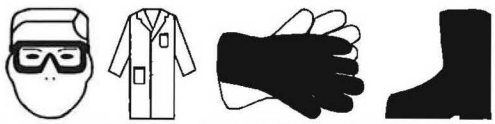
Impervious gloves and clothing should be worn as appropriate to protect against skin contact. Neoprene or nitrile material is suggested.

Respiratory

Respiratory protection may be required in poorly ventilated areas. Properly fitted air purifying masks equipped with organic vapour filters will provide protection at low concentrations. Air supplied respirators or positive pressure self contained breathing apparatus is required when atmospheric concentrations of hydrocarbon vapours are likely to exceed 10X the occupational exposure limit or when high concentrations of H2S may be present.

Other

As required by the situation according to your companies policies and procedures. Contact your supervisor for direction.



Section 11. Preparation Information

References

-Provisional Domestic Substances List, Canadian Ennvironmental Protection Act, Volume 1-Registry Number Index, April 1990; Environment Canada. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. CCOHS (Chem advi)
CCOHS(Cheminfo) Doccumentation of the Threshold Limit Values and Biological Exposure Indices (ACGIH)
Pocket Guide to Chemical Hazards (NIOSH)
Transportation of Dangerous Goods Shedule II List II

MSDS Status

Acronyms: TLV = Threshold Limit Value N/AP = Not applicable N/AV = Not Available COC = Cleveland Open Cup PMCC = Pensky Martens Closed Cup

Validated by Husky Corporate Hygiene on 3/19/2009.	**Verified by Husky Corporate Hygiene.**
Supersedes: 11/28/2005	**Printed 3/9/2009.**

Continued on Next Page

Emergency Phone # 403-262-2111

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

TASK HAZARD ASSESSMENT

Job Position &/or Task : Site Prep ,vacuum truck, Boom Deployment, Hydrocarbon Skimmer, Creek Diversion, Contaminated soil, contaminated material handling, Liquid waste holding, Tank set up and transfer operation.
Position Status : Company **X** Contractor **X**
Project & Site Location : Marshall Leak sites
Date Completed &/or Revised : July 29, 2010

KEY JOB FUNCTIONS &/OR TASKS	EQUIPMENT, MATERIALS,TOOLS & MACHINERY UTILIZED	RISKS (HEALTH & SAFETY HAZARDS)	HAZARD CONTROLS (PROTECTIVE DEVICES & EQUIPMENT, SAFE WORK PROCEDURES)
Access Site	Personnel, Trucks, Vacuum Trucks, Frac Tanks, and Tanker Trucks.	No Site contact. LEL 10%, H_2S 10 PPM, CO 35 ppm and Benzene 0.5 ppm levels to high	Security in place for access control. All personnel must have site contact; all personnel must have site orientation to access site. Safe work permit with Initial atmospheric testing required Equipment to meet spark arrestor / shut- off requirements. Site conditions to be checked for soft areas and gravel or matting in place for access to be maintained.
Control zones	Cold zone Staging areas Hot zone	No site access approval No control of work zones No control of equipment Risk of spreading contaminated material	Cold zone- security, orientation decals, equipment tracing and assignment. Staging area- Tool and equipment storage, PPE. Supplies. Hot zone area cordoned off restricted access - permit required area monitoring.
MSDS	Heavy Crude Diluent Mix (i.e. Cold Lake)	Fire , exposure to H_2S, Benzene Light hydrocarbons vapors will release from product at normal temperatures creating an explosive atmosphere.	Ventilation (natural or mechanical) may be required. Gas detection equipment for continuous LEL monitoring is required. Proper binding techniques to prevent static. Proper bins for hydrocarbon waste store as vapors may release from waste materials.
Labor Personnel	Response workers Personnel exposure to LEL, H_2S, benzene.	No training records, Exposure greater than 3% LEL	Identify training requirements. Respirator fit testing required Fit testing records. Review Christina Lake (Cold

	Uneven ground Working with loose product. Vegetation clean up at stream banks Booms	Strains, slips, trips falls, eye injuries, Worker exposed to crude oil, LEL, H_2S,CO, benzene No respirator fit testing.	Lake) MSDS for product leaked and surrounding area. Spill cleanup meets precautions higher risk of exposure for working with hydrocarbons. Continuous Atmospheric monitoring for LEL and H_2S and spot sample for benzene. Safe work permits required for all work in restricted areas. Life jackets when required.
Site excavation for culvert installation for stream diversion	Heavy equipment	Line strike , ignition source, excavation slough in	Excavation checklist, Line locates, stake out excavation. Spotters Continuous gas monitoring. Proper rigging techniques. High visibility vests
Dry shrub, grass area	Trucks	Fire	Vehicles equipped with fire extinguishers. Monitor area Check area for equipment staging to prevent ignition of dry grass. Smoking in designated areas only.
Staging vacuum trucks	Vacuum truck	Limited truck access, striking property, Backing incidents, static, hose rupture, gasket leaks, worker exposed to crude oil, LEL, H_2S, benzene, noise levels above 85DbA	Drive through preferable, Use spotters for backing and positioning, Trucks bond to ground. Check hose condition, ensure gaskets are the proper material and in good condition and use a spill pail for drip containment. Exhaust hose to safe location. Continuous gas monitoring. Ensure workers have current Hazard Communication training and respiratory fit testing. Hearing protection
Leak containment	Boom Deployment	Drowning, Slips, trips and falls. Potential to be pinned in current against dams or barrier in the stream. Manual lifting and carrying of equipment and supplies. Personnel exposure, Contaminated	Stream, Booms/dams to be at checked for potential hazards, life jackets to be worn on boats and at night adjacent to waterways, in high current areas. Booms to be checked for breech. Stages to be monitored to maintain containment and boom control. Area monitoring LEL H_2S. Proper PPE to be worn. Decontamination zone- remove outer layer of clothing to prevent

		clothing. Unstable stream banks. Underwater hazards.	spreading oil contamination. Fast currents by hidden underwater terrain – no entry (risk of someone getting pinned.)
Material transfer Tank farm operation	Skimmers, Vacuum Trucks, Tanker trucks.	Fire, over fill, vents overflow. Leaks. Workers not trained for tank loading or unloading. Exposure to LEL, H_2S, benzene. Tank overflow-spill Over pressure tank vacuum. Static build-up potential ignition source. Valve left open or closed or operated by unauthorized worker.	Personal protection standard leak site PPE. Continuous gas monitoring, open vents at all time to prevent over pressure/ vacuum. Exhaust vents hose to safe location. Valve to be in good operating order. Tank setup stable ground. Grounding in place for tanks. Known tank volume. Level gage and log book. Tank transfer to be operated by tanker personnel at all time while truck loading and unloading. Proper bonding techniques to be used while transferring products. All personnel to be on Safe work permits. Safety eye wear, respirator fit testing, Hearing protection Proper PPE to worn at all times during transfers if required. Continuous gas monitoring and checks for benzene.
Contaminated soil and contaminated material.	Heavy haul trucks	Spill contaminated ground in clean zones. Hot material fire hazard, over exposure Containment area loading. Contaminated material in trucks. Contaminates Uneven loads on trucks Truck over turn, Jack knife. People walking in area No Identification	100% containment. Soil testing to confirm soil characterization- Flash point-hydrocarbon content, area monitoring for LEL H_2S, benzene. Assess truck loading ramp for slope, slippage and turning radius for loading and unloading verify with test runs. Line trucks with poly. Uneven loads on trucks . Wind and weather conditions may effect -off loading. Proper bonding techniques to be used while transferring products. All personnel to be on Safe work permits. Safety eye wear,

		on tank bins	respirator fit testing, Hearing protection Proper PPE to worn at all times during transfers if required. Continuous gas monitoring and checks for benzene. No foot traffic on rig mats. Waste manifest and labels if required.
Leak site excavation	Heavy equipment	Hazardous area, Chemical exposure, Fire, Trench walls unstable. Contact pipeline.	Soft terrain rig matting where required for unstable ground. Atmosphere monitoring for benzene, H_2S, LEL. Cordon off hot zone area applicable signage in place No smoking. Wind socks in place. Fire watch, spotters Fit testing requirement may apply for respirators.
Site Grading and material handling	Heavy equipment Culvert piping Transport trucks	Fire, Noise, equipment strike , underground cables, overhead line, towing vehicles, people traffic	Fire watch with reflective vests and fire extinguisher, Hearing protection, good communication practice to be followed between equipment operators for operating in congested areas. Continuous monitoring for LEL Spotters to wear high visibility vest. Proper rigging techniques. Proper signal persons, Proper use of tag lines. Transport trucks fit for transporting wet waste material.
Tank farm set up	Holding tank and Piping	Spill containment, static charge, truck loading, Fire, wrong valve operation in tank farm.	Lining for containment, piping off loading using proper rigging practices, Grounding in place for tanks and truck loading. Only workers in charge of operating tanks operate tank farm valve header and operate off loading pump. Only worker operating trucks operate truck valves. Vac unit must have drip pans in place spill containment.
Vehicle Maintenance	Heavy equipment	Worker not involved in clean up create hazard	All work at site to be permitted and authorized.
Air monitoring	Public concerns	Odors , fugitive emissions	Maintain good communication with landowners, environment to

		Vehicle traffic. Pedestrian traffic.	set up perimeter air sampling for fugitive emission measurement. Drive within speed limits. Monitor roads for debris. Share awareness to work force. Limit parking alongside Leggitt Road leading to Marshall PLM shop.
Health	People	Mosquitoes Heat Stress	Use insect repellant with 10-25% DEET. Follow procedures for working in extreme temperatures (frequent water breaks)

Worker (Print Name): _____

Worker Signature: _____

Site Supervisor: _____

Site Supervisor Signature: _____

TASK HAZARD ASSESSMENT

Job Position &/ or Task: Chain Saw Operation In and Around Water
Position Status: Company and Contractor
Project & Site Location: Marshall Leak Sites
Date Completed &/or Revised: August 26, 2010

Chainsaw operation from the ground or river bottom	-Proper PPE for the activity -Water or other hydration materials	-Laceration -Muscle strain, static muscle loading -Vibration -Chain snag or break -Heat stress or exhaustion -Particles in the eyes	-Chainsaw operator must be competent in saw operation. -Keep saw close to the body and arm extensions to a minimum -Minimize saw use above the shoulder level -Wear padded gloves to minimize vibration to hands and arms -Wear nylon or other chaps to protect against snag and/or broken chain impact -Take breaks as required ensuring water or other hydration material is available
Chainsaw operations from the boat	-Proper PPE for the activity	-Drowning or personal contamination -Upset or capsizing of the boat -Laceration -Muscle strain, static muscle loading -Vibration -Chain snag or break	-Chainsaw operator must be competent in saw operation. -Keep saw close to the body and arm extensions to a minimum -Maintain a seated position ONLY during saw operation -Minimize saw use above the shoulder level -Wear padded gloves to minimize vibration to hands and arms -Wear nylon or other chaps to protect against snag and/or broken chain impact
Ensure that no-one is under or in the immediate vicinity of falling objects and/or trees and braches being cut.	-Communications	-Items may strike an individual and cause injury or death	-Personnel must identify fall path of material and objects before the cut -Guide roped held by a second worker should be used to stabilize and guide the fall of large trees and branches -Do not walk under hung trees or branches
Conduct a Post-Job Critique	-Communications	-Not capturing the appropriate lessons learned from this activity, which could lead us to making the same mistake more than once.	-Get the work team together and review the previous work activity. -If appropriate, red mark a copy of this JHA and provide the feedback to your supervisor.

Worker (Print Name): _____

Worker Signature: _____

Site Supervisor: _____

Site Supervisor Signature: _____

Worker (Print Name): _____

Worker Signature: _____

Site Supervisor: _____

Site Supervisor Signature: _____

APPENDIX B.3

Enbridge Line 6B MP 608

Enbridge Energy, Limited Partnership
Marshall Pipeline Release

Decontamination of Equipment and Personnel Work Plan

August 23, 2010

Revised: February 2011

ENBRIDGE™

APPENDIX B.3

Decontamination of Equipment and Personnel Work Plan

Enbridge Line 6B MP 608
Enbridge Energy, Limited Partnership Marshall Pipeline Release
Marshall, Michigan

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APPENDIX B.3

Decontamination of Equipment and Personnel Work Plan

Enbridge Line 6B MP 608Enbridge Energy, Limited Partnership Marshall Pipeline Release: Marshall, Michigan

Purpose

The purpose of this work plan is to provide the methods to be used for preventing, minimizing, or limiting contamination migration accumulated on personnel and equipment assigned to response activities. It is appropriate for personnel and equipment to be used during hazardous waste and disposal operations as per 29 Code of Federal Regulations (CFR) 1910.120, and 49 CFR Subpart C "Hazardous Materials Regulations".

Because the operations associated with the oil spill response operations associated with the Enbridge-Marshall release involves the transit of personnel and equipment through contaminated soils and/or water, it is assumed that personnel, on- and off-road equipment and/or watercraft will be impacted with oil. This plan will be used for all personnel and equipment, either visibly contaminated or suspected of being contaminated with oil, to return to a non-oiled state. The Plan will also identify methods to minimize the spread of contamination during operations (transport, etc.).

All decontamination operations will be performed under the authority of the Waste Management Branch Director (WMD). These are standard operating procedures which may be varied or changed as required only with formal approval from the WMD. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Inventory

One decontamination station remains at Frac Tank City to handle the decontamination needs of personnel, vac-trucks, tanker trucks, boats, frac tanks, roll-off boxes, and associated equipment. All of this equipment will need to be decontaminated before it can be released back to its owners. A list of the known operational stations is attached to this document as "Table D1". However, it should be noted that this list is not all encompassing, as new access points are being developed, and some level of decontamination is planned for all sites.

Decontamination Procedures

Personnel decontamination areas and equipment decontamination areas have been established at numerous locations for the duration of the response. The number of units will vary by needs related to response activities (i.e. all sites will, at a minimum, provide decontamination for personnel, while only selected sites will handle the decontamination needs for larger equipment). The decontamination areas have been established to be strategically near work areas for personnel and equipment. Water craft decontamination areas have been established in areas accessible to water craft launch locations.

Decontamination Material

A variety of products are available for the decontamination of oil impacted equipment, material and/or personnel, but in general terms, should follow the same philosophy. Environmentally friendly products, such as Core Citrus, Simple Green or like will be used for the bulk of the equipment and material impacted by oil; and with "Dawn" or similar dishwashing liquid for lighter cleaning of material and personnel. Manufacturer recommendations with respect to field concentrations will be followed. If alternative products are proposed, they must be approved by the WMD after consultation with Safety and Environment and the appropriate Transportation, Storage and Disposal (TSD) facility. MSDS for all approved decontamination agents may be found in the Safety office and within the Share Point site.

During washing activities involving Core Citrus or Simple Green Cleaners, the following PPE is required:

- Non-pressure washing activities: Safety glasses, face shield options
- Pressure washing activities: Safety glasses, Foot protection, face shield options

Personnel and hand tool decontamination

Entrance and egress from the hot zones will require donning and doffing personnel protective equipment (PPE). A decontamination station will be established nearby for areas where the potential for personnel contamination exists. Such stations shall be set up to accommodate individuals entering under their own power or in the event that they become disabled. Contaminated PPE will be removed from the outermost layer and turned inside out while removing. Gloves will be removed last. Skin surfaces will be rinsed with a mild detergent and rinsed thoroughly. Contaminated PPE and debris will be collected and bagged for proper disposal.

These decontamination stations are also to be utilized for emergency decontamination of workers should an incident occur. In the case of an emergency contamination incident within a Hot Zone, individuals will be transported to the nearest decontamination area outside of the Hot Zone. Local emergency personnel have been briefed on the procedure for these locations.

Each personnel decontamination area will be contained within a lined and bermed area. These locations will also have at a minimum the following components.

