Kalamazoo River/Enbridge Spill Decision Memo **August 4, 2010**

Kalamazoo County

Calhoun County

State of Michigan

U.S. EPA

Enbridge ~~Pipeline~~ Energy Partners

This decision memo codifies the Health And Safety Plans, HASP (Enclosure (1)) that the UC will follow to communicate, coordinate, and enforce the management of this Plan. Any proposed revisions to these procedures will be presented to the Unified Command Safety Officer (SOFR) to review and propose to the UC during a future scheduled meeting.

Encl: (1)

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

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

August 4, 2010

SITE HEALTH AND SAFETY PLAN

Company Name	Signature	Date
USEPA John Glover, SO		8/4/10
Enbridge Mike Kobby SO-A		8/4/10
USCG Robert Holm SO-A		8/4/10

Kalamazoo River/Enbridge Spill

Health And Safety Plan, HASP

August 4, 2010

This site Health and Safety Plan contains overall guidance and requirements for all persons working in response to the Enbridge pipeline oil spill in Marshall MI. This plan contains the overall minimum safety requirements that shall be followed on all job sites related to this incident. Nothing in this plan shall be changed or amended without the approval of the incident Safety Officer, SO and the Responsible Party, RP Safety Officer, SO.

Reviewed and approved by: Michael Koby, Enbridge SO

Reviewed and approved by: John Glover, EPA, site SOFR

RECORD OF CHANGES PAGE
ENBRDIGE OIL SPILL, MARSHALL, MI

In each block include the amendment / addition, date and name

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PART 1 - GENERAL

1.01 Overview

The Unified Command 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 Unified Command expects to be utilized in accomplishing the work. In addition, the Unified Command expects all contractors, employees and responders to bring a safe work attitude to the job site.

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

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 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 Job Task Hazard Assessment Appendix. These work practices will be evaluated using the Enbridge Hazard Assessment process and Safe Work Permits issued when applicable.

Work Practices:

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

Job Tasks not covered within this document should be evaluated and documented through the Enbridge Hazard Assessment Process (or other equal Hazard Assessment process) and a Safe Work Permit issued when applicable.

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

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

1.05 Documentation

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

Working copies shall be maintained in the Unified Command Center and Operations Command Center. 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 Unified Command.

1.07 Site History

Enbridge Energy Partners reported that a leak was detected on a pipeline on its Lakehead System near the company's Marshall, Michigan pump station on July 26, 2010. Initial estimates at the time were that approximately 19,500 barrels of crude oil may have been released as a result of the leak. 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.

Enbridge crews, emergency response and 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. The pipeline will be repaired and tested before being returned to service.

1.08 Site Description

The location of the release is Enbridge's Line 6B, at Milepost 608 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. There are more than thirty control points ranging from earthen berm/flume configurations to containment and absorbent boom sites with vacuum trucks and skimmers. Enbridge has 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.

Divisions:

A - Leak site at Line 6B, milepost 608

B - Talmadge Creek

C - Kalamazoo River to Battle Creek

D - Battle Creek to County Line

E – County Line to Morrow Lake

PART 2 - EXECUTION

2.01 Introduction

A. The purpose of the plan is to provide guidance in order to prevent incidents and injuries to site workers/responders from possible contamination or exposure that may be encountered during oil recovery or response activities. Any employee, responder, regulator or contractor is responsible to stop any work that they believe places any worker in danger. Surface contamination may be encountered in numerous areas under assessment/recovery The following information was completed by the Safety Officer:

B. Operational Dates: July 27, 2010 - TBD.

The Safety Officer (SOFR) and Safety Officer Assistants (SOFR-A) 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 (appendix B) to signify they understand the Health and Safety Plan through their management structure. Personnel shall not be allowed on-site until thoroughly briefed on anticipated hazards, any additional safety practices to be followed and the Safety Orientation has been completed.

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 the **Appendix A**:

- Heavy Crude Oil – Heavy Crude Oil/Diluent Mix – Christina/Foster Creek
- Benzene – Potential byproduct of Heavy Crude Oil (See MSDS above)
- H_2S – Potential byproduct of Heavy Crude Oil (See MSDS above)
- Hexane – Potential byproduct of Heavy Crude Oil (See MSDS above)

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; plants, animals, 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 ICS SSP).

A job task hazard assessment (appendix C) 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.

Orientation:

All workers will receive orientation training prior to commencing work. 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:

- Potential hazards and special safety requirements.
- The worker's right to refuse to do unsafe work or work in unsafe conditions.
- Communication of the safety responsibilities for personnel.
- Review of the Company's Health and Safety Plan for this incident.
- Review of additional safety and environmental requirements (for example "Safety and Environmental Guidelines" and "Your Safety is On the Line videos).

Upon completion of the safety orientation, each worker will provide their signature as proof that they attended the safety orientation and understand the safety hazards and required mitigations identified in the Health and Safety Plan.

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. The entire site is designated a no smoking zone.
- 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.
- During recovery activities, on site workers shall act as the safety backup to each other.
- 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 (if needed) shall be in accordance with OSHA and all applicable regulations. These regulations include that workers shall not enter any excavation deeper than 4 feet, unless acceptable sloping, shoring, or other means of protection are provided. Open excavations deeper than 4 feet shall not be entered unless appropriate entry precautions are taken with trained staff.
- Employees will not be permitted to work alone in a deemed "hot zone" or adjacent (within six feet) to water.
- When employees are working during the night, light plants will be utilized to ensure the site is appropriately illuminated.

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
- Steel-Toed Boots
- Disposable suits (e.g. Tyvek)/booties, as needed
- Rubber or Latex Gloves, as needed
- Full length pants

As of August 3, 2010 the current minimum PPE requirements (not including site specific respiratory requirements) are the following.

Divisions A & B: Nomex FR, Hard Hat, Safety Glasses, Steeled Toed Boots & High Visibility Vest

Divisions C, D & E: Nomex OR Tyvex OR Long Sleeve Shirt and Long Pants, Hard Hat, Safety Glasses, Steeled Toed Boots & High Visibility Vest (note any oil soiled clothing must be decontaminated prior to leaving site)

For more detailed information regarding Personal Protective Equipment and determinations on when to wear PPE, please see Section 2.17. The level of protection may be increased to include fire retardant (FR) clothing if atmospheric monitoring results or activities that have the potential increase LEL levels (e.g., agitation, product skimming, release of free product, and product in water etc.) during any phase of the work. 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.

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

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. A Coast Guard-approved PFD is also required at all times when working over water or within 6 feet of water.

Monitoring:

Ambient air monitoring will be provided on a continuous basis with a personal four gas monitor (LEL, H_2S, CO, O_2). Periodic samples will be performed with a PID, Drager CMS, or Ultra Rae devices in the breathing zone and area of the recovery workers for benzene. The results will be documented on the gas test record form, daily or field reports, or through computer data retrievable (download) methods.

Personal samples will be taken in representative locations using both passive methods, 3M badges, and active methods, sampling pumps and charcoal tubes for 25 contaminants.

The acceptable level for work on this site under level D protection is 0.5 ppm for benzene.

Permissible exposure limits (PEL)

Petroleum vapors	Not Established (500 ppm reference petroleum distillates)	Ign, Resp, Flam, Cont
Hydrogen Sulfide	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 Unified Command 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 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 6 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, or soiled, or when breathing is difficult. If used in environments containing oil aerosols, replace oil-resistant filters after a total of 40-hrs use or 30 days, whichever comes first.