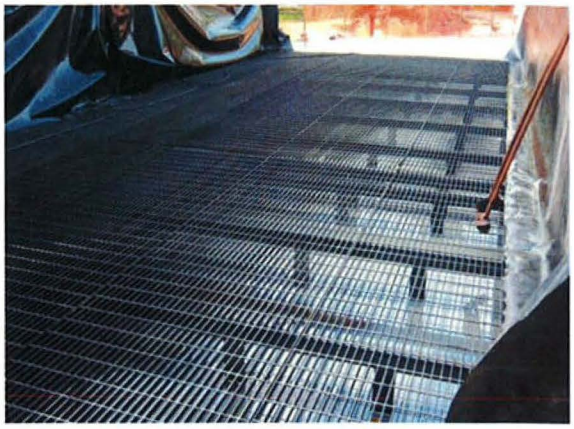
- Sorbent wipers
- Plastic buckets with scrub brush
- Child wading pool
- Containment for solid, oily waste
- Labels for disposal containers
- Containment for decontamination waste water

Equipment that cannot be safely moved and/or small tools will be decontaminated on-site using approved cleaning solutions as described in Section 3.1 – Decontamination Material (above) with a water rinse; this process will be repeated until visible contamination is removed. Areas used for cleaning will be bermed and lined to prevent additional contamination, and the resulting water will be collected and properly disposed of as specified in the Waste Treatment, Transportation and Disposal Plan ("Disposal Plan").

Expendable equipment (e.g., rope mops, brushes, tarps, etc.) will not be decontaminated but will be disposed of in an appropriate container (roll-off, drum, etc.). Each area shall have containers set-up and labeled for each waste stream. All waste will be disposed of as specified in the "Disposal Plan".

Overspray Protection

All decontamination stations dealing with heavy equipment and/or watercraft shall be equipped with overspray berms and curtains to prevent the spread of contamination due to overspray.



Heavy Equipment Decontamination

This section identifies procedures to be followed for heavy equipment used in oil spill response operations associated with the Enbridge-Marshall release. Because these operations may involve transit through and excavation of oil-impacted areas it is assumed that equipment will become contaminated with oil. This plan will be used for all equipment and support equipment, either contaminated or suspected of being contaminated with oil.

Typical Decontamination Station – Heavy equipment

The primary focus of this operation will be to expedite cleanup of oiled heavy equipment, unpowered equipment such as mats, and other response equipment. All equipment must be decontaminated before leaving the work zone. Much of the heavy equipment is being used for soil excavation in or adjacent to the Source Area. Equipment in use at remote locations may require transportation to the decontamination facility across un-impacted areas, and will require partial decontamination (see Working Decontamination below) at the point of use.

Decontamination Pads at Point-of-Use Areas

An impermeable geosynthetic liner (geomembrane) will be placed under each decontamination pad/pool, with the perimeter sufficiently bermed to form a secondary containment to allow for wastewater and rainwater evacuation. Pad/pools and membrane shall have sufficient protection from puncture. All wastewater will be removed via vacuum truck or stored in pumps/pails, drums and/or larger containers for

disposal per the approved "Disposal Plan". All pumps, hoses and piping will be left in place to facilitate speedy evacuation of retained oil/water. Smaller decontamination areas may have a pump and drums for rinseate storage. The final disposal of wash water, oiled sorbents and decontamination materials will be accomplished in accordance with the approved "Disposal Plan".

Heavy equipment decontamination will be performed as follows:

- Working Decontamination - Gross contamination shall be removed by wiping and scraping to remove all oil to conform to 49 CFR Subpart C requirements and will result in no oil being tracked out of the hot zone into or onto clean areas. The work will be performed on a decontamination pad equipped with a wear resistant surface at the edge of the hot zone with the level of PPE required for the work in that area. This level of decontamination will allow the equipment to be immediately transported only to other work zones or to final decontamination locations on public highways in the custody of the operator or driver. All recovered and used materials will be segregated and handled as described in Section 3.2 above, and disposed of as "oily waste" in secure containers at the decontamination site for disposal in accordance with the approved "Disposal Plan". The decontamination will be performed to the satisfaction of the Waste Management Director (WMD), the Decon Branch Supervisor or the supervisor assigned designees. This will be documented on the Decon 3.

- Final Decontamination – All visible impact will be removed from the equipment by pressure washing on a decontamination pad equipped with a wear resistant surface to the satisfaction of the owner and WMD. Final decontamination will be performed at a central facility near the Source Area. Point-of-use decontamination of heavy equipment will be performed on a case-by-case basis and will require the approval of the WMD. The equipment will be cleaned until all visible oil and staining is removed. In the event staining cannot be removed, the stained areas will be wiped with a clean, white absorbent pad. If no visual or olfactory evidence of oil is present, then the decontamination will be considered to be complete, and the WMD or their designee will issue a certificate of Full Decontamination.

- Decontamination waste will be stored, transported and disposed in accordance with the "Disposal Plan"

- Follow-up cleanup of the decontaminations areas will be handled as described in Section 4.0 – Decontamination Station Decommissioning.

Decontamination at Source Area Facility

Decontamination of heavy equipment and other large portable equipment will be performed on a wear-resistant pad with integral sump and geomembrane liner located at a central facility to be located in the Source area.

Approved cleaning solutions (see Section 3.1 – Decontamination Material) will be used as a degreaser and will be applied by a sprayer as needed. By using such a solution, which will not emulsify the oily water, it is possible to recycle/reclaim the rinseate. A MSDS for cleaning solution/chemical will be available at all times at a "right to know" station located at the decontamination site.

Pressure washing, will be performed using a hot/cold pressure washer with a temperature range of ambient to 200° F and pressure ratings between 1,000- and 2,500-psi.

- PPE for decontamination activities at all decontamination sites will include; tyvek coveralls, nitrile gloves, rubber boots, safety glasses and full face shield protection during blasting operations.

NO confined space entry is anticipated with decontamination of heavy equipment. If confined spaces in equipment are encountered, the decontamination or inspection will be performed at the Frac Tank City decontamination area as described in Section 3.4 – Frac Tank City Decontamination Area below. If

confined spaces are encountered at structures, all federal, state, local safety regulations including but not limited to OSHA confined space entry requirements will be followed. The Enbridge confined space entry process and permit shall be used for all confined space entries.

Frac Tank City Decontamination Area

A tank farm (Frac Tank City) has been established on approximately 10-acres south of Division Road and 16-Mile Drive to receive a mixture of crude oil and water generated by the response efforts on the Kalamazoo River and Talmadge Creek. This procedure identifies the procedures for decontamination of tanks and trucks, especially those with confined spaces to be cleaned.
This section provides the requirements for the proper decontamination of the tanks and Trucks, emphasizing non-entry cleaning methods. Such non-entry methods result in added safety to site workers. The tank decontamination work will comply with the tasks listed below.

To accommodate the job requirements, the decontamination cell will be large enough to stage the equipment to be decontaminated and the associated decontamination equipment. To ensure that liquids generated during the cleaning activities are contained a geomembrane, will be placed over the graded sub-grade and a non-woven geotextile will be placed to protect the geomembrane. The geomembrane will be protected by a wear-resistant pad. The decontamination pad will drain to an open sump for water to accumulate, and a pump will transfer the water to a nearby, active frac tank. The total storage capacity of this configuration exceeds the volume of water that could be discharged from a breach in any of the tanks.

Upon completion of decontamination, the tank (and/or Truck) will be certified according to the procedures outlined in *Section 5.0 – Certificate of Decontamination* below, and can then be demobilized from the site. All waste water generated as a result of the decontamination efforts will be stored on-site, and disposed of as specified in the "Disposal Plan".

Marine Equipment Decontamination

This section identifies procedures to be followed by watercraft participating in response operations on Morrow Lake, the Kalamazoo River and any connecting waters. This plan will be used for all watercraft and support equipment, either contaminated or suspected of being contaminated with oil.

Visual Inspection

Each day water based equipment is utilized, the WMD or their designated representative will conduct a visual inspection and if found to be grossly impacted, said equipment will be pulled out of the water, and decontaminated as described in Section 3.5.2 – On Land Decontamination (below).

On-Land Decontamination

The primary focus of this operation will be to expedite cleanup of oiled watercraft, containment boom and response equipment that can be removed from the water in a safe, organized and efficient manner while minimizing further damage to the environment and waste generation. All watercraft must be decontaminated before leaving the work zone.

Watercraft and Trailers

All watercraft working in the oil- impacted areas of the project will be decontaminated at the point of retrieval (see Working Decontamination below).

Water craft equipment decontamination will be performed to one of two standards:

- Working Decontamination - Gross contamination shall be removed by wiping with hydrophilic rags and scraping to remove all oil to conform to 49 CFR Subpart C requirements and preclude oil being tracked onto clean areas. The work will be performed at the edge of the hot zone with the

level of PPE required for the work in that area. This level of decontamination will allow the water craft to be immediately transported only to other work zones on public highways and in the custody of the operator. Transport and storage of partially decontaminated equipment in public areas (i.e. restaurants, hotels, motels, etc.) is prohibited. All recovered and used materials will be disposed of as "oily Waste" in secure containers at the decontamination site for disposal in accordance with the approved Waste Treatment, Transportation and Disposal Plan. The decontamination will be performed to the satisfaction of the WMD or DBS, and will be documented on form DECON-D3.

- Final Decontamination – All impacted equipment is required to undergo full decontamination before leaving the project. Final decontamination will be performed at selected stations designated for full decontamination, and staffed with WMD personnel who are authorized to issue Certificates of Full Decontamination for each piece of equipment. Final decontamination will be performed as described in Section 3.3.2 – Decontamination at Source Area Facility. All visible impact will be removed from the water craft by pressure washing to the satisfaction of the equipment owner and WMD or his designee. The equipment will be cleaned until all visible oil and staining is removed. In the event staining cannot be removed, the stained areas will be wiped with a clean, white absorbent pad. If no visual or olfactory evidence of oil is present, then the decontamination will be considered to be complete, and the WMD or his designee will issue a certificate of Full Decontamination.

Containment Booms

All booms will be removed from the river and either disposed of (absorbent booms) or decontaminated (containment booms) as required. Booms will be removed at the retrieval site and immediately placed in secure containers such as sealed roll-offs, tanks, or other specialized transport containers in compliance with 49 CFR SUBPART C regulations. Booms to be decontaminated will be taken to a specified decontamination station and cleaned to the Final Decontamination standard.

Decontamination Pads at Retrieval Areas

A geomembrane liner will be placed under each decontamination pool with the perimeter sufficiently bermed to form a secondary containment to allow for wastewater and rainwater evacuation. All wastewater will be removed via vacuum truck or pump for disposal per the "Disposal Plan". All pumps, hoses and piping will be left in place to facilitate speedy evacuation of retained oil / water. Small decontamination areas may have a pump and drums for rinseate storage. All barrels, tanks, hoses and other material should be situated within the containment area. The final disposal of wash water, oiled sorbents and materials will be accomplished in accordance with the "Disposal Plan".

Decontamination at Full Decontamination Facility

Final Decontamination of watercraft will be performed at either FTC or E4. FTC will be equipped with lifting equipment to lift boats off trailers to allow full decontamination of the hull and trailer. Other designated facilities will require manual lifting to access the hull and trailer.

Cleaning solutions, such as those described in Section 3.1 – Decontamination Materials will be utilized as a degreaser and will be applied by a hand sprayer and/or pressure washer as applicable. Because this cleaning solution is citrus based it does not leave a petroleum sheen on the equipment after the cleaning process. An MSDS for cleaning solution/chemical will be available at all times at a "right to know" station located at the decontamination site. Typically it is necessary to hand spray applications of the solution with sprayers to hand scrub contaminants from equipment before pressure washing residuals from equipment.

Pressure washing, will utilize a hot/cold pressure washer with a temperature range up to 200° F and a pressure rating up to 2,500 psi.

In-Water Decontamination

Watercraft or equipment too large to be removed from the water (none is known to exist at the time of preparation of this plan) or structures that cannot be removed will be decontaminated inside standard contractor 18" containment boom. If required, smaller watercraft will be used as platforms to facilitate cleanup operations. The hull of the watercraft, or surface to be decontaminated shall be wiped by hand with cotton rags and pressure washed. Cleaning solutions will be not used unless pre-approved by the DSM. Personnel involved in this activity will wear modified PPE Level C including; rain gear or tyvek coveralls, chemical resistant gloves, eye protection and personal floatation device (PFD). Preplanning for protection of adjacent areas shall be accomplished in order to minimize cross contamination. Floating oil from sheen-emanating watercraft will be minimized with sorbents as necessary to reduce potential loss outside the containment boom. Floating sorbent materials shall be utilized in natural collection points as needed to retain free-floating oil. These sorbents will be tended daily.

If initial water craft decontamination is completed and sheen is observed upon water craft egress from decontamination area, secondary decontamination will be implemented. All sheen/product from water craft decontamination will be collected via absorbent pad/boom or trash pump transfer to a collection tank for quantification, reclamation and proper disposal.

NO confined space entry is anticipated as part of the "In-water" decontamination activities. If confined spaces in equipment are encountered, the decontamination or inspection will be performed at the Frac Tank City decontamination area but only after the equipment is inspected to ensure the external surfaces of the equipment has no contamination or has completed working decontamination to prevent contamination of roadways enroute to Frac Tank City. If confined spaces are encountered at structures, special procedures will be prepared on a case by case basis, incorporating all federal, state, local safety regulations including but not limited to OSHA confined space entry requirements will be followed.

Decontamination of Transport Equipment after Loading

The load-out area at FTC is currently equipped with a lining station where inbound empty trucks to transport impacted soil and other waste to disposal facilities are lined, and outbound loads are lined and tarped. Trucks will be inspected and all loose and superficial soils removed to prevent contaminated soils from falling off onto the roadways in accordance with 49 CFR SUBPART C requirements. The roadway and lining facility pavement will be kept clean of all oily matter to avoid tracking contaminated soils off-site and onto the public highways.

Decontamination Station Decommissioning

Containment Sites

As the containment sites are decommissioned, so too, will the need for decontamination at each cease. All salvageable equipment (i.e. hard pads, sprayers, etc.) will be cleaned as described in Section 3.3.1 – Working Decontamination, and transported to the Source Area Decontamination station for final decontamination prior to being released from service. All disposable equipment (i.e. pools, liners, etc.) will be placed in roll-off boxes for disposal as specified in the "Disposal Plan". After removal of all equipment, the site will be inspected for any visible spills/stains, and remediated as necessary, and the site cosmetically restored.

Frac Tank City Site

After all tanks and Trucks have been decontaminated and released from service, the decontamination facility at Frac Tank City will be dismantled and decommissioned. All liners will be removed and placed in transport vehicles or roll-off boxes for disposal. The site will be inspected, and any visible spills/stains remediated as necessary, and the site cosmetically restored.

All final decontamination will take place at Frac City

Source Area Site

After all decontamination activities have ceased at the Source Area Site, the decontamination facilities will be dismantled and decommissioned. All liners will be removed and placed in transport vehicles or roll-off boxes for disposal. The site will be inspected, and any visible spills/stains remediated as necessary and the site cosmetically restored.

Certificate of Decontamination

A certificate of final decontamination will be issued for each piece of equipment prior to demobilization. The WMD or designee and the equipment owner's designated representative will certify that the equipment has been satisfactorily decontaminated before it is released from Company service. The certificate at a minimum, will identify the piece of equipment by make, model and serial number/vehicle identification number (SN/VIN). In the event of a dispute, the WMD representative shall provide final certification of decontamination. A Final Decontamination form (Form DECON-D1) will be used to document final cleaning and acceptance by the equipment owner's representative.
The decontamination will be for each piece of equipment that is partially decontaminated to allow for transport to another work/staging area in compliance with 49 CFR SUBPART C regulations. Form DECON-D3 is provided for daily tracking of decontamination activity and the form is to remain with the WMD until filled and then given to the WMD.
Form DECON-D4 Delegates Authority to the DSMs to act on behalf of the DBM.
All decontamination forms need to be given to the Documentation Unit upon completion of the cleanup.

Enbridge Confined Space Entry

Confined Space Entry Permit

The Contractor shall obtain a Confined Space Permit from an Enbridge Operations Employee who has been designated as Entry Supervisor as required in 29 CFR 1910.146 prior to work commencing, including initial gas testing. The Confined Space Permit procedures shall be in compliance with 29 CFR 1910.146.

The confined space permit shall list all members of the confined space team, including entrants, rescue team, attendants and supervisors. At least one member of the rescue team shall be trained and certified in First Aid and CPR.

The Confined Space Permit shall be reviewed and signed by all workers involved in the activity (including rescue crew) prior to commencement of the work. In the event that conditions deviate from the conditions stipulated in the original permit, all entrants will be withdrawn until conditions can be re-assessed and a revised permit issued.