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
petroleum vapors	less than (<) 3% LEL	None	
	greater than or equal to (≥) 3% LEL to less than (<) 10% LEL	half-mask APR with OV cartridge	3M 6000 with 6003 cartridge
	greater than or equal to (≥) 10% LEL to less than (<) 20% LEL	SCBA (or equivalent) for cold work; hot work is not permitted	Scott Air-Pak
	greater than or equal to (≥) 20% LEL	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 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.
- 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.
- No small boats shall be overloaded
- A shore watch/water safety inspector must be present with the responsibility of tracking hazards in the water, and to coordinate boats in the event an individual would fall overboard.
- A rope and buoy will be with the shore watch at all times.
- A Float Plan will be included with each boat.

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.
- A minimum of two light plants will be utilized for each work crew
- 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.
- A Float Plan will be included with each boat.

2.05 Emergency Procedures and First Aid

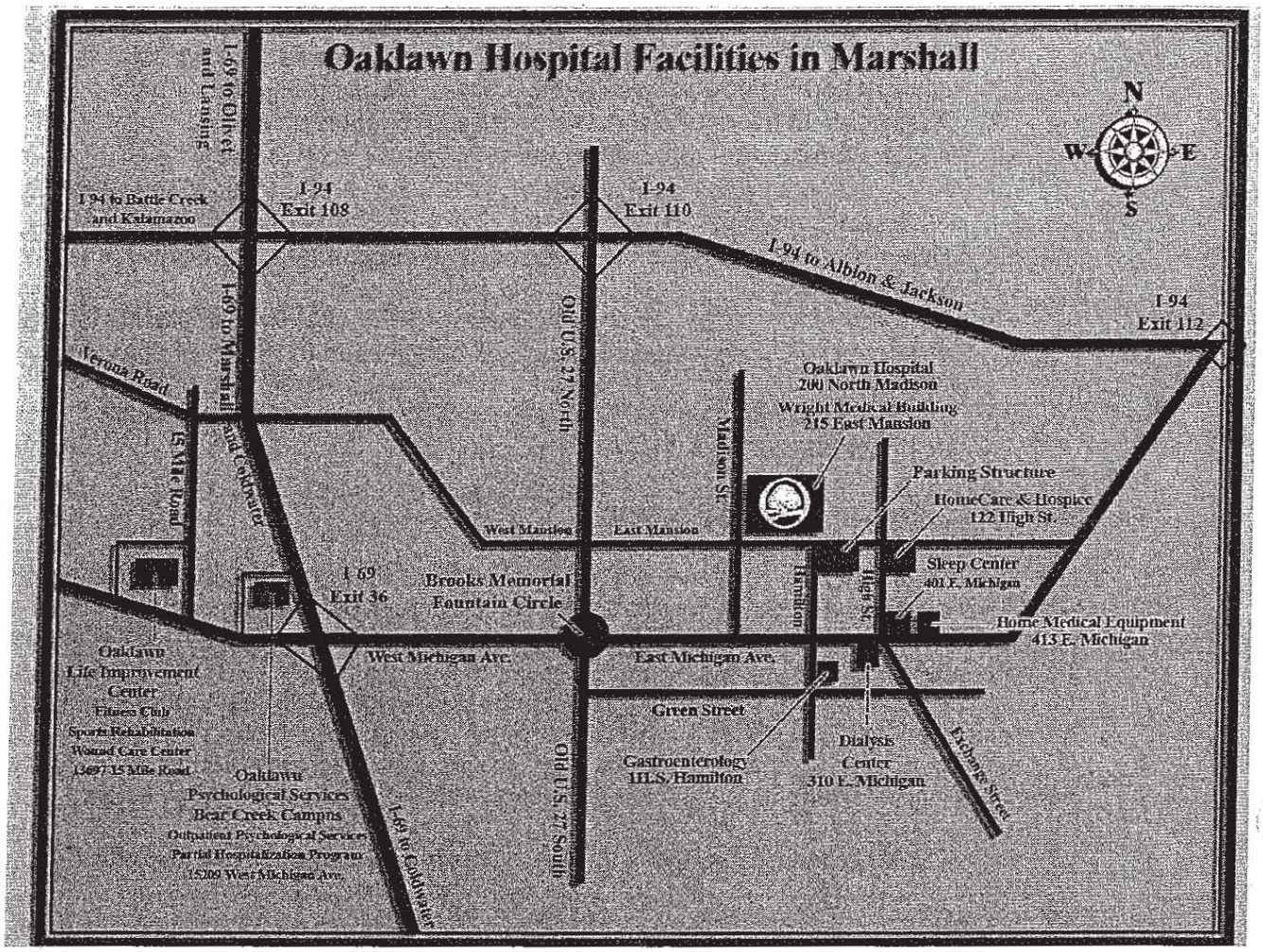
During containment and recovery activities, a certified Emergency Medical Technician (EMT) will be dedicated to the workforce and supply on-scene assessments. Should the need arise, the EMT will direct workers requiring specialized services such as decontamination or Emergency Room treatment to the appropriate locations. Emergency DECON for each division will be addressed in each divisions SSP. **EMT personnel can be contacted by calling 911 and identifying the Division and location**. This information will be communicated to the appropriate EMT location. Additionally, personnel if able can go directly to EMT personnel at the locations identified below.

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.

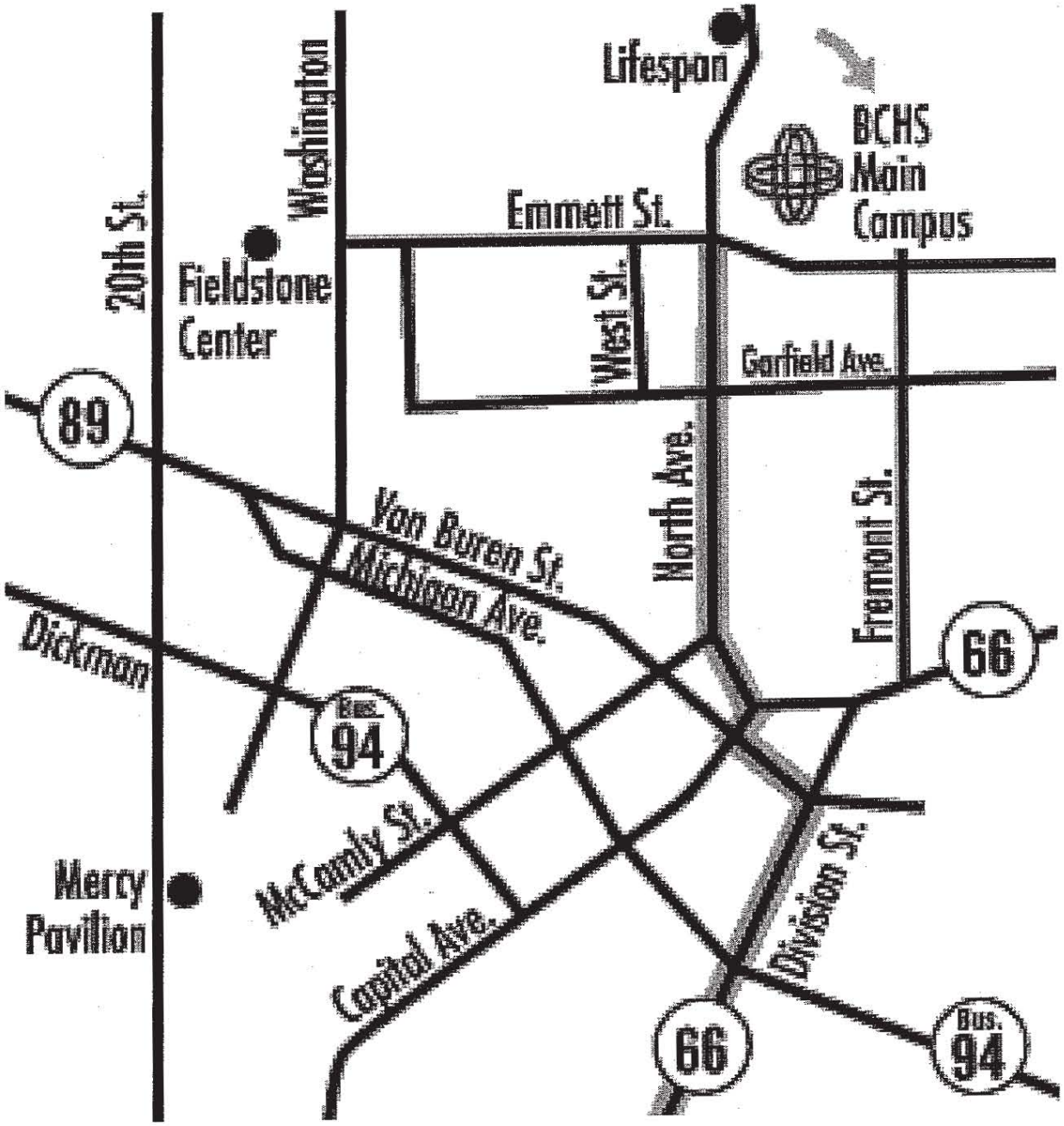
A. **Emergency Communication**:

Fire Department	911
Ambulance	911
Police Department	911
Division A EMT and Ambulance	911
Division B EMT	911
Division C, D & E EMT (Day Shift Only)	911

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


Oaklawn Hospital Facilities in Marshall
N
W
E
S
I-69 to Olivet and Lansing
I-94 to Battle Creek and Kalamazoo
I-94 Exit 108
I-94 Exit 110
I-94 to Albion & Jackson
I-94 Exit 112
I-69 to Marshall and Coldwater
Old U.S. 27 North
Verona Road
15 Mile Road
Madison St.
Oaklawn Hospital
200 North Madison
Wright Medical Building
215 East Mansion
Parking Structure
HomeCare & Hospice
122 High St.
West Mansion
East Mansion
Sleep Center
401 E. Michigan
I-69 Exit 36
Brooks Memorial Fountain Circle
Hamilton
High St.
Home Medical Equipment
413 E. Michigan
West Michigan Ave.
East Michigan Ave.
Oaklawn Life Improvement Center
Fitness Club
Sports Rehabilitation
Wound Care Center
13697 15 Mile Road
Green Street
Dialysis Center
310 E. Michigan
Gastroenterology
111 S. Hamilton
Old U.S. 27 South
Exchange Street
Oaklawn Psychological Services
Bear Creek Campus
Outpatient Psychological Services
Partial Hospitalization Program
15209 West Michigan Ave.
I-69 to Coldwater

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



Emergency Care and Trauma Services at Bronson Methodist Hospital
Hours of Operation: 24 hours a day, 7 days a week
601 John Street
1st Floor, West Pavilion
Kalamazoo, MI 49007
Phone: (269) 341-6386
Fax: (269) 341-6248

B. Incident Reporting:

In the event of an incident or close call, the responsible Safety Representative will investigate to identify both the immediate and all underlying causes. Any incident resulting in personal injury, close call, or property damage shall be verbally reported immediately to the site supervisor. The site supervisor will communicate the information to the safety officer.

C. First Aid

If appropriate, injuries sustained shall be initially assessed and based on the nature of the illness/injury may be treated on-site. A fully-stocked first aid kit shall be available to all recovery personnel to treat minor injuries. As 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 addition Emergency Medical Technicians (EMT) will be provided at various locations throughout the response area. EMT services will be located at the following locations and be reached at the numbers listed in Section 2.04 (A) Emergency Communication.

Division A EMT and Ambulance — Location: Staging Area 1/Training Center
Division B EMT — Location: Division B Control Point 3
Division C, D & E EMT (Day Shift Only) — Location: Division C Control Point 3

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 (eye wash bottles will be available in all vehicles and at all sites). 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.

   Medical attention shall be requested for all victims of sickness due to ingestion of contaminated materials. Do not induce vomiting. Drink two glasses of water.

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 Health and Safety Coordinator. All occurrences shall be documented by the completion of an accident report.

D. 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. 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.

E. 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.

If lightning is encountered, it is further recommended to:

Go inside a fully enclosed building or vehicle

Avoid water and boats

Stay away from doors, windows, metal indoor fixtures and electrical devices

Stay off the telephone

Avoid open high ground and isolated large trees
Avoid contact with metal objects, such as vehicles

F. **Fire Response**

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

- **Workers 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.

- 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 and is to be addressed in the Safe Work Permit process
- 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;

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.

G. 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 Workers, if requested, will identify required training and provide documentation.

2.06 Site Safety Plans / Tailgate Meetings

For all projects related to the Marshall Area Oil Pipeline Release, Enbridge employees, contractors, volunteers, and regulators shall prepare a project orientation, covering specific health, safety, and environmental policies, site specific hazards and project requirements. This orientation shall be discussed with Unified Command, prior to commencement of the project.

Site specific orientations for operations projects will be provided to employees, contractors, volunteers, regulators, etc. by Unified Command representatives through the delivery of Site Safety Plans and/or presentation of material during Tailgate Meetings. At a minimum Tailgate Meetings will consist of a review of sifts work activities and the associated Hazard Assessment and Safe Work Permit if applicable.

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

- Importance of safety to Unified Command.
- Safety objectives and zero tolerance of rules violations
- Work permit requirements.
- Right and responsibility to refuse dangerous work.
- Parking and backing-in policy.
- Security requirements and restricted access areas.
- Location of designated smoking areas.
- Location of designated eating and other non-work related activities 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., oil contaminated areas, heavy equipment, water (river / banks), etc.).
- 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 fire fighting 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; and
    - Location of assembly areas

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

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 1 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 Unified Command 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 Unified Command 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

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 a 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

Fatigue Management Plan plans will be developed 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).
    - Plan and follow a work/rest schedule based on the hourly estimated Heat Index, workload and other climatic conditions.
    - Schedule heavy work for the cool times of the day
    - Increase staffing on heavy work jobs and jobs in hot environments
    - Have workers drink at set intervals – e.g. 6 oz (3/4 cup or 180 ml) cool water or sport drinks every 20 minutes to maintain a fluid/electrolyte balance.
    - Use area refrigeration, cooling fans, ice pack, cool vests and phase change vests, whichever is feasible. DO NOT use fans if air temperature is > 95°F since air movement across skin hinders evaporative perspiration.
    - Provide sun shielding, tents, or canopies to shade a rest spot or small work site.
    - Offer first aid assistance when symptoms or injuries occur
    - Constantly monitor employees to detect signs and symptoms of heat stress. Use the buddy system.
    - Reduce alcohol, caffeine, and nicotine intake.
    - Get medical conditions under control.
    - Report any conditions of possible heat stress immediately (see Appendix E for information on heat stress/heat stroke)

- 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.