Atmospheric Testing

Prior to work commencing or a permit being issued, in compliance with 29 CFR 1910.146, the Entry Supervisor or his designated representative shall test the atmosphere within the work area with a calibrated direct reading instrument for the following conditions:

- Oxygen content (% O_2) (where required).
- Flammable gases/vapors (% LEL).
- Toxic air contaminants (H_2S, benzene, mono-styrene, acetone, etc. as required).
- Carbon Monoxide level (CO as ppm).

NOTE: The testing results shall be recorded on the Enbridge Confined Space Entry Permits.

Upon completion of initial gas testing, the Permit Issuer and Permit Receiver must determine the level of respiratory protective equipment required based on the completed Task Hazard Assessment.

While working within a potential hazardous area, air monitoring shall be done at a frequency, which is sufficient to verify that acceptable atmospheric conditions are being maintained within the work area. The Contractor shall provide appropriate gas detection equipment, and shall ensure that Confined Spaces are continuously monitored. This frequency shall be indicated on detailed work procedures or on the Confined Space Entry Permit. As concentrations change, respiratory protection levels shall be reviewed and adjusted accordingly.

Continuous monitoring shall be achieved through the following methods:

- The confined space shall be continuously monitored with a 4-gas monitor placed within the entrant's breathing zone. Two meters will be used, one located at the entry man-way, and one in close proximity to the entrant. An attendant will monitor the remote display of the meters at all times that personnel are in the confined space.
- External monitoring will be performed to assess the atmosphere of areas immediately adjacent to the work area.
- If a monitor goes into alarm, all workers in the work area must immediately stop work, escape to a predesignated muster area, and notify other potentially affected workers.
- The hazards must then be re-assessed by a worker wearing appropriate respiratory protective equipment using a portable multi-gas detector capable of measuring LEL, H_2S, CO and O_2, as per the Contractor's respiratory program.
- As a minimum, gas monitors must provide a visual and audible alarm that is equipped with a low and high alarm points.

Monthly calibration checks and daily bump tests shall be performed on each portable gas detector as specified in the manufacturer's instructions. The Contractor must maintain calibration and bump test records showing the date and initials of the person doing the calibration.

When opening petroleum systems where a known potential for exposure exists, all workers in the immediate work area must wear appropriate respiratory protection as per the completed hazard assessment until O_2 %, H_2S, LEL and Benzene levels have be verified.

Contractor Certifications

All personnel engaged in confined space entry shall provide the WMD or HSO with copies of all certifications documenting valid confined space entry training.

ATTACHMENTS

ATTACHMENT 1
Decontamination Tracking Forms

Enbridge Line 6B MP 608
Marshall Pipeline Release
Certificate of Decontamination

Final

This is to certify that the equipment described below has been satisfactorily decontaminated to be safely released from Company service.

Equipment Make/Model	Equipment SN/VIN
Equipment Description (i.e. Boat/Motor/Trailer, etc.)	
Equipment Owner	Equipment Owner Address
Certified By:	***Accepted By:***
Decontamination Site Manager Signature/Date	Owner/Operator/Agent Signature/Date
Decontamination Site Manager Name (Please Print)	Owner/Operator/Agent Name (Please Print)

Form DECON-D1

Note: Form Decon-D1 to be printed in triplicate with copies noted as follows:

1. *Original Copy: Equipment Owner*
2. *Copy 2: Enbridge Demobilization Unit*
3. *Copy 3: To be retained at Decon Site*

DECON 3

Date: _____

Make/Model	SN/VIN	Unit Description	Owner Name/Address	Signature/Date of Site Decon Manager	Signature/Date of Owner Representative

Enbridge Line 6B MP 608
Marshall Pipeline Release
Delegation of Authority

This is to certify that the undersigned has been authorized by the Decontamination Branch Manager (DBM) to act on his behalf as Decontamination Site Manager (DSM) at the referenced decontamination station:

Waste Management Director Signature/Date

Decontamination Station

Comments:

Decontamination Branch Manager Name (Please Print)

Authorized Decontamination Site Manager Name (print)

Decontamination Site Manager Signature/Date

Form DECON-D4

Note: Form DECON-D4 to be printed in duplicate with copies noted as follows:

1. *Original Copy: Decontamination Site Manager*
2. *Copy 2: to be retained by Decontamination Branch Manager*

ATTACHMENT 2
Decontamination Procedures

Frac Tank Decontamination Procedure: General

1. A lined decontamination pad will be constructed in the vicinity of the water treatment plant, with the exact location determined in the field, to provide two major functions. First, it will keep liquids generated by the cleaning activities from migrating to the surrounding environment. Secondly, its storage capacity will be large enough to provide liquid containment in the event there is a breach in one or both of the process tanks described in Section 2, below.

   To accommodate these requirements, the decontamination cell will be large enough to stage a total of six frac tanks – four tanks being cleaned and two process tanks. The fact that the pad must provide containment and, at the same time allow easy access for the frac tanks, requires that the floor of the pad be excavated below the surrounding ground surfaces.
   Access to the pad will be achieved by backing the frac tank into place. When the frac tank is unhitched, the tongue end at the front of the decontamination cell will be lower than the wheeled end. This configuration is necessary for the cleaning activities to be accomplished as described below. To ensure that liquids generated during the cleaning activities will not flow out of the decontamination cell, the sub-grade will be sloped downward from front to back – the front will be excavated to a depth of about sixteen inches below the adjacent ground, with the back being an additional twelve inches deep, or 28 inches below the adjacent ground. An impermeable geosynthetic liner, such as 40-mil LLDPE or equal, will be over the graded sub-grade and a non-woven geotextile will be placed to protect the geosynthetic liner. Next a variable depth layer of stone will be placed – 12 inches deep at the front and 24 inches deep at the rear, creating a level surface about four inches below the surrounding ground surface. No stone will be placed within four feet of the back of the pad, leaving an open "sump" in which water can accumulate. A pump will transfer water collected in the sump to a nearby, active frac tank in the tank farm. The total storage capacity of this configuration exceeds the volume of water that could be discharged from a breach in the process tanks.
2. One frac tank will be pre-staged in the decontamination area for the storage of clean water obtained from an approved local source to be used in the decontamination process.

3. As they are released from service, contaminated frac tanks will be moved to the decontamination pad, the wheels properly chocked where applicable, and the tank supported with cribbing and bracing in a manner that is consistent with the support structure of the frac tank. The entire decontamination pad will be cordoned off to limit entry by only qualified personnel assigned by, and approved by the Decontamination Branch Manager (DBM) and/or the Decontamination Site Manager (DSM).

4. Prior to the tank cleaning, the atmosphere within the tank will be checked for LEL, H_2S, O_2 and CO and visually inspected to verify that tank entry is acceptable. In the event that confined space entry parameters are not met, the interior of the tank will be rinsed from the outside.

5. After verifying that the atmosphere within the tank meets the confined space entry parameters for LEL, Benzene, H_2S, O_2 and CO and visually inspected, the tank may be entered.

6. All crude oil residuals and/or oily sludge will be vacuumed from the frac tank and transferred into a bulk tank on-site for later disposal per the Waste Treatment, Transportation and Disposal Plan ("Disposal Plan").

7. Utilizing a hot water (ambient to 200°F) pressure washer (1,000- to 2,500-psi) with an extended lance, the remaining heavy crude residual will be flushed to the vacuum pipe and transferred to the receiving tank.

8. After decontamination has been completed, the tank will be inspected and a tank decontamination form (DECON-D1) will be completed identifying the individual tank by owner, tank number, date and time.

SET Environmental, Inc.

450 Sumac Road

Wheeling, IL 60090

High Pressure Washer Safety Inspection Plan

Data available from the Consumer Product Safety Commission (CPSC) indicate approximately 3,100 people were treated in hospitals for high-pressure washer injuries during 2003. Approximately 20 percent of the injuries were chemical burns to the eyes and about 15 percent were lacerations to fingers and hands. Other injuries include thermal burns to hands, back and shoulder strains, and various types of contusions.

Pre-Use Activities

- Thoroughly review and understand information provided in the high-pressure washer operator's manual with particular attention given to descriptions of safety procedures.
- Before using, always inspect the high-pressure washer for damage or disrepair and assure all hoses are intact and connected properly. Verify the "whip checks" are in place at all connection locations.
- If a high-pressure washer fails the pre-use inspection, notify your supervisor and remove the washer from service by attaching a red tag that states "DO NOT USE".

Operating Precaution

- Always wear safety glasses or goggles when using a high-pressure washer.
- Attach hoses and turn on the water before starting a high-pressure washer.
- Maintain a distance from 8-24 inches between the spray-wand nozzle and surface being cleaned.
- Never point the high-pressure washer spray wand at another person.
- High-pressure washers develop pressures from 1,000-4,000 psi at the spray wand nozzle. At these pressures, washer fluids could be inadvertently injected into the skin.
- Keep hands and feet away from the spray wand nozzle. Metatarsal guards must be worn while pressure washing.
- After turning a high-pressure washer off, pull the spray wand trigger to release water pressure in the hose.
- NEVER REPAIR A DAMAGED HIGH-PRESSURE HOSE. ALWAYS REPLACE IT.

High Pressure Hose Inspection – MUST BE COMPLETED BEFORE EACH USE

- Inspect hoses for damage including cuts, bulging, frayed housing, sheathing, missing or worn gaskets and o-rings
- If any defects are found, the hose will be red-tagged and discarded/replaced
- O-rings will be replaced as needed when fault is detected during the inspection
- Whip checks will be used at all hose connection locations
- All hoses will be rated at a minimum of 4500 psi and 250 degrees Fahrenheit.
    - At all times, water being discharged will be less than these specifications.
- All new hoses brought to site must be tagged with the date they are placed in service. Replacement schedule is as follows:
    - 6 months for hoses that are in 24 hour/day service
    - 12 months for hoses that are in 12 hour/day service
    - Based on findings during the daily inspections, hoses may need to be replaced more frequently

COLD STRESS

Overview

Workers who are exposed to extreme cold or work in cold environments may be at risk of cold stress. Extreme cold weather is a dangerous situation that can bring on health emergencies to those who work outdoors, in an area that is poorly insulated or without heat. Whenever temperatures drop decidedly below normal and as wind speed increases, heat can more rapidly leave your body. These weather-related conditions may lead to serious health problems.

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

Early Symptoms:

- Shivering
- Fatigue
- Loss of coordination
- Confusion and disorientation

Late Symptoms:

- No shivering
- Blue skin
- Dilated pupils
- Slowed pulse and breathing
- Loss of consciousness

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, 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)
- Call 9-1-1 immediately

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.

Symptoms of frostbite include:

- Reduced blood flow to hands and feet (fingers or toes can freeze)
- Numbness
- Tingling or stinging

- Aching
- Bluish or pale, waxy skin

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 cool to warm water (the temperature should be comfortable to the touch for unaffected parts of the body). Do NOT use hot water
- 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

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.

Symptoms of trench foot include:

- Reddening of the skin
- Numbness
- Leg cramps
- Swelling
- Tingling pain
- Blisters or ulcers
- Bleeding under the skin

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

The following steps are recommended to protect workers from cold stress:

- Use the buddy system (work in pairs)
- Schedule cold jobs for warmer part of the day
- Reduce physical demands of workers
- Use relief workers or assign extra workers for long, demanding jobs
- Provide warm liquids to workers
- Provide warm areas for use during break periods
- Monitor workers who are at risk of cold stress

Recommendations for Workers

Workers should avoid exposure to extremely cold temperatures when possible. When cold environments or temperatures cannot be avoided, workers should follow these recommendations to protect themselves from cold stress:

- Wear appropriate clothing
  - Wear several layers of loose clothing. Layering provides better insulation

  - Tight clothing reduces blood circulation. Warm blood needs to be circulated to the extremities
  - When choosing clothing, be aware that some clothing may restrict movement resulting in a hazardous situation
- Make sure to protect the ears, face, hands and feet in extremely cold weather
  - Boots should be steel toed, waterproof and insulated
  - Wear hard hat liners; it will keep your whole body warmer. Hats reduce the amount of body heat that escapes from your head
- Move into warm locations during work breaks; limit the amount of time outside on extremely cold days
- Carry cold weather gear, such as extra socks, gloves, hats, jacket, blankets, a change of clothes and a thermos of hot liquid
- Avoid touching cold metal surfaces with bare skin
- Monitor your physical condition and that of your coworkers

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperatur- (°F) V= Wind Speed (mph)

Effective 11/01/01

1.0 Introduction

1.1 Purpose

This document provides general overview for actions to be taken in the event of severe weather. For the purposes of this document severe weather includes both:

- Thunderstorms / Lightning
- Tornadoes
- High Winds

1.2 Acronyms

Call-Em-All – Emergency Response Messaging System
NWS – National Weather Service
NOAA – National Oceanographic and Atmospheric Administration
PTT – Verizon Push To Talk

2.0 Roles and Responsibilities

2.1 Project Safety Officer

- Provide Task Force Leaders/Field Safety with general information to implement this plan.

2.2 Field Safety Staff

- Provide advice and recommendations to Field Supervisors regarding the implementation of this plan.
- Monitor Verizon Push To Talk (P.T.T.) and Call-Em-All for weather warnings.
- Notify work crews of severe weather alerts.

2.3 Field Supervisors

- Advise workforce based on the requirements of this management program.
- Monitoring probability of severe weather conditions throughout the day.
- Provide general overview to employees where safe shelter can be found in the event of severe weather.
- Complete the Severe Weather Plan for your area(s) found in Appendix A.

2.4 Workers

- Follow the direction of field supervisor
- Be alert for severe weather.
- Know where you will go to seek safe shelter in the event of a severe weather episode

3.0 Lightning and Tornado Management Plan

3.1 Work Planning and Scheduling: Good planning can reduce the chances of injury during severe weather. During severe weather warnings, instructions should be provided to task force members to remind them where they can find safe shelter should the need arise.

3.2 Thunder Storms / Lightning Instructions

Lightning presents a serious risk to employees that are working outdoors. The supervisor is responsible for ensuring the safety of their employees. The supervisor will:

- Set yourself up for success. Before working in the field the supervisor should obtain weather information and communicate it to the field crew from Enbridge Safety. During the day, watch for developing thunderstorms.
- Review and be knowledgeable of potential hazards and actions that need to be taken during a lightning event.
- Take actions based on a lightning warning issued by Enbridge Safety. Enforce lightning drill when a storm is within 10 miles of the group/base, i.e. a 30 second count or less between flash and boom. Notify Enbridge Safety Office that work has stopped and workers are seeking shelter.
- Direct workers to seek shelter (building or vehicle) if they are working in exposed locations such as open water, marshes, on beaches, etc
- Direct workers to avoid water, high ground, open spaces, metal objects including electric wires, machinery, motors, etc., and solitary trees or other tall objects when lightning is in the area.
- Direct personnel in vessels to come to a shore.
- When working in remote locations, maintain communications for weather changes. Relocation takes longer, so you'll need to be more proactive in your decisions.
- Wait 30 minutes after the last clap of thunder or the last lightning strike, before resuming work in a high-risk area. Notify the Safety Officer of the resumption of work activities.

3.3 Tornado Instructions

Some tornadoes strike rapidly, without time for a tornado warning, and sometimes without a thunderstorm in the vicinity. When you are watching for rapidly emerging tornadoes, it is important to know that you cannot depend on seeing a funnel: clouds or rain may block your view. The following weather signs may mean that a tornado is approaching:

- A dark or green-colored sky
- A large, dark, low-lying cloud
- Large hail
- A loud roar that sounds like a freight train

A tornado warning is issued when a funnel cloud has been sighted or picked up by radar. If possible, shelter should be taken when a tornado warning is issued. In the event of severe weather, the following plan will be implemented.

1. The Safety group within the ICP will monitor severe weather. Enbridge Safety will disseminate a warning (as per the Warnings and Communication Plan) if a tornado alert is issued.
    - The audio alarm in Calhoun and Kalamazoo County will be triggered by the local government in the event of a Tornado.

When a tornado warning is issued the Task Force Leader (Field Supervisor) in the affected area will:

- Ensure that employees in span of control take shelter immediately
- Try to keep employees calm and corralled in shelter until they receive the —all-clear from Enbridge Safety.
- If shelter is not available direct workers to:
    - Lie flat in a nearby ditch or depression and cover your head with your hands. Be aware of the potential for flooding.
    - Do not get under an overpass or bridge. You are safer in a low, flat location.
    - Never try to outrun a tornado in urban or congested areas in a car or truck. Instead, leave the vehicle immediately for safe shelter.
    - Watch out for flying debris. Flying debris from tornadoes causes most fatalities and injuries
- An "all clear" will be announced that employees may return to their work areas.

2. If any work area has suffered damage, Field Supervisor will determine if the area is safe for reoccupation, based on input from competent persons including Professional Engineers, Safety Professionals, Operations or other competent person.

For instructions on the shelter in place procedure for the command post please see the Facility Safety Plan.

In the event of severe weather event, contact the Project Safety Office.

Nearest severe weather shelter (Option 1):

Nearest severe weather shelter (Option 2):

Describe possible flying debris hazards, its risk and corrective actions if possible

Hazard	Risk	Corrective Action

Hazard Risk Corrective Action

Make sure that you have the following functioning equipment with you:

- Route map to follow in the event of an relocation (if needed)
- First Aid Kit
- Appropriate clothing for the current and forecasted weather
- Noisemaking device audible in field area to indicate relocation

Remember Safety First:

- Use vehicles for relocation purposes
- Drive safely during relocation.
- Never try to out run tornadoes or drive in water

Post Event Documentation

1. Describe any injuries that occurred:

2. Describe any property damage or losses that occurred:

Purpose: The purpose of radio plan is to ensure the effectiveness of the communication protocols by incorporating a system of redundancy during periods of inclement weather. Push To Talk (P.T.T.) Radios will be used to communicate with the field complementing the cell phone call tree notification system.

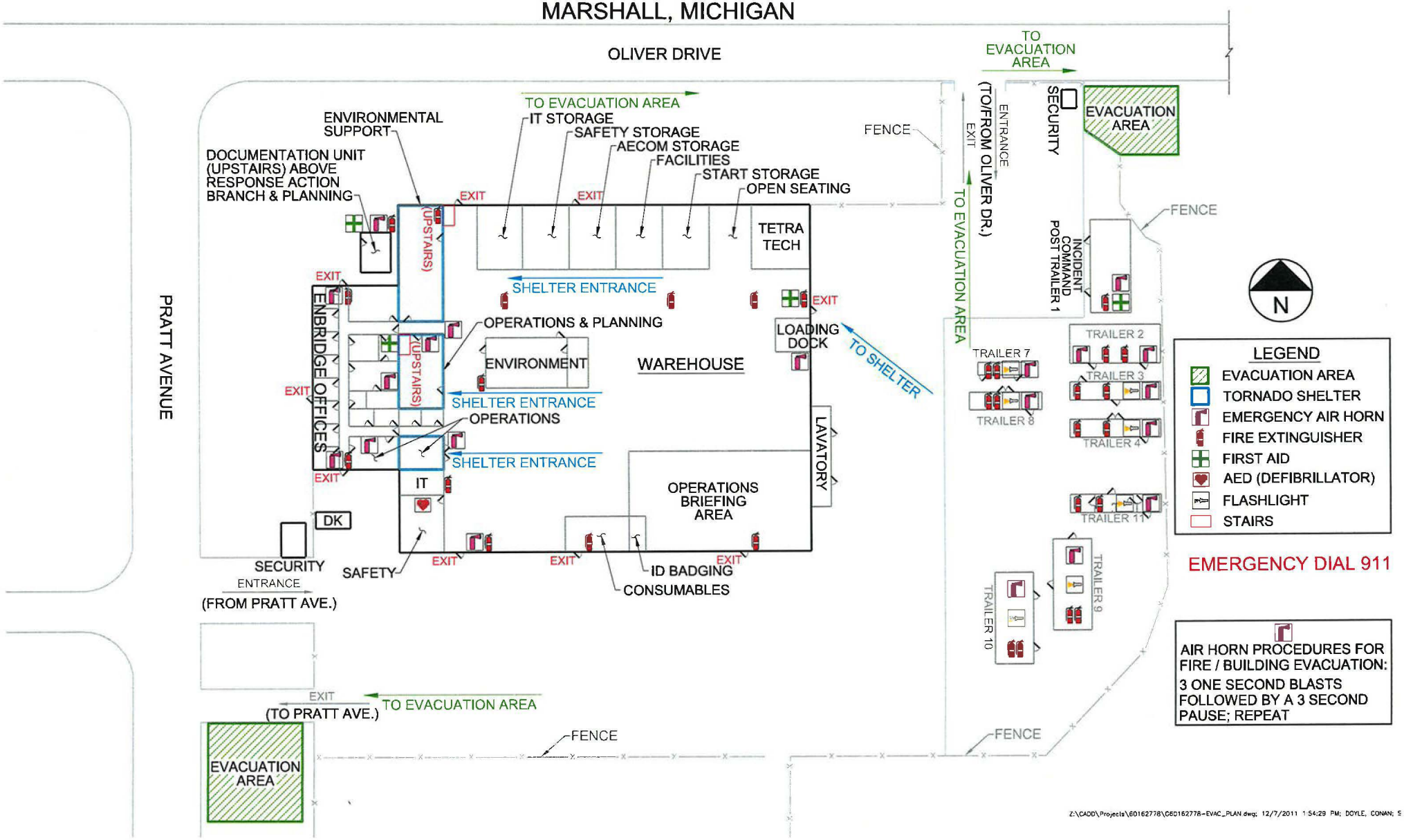
Scope: Select operations and field personnel will be assigned radios to ensure an appropriate level of communication within the Incident Action Plan (IAP). Radio communication will provide a redundant means in field notification process.

Responsibilities:

- Enbridge Safety: initiate the Call-Em-All notification system. Maintains a radio check list which keeps track of the number of radios assigned per contractor and/ or department.
- Operations: communicate work scope changes or restrictions based on alerts and advisories.
- Each individual party will be responsible to get entered into the Call-Em-All system and removed by contacting Enbridge Safety.
- Each individual party will assure their Push To Talk (P.T.T) battery is charged at the start of shift.
- Each individual party will confirm radio operations by participating in a Push To Talk (P.T.T.) radio check (Monday and Thursday @ 1200 hours) that Enbridge Safety performs.

APPENDIX C-4

ENBRIDGE INCIDENT COMMAND POST FACILITY
EMERGENCY RESPONSE / EVACUATION PLAN
MARSHALL, MICHIGAN



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Verizon Push To Talk (P.T.T.) and Call-Em-All Weather Alerts

HEAT

Heat Index Chart (alerts sent for "Red Flag Risk" and "Black Flag High Risk")

TORNADO, SEVERE THUNDERSTORMS, FLASH FLOODS

WATCH: Initial issuance, then update hourly until "All-Clear" is given

WARNING: Initial issuance with location threats, updated every 15 to 30 minutes (forecaster discretion) until "All Clear" is given.

LIGHTNING

Lightning expected to occur over the operations area within 60 minutes and/or within 30 miles.

- Reference time/distance of nearest strike to operations area (divisions).

WIND

Sustained winds ≥ 25 mph or gusts ≥ 35 mph expected within the next hour.

Wind Chill / Apparent Temperature

Wind Chill / Apparent Temperature exceeds -15F (Updated Hourly)

WINTER WEATHER Updates:

Alert for onset of freezing rain/drizzle, heavy sleet, or heavy snow (vis < ½ mile). Update as needed (forecaster discretion)…

The alerts will be sent as follows:

- **6 AM to 9 PM**
  - Verizon PTT Push To Talk cell phone
  - Call-Em-All messaging system

- **9 PM to 6 AM**
  - Phone call to the **DK Security Supervisor: (269) 781-1911**

Questions or requests for additional weather information should be directed to Enbridge Safety at 269-781-1913

Industrial Hygiene Air Monitoring/Sampling

Based on IH exposure assessments conducted throughout the response, recovery and remediation activities, ongoing IH monitoring is not required. In the event IH monitoring resumes, the exposure assessment criteria below will be used.

Exposure Assessment

Exposure to chemicals:
Area sampling:
- Sampling locations: jobsites, leak boundary, waterways, and station areas
- Sampling methods: 3M organic vapor monitors, charcoal tubes with pumps, Orbo 34 with sampling pumps, and cassettes

Area monitoring:
- Monitoring methods: Colormetric tubes (Gasetc, Drager CMS) and Photo Ionization Detectors (UltraRae)

Personal sampling:
- Sampling targets: employees, contractors, and Federal/State officials
- Sampling methods: 3M organic vapor monitors, charcoal tubes with pumps, Orbo 34 with sampling pumps, and cassettes

Personal monitoring:
- Monitoring methods: multi-head personal gas detectors

Community sampling:
- Sampling locations: residential houses, commercial buildings, and roads
- Sampling methods: summa canisters

Charcoal tube sample analytes: 25 VOCs including benzene, toluene, ethylene, xylenes (BTEX), n-hexane, etc.
Orbo tube sample analyte: H_2S
Cassettes: welding fumes (heavy metals, total fume particulates)

Exposure to noise:
Area sampling:
- Sampling locations: vacuum trucks, heavy equipment, and any other stationery noise sources
- Sampling methods: sampling with sound level meters

Personal Sampling:
- Sampling targets: employees, contractors, and Federal/State officials
- Sampling methods: sampling with noise dosimeters for workers working around the noisy equipment

---

Warning: Suspend activity and withdraw to a safe position if conditions encountered by the air tester exceed the level of respiratory protection worn, as detailed in Section 2.03 Site Control, or if any of the following conditions are found:

$H_2S \geq 100$ ppm
$O_2 < 19.5\%$
LEL $\geq 10\%$

Warning: Low-lying areas (trenches, depressions) and enclosed spaces that need to be entered (hollows, buildings, etc.) have an increased risk of containing immediately dangerous to life and health (IDLH) atmospheres.

Medical Surveillance

1. Pre-job health screening: Prior to starting to work, employees and contractors should obtain medical clearance for wearing respirators. Contracted physicians also review fitness of workers for working under heat stress and at work conditions with various hazards.

2. Monitoring of health risks: As applicable, all sites within the operations will perform exposure assessment to identify job tasks with potential elevated exposures to various agents such as chemicals, heat stress, noise, and ergonomics.

3. Health risk identification: Field observations will be conducted to evaluate respiratory protection implementation, respirator use, use of personal protective clothing, and personal hygiene practices. Health issues will be identified, health complaints will be investigated, and health concerns, complaints, and symptoms will be addressed.

4. Medical Examination: Upon notification by a worker that the worker has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the worker has been injured or exposed above the permissible exposure limits and/or the worker presents with symptoms, medical examinations will be made available as soon as possible following the emergency incident or development of signs or symptoms. Examinations will be conducted at additional times, if the examining physician determines that follow-up examinations or consultations are medically necessary.

5. Controls: Engineering, administrative and PPE controls will be implemented to reduce worker's exposure to various hazardous agents.

Aviation Safety Resources:

Mike Foss – Chief Pilot, McMahon Helicopter Services [redacted]

Brian McMahon – Owner/Operator, McMahon Helicopter Services [redacted]

Aviator Responsibilities:

- Pilot in command is responsible for verifying suitable weather conditions along the route of flight to include scheduled landing locations
- Sources of information include the Internet, Federal Government Aviation Facilities and on board satellite weather
- Pilots will never plan a flight or continue a flight if icing conditions are known to exist or experienced in flight

Local Information:

- Air traffic control from Kalamazoo (AZO), Battle Creek (BTL) – Marshall Airport – Pilot to Pilot OR; Visual (NORDO)
- For adverse conditions experienced in flight the pilot could land at a local airport or other suitable location
- Helicopters are not approved for flight into known icing conditions; we will not plant a flight or continue a flight if icing conditions are known to exist or experienced in flight
- Helicopters are equipped with special safety equipment that allow them to fly in winter conditions (low temp/ snow) to the threshold limits of the particular aircraft

Final Thoughts:

- Risk Management (Risk vs. Reward) – though important to our operation the purpose of the air support does not support consideration of undue risk. For that reason utmost cautions will be taken in missing planning and execution

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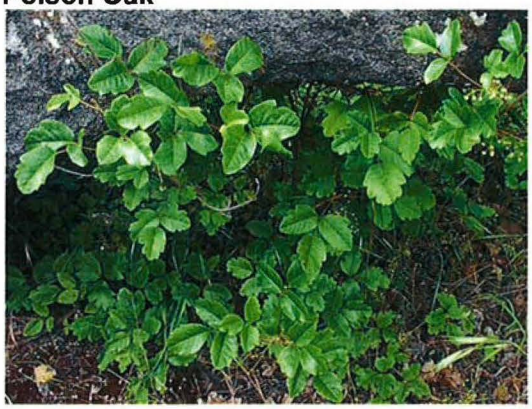
Purpose:
This appendix will cover hazards that may be encountered in the field during response and clean up efforts; other than those associated with the oil from the pipeline. The following is general information only; if there's doubt or concern about a suspected hazard or your health, inform your supervisor.

Plants:
There are three plants to look out for when working on land. They are Poison Ivy, Poison Oak and Poison Sumac. Usually considered a mild to moderate irritant; some people can have a severe reaction requiring immediate medical attention. Learn their physical characteristics so that you can avoid them if you see them. The old saying "*Leaves of three, Let it be!*" is a helpful reminder for identifying poison ivy and oak, but not poison sumac which usually has clusters of 7-13 leaves. Even poison ivy and poison oak may have more than three leaves and their form may vary greatly depending upon the exact species encountered, the local environment, and the season. Being able to identify local varieties of these poisonous plants throughout the seasons and differentiating them from common nonpoisonous look-a-likes are the major keys to avoiding exposure. Review the pictures below.

Poison Ivy

- Eastern poison ivy is typically a hairy, ropelike vine with three shiny green (or red in the fall) leaves budding from one small stem
- Western poison ivy is typically a low shrub with three leaves that does not form a climbing vine
- May have yellow or green flowers and white to green-yellow or amber berries

Poison Oak



- Typically a shrub with leaves of three, similar to poison ivy
- Pacific poison oak may be vine-like
- May have yellow or green flowers and clusters of green-yellow or white berries

Poison Sumac

- Woody shrub with stems that contain 7-13 leaves arranged in pairs
- May have glossy, pale yellow, or cream-colored berries

Exposure- Workers may become exposed through:

- Direct contact with the plant
- Indirect contact, such as touching tools, livestock, or clothing that had direct contact
- Inhalation of particles from burning these plants

Symptoms:

- Red rash within a few days of contact
- Possible bumps, patches, streaking, or weeping blisters (blister fluids are not contagious)
- Swelling
- Itching
- Possible headache and fever

First Aid:

- Immediately rinse skin with rubbing alcohol, specialized poison plant washes, degreasing soap (such as dishwashing soap) or detergent, and lots of water.
    - Rinse frequently so that wash solutions do not dry on the skin and further spread the urushiol.
- Scrub under nails with a brush.
- Apply wet compresses, calamine lotion, or hydrocortisone cream to the skin to reduce itching and blistering.
    - Follow the directions on any creams and lotions. Do not apply to broken skin, such as open blisters.
    - Oatmeal baths may relieve itching.
- An antihistamine such as diphenhydramine (Benadryl) can be taken to help relieve itching.
    - Follow directions on the package.
    - Drowsiness may occur.
    - If children come in contact with work clothing contaminated with urushiol, a pediatrician should be contacted to determine appropriate dosage.
- In severe cases or if the rash is on the face or genitals, seek professional medical attention.
- Call 911 or go to a hospital emergency room if the worker is suffering a severe allergic reaction, such as swelling or difficulty breathing, or has had a severe reaction in the past.

Prevention - Workers can prevent contact with poisonous plants by taking these steps:

- Wear long sleeves, long pants, boots, and gloves.
    - Wash exposed clothing separately in hot water with detergent.
- Barrier skin creams, such as a lotion containing bentoquatum, may offer some protection before contact.
    - Barrier creams should be washed off and reapplied twice a day.
- After use, clean tools with rubbing alcohol (isopropanol or isopropyl alcohol) or soap and lots of water. Urushiol can remain active on the surface of objects for up to 5 years.
    - Wear disposable gloves during this process.
- Do not burn plants that may be poison ivy, poison oak, or poison sumac.
    - Inhaling smoke from burning plants can cause severe allergic respiratory problems.