Exposure to heat stress:

- Sampling locations: jobsites
- Sampling methods:
    - Obtaining hourly climatic conditions from the local weather forecast office or preferably using a thermo hygrometer to measure the temperature and relative humidity at the jobsite and consulting Table 1, or
    - Using a Thermal Environment Monitor to determine the workplace's WBGT and converting it to Heat Index according to the following formula:
      Heat Index = 1.94 × WBGT – 11.3
    - Determining the final Heat Index by considering the following correction factors:
        - Radiant heat: percent of clouds, adding 4-6 ^{0}F
        - FR clothing: adding 9 ^{0}F
        - Half-face respirators: adding 4 ^{0}F
        - Workload: heavy to very heavy, adding 4-6 ^{0}F
- Consulting Table 2 to determine heat stress risk level and a regimen of work time and rest time
- Repeating the assessment process whenever climatic conditions change

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

Table 1: Heat Index from Temperature and Relative Humidity Readings*

Relative Humidity	Actual Temperature °F (°C)								
	70 (21.1)	75 (23.9)	80 (26.7)	85 (29.4)	90 (32.2)	95 (35)	100 (37.8)	105 (40.6)	110 (43.3)
0%	70 (21.1)	75 (23.9)	80 (26.7)	85 (29.4)	90 (32.2)	95 (35)	100 (37.8)		
10%	70 (21.1)	75 (23.9)	80 (26.7)	85 (29.4)	90 (32.2)	95 (35.0)	100 (37.8)		
20%	70 (21.1)	75 (23.9)	80 (26.7)	85 (29.4)	90 (32.2)	96.8 (36.0)	102.2 (39.0)		
30%	70 (21.1)	75 (23.9)	80.6 (27.0)	87.8 (31.0)	95 (35.0)	102.2 (39.0)			
40%	70 (21.1)	77.0 (25.0)	84.2 (29.0)	91.4 (33.0)	98.6 (37.0)				
50%	71.6 (22.0)	80.6 (27.0)	87.8 (31.0)	95 (35.0)					
60%	75.2 (24.0)	82.4 (28.0)	91.4 (33.0)	98.6 (37.0)					
70%	77.0 (25.0)	86 (30.0)	95 (35.0)						

80%	80.6 (27.0)	87.8 (31.0)	98.6 (37.0)
90%	82.4 (28.0)	91.4 (33.0)	100.4 (38.0)
100%	84.2 (29.0)	95 (35.0)	[illegible]

*This table is based on work with little or no radiant heat, assuming wearing regular summer clothing, moderate work for unacclimatized workers or heavy work for acclimatized workers).

Table 2. Work/Rest Schedule for Hot Work Environment

Heat Index °F (°C)	Risk of Heat Disorders	Work/Rest Regimen
130+ (55+)	Extreme danger	Discontinue work
[illegible]		
100.4-102.2 (38-39)	Heat stroke, heat cramps and/or heat exhaustion possible	Work 45 min and rest 15 min every hour
93.2-98.6 (34-37)	Extreme caution	Warn for symptoms and extra water
86-91.4 (30-33)	Fatigue possible	Alert for symptoms and extra water
77-84.2 (25-29)	Caution	Water as needed

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 intermittent rest periods with water breaks;
- 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.

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:

- Prior approval from Unified Command.
- There is a minimum of two workers, or communications exist to outside areas to request assistance if required.
- 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.
- Regular "night shift" work will require prior approval from the Unified Command.
- 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 Unified Command. Communications must be maintained and checked at least every two hours with a control room or other appropriate personnel.

2.12 Working Alone

Unified Command 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.

Unified Command, especially the Safety and Security Coordinators, must ensure that the required hazard assessments have been completed prior to the work taking place.

Where any worker is required to work alone, Unified Command 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, dangerous water conditions) without first making certain that appropriate safety precautions are taken (e.g. personal gas monitors, frequent communications, PFDs).
- 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

Unified Command must communicate Security expectations to all personnel and compliance will not be compromised. Hot and Warm zone access are controlled by security guards and hot zones are additionally identified through staking.

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 / 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.

Unified Command reserves the right to request any worker or visitor have drug and alcohol tested based on reasonable cause.

Workers under the influence of prescription drugs causing impairment may also be removed from the site and may be subject to the disciplinary measures.

2.15 Disciplinary Measures

Unified Command 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 Unified Command.

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 Unified Command 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 Unified Command.

2.16 Incident Reporting

The Unified Command 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 the Unified Command Safety Officer. The incidents will be documented and reviewed by the Unified Command. 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.

Written Report – within 48 hours

A written report shall be completed and provided to the Unified Command 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 Safety Coordinator 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 Unified Command 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 Unified Command Inspector / Safety Inspector / Safety Coordinator within the required time frame.

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

The Unified Command 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

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

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 (Steel Toe)
- 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.

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.

NOTE: Pancake style welding helmets are acceptable providing the helmet is ANSI approved. Safety glasses do not have to be worn when actively using the pancake style helmet; however, safety glasses must be donned immediately after a pancake helmet is flipped up or removed.

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

NOTE: Safety eyewear (glasses) shall be worn in addition to the proper face shield or welder's shield when grinding or welding.

Activity	Protection Required
Abrasive blasting	Blasting hood complete with supplied air
Arc Welding and gouging	• Welder – welding helmet and safety glasses c/w side shields under the helmet • Helper – as above, or full face shield and safety glasses with side shields (minimum shade 3) or full face shield and welder/cutter goggles (minimum shade 3)
CAD Welding activities	• Full face shield and safety glasses with side shields
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 asbestos-containing materials	• Full face shield and safety glasses with side shields or • Goggles
Handling hazardous substances (e.g. toluene, NGL)	• 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
Handling PCB's	• Full face shield and safety glasses with side shields or • Chemical resistant goggles
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)

Oxy-acetylene welding, cutting, brazing or soldering	• Welder – welder's/cutter's goggles (eye-cup or mono-goggles) or safety glasses with side shields (minimum shade 3) and a face shield • NOTE: A welding helmet with a flip-up lens can substitute a face shield. • Helper – same as welder
Pneumatic or electric grinding and buffering (includes cut-off and concrete saws)	• Welding helmet and safety glasses with side shields under helmet or • Full face shield and safety glasses with side shields or • Full face shield and impact goggles
Working in windy conditions	• Protection as required

2.17.2Foot 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.

2.17.4 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, and as determined on the Hazard Assessment.

2.17.7 Fire Retardant Clothing

Approved Fire Retardant (FR) clothing shall be worn for:

- **Electrical work**
- **Work within hazardous or restricted areas, including work inside fenced or operating facilities**
- Persons involved in, or any persons within 100 feet of mechanical ground disturbance work (e.g. stumping, stripping, grading, excavating, boring/drilling, backfilling, etc.) within ten feet of operating facilities, i.e. gas or oil pipelines, whether above or below-ground.
- Welding/cutting on an existing Company or foreign pipeline and/or, any piping system that has recently been hydro-tested using a water-methanol mix and may still contain a flammable atmosphere.
- **Areas with potential for flash fire or explosion, or where required by the Project Hazard Assessment and Task Hazard assessment.**
- Investigating facilities for known or suspected anomalies;
- Repairing facilities with leaks, defects or corrosion pits/clusters where the calculated rupture pressure ratio is less than one;
- Welding directly to the parent pipe (i.e., mainline or station piping);
- Welding on a pressurized split tee with longitudinal fillet-weld check-straps;
- Welding on a pressurized Morrison sleeve; and
- Working near open systems (within 100 feet). An open system is any component of the pipeline system which is open to the atmosphere and has not been gas-freed and isolated. Examples include, but are not limited to:
    - Open strainers;
    - Open pumps;
    - Open scraper traps;
    - Open pipes;
    - Sumps;
    - Storage tanks;
    - Open valve bonnets; and
    - Open prover pipes.

Where FRC is required, the full length sleeves and front of the garments must be fastened as completely as designed.

2.17.7.1 Fabric Requirements

Approved fire retardant clothing fabrics shall meet the intent of NFPA 2112

Approved fire retardant clothing for electrical workers shall meet the minimum arc thermal protection of 8 cal/cm2 (HRC 2).

Leather shoulder and sleeve covers should be worn during welding and cutting operations. Sleeves and the front of clothing must be fastened during welding activities.