Bites and Stings:

Animal Bites - Poisonous snakes are extremely rare in the area.

In Michigan, bats and skunks are the animals that harbor rabies virus. Sometimes they transmit the virus to other wild animals such as fox, or domestic animals such as unvaccinated cats, horses, cattle, sheep and dogs. Bats are the species most often tested for rabies in Michigan, followed by cats and dogs. Although Rabies is less common these days; always suspect rabies in cases of unprovoked attacks, strangely acting animals, or wild animals. Being proactive in receiving treatment as soon as possible greatly reduces the risk of Rabies developing. In addition, report all animal bites to local animal control officers or police. **Do not try to catch the animal!**

First Aid:

- Clean wound with soap and water
- Run water over wound for 5 minutes
- Control bleeding
- Cover wound with sterile dressing and bandage
- Victim should see a healthcare provider or go to emergency room right away

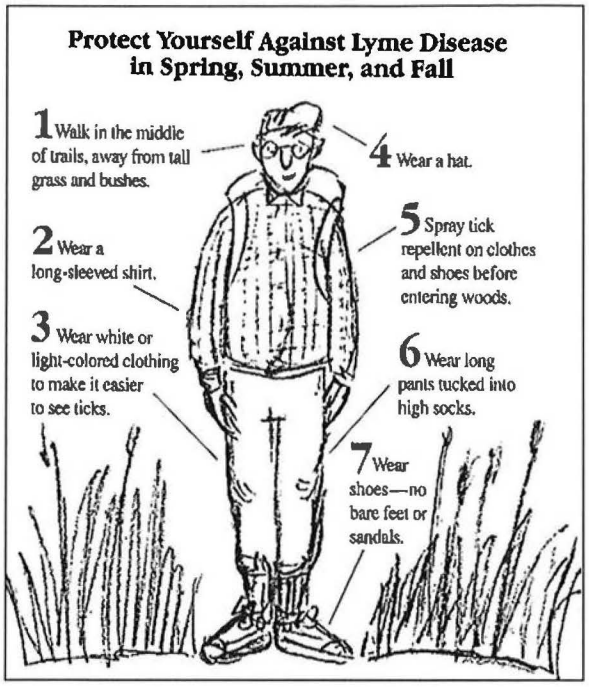
Insect Bites -Spiders are considered low risk in Michigan. Repellants containing DEET is still the most effective method of defense against ticks and mosquitoes. Always follow the instructions on the product label.

- Cover exposed skin or clothing. Don't apply repellent under clothing.
- Do not apply repellent to cuts, wounds, or irritated skin.
- Wash treated skin with soap and water after returning indoors.
- Do not spray aerosol or pump products in enclosed areas.
- Do not apply aerosol or pump products directly to your face. Spray your hands and then rub them carefully over the face, avoiding eyes and mouth. Don't forget your ears.

Blacklegged Ticks are considered nonpoisonous. However they are known to transmit Lyme disease and Rocky Mountain Spotted fever. Kalamazoo and Calhoun counties are both identified as sites where there's an elevated risk of Lyme disease as indicated on the distribution map below.

UPDATE on Blacklegged tick distribution in Michigan

- Blacklegged ticks are the main vector of the Lyme disease pathogen to humans, and are an invasive species in Michigan.
- Field research indicates that blacklegged ticks are established in a focal area of the UP, and have been moving north and inland from the southwest corner of the state over the past 10 years.
- People residing and recreating in counties with confirmed presence of blacklegged ticks and adjacent counties should be aware of the heightened risk of exposure to ticks and their pathogens.



A tick bites by embedding its mouth parts into the skin which is painless. Ticks can remain attached to the body for days without being detected. To reduce tick bites, improve detection, and proper tick removal; follow the recommendations below:

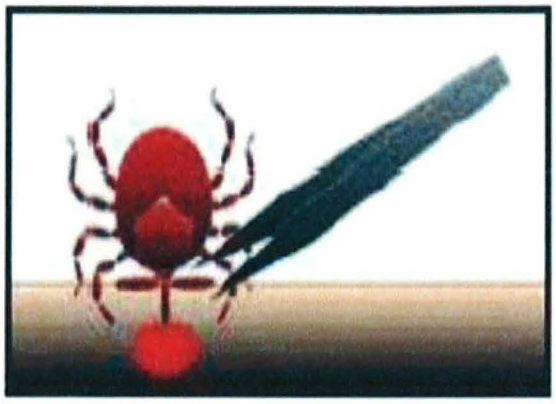
Avoidance

- Insect repellant containing DEET must be applied according to label guidelines. Renew as needed
- Do not lay clothing, towels, etc. on ground
- Comb or brush your hair after working in or near a wooded area
- Check your body everywhere when bathing or showering
- Wear socks with boots; tucking long pants into socks
- Wear light-colored clothing it makes it easier to see the ticks

Removal

The transmission of *B. burgdorferi* (the bacteria that causes Lyme disease) from an infected tick is unlikely to occur before 36 hours of tick attachment. For this reason, daily checks for ticks and promptly removing any attached tick that you find will help prevent infection. Ticks can attach to any part of the human body but prefer body creases and areas with hair such as the groin, armpits, sock line and scalp. To remove attached ticks, use the following procedure:

1. Using fine-tipped tweezers, grasp the tick by the head as close to the skin as possible then gently, but firmly, pull it straight out. Do not twist or jerk the tick, apply petroleum jelly, a hot match, or other irritants. This can lead to infection because the tick's mouth parts may remain embedded, or you may be burned. Use your fingernails and tissue paper if tweezers are not available. Refer to the diagrams below.



2. The tick's mouthparts may remain in the skin, but do not be alarmed. The bacteria that cause Lyme disease are contained in the tick's midgut or salivary glands. Immediately wash the bite area and your hands with soap and water then apply an antiseptic to the bite wound.

3. If in doubt of tick identification, place the tick in a small vial containing a damp piece of tissue and submit it to the local health department for examination.

Tick

Engorged Tick

Lyme disease in humans may progress through three stages, depending upon the individual.

Stage 1 (Acute Localized) - People may have any combination of the following signs and symptoms:

- Headache
- Nausea

- Fever
- Spreading rash
- Aching joints and muscles
- Fatigue

These signs and symptoms may disappear altogether, or they may reoccur intermittently for several months. A characteristic red rash, called erythema migrans (EM) may appear within 3 to 32 days after a person is bitten by an infected tick. The rash is circular in shape, can attain a diameter of 2 to 20 inches, and is not itchy or painful. EM is not restricted to the bite site and more than one lesion may occur on the body. Up to 30% of the people who have Lyme disease do not develop EM lesions, making diagnosis more difficult.

Stage 2 (Early Disseminated) - (Weeks to months after initial exposure to the bacterium or after the first symptoms appear); some people may develop complications involving the heart and/or nervous system. Specific disorders may include various degrees of heart block, nervous system abnormalities such as meningitis, encephalitis and facial paralysis (Bell's palsy), and other conditions involving peripheral nerves. Painful joints, tendons, or muscles may also be noted during this stage of the disease.

Stage 3 (Late Disseminated) - The most common objective manifestation of late disseminated Lyme disease is intermittent swelling and pain of one or a few joints, usually large, weight-bearing joints such as the knee. Some patients develop neurologic disorders, or encephalopathy, the latter usually manifested by cognitive disorders, sleep disturbance, fatigue, and personality changes. Infrequently, Lyme disease illness may be severe, chronic, and disabling.

Mosquitoes -Michigan monitors and tests for mosquito-borne diseases. Female mosquitoes and blood samples from house sparrows (a natural indicator of mosquito-transmitted disease) are tested for Eastern Equine Encephalitis (EEE), West Nile Virus (WNV) and other viruses. Currently there is an alert out for EEE as there is a high risk in Calhoun and Kalamazoo counties.
Eastern equine encephalitis virus (EEEV) - is transmitted to humans by the bite of an infected mosquito. EEE is one of the most severe mosquito-transmitted diseases in the United States with approximately 33% mortality and significant brain damage in most survivors. Eastern equine encephalitis (EEE) is a rare illness in humans, with only a few cases are reported in the United States each year. Most persons infected with EEEV have no apparent illness. Severe cases of EEE (involving encephalitis, an inflammation of the brain) begin with the sudden onset of headache, high

fever, chills, and vomiting. The illness may then progress into disorientation, seizures, or coma. There is no specific treatment for EEE; care is based on symptoms. You can reduce your risk of being infected with EEEV by using insect repellent, wearing protective clothing, and staying indoors while mosquitoes are most active. If you think you or a family member may have EEE, it is important to consult your healthcare provider for proper diagnosis.

Symptoms:

The incubation period for Eastern equine encephalitis virus (EEEV) disease (the time from infected mosquito bite to onset of illness) ranges from 4 to 10 days. EEEV infection can result in one of two types of illness, systemic or encephalitic (involving swelling of the brain, referred to below as EEE). The type of illness will depend on the age of the person and other host factors. It is possible that some people who become infected with EEEV may be asymptomatic (will not develop any symptoms).

Systemic infection has an abrupt onset and is characterized by chills, fever, malaise, arthralgia, and myalgia. The illness lasts 1 to 2 weeks, and recovery is complete when there is no central nervous system involvement. In infants, the encephalitic form is characterized by abrupt onset; in older children and adults, encephalitis is manifested after a few days of systemic illness. Signs and symptoms in encephalitic patients are fever, headache, irritability, restlessness, drowsiness, anorexia, vomiting, diarrhea, cyanosis, convulsions, and coma.

Approximately a third of all people with EEE die from the disease. Death usually occurs 2 to 10 days after onset of symptoms but can occur much later. Of those who recover, many are left with disabling and progressive mental and physical sequelae, which include can range from minimal brain dysfunction to severe intellectual impairment, personality disorders, seizures, paralysis, and cranial nerve dysfunction. Many patients with severe sequelae die within a few years.

Treatment:

No human vaccine against EEEV infection or specific antiviral treatment for clinical EEEV infections is available. Patients with suspected EEE should be evaluated by a healthcare provider, appropriate serologic and other diagnostic tests ordered, and supportive treatment provided

West Nile Virus - Most people who are infected with West Nile virus either have no symptoms or experience mild illness with flu-like symptoms. In some individuals, particularly the elderly, West Nile virus can cause serious disease that affects brain tissue. At its most serious, it can cause permanent neurological damage and can be fatal.

Symptoms:

The majority of people infected with West Nile virus will show no symptoms. The incubation period, or the time between the bite by an infected mosquito and the onset of clinical signs, ranges from 3 - 14 days. An estimated 20% of people infected will develop mild flu-like symptoms which generally last a few days. These symptoms include fever, fatigue, headache, body aches, swollen lymph nodes, and/or a body rash. An estimated 1 in 150 people infected with WNV will progress to a more severe infection called WNV encephalitis (inflammation of the brain), WNV meningitis (inflammation of the membrane around the brain and spinal cord) or WNV meningeoencephalitis (inflammation of the brain and surrounding membrane). Symptoms of this severe disease can last several weeks, and the neurological effects may be permanent. The symptoms include headache, high fever, stiff neck, disorientation, stupor, tremors, seizures or convulsions, paralysis, muscle weakness, loss of consciousness (coma) and/or death.

A milder illness caused by WNV, called West Nile Fever (WNF) is currently reportable by local and state health agencies on a voluntary basis only. This includes those individuals with flu-like illness and no central nervous system signs (such as stiff neck, abnormal cerebral spinal fluid, mental status changes, paresis or paralysis) that have laboratory evidence of WNV infection. In an effort to document where transmission of this new pathogen is occurring, the MDCH encourages the reporting of these individuals to local and state health agencies.

There is no specific treatment for West Nile viral illnesses. Because West Nile infections are caused by a virus, antibiotics are not an effective treatment and no antiviral drugs have been successfully used. Therefore, treatment is supportive. It is aimed at improving the symptoms of an infected person but does not shorten the course of illness. Main treatment concerns involve lowering fever, avoiding dehydration, decreasing brain swelling or dealing with a loss of automatic breathing activity. Individuals with severe infection may require hospitalization. Mild symptoms will usually resolve in a few days.

Bee and Wasp Stings -Insect stings are not poisonous but can cause life-threatening allergic reactions in victims with severe allergies, causing anaphylactic shock which requires immediate medical attention.

Symptoms

- Complaints of pain, burning, or itching at sting site
- Redness of the skin
- Swelling-for those who are allergic; swelling can occur rapidly, affecting the airway
- Stinger possibly still in skin

First Aid

- Remove stinger from skin by scraping it away gently with credit card or knife blade (call 911 for known allergy to stings)
- Wash area with soap and water
- Put ice pack on sting site
- Sting to mouth - Have victim suck on ice to reduce swelling
- Watch victim for 30 minutes for any signs or symptoms of allergic reaction
- If symptoms occur, call 911 and treat for shock

Other Site Hazards

Carbon Monoxide Poisoning - Carbon monoxide is invisible, odorless, tasteless—and very lethal. It may be present from motor vehicle exhaust, industrial equipment powered by gas or diesel engines, or fire. Exposure to large amounts causes an immediate poisoning reaction. Although other various gases and fumes may be present; unless you know specific treatment for a gas inhaled, care for victim the same as for carbon monoxide.

Symptoms

- Headache, Dizziness, Lightheadedness, Confusion, Weakness
- Nausea, Vomiting
- Signs of chest pain
- Convulsions
- Changing levels of responsiveness

First Aid

- Immediately move victim to fresh air
- Call 911 even if victim starts to recover
- Monitor victim and give BLS as needed

Trench Foot or Immersion Foot - Trench foot, also known as immersion foot, occurs when the feet are wet for long periods of time. It can be quite painful, but it can be prevented and treated.

Symptoms

- Tingling and/or itching sensation,
- Pain, swelling, cold and blotchy skin,
- Numbness, and a prickly or heavy feeling in the foot
- Foot may be red, dry, and painful after it becomes warm.
- Blisters may form, followed by skin and tissue dying and falling off. In severe cases, untreated trench foot can involve the toes, heel, or entire foot.

Prevention and Treatment

When possible, air-dry and elevate your feet, and exchange wet shoes and socks for dry ones to help prevent the development of trench foot. Treatment for trench foot is similar to the treatment for frostbite. Take the following steps:

- Thoroughly clean and dry your feet.
- Put on clean, dry socks daily.

Prevention and Treatment (continued)

- Treat the affected part by applying warm packs or soaking in warm water (102° to 110° F) for approximately 5 minutes.
- When sleeping or resting, do not wear socks.
- Obtain medical assistance as soon as possible.

If you have a foot wound, your foot may be more prone to infection. Check your feet at least once a day for infections or worsening of symptoms.

Purpose

The purpose of this plan is to ensure timely and effective emergency response to any water related incidents involving personnel performing boat operations and/or shoreline clean-up operations on Talmadge Creek and the Kalamazoo River to Morrow Lake for Enbridge's Marshall Michigan Pipeline Release.

References:

- Enbridge Operating Maintenance & Procedures - Book 7: Emergency Response
- Enbridge Line 6B MP 608 Marshall, Michigan Pipeline Release – Health & Safety Plan
- MIOSHA-STD-1303 Part 6 R 408.40636 Rule 636

Definitions

Safety Boat – a boat that is designated to perform rescue in the event of a man overboard situation during boom deployment activities. Safety boats will consist of:

- *Two personnel wearing approved PFD's*
- *One 4 head gas detector (O2, H2S, LEL, CO)*
- *One hand held radio or cellular telephone*
- *Emergency contact numbers*

Rescue Boat – a boat dedicated and assigned to perform search and rescue operations for a specified section of the Talmadge Creek and/or Kalamazoo River where boat operations and/or shoreline clean-up operations are taking place. Rescue Boats, at a minimum, will consist of:

- *One First Aid/CPR trained personnel wearing approved PFD's,*
- *One 4 head gas detector (02, H2S, LEL, CO),*
- *One life ring and 90 feet of rope,*
- *One hand held radio and/or cellular telephone*
- *One first aid kit*
- *Emergency contact numbers*

Special Notes

No Wake Zones have been designated by signage on the Kalamazoo River. Additionally, areas where individuals are on foot working within the water are also no wake zones. No wake zones will be enforced and should be strictly adhered to. All boats should operate at safe speeds, exercising caution when operating with other boats or persons in the vicinity. All persons operating on or within 10 feet of the water must wear an approved personal flotation device (PFD), unless otherwise noted in the HASP.