2.17.7.2 Outerwear

Workers shall wear fire retardant clothing as the outer garment (including hard hat liners and hooded jackets) and must fully cover any non fire retardant clothing being worn, except where permitted otherwise within the requirements of this policy.

Non fire retardant outerwear may be worn over approved fire retardant clothing only when other safety concerns exceed the fire hazard (e.g., protection against asbestos, drowning, visibility or corrosive materials).

Where there is a potential for the fire retardant outerwear to become contaminated with flammable products, impermeable FR rain suits or FR Tyvek coveralls may be worn over the fire retardant outerwear.

2.17.7.3 Rainwear and Disposable Coveralls

Fire retardant rainwear that meets the intent of the NFPA 2112 standard may be worn as an approved outer garment without any other approved fire retardant clothing underneath

NOTE: Rainwear and disposable coveralls that do not meet the entire standard is acceptable providing it is not required in the Hazard Assessment for the work, and is worn over approved FR clothing.

2.17.7.4 Laundering

Follow the laundering instructions and temperature limits for fire retardant clothing identified on the garment care tag. Clothing must be kept reasonably free from grease and oil.

2.17.7.5 Audits of Clothing Program

All workers shall routinely inspect / audit fire retardant clothing to ensure it is kept in good condition for its intended use. Results of the inspections/audits shall be in writing and made available to the Unified Command upon request.

NOTE: **Fire retardant clothing that is threadbare or torn does not provide sufficient protection.**

2.17.8 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 Unified Command 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
Abrasive blasting	Silica dust, non-silica dust (e.g., slag, steel grit), lead (from removal of lead-based paint)	Mandatory minimum for blaster: supplied-air hood or helmet with apron (also called cape or bib) operated in a continuous flow mode	Contact appropriate safety coordinator for additional requirements if lead paint is involved. If blasting in a confined space or if positioned in the immediate blast area of blasting operations, the helper's protection must be identical to the blaster's.
		Mandatory minimum for helper if positioned in the immediate blast area of blasting operations: half mask APR with HEPA dust filter (see Comments)	

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 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	See Ventilation, Air Testing and Air Monitoring in Confined Spaces, and Personal Protective Equipment for Confined Spaces, for further requirements. 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.

Task/Exposure	Hazards	Respiratory Protection	Comments
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.
Gauging	Toxic organic vapors (e.g., benzene, petroleum vapors), hydrogen sulfide	Mandatory minimum if LEL >4% and <10%, and H_2S <10 ppm: half mask APR with organic vapor cartridge	
		Mandatory minimum if LEL >10% or H_2S >10 ppm: SCBA	
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.
Lab operations	Toxic organic vapors (e.g., benzene, toluene)	Recommended minimum: half mask APR with organic vapor cartridge if high vapor concentration is present	A respirator is not required if a fume hood is used.
Task/Exposure	**Hazards**	**Respiratory Protection**	**Comments**
Painting and coating (not applicable to water-based coatings)	Toxic organic mists (spraying),	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.

Task/Exposure	Hazards	Respiratory Protection	Comments
	toxic organic vapors (spraying and brush/roller application), isocyanates (two-part coatings containing isocyanates)	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.
Tank cleaning	Toxic organic vapors (e.g., benzene, petroleum vapors,	Mandatory minimum for initial entry: SCBA or SAR	
		Mandatory minimum for ongoing work, LEL <10%, H_2S <10 ppm, with oil residue present: half mask APR with organic vapor cartridge	

Task/Exposure	Hazards	Respiratory Protection	Comments
		Mandatory minimum for ongoing work, LEL >10%, H_2S >10 ppm: SCBA or full face piece SAR	No work is permitted if LEL >20%.
Welding	Toxic dusts and fumes	Recommended dust mask	

Respiratory protection is mandatory when welding inside tanks or in areas with poor ventilation.

2.17.9 PERSONAL FALL ARREST AND TRAVEL RESTRAINT SYSTEMS

2.17.9.1 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**

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.

2.17.9.2 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.

2.17.10 Lifejacket / Personal Flotation Devices

All Lifejacket and Personnel Flotation Device must meet or exceed all applicable regulations and approvals (United States Coast Guard Type II).

Lifejackets and/or Personal Floatation Devices (PFDs) shall be worn when working over water (ponds, rivers, creeks, etc.) adjacent to water (within six 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 PFDs.

2.17.11 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 below 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 reevaluated 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 Mobil 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 centre 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**

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

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

shall be immediately replaced or repaired.

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 (PDFs). 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 E.

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.

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 PFDs.

3.04 Pipeline Repair

The pipeline repair will be conducted using Enbridge Pipeline Maintenance workers augmented with pipeline contract crews. Pipeline repair will consist of pipe drain-up, site preparation, cut-out of the damaged pipe, heavy lifting, measurement and preparation of replacement pipe, aligning replacement pipe, welding and filling once complete. Enbridge Pipeline Maintenance workers involved in this aspect of the work are trained in Enbridge's Operating and Maintenance Procedures, which include specific and detailed descriptions of the work and the procedures involved. All work will be completed under the direction of Enbridge Pipeline Maintenance Supervision and will include the Enbridge Job Planning Tool. Refer to the Pipeline Repair Manual 6B for Pipeline Repair safety elements.

3.05 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.

3.06 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.

3.07 Decontamination Procedures

Personnel decontamination areas and equipment decontamination areas have been established on site for the duration of the response. The number of units will vary by needs related to response activities. 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.

These decontamination stations are also to be utilized for emergency decontamination of workers should an incident occur. EMT members and workers will be briefed 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 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

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 using soap and water 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.

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 Areas:

Vessel decontamination areas will be established at boat ramps and access areas where vessels will be removed from waterways. These areas will be designed to sufficiently contain oil as the vessels are removed from the water. This containment will consist of a diked impoundment in which boats can be cleaned through either spray wash or wipe down to remove product. A system for retrieve the sheep/product from decontamination area will be utilized.

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

Appendix A

MSDS for Crude Oil

EnCana Corporation Material Safety Data Sheet
Heavy Crude Oil/Diluent Mix – Christina Lake/Foster Creek Page 1 of 2

SECTION 1 – MATERIAL IDENTIFICATION AND USE
Material Name: HEAVY CRUDE OIL/DILUENT MIX (CHRISTINA LAKE/FOSTER CREEK)
Use: Process stream, fuels and lubricants production
WHMIS Classification: Class B, Div. 2, Class D, Div. 2, Sub-Div. A and B
NFPA: Fire: 2 **Reactivity**: 0 **Health**: 3
TDG Shipping Name: Petroleum Crude Oil
TDG Class: 3 **UN**: 1267
TDG Packing Group: II (boiling point 35 deg. C or above, and flash point less than 23 deg. C)
Manufacturer/Supplier: ENCANA CORPORATION
#1800, 855 - 2nd Street S.W., P.O. BOX 2850,
CALGARY, ALBERTA, T2P 2S5
Emergency Telephone: 403-645-3333
Chemical Family: Crude oil/condensate mix

SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL
Hazardous Approximate C.A.S. LD50/LC50 Exposure
Ingredients Concentrations (%) Nos. Specify Species Limits
& Route
Crude oil 50 - 70 8002-05-9 LD50,rat, skin,>2 g/kg 5 mg/m3 (OEL,TLV)
Hydrocarbon Diluent 30 - 50 N.Av. N.Av. 900 mg/m3 (OEL)*
Benzene 0.03 - 0.3 71-43-2 LD50,rat,oral,930 mg/kg 1 ppm (OEL),
LC50,rat,4 hr,13200 ppm 0.5 ppm (TLV)
Hydrogen Sulphide <0.5 7783-06-04 LC50, rat, 4 hrs, 444 ppm 10 ppm (OEL,TLV)
OEL = 8 hr. Alberta Occupational Exposure Limit; TLV = Threshold Limit Value (8 hrs) *OEL for gasoline

SECTION 3 – PHYSICAL DATA FOR MATERIAL
Physical State: Liquid **Vapor Pressure (kPa)**: 2.5 – 36.5 @ 20C
Specific Gravity: 0.65 – 0.75 **Odor Threshold (ppm)**: N.Av.
Vapor Density (air=1): 2.5 -5.0 **Evaporation Rate**: N.Av.
Percent Volatiles, by volume: 20 - 30 (estimated) **Boiling Pt. (deg.C)**: 40 - 180
pH: N.Av. **Freezing Pt. (deg.C)**: <0
Coefficient of Water/Oil Distribution: <0.1
Odor & Appearance: Brown/black liquid, hydrocarbon odor
(N.Av. = not available N.App. = not applicable)

SECTION 4 – FIRE AND EXPLOSION
Flammability: Yes **Conditions**: Material will ignite at normal temperatures.
Means of Extinction: Foam, CO2, dry chemical. Explosive accumulations can build up in areas of poor ventilation.
Special Procedures: Use water spray to cool fire-exposed containers, and to disperse vapors if spill has not ignited. Cut off fuel and allow flame to burn out.

Flash Point (deg.C) & Method: <-35 (PMCC)
Upper Explosive Limit (% by vol.): 8 (estimated) **Sensitivity to Impact**: No
Lower Explosive Limit (% by vol.): 0 8 (estimated) **Sensitivity to Static Discharge**: Yes, at normal temperatures
Auto-Ignition Temp. (deg.C): 250 (estimated) **TDG Flammability Classification**: 3
Hazardous Combustion Products: Carbon monoxide, carbon dioxide, sulphur oxides

SECTION 5 – REACTIVITY DATA

Chemical Stability: Stable **Conditions**: Heat
Incompatibility: Yes **Substances**: Oxidizing agents (e.g. chlorine)
Reactivity: Yes **Conditions**: Heat, strong sunlight
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, sulphur oxides

SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT

Routes of Entry:
Skin Absorption : Yes **Skin Contact**: Yes **Eye Contact**: Yes
Inhalation: **Acute**: Yes **Chronic**: Yes **Ingestion**: Yes
Effects of Acute Exposure: Vapor may cause irritation of eyes, nose and throat, dizziness and drowsiness. Contact with skin may cause irritation and possibly dermatitis. Contact of liquid with eyes may cause severe irritation/burns.
Effects of Chronic Exposure: Due to presence of benzene, long term exposure may increase the risk of anemia and leukemia Repeated skin contact may increase the risk of skin cancer.
Sensitization to Product: No.
Exposure Limits of Product: 1 ppm (Alberta 8 hr OEL for benzene)
Irritancy: Yes
Synergistic Materials: None reported
Carcinogenicity: Yes **Reproductive Effects**: Possibly **Teratogenicity**: Possibly **Mutagenicity**: Possibly

SECTION 7 – PREVENTIVE MEASURES

Personal Protective Equipment: Use positive pressure self-contained breathing apparatus, supplied air breathing apparatus or cartridge air purifying respirator approved for organic vapors where concentrations may exceed exposure limits (note: cartridge respirator not suitable for hydrogen sulphide, oxygen deficiency or IDLH situations) – see also Storage below).
Gloves: Viton (nitrile adequate for short exposure to liquid)
Eye: Chemical splash goggles. **Footwear**: As per safety policy **Clothing**: As per fire protection policy
Engineering Controls: Use only in well ventilated areas. Mechanical ventilation required in confined areas. Equipment must be explosion proof.
Leaks & Spills: Stop leak if safe to do so. Use personal protective equipment. Use water spray to cool containers. Remove all ignition sources. Provide explosion-proof clearing ventilation, if possible. Prevent from entering confined spaces. Dyke and pump into containers for recycling or disposal. Notify appropriate regulatory authorities.
Waste Disposal: Contact appropriate regulatory authorities for disposal requirements.
Handling Procedures & Equipment: Avoid contact with liquid. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions.

Storage Requirements: Store in a cool, dry, well ventilated area away from heat, strong sunlight, and ignition sources.
Caution: hydrogen sulphide may accumulate in headspaces of tanks and other equipment, even when concentrations in the liquid product are low. Overexposure to hydrogen sulphide may cause dizziness, headache, nausea and possibly knockdown and death. Factors increasing this risk include heating, agitation and contact of the liquid with acids or acid salts. Assess the exposure risk by gas monitoring. Wear air supplying breathing apparatus if necessary.
Special Shipping Provisions: N.App.

SECTION 8 – FIRST AID MEASURES
Skin: Flush skin with water, removing contaminated clothing. Get medical attention if irritation persists or large area of contact. Decontaminate clothing before re-use.
Eye: Immediately flush with large amounts of luke warm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation persists.
Inhalation: Ensure own safety. Remove victim to fresh air. Give oxygen, artificial respiration, or CPR if needed. Seek medical attention immediately.
Ingestion: Give 2-3 glasses of milk or water to drink. DO NOT INDUCE VOMITING. Keep warm and at rest. Get immediate medical attention.

SECTION 9 – PREPARATION DATE OF MSDS
Prepared By: EnCana Environment, Health and Safety (EHS)
Phone Number: (403) 645-2000 Preparation Date: October 15, 2008 Expiry Date: October 15, 2011

MATERIAL SAFETY DATA SHEET

1. Chemical Product and Company Identification

24-HOUR EMERGENCY TELEPHONE NUMBER:
CHEMTREC (800) 424-9300

PRODUCT NAME: HYDROGEN SULFIDE

CHEMICAL NAME: Hydrogen Sulfide

COMMON NAMES/SYNONYMS: Dihydrogen Sulfide, Sulfur Hydride

TDG (Canada) CLASSIFICATION: 2.3 (2.1)

PREPARATION DATE: 6/1/95

REVIEW DATES: 6/7/96

2. Composition, Information on Ingredients

INGREDIENT % VOLUME PEL-OSHA1 TLV-ACGIH2 LD50 or LC50 Route/Species

Hydrogen Sulfide
FORMULA: H2S
CAS: 7783-06-4
> 99.0 20 ppm Ceiling 10 ppm TWA
15 ppm STEL LC50 444 ppm (rat)

1 As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)
2 As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents

3. Hazards Identification

EMERGENCY OVERVIEW

Irritating to the eyes, mucous membranes and respiratory system. Inhaled gas inhibits cellular respiration resulting in pulmonary paralysis, sudden collapse and death. Extremely flammable.

ROUTE OF ENTRY:

Skin Contact	Yes
Skin Absorption	No
Eye Contact	Yes
Inhalation	Yes
Ingestion	Yes

HEALTH EFFECTS:

Exposure Limits	Yes
Irritant	Yes
Sensitization	No
Teratogen	Yes
Reproductive Hazard	Yes
Mutagen	No
Synergistic Effects	None Reported

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS:

Low concentrations will generally cause irritation to the conjunctiva. Repeated exposure to low concentrations is reported to cause conjunctivitis, photo phobia, corneal bullae, tearing, pain and blurred vision.

SKIN EFFECTS:

May irritate the skin upon contact.

INGESTION EFFECTS:

Ingestion is unlikely. Hydrogen sulfide will irritate the mucous membranes causing a burning feeling with excess salivation likely. Irritation of the gastrointestinal tract may also occur.