Water Response Activity Requirements

General

USCG approved PFD's are required for all personnel working on or within 10 feet of the water's edge, unless otherwise noted in the HASP.

A life ring and 90 feet of rope is required to be readily available at the water's edge at each control point location where workers are required to work within 10 feet of the water's edge. Furthermore, a life ring and 90 feet of rope will be assigned to each crew working along the creek or river in order to ensure it is available within 200 feet. In addition, a life ring will be assigned to boats as required to ensure at least one life ring with 90 feet of rope is available within 200 feet of any activity taking place on the water. This will apply anywhere where a drowning hazard exists.

A worker wearing a PFD and equipped with a means of communication offsite (Verizon push to talk phone) will be positioned on-shore and be assigned to fulfill the role of a safety watch whenever any worker is required to enter the water. Workers will be tethered if required to perform work in an area where water level is above three feet. The number of workers required to fulfill the role of the safety watch will depend on the number of personnel required to enter the water and will be determined through completion of the Safe Work Permit/Hazard Assessment process.

No boat will be used in operations unless fully equipped as required by the state of Michigan. All boats must be in good condition, with its capacity plate and vessel identification number (VIN) fully legible. In addition all boats must have current registration on board and be marked as required by the state of registry.

No boats are permitted to be operated within 100 feet in the flow channel immediately upstream of any dam or weir unless specifically tasked otherwise in accordance with established controls as approved by Enbridge's Operations Chief and Safety Officer. Furthermore, no boats are permitted to travel through the culverts under the road downstream of C6 unless otherwise authorized.

No Wake Zones have been denoted by buoys placed in the Kalamazoo River. These buoys come in two colors; red and white. Red means upstream direction and white means downstream direction. If the boat is moving downstream and reaches the red buoy mark, this means that the operator of the boat needs to slow down. White means free to accelerate. When moving upstream; red means accelerate and white slow down. Additionally, areas where individuals are on foot working within the water are also no wake zones. No wake zones will be enforced and should be strictly adhered to. All boats should operate at safe speeds, exercising caution when operating with other boats or persons in the vicinity. All boats will be operated at a no-wake speed in this area, exercising due caution when operating with other boats or persons in the vicinity. Operators should be alert for hazards when transiting through an unknown area and familiarize themselves as to where shallow spots and submerged rocks or obstructions are located in their operating area. All airboats require hearing protection (single or double layer) in addition to mandatory PPE and safety equipment.

The operator of a boat that will be operating alone must develop a float plan for that boat and turn it in to their lead or a designate on shore prior to departing. The boats working in groups of 2 or more will not be required to fill out a float plan (ICS 204 shall suffice). All boat operators will have a copy of their ICS 204 on board with them or with their supervisor. All boats shall carry some means of communication on board as required. All operators shall have a radio that has a channel that provides weather reports.

Safety Boats

A minimum of two boats are required for all boom deployment activities. In the event one boat experiences a loss of power or man overboard situation, the other boat shall immediately notify the individual assigned to oversee the boat operations on shore via hand held radio or cellular telephone and initiate emergency rescue operations.

Upon being notified, the individual assigned to oversee the boat operations on shore will contact 911 as required to summon an ambulance if required to respond to site for transport of the injured worker or to initiate further search and rescue operations.

Rescue Boats

Rescue boats are required to be deployed where boat and shoreline clean-up operations are being performed. The number of rescue boats required for a section of water will be assessed based on the:

- Level of activity (number of workers, boats etc.) and type of activity being performed within a division (i.e. boom deployment and maintenance vs. vegetation cultivation and collection and shoreline clean-up activities),
- Presence of any obstructions that would restrict water travel (i.e. weir) within a section of waterway where the work is planned to occur, and the distance of travel required to respond to an incident.

There will be a rescue boat covering Kalamazoo River from C2.5 to E5.0. In the event of an emergency (i.e. injury requiring medical attention, water rescue) during the boat and shoreline clean-up operations a rescue boat will be summoned to the location of the emergency via Verizon Push To Talk cellular phone. The boat will respond and provide first aid and/or rescue services as required. Should additional rescue support be required, this will be communicated to fire rescue support through the nearest fire department via cellular telephone by dialing 911.

Fatigue Risk Factors Present

Work Hours & Rest Periods

- Extended length of shift worked (beyond 12 hours).
- Extended consecutive days worked (beyond 10 consecutive days).
- Extended travel time to and from the work site (total work day, including travel, exceeds 14 hours).
- Excessive physical effort required as part of normal work activity.

Living Conditions

- Limited availability of hotels. Responders will be traveling 30-60 minutes at the start and end of the work shift.
- Communications composed of land lines, cell phones, and Push To Talk (P.T.T) radios
- Limited or no opportunity for recreational or leisure activities (i.e. exercise)
- Community has been impacted. Land owners may complain to responders directly regarding clean-up efforts or land access issues.

Nature of Work

- Limited or no familiarity with the area, increasing over the duration of the assignment
- Moderate familiarity with emergency response work
- Field personnel are conducting moderate activity in various levels of PPE

Site Conditions

- Controlled and predictable chemical exposure during recovery

Stresses

- Variable weather conditions including:
  - Cold Temperatures
  - High winds
  - High heat index
  - Potential for severe weather – severe thunderstorms, tornado
- Extended time away from home and family, lack of personal support network
- Pressure to meet deadlines and timelines

Controls to be Implemented

Education

- Fact Sheets on preparing for this deployment and what workers should bring with them.
- Advance Planning – An Incident Command Post has been set up and work areas are established.

Work Hours and Rest Periods

- During this phase of the incident, workers will be working twelve (12)+ hours/day (which may not include commuting time, depending on the location). Workers will be provided a minimum of eight (8) hours off for rest during each twenty-four (24) hour period. Efforts will be made to increase this to ten (10) consecutive hours off for rest as much as possible. Work hours will be tracked by the respective employers. The Safety Officer will coordinate with the Logistics Section to ensure that personnel who work the full ten (10) day work rotation will have a twenty-four (24) hour rest period prior to starting work during subsequent rotations for the project.

- During temperature extremes and/or heavy physical activity (particularly those in PPE), workers should consult Section 2.1 of the HASP for work/rest schedules for different circumstances.

Transportation

- Where practical, van or car pools will be used to transport workers from hotels to work locations.
- Commercial motor vehicle drivers must follow the U.S. Department of Transportation, Federal Motor Carrier Safety Administration's Hours-of-Service Regulations (49 CFR Part 395) which limits how long commercial motor vehicle drivers may drive.

Living Conditions

- Appropriate living/sleeping arrangements should be obtained within one (1) hour of work areas.
- Designate clean areas acceptable for food service and meal consumption.
- Latrine and hand wash facilities will be provided at field work sites and at ICP.

Recuperation Provisions

- No formal recreation facilities will be available. Workers should bring easy-to-carry recreational materials with them (e.g., playing cards, balls, and/or strength bands).
- Communications plan that details good, positive options for any recreational activities.

Health Care Services

- Local health care support is readily available
- Site specific support will be assigned as needed

Evaluation Schedule:

- At the end of the response, a debrief (Hot Wash) will be conducted. Comments will be incorporated into an after action report and integrated into organizational policies and procedures for use during future responses.

Access (General)

- Enbridge personnel/contractors: only authorized personnel with photo badges will be allowed beyond entry control point(s)
- EPA: badges issued by EPA with photo and logo are allowed beyond entry control point(s). In addition to a Enbridge I.D.
- Visitors will be escorted, vouched for and provided a visitor badge to be returned upon departure

Access (Pratt Street Warehouse)

- 24/7 security for Incident Command/Trailers
- Authorized Enbridge employees/contractors will be provided cipher code for after hour access
- All doors secure at **2100** – cipher lock door only access.
- Guard will have pass key for authorized Enbridge employees in case code is forgotten or cipher malfunction.
- Guard will use pass key to allow access for cleaners, select vendors, etc.

Guards (General)

- Wherever long term guards are required a guard house will be positioned and provided electricity with heat and air conditioning
- Short term assignments – DK will ensure adequate shelter (e.g. vehicle or tent)
- Guard will be provided cell phone, weather appropriate gear for unsheltered protection by DK
- Guard locations will be illuminated and supplied electricity
- Guard supervisor will ensure a documented system of status checks is maintained (call in)
- Guard supervisor will conduct welfare checks at each location throughout overnight hours and for guards on remote assignment

Guards (Pratt Street)

- During normal hours of operation (0600 – 2100) guards will be posted at
  - Pratt Street entrance
  - Oliver Street entrance
- After 2100 **and** weekends or holidays
  - Guards posted at Pratt Street entrance
  - Rounds checklist to include interior/exterior security
  - Fire watch duty

Additional Guard Postings:

- **Guards will be placed at work locations as required for asset protection and/or access control.**
- **Supervisors will do stops at Marshall Offices and perform a walk through Security check. A night shift supervisor will do building security checks throughout their shift.**

KALAMAZOO RIVER/ENBRIDGE SPILL	APPENDIX K RIVER OPENING TO THE PUBLIC: SAFE WORK PRACTICES	30 MARCH 12

Purpose

The purpose of this plan is to ensure the safe interaction of public recreation and work activities on the Kalamazoo River. This plan applies to all work activities that will be performed on the water at locations of the Kalamazoo River that have been re-opened for public use. This includes maintaining appropriate signage (buoys and information kiosks) that will inform the general public of river accessibility and active work status.

Training

Awareness training will be required for all personnel working on the Kalamazoo River. This training will detail practices and procedures for working on the water and potential public interaction due to the river re-opening.

Signage

Buoy/Signpost: Buoys or signposts will be placed in the river in accordance with permit requirements (approximately 100 yards upstream and 100 yards downstream of the work area). This signage will inform the public that active work is being performed ahead on the river. Specific instructions may also be posted as deemed necessary by the Enbridge Safety Officer.

Kiosks: Kiosks, which are installed at 12 access locations along the Kalamazoo River, will include informational updates regarding active work locations. The updates will provide the public with current work location information and specific instructions as necessary (such as "Boaters Keep Left").

Monitoring/Documentation

Monitoring the condition of the signage will be performed once every week, or more often as necessary, to address specific issues such as theft or storm damage. The inspection includes visual reconnaissance of the Kalamazoo River to confirm that buoys are properly placed and maintained. The kiosks will be inspected on a weekly basis to ensure that informational documents are in place and updated as necessary.

A Public Interaction form will be completed for each work location and submitted daily to the Safety Officer. This form will be used to document public river use at active work locations, with specific details to be documented per occurrence, including number of persons, time of day, recreational activity, and interaction with on-site Enbridge personnel (if any).

Security

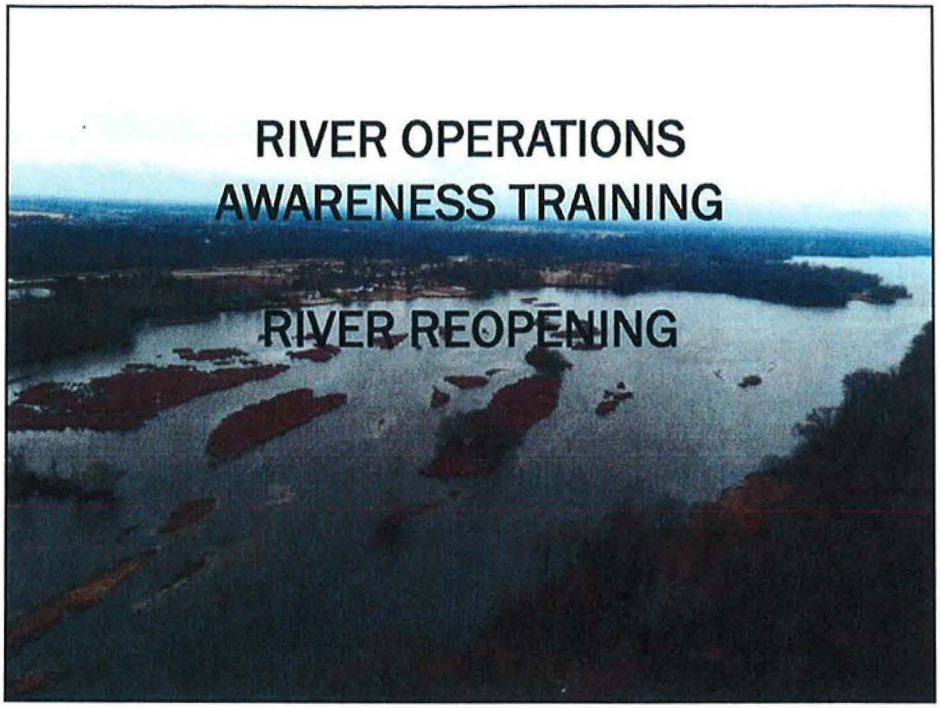
Security will be present at select ingress and egress locations along the Kalamazoo River. They will help provide information to the public and also manage non compliant patrons.

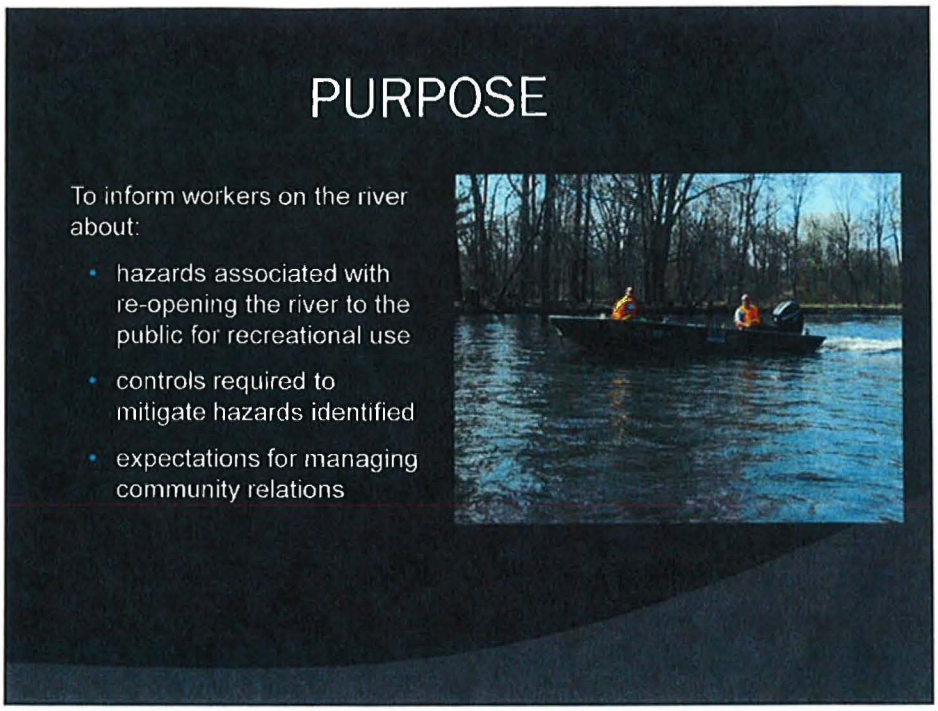
Public/Enbridge Interaction

Interaction between Enbridge personnel and the general public will be kept to a minimum and should be limited to the Site Safety Representative and/or Site Supervisor. Specific non-safety related questions should be referred to Enbridge Public Relations personnel.

Incident Reporting

Incidents involving a negative interaction with the general public will be documented in the safety audit form and reported immediately to the Safety Officer. If any aggressive or threatening behavior is encountered, the Enbridge personnel on site should immediately contact the County Sheriff's department and/or stop work and leave the site.


RIVER OPERATIONS
AWARENESS TRAINING
RIVER REOPENING



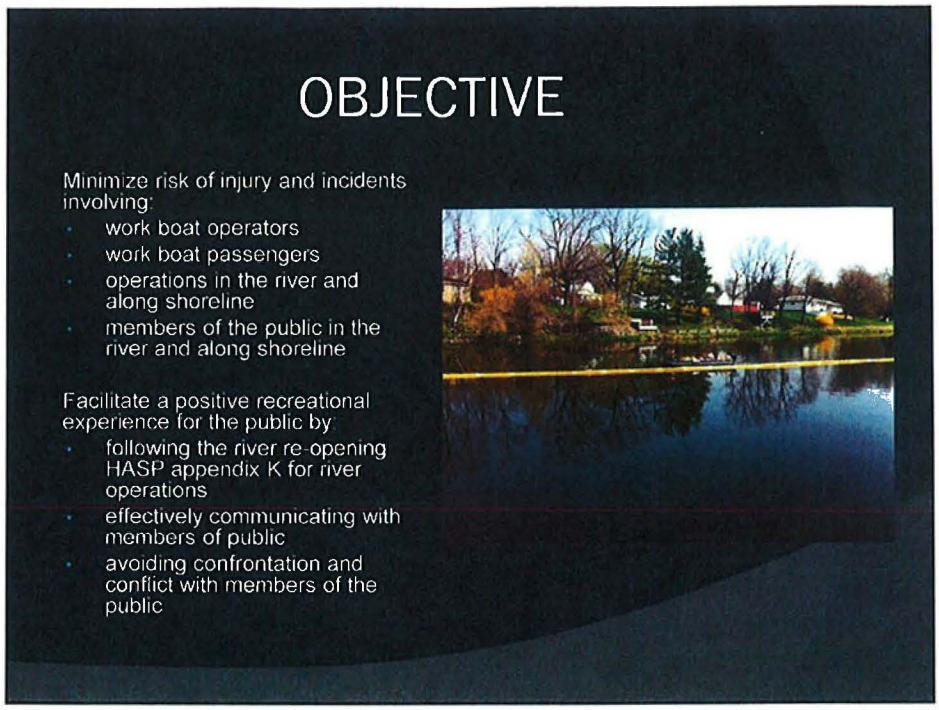
Public boat traffic, on land and in-water activities, and the dual-use launch sites will create an increase in both hazards and risk as the Kalamazoo River System is opened to recreational use while work activities are underway. To minimize the risk, this training is to inform workers on the river about:

- The hazards associated with reopening the river to the public for recreational use
- Controls required to mitigate hazards identified
- Expectations for managing community relations

We will now be sharing the river with the public and need to be aware and responsive to the situations that this new dynamic presents.

While boating safety has not been a major source of incidents during response activities, once the river is opened to the public, there is a potential for incidents to increase based on more boat traffic, varying levels of boating expertise, more non-boating activities, and greater vehicle traffic to and from launch sites.

The majority of recreational boating accidents and fatalities are attributable unsafe boating. The addition of recreational activities will increase safety concerns based on an increase in traffic and the nature of the work (heavy boat use at any one point in the river even without unsafe practices by either side).

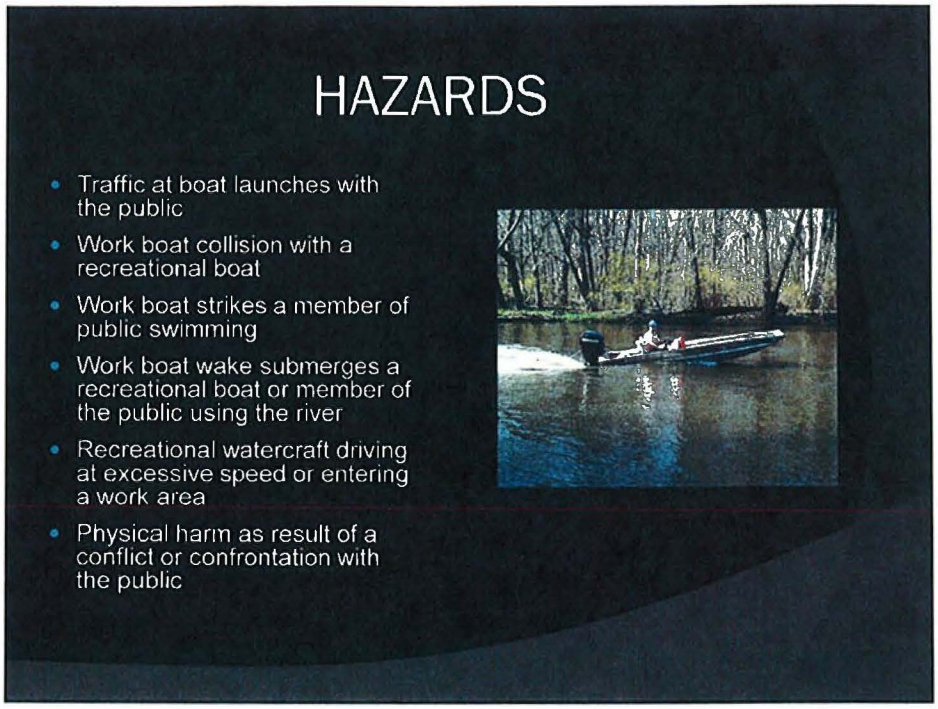


The objective of this training is to minimize risk of injury and incidents involving:

- Work boat operators
- Work boat passengers
- Operations in the river and along shoreline
- Members of the public in the river and along shoreline

We also can facilitate a positive recreational experience for the public by:

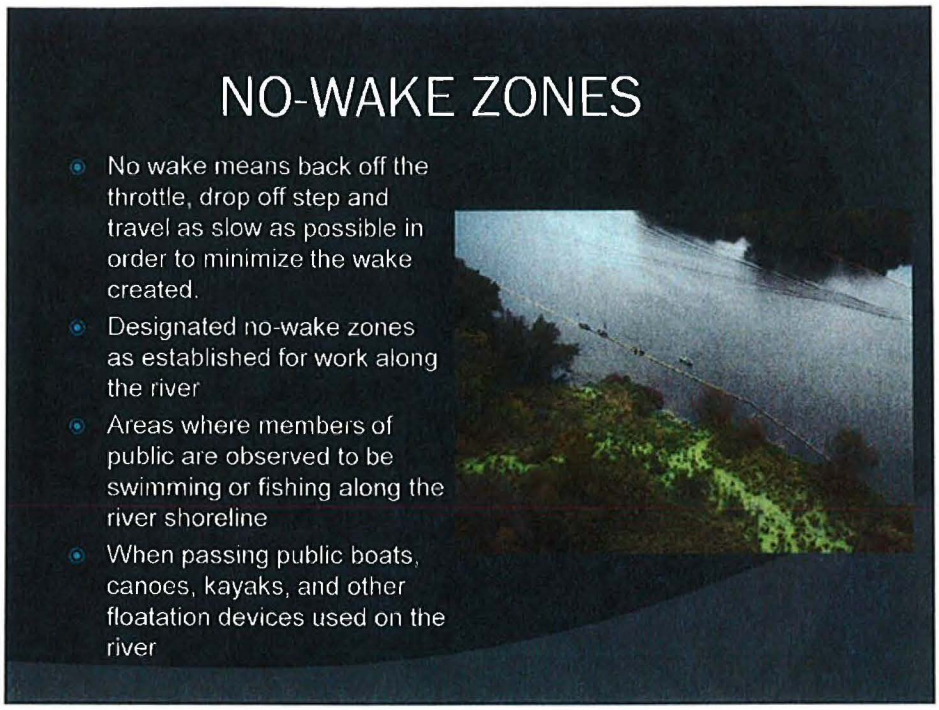
- Following the river re-opening HASP appendix K for river operations
- Effectively communicating with members of public
- Avoiding confrontation and conflict with members of the public



Potential hazards that may be present or occur include:

- Traffic at boat launches with the public
- Work boat collision with a recreational boat
- Work boat strikes a member of public swimming
- Work boat wake submerges a recreational boat or member of the public using the river
- Recreational boat driving at excessive speed , entering a work area, or crossing deployed boom. The recreational watercraft may damage boom or become entangled in the boom
- Physical harm as result of a conflict or confrontation with the public

Its our responsibility to mitigate and minimize these hazards by raising our awareness of the fact that we have not had to contend with or watch out for other boaters or recreational water users.

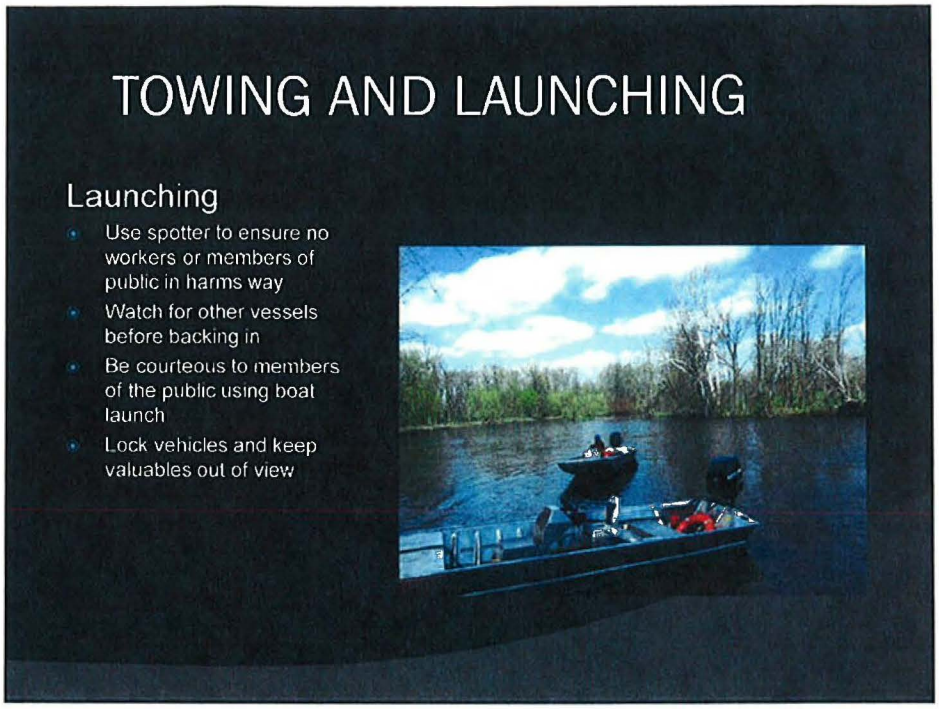


No wake means to back off the throttle, drop off step and travel as slow as possible in order to minimize the wake created.

Designated no-wake zones will be established and marked for work along the river

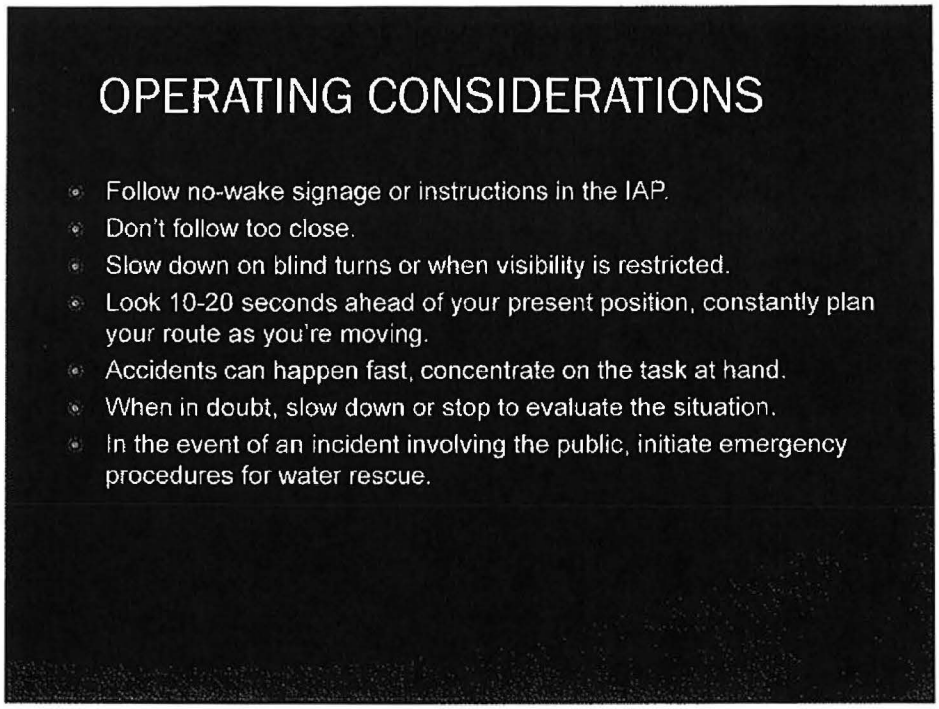
Areas where members of public are observed to be swimming or fishing along the river shoreline

When passing public boats, canoes, kayaks, and other floatation devices used on the river



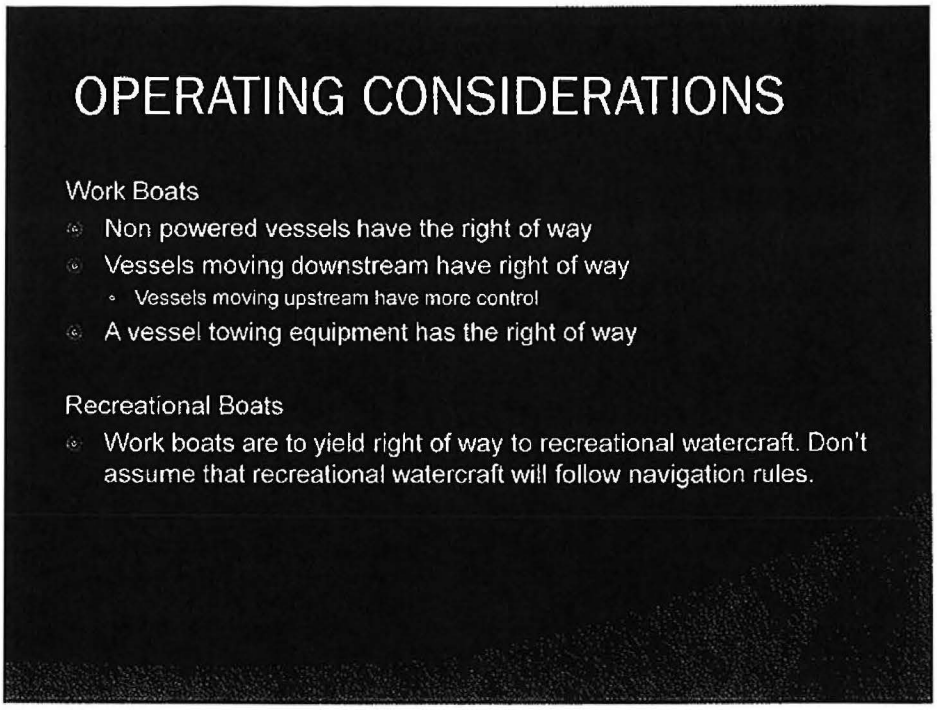
Launch sites will have a potential for worker and recreational user interaction.

- Use a spotter to ensure no workers or members of public are in harms way while backing
- Watch for other vessels before backing in
- Be courteous to members of the public using boat launch. Have patience while others launch or recover their boats.
- Lock vehicles and keep valuables out of view



- Follow no-wake signage or instructions in the IAP.
- Don't follow too close. Maintain a safe distance and speed.
- Slow down on blind turns or when visibility is restricted. This can include low light, fog, and glare.
- Look 10-20 seconds ahead of your present position, constantly plan your route as you're moving.
- Accidents can happen fast, concentrate on the task at hand.
- When in doubt, slow down or stop to evaluate the situation.
- In the event of an incident involving the public, initiate emergency procedures for water rescue.

Each type of boat we use has potential issues based on its handling capabilities as well as the experience of the operator. The outboard prop and jet motors that are currently being used don't have the same issues as airboats having limited control at slow speeds and in windy conditions, but still have some handling concerns in tight quarters or during evasive maneuvers base on operator experience.

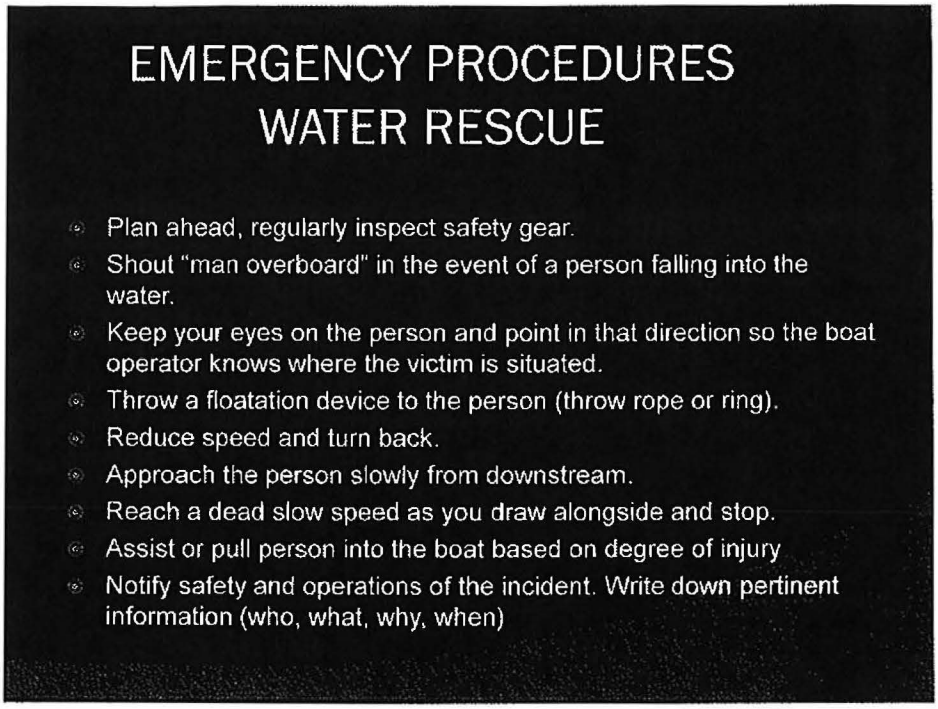


Work Boats are to

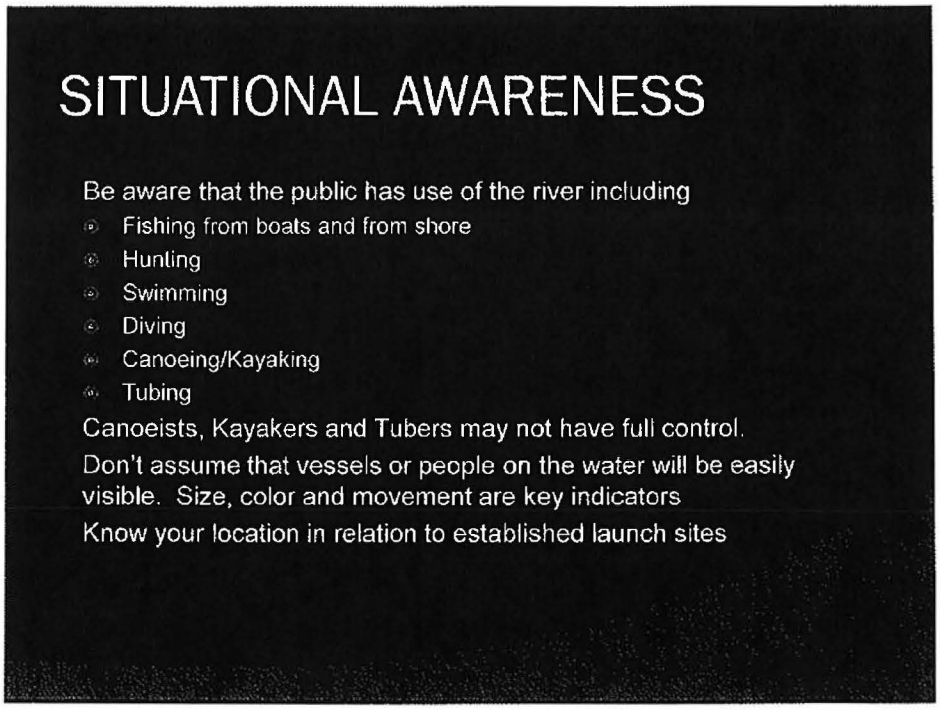
- Yield to non powered vessels that have the right of way
- Vessels moving downstream have right of way. This is because vessels moving upstream have more control
- A vessel towing equipment has the right of way

Recreational Boats

Work boats are to yield right of way to recreational watercraft. Don't assume that recreational watercraft will follow navigation rules. Be aware that recreational users may be anywhere on the river whether or not an established buoy permit is in place. Recreational watercraft operators may or may not be competent in operating their watercraft.



- Plan ahead, regularly inspect safety gear. Make sure boat safety and rescue gear is in good condition and accessible. Know how to use the equipment on board.
- Shout "man overboard" in the event of a person falling into the water.
- Keep your eyes on the person and point in that direction so the boat operator knows where the victim is situated.
- Throw a floatation device to the person (throw rope or ring).
- Reduce speed and turn back.
- Approach the person slowly from downstream.
- Reach a dead slow speed as you draw alongside and stop.
- Assist or pull person into the boat based on degree of injury, if any. Assess and call 911, if necessary.
- Notify safety and operations of the incident. Write down pertinent information (who, what, why, when).

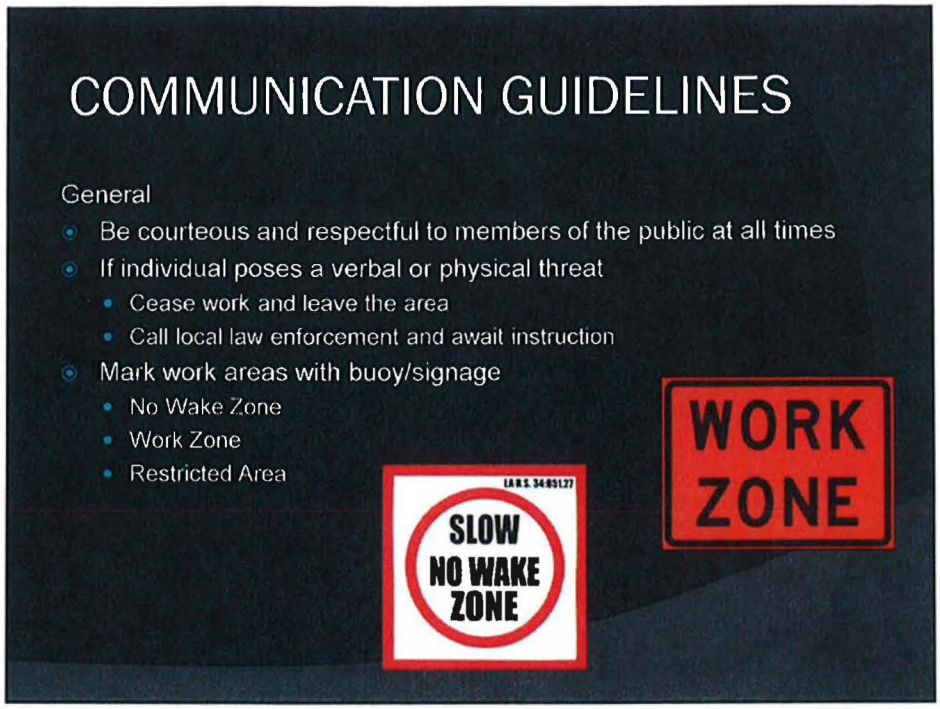


Be aware that the public has use of the river including

- Fishing from boats and from shore
- Hunting
- Swimming
- Diving. Divers may or may not use a dive flag or alpha flag
- Canoeing/Kayaking
- Tubing
- Canoeists, Kayakers and Tubers may not have full control

Don't assume that vessels or people on the water will be easily visible. Camouflage clothing may be worn by people hunting or fishing. Waterfowl hunters may set decoys in the river. Size, color and movement are key indicators. A person swimming in the river will present a small target. It may not be easy to spot them from a boat and you may have to utilize other methods of identification such as talking, laughing, and splashing. The passengers on the work boat can assist the boat operator maintain situational awareness. If you notice something such as movement, color, wave action, wildlife movement, sound that may be a potential hazard point it out to the boat operator.

It is also important to know your location in relation to established launch sites and to be prepared for changing weather conditions. If weather conditions warrant, inform others of impending storms.



Be courteous and respectful to members of the public at all times. We are professionals. Know what to do in the event that a member of the public enters inadvertently or intentionally enters a closed segment of the river or a work area.

If a member of the public is encountered in a closed segment of the river or in a work area, politely remind them that this section of the river is still closed by the county and request that they leave for their own safety and for worker safety.

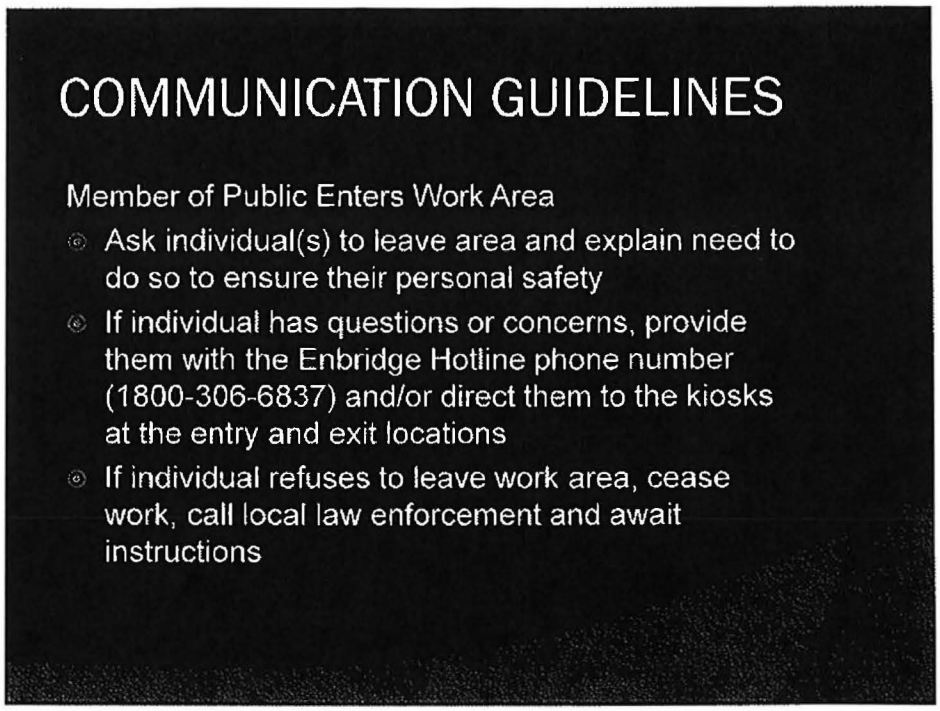
If individual poses a verbal or physical threat

- Cease work and leave the area
- Call local law enforcement and await instruction

Mark work areas with buoy/signage

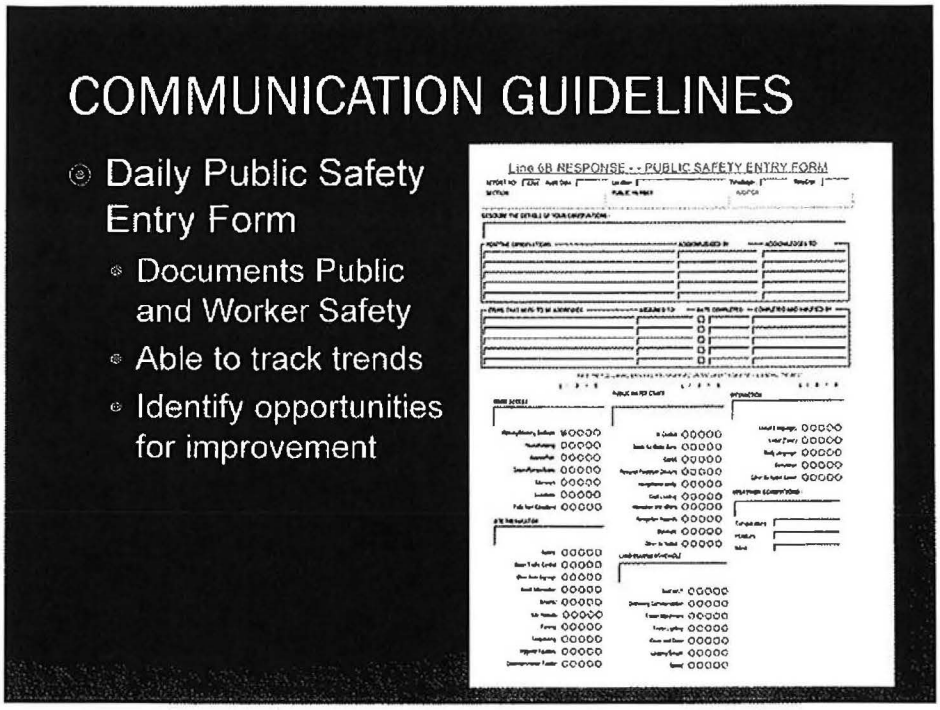
- No Wake Zone
- Work Zone
- Restricted Area

These buoys and signs must be appropriate, visible, and understandable. The buoys and signs need to be located with enough area and at a safe distance to assure that the public will not enter the work area. We also need to understand that not everyone may comply with buoys and signage.



Member of Public Enters Work Area

- Ask individual(s) to leave area and explain need to do so to ensure their personal safety
- If individual has questions or concerns, provide them with the Enbridge Hotline phone number (1800-306-6837) and/or direct them to the kiosks at the entry and exit locations. Cards with the hotline number are available at the table.
- If individual refuses to leave work area, cease work, call local law enforcement and await instructions



Daily Public Safety Entry Form

- The purpose of this form is to documents Public and Worker Safety.
- The form is fairly straight forward and similar to the safety audit form that has been already used onsite. Team Leaders and Inspectors are required to complete a minimum of one form daily.
- This form gives the ability to track trends and help determine what works.
- The form also helps identify opportunities for improvement.

A minimum of one entry form will be completed by each team lead, safety inspector, and operations inspector working on or near the river.

Document positive observations: It can be as simple as friendly wave or providing information.

Document items that need to be addressed: An example being, litter at the boat launches.

Rate each category on a scale of 1 to 5 with 5 being the best. Comments can be included beneath each category.


BOAT SAFELY
03/19/2012 12:12

Addendum to Airboat Safety Manual

Procedure for Moving Swamp and Marsh Buggies

On River

1. Notify SEMO Operations Supervisor, SEMO Boat Supervisor and SEMO Safety Supervisor before a proposed move.

2. Assign Escort and Push Boat at least 2 hours before move.

3. Safety Tailgate meeting with Buggy operator, Escort Boat Captain, Push Boat Captain, Boat Supervisor and Safety Supervisor.

4. Invite Enbridge Safety Official that is assigned to the area of river that the launch is made from.

5. Allow buggy operator to ride in escort boat or area safety boat to search route for possible obstacles that may pose problems before making the move.

6. Front Escort Boat must maintain at least a 100 yard length in front of buggy to warn oncoming boats and workers. Be prepared to work back to buggy if obstacle is detected.

7. Utilize preplanned hand signals even if radio equipment is provided.

8. Buggy must attach digging bucket to boom for travel. Stingers, cutters and tiller must be removed.

9. Do not tether push boat to buggy due to water level and current concerns

10. Perform a walk around of the buggy to check for hydraulic and fuel leaks before entering river or lake.

This addendum will be attached to SEMO Environmental's Airboat Safety Plan that is on file in the Safety Supervisors Office.

Permission is granted to Enbridge to add this as a supplemental to the Contractor Safety Program if needed.

SEMO ENVIRONMENTAL LLC
HAZMAT RESPONSE

PROJECT: Kalamazoo River

Float Plan, Boat Safety Checklist & Daily Report

DATE: _____ Location: _____

Crew/Passenger: _____ Crew/Passenger: _____

Crew/Passenger: _____ Crew/Passenger: _____

Crew/Passenger: _____ Crew/Passenger: _____

Crew/Passenger: _____ Crew/Passenger: _____

Crew/Passenger: _____ Crew/Passenger: _____

Air Horn: _____ First Aid Kit: _____ Fire Extinguisher: _____ Paddle or Boat Hook: _____
Throwable Floatation Device: ___ Lifejackets: __ Earplugs: __ Green Bag: ____
Trailer Inspection:_____ Bearings Inspection:_____ Boat Inspection:_____

Suggested corrective Action:_____
_____

Daily Log:
08:00-_____
09:00-_____
10:00-_____
11:00-_____
12:00-_____
13:00-_____
14:00-_____
15:00-_____
16:00-_____
17:00-_____
18:00-_____

Safety Issues_____
_____
_____

Captain: _____ ***Boat #***_____ ***Radio #***_____

Boat Operators Signature: _____ ***Cell #***_____