INHALATION EFFECTS:
Hydrogen sulfide reacts with enzymes in the bloodstream and inhibits cellular respiration resulting in pulmonary paralysis, sudden collapse and death. Continuous exposure to low (15-50 ppm) concentrations will generally cause irritation to mucous membranes, and may also cause headache, dizziness or nausea. Higher concentrations (200-300 ppm) may result in respiratory arrest leading to coma or unconsciousness. Exposures for more than 30 minutes at concentrations greater than 700 ppm have been fatal. Continuous inhalation of low concentrations may cause olfactory fatigue or paralysis of the sense of smell. Thus, detection of hydrogen sulfide by its odor is not effective.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
Blood disorders.
NFPA HAZARD CODES HMIS HAZARD CODES RATINGS SYSTEM
Health: 4 Health: 4 0 = No Hazard
Flammability: 4 Flammability: 4 1 = Slight Hazard
Reactivity: 0 Reactivity: 0 2 = Moderate Hazard
3 = Serious Hazard
4 = Severe Hazard
4. First Aid Measures
EYES:
PERSONS WITH POTENTIAL EXPOSURE TO HYDROGEN SULFIDE SHOULD NOT WEAR CONTACT LENSES. Flush contaminated eyes with large amounts of water for at least 15 minutes. Part eyelids with fingers to ensure complete flushing. If irritation persists, seek medical attention immediately.
SKIN:
Flush affected area with water. If irritation persists, consult a physician.
INGESTION:
Treat in a manner similar to inhalation exposure. Seek medical attention as soon as possible.
INHALATION:
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE
PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND SHOULD RECOGNIZE THE HAZARDS OF OVEREXPOSURE DUE TO OLFACTORY FATIGUE. An extreme fire hazard exists when rescuing semiconscious or unconscious persons due to the flammability hazard. Avoid use of rescue equipment which may contain ignition sources or cause static discharge. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen or a mixture of 5% carbon dioxide in oxygen. Keep victim calm and warm. Further treatment should be symptomatic and supportive. Seek medical assistance immediately.
5. Fire Fighting Measures
Conditions of Flammability: Flammable
Flash point: Not Available
Method: Not Applicable
Autoignition Temperature: 554°F (290°C)
LEL(%): 4.0 UEL(%): 44.0
Hazardous combustion products: Sulfur Compounds
Sensitivity to mechanical shock: None
Sensitivity to static discharge: None
FIRE AND EXPLOSION HAZARDS:

Hydrogen sulfide is heavier than air and may accumulate in low areas and may travel a considerable distance to a source of ignition Should flame be extinguished and flow of gas continue, increase ventilation to prevent flammable mixture formation in low areas or pockets. Product may explode or burn over a wide range of mixtures in air.

EXTINGUISHING MEDIA:

Water, carbon dioxide, dry chemicals

FIRE FIGHTING INSTRUCTIONS:

If possible, stop the flow of hydrogen sulfide. Use water spray to cool surrounding containers. Fire fighters should use self-contained breathing apparatus.

6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Earth-ground and bond all lines and equipment associated with the Hydrogen Sulfide system. All electrical equipment should be non-sparking or explosion proof. Do not rely on the olfactory sense to detect the presence of hydrogen sulfide. Analytical devices and instrumentation are readily available for this purpose. Perform frequent analytical tests to be certain that the TWA is not exceeded. Many metals corrode rapidly with wet hydrogen sulfide. Anhydrous hydrogen sulfide can be handled in carbon steel, aluminum Inconel ®, Stellite ® and 304 and 316 stainless steels. Avoid hard steels which are highly stressed since they may be susceptible to hydrogen embrittlement from hydrogen sulfide Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<750 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the system. Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130oF (54oC). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" signs in the storage area or use area. There should be no sources of ignition in the storage or use area

For additional storage recommendations, consult Compressed Gas Association Pamphlets P-1 and G-12.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

8. Exposure Controls, Personal Protection

EXPOSURE LIMITS1:

INGREDIENT % VOLUME PEL-OSHA2 TLV-ACGIH3 LD50 or LC50 Route/Species

Hydrogen Sulfide
FORMULA: H2S
CAS: 7783-06-4
> 99.0 20 ppm Ceiling 10 ppm TWA
15 ppm STEL LC50 444 ppm (rat)

1 Refer to individual state of provincial regulations, as applicable, for limits which may be more stringent than those listed here.
2 As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)
3 As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

ENGINEERING CONTROLS:
Hood with forced ventilation. Use local exhaust to prevent accumulation above exposure limit.

EYE/FACE PROTECTION:
Gas tight chemical goggles or full-face piece respirator.

SKIN PROTECTION:
Protective gloves: Neoprene, butyl rubber, PVC, polyethylene.

RESPIRATORY PROTECTION:
Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

OTHER/GENERAL PROTECTION:
Safety shoes, safety shower, eyewash "fountain".

9. Physical and Chemical Properties

PARAMETER VALUE UNITS

Physical state (gas, liquid, solid): Vapor
Vapor pressure: 267 (1840 kPa) psia
Vapor density at STP (Air = 1): 1.21
Evaporation point: Not Available
Boiling point: -76 °F: -60 °C
Freezing point: -117.8 °F: -82.2 °C
pH: Not Available
Specific gravity: Not Available
Oil/water partition coefficient: Not Available
Solubility (H20): Soluble
Odor threshold: Not Available
Odor and appearance: Colorless vapor with rotten egg odor.

10. Stability and Reactivity

STABILITY:
Stable

INCOMPATIBLE MATERIALS:
Dangerously reactive when mixed with concentrated nitric acid or other strong oxidizing agents. Vapors will ignite spontaneously when mixed with vapors of chlorine, oxygen difluoride or nitrogen trifluoride.

HAZARDOUS DECOMPOSITION PRODUCTS:
Oxides of sulfur.

HAZARDOUS POLYMERIZATION:
Will not occur.

11. Toxicological Information

REPRODUCTIVE:
Toxic effects observed in newborn rats after exposure of pregnant female to 20 ppm Hydrogen Sulfide.

12. Ecological Information
No data given.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER United States DOT Canada TDG

PROPER SHIPPING NAME: Hydrogen Sulfide, liquefied Hydrogen Sulfide, liquefied

HAZARD CLASS: 2.3 2.3 (2.1)

IDENTIFICATION NUMBER: UN 1053 UN 1053

SHIPPING LABEL: POISON GAS, FLAMMABLE GAS POISON GAS, FLAMMABLE GAS

Additional Marking Requirement: "Inhalation Hazard" If net weight of product > 100 pounds, the container must be also marked with the letters "RQ".

Additional Shipping Paper Description Requirement: "Poison-Inhalation Hazard, Zone B" If net weight of product > 100 pounds, the shipping papers must be also marked with the letters "RQ".

15. Regulatory Information

Hydrogen sulfide is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

SARA TITLE III NOTIFICATIONS AND INFORMATION

Hydrogen sulfide is listed as an extremely hazardous substance (EHS) subject to state and local reporting under Section 304 of SARA Title III (EPCRA). The presence of hydrogen sulfide in quantities in excess of the threshold planning quantity (TPQ) of 100 pounds requires certain emergency planning activities to be conducted. Releases of hydrogen sulfide in quantities equal to or greater than the reportable quantity (RQ) of 100 pounds are subject to reporting to the National Response Center under CERCLA, Section 304 SARA Title III.

SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard
Sudden Release of Pressure Hazard

SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER INGREDIENT NAME PERCENT BY VOLUME 7783-06-4 Hydrogen sulfide > 99.0

This information must be included on all MSDSs that are copied and distributed for this material.

16. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

Material Safety Data Sheet
Hexanes MSDS
Section 1: Chemical Product and Company Identification
Product Name: Hexanes
CAS#: 110-54-3
TSCA: TSCA 8(b) inventory: Hexane
Synonym:
Chemical Name: Hexane
Chemical Formula: C6-H14
Contact Information:
CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300
International CHEMTREC, call: 1-703-527-3887
Section 2: Composition and Information on Ingredients
Composition:
Name CAS # % by Weight
Hexanes 110-54-3 98.5-99.9
Toxicological Data on Ingredients: Hexane: ORAL (LD50): Acute: 25000 mg/kg [Rat].
Section 3: Hazards Identification
Potential Acute Health Effects:
Hazardous in case of skin contact (permeator), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).
Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to peripheral nervous system, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.
Section 4: First Aid Measures
Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Get medical attention if irritation occurs.
Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops
Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.
Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.
Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Serious Ingestion: Not available.

Section 5: Fire and Explosion Data
Flammability of the Product: Flammable.
Auto-Ignition Temperature: 225°C (437°F)
Flash Points: CLOSED CUP: -22.5°C (-8.5°F). (TAG)
Flammable Limits: LOWER: 1.15% UPPER: 7 5%
Products of Combustion: These products are carbon oxides (CO, CO2).
Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.
Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.
Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire.
Special Remarks on Explosion Hazards: Not available.
Section 6: Accidental Release Measures
Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill:
Flammable liquid, insoluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.
Section 7: Handling and Storage
Precautions:
Keep locked up. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.
Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).
Section 8: Exposure Controls/Personal Protection
Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection:
Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).
Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 500 (ppm) from OSHA (PEL) [United States] Inhalation TWA: 1800 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 176 (mg/m3) from ACGIH (TLV) [United States] SKIN TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 500 STEL: 1000 (ppm) from ACGIH (TLV) [United States] Inhalation TWA: 1760 STEL: 3500 (mg/m3) from ACGIH (TLV) [United States] Inhalation Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Gasoline-like or petroleum-like (Slight.)

Taste: Not available.

Molecular Weight: 86.18g/mole

Color: Clear Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 68°C (154.4°F)

Melting Point: -95°C (-139°F)

Critical Temperature: Not available.

Specific Gravity: 0.66 (Water = 1)

Vapor Pressure: 17.3 kPa (@ 20°C)

Vapor Density: 2.97 (Air = 1)

Volatility: Not available.

Odor Threshold: 130 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.9

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Soluble in diethyl ether, acetone. Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not available.

Special Remarks on Reactivity: Hexane can react vigorously with strong oxidizers (e.g. chlorine, bromine, fluorine)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 25000 mg/kg [Rat]. Acute toxicity of the gas (LC50): 48000 ppm 4 hours [Rat]

Chronic Effects on Humans:

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: peripheral nervous system, skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (permeator). Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects based on animal data. May be tumorigenic based on animal data. May affect genetic material. Passes through the placental barrier in animal.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause mild skin irritation. It can be absorbed through the skin in harmful amounts. Eyes: May cause mild eye irritation. Inhalation: May be harmful if inhaled. Inhalation of vapors may cause respiratory tract irritation. Overexposure may affect, brain, spinal cord, behavior/central and peripheral nervous systems (lightheadedness, dizziness, hallucinations, paralysis, blurred vision, memory loss, headache, euphoria, general anesthetic, muscle weakness, numbness of the extremities, asphyxia, unconsciousness and possible death), metabolism, respiration, blood, cardiovascular system, gastrointestinal system (nausea) Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation with abdominal pain and nausea. May also affect the liver, blood, brain, peripheral and central nervous systems. Symptoms of overexposure by ingestion are similar to that of overexposure by inhalation.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: Hexane UNNA: 1208 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Hexanes Illinois toxic substances disclosure to employee act: Hexanes Illinois chemical safety act: Hexanes New York release reporting list: Hexanes Rhode Island RTK hazardous substances: Hexanes Pennsylvania RTK: Hexanes Florida: Hexanes Minnesota: Hexanes Massachusetts RTK: Hexanes Massachusetts spill list: Hexanes New Jersey: Hexanes New Jersey spill list: Hexanes Louisiana spill reporting: Hexanes TSCA 8(b) inventory: Hexanes SARA 313 toxic chemical notification and release reporting: Hexanes CERCLA: Hazardous substances: Hexanes: 5000 lbs. (2268 kg).

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).
DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. R38- Irritating to skin. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R62- Possible risk of impaired fertility. R65- Harmful: may cause lung damage if swallowed. R67- Vapors may cause drowsiness or dizziness. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S29- Do not empty into drains. S33- Take precautionary measures against static discharges. S36/37- Wear suitable protective clothing and gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets. S62- If swallowed, do not induce vomiting: seek medical advice immediately and show this
HMIS (U.S.A.):
Health Hazard: 2
Fire Hazard: 3
Reactivity: 0
Personal Protection: g
National Fire Protection Association (U.S.A.):
Health: 1
Flammability: 3
Reactivity: 0
Specific hazard:
Protective Equipment:
Gloves (impervious). Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.
Section 16: Other Information
References: Not available.
Other Special Considerations: Not available.
Created: 10/10/2005 08:19 PM
Last Updated: 11/06/2008 12:00 PM
The information above is believed to be accurate and represents the best information currently available to us.

Material Safety Data Sheet
Benzene MSDS
Section 1: Chemical Product and Company Identification
Product Name: Benzene
CAS#: 71-43-2
TSCA: TSCA 8(b) inventory: Benzene
Synonym: Benzol; Benzine
Chemical Name: Benzene
Chemical Formula: C6-H6
Contact Information:
CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300
International CHEMTREC, call: 1-703-527-3887
Section 2: Composition and Information on Ingredients
Composition:
Name CAS # % by Weight
Benzene 71-43-2 100
Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50):
Acute: 9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].
Section 3: Hazards Identification
Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.
Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System Repeated or prolonged exposure to the substance can produce target organs damage.
Section 4: First Aid Measures
Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Vigorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be

careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.
Odor Threshold: 4.68 ppm
Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1
Ionicity (in Water): Not available.
Dispersion Properties: See solubility in water, diethyl ether, acetone.
Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data
Stability: The product is stable.
Instability Temperature: Not available.
Conditions of Instability: Heat, ignition sources, incompatibles.
Incompatibility with various substances: Highly reactive with oxidizing agents, acids.
Corrosivity: Non-corrosive in presence of glass.
Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.
Special Remarks on Corrosivity: Not available.
Polymerization: Will not occur.

Section 11: Toxicological Information
Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.
Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].
Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.
Other Toxic Effects on Humans:
Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (female fertility, Embryotoxic and/or phototoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances

disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene:
10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

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

DSCL (EEC):

R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2
Fire Hazard: 3
Reactivity: 0
Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2
Flammability: 3
Reactivity: 0
Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.
Other Special Considerations: Not available.
Created: 10/10/2005 08:35 PM
Last Updated: 11/06/2008 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us.

Appendix B

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	No training records,	Identify training requirements. Respirator fit testing required

	to LEL, H_2S, benzene. Uneven ground Working with loose product. Vegetation clean up at stream banks Booms	Exposure greater than 3% LEL Strains, slips, trips falls, eye injuries, Worker exposed to crude oil, LEL, H_2S,CO, benzene No respirator fit testing.	Fit testing records. Review Christina Lake (Cold 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	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.

		supplies. Personnel exposure, Contaminated clothing. Unstable stream banks. Underwater hazards.	Area monitoring LEL H_2S. Proper PPE to be worn. Decontamination zone- remove outer layer of clothing to prevent 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	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

		trucks Truck over turn, Jack knife. People walking in area No Identification on tank bins	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, 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 Vehicle traffic Pedestrian traffic.	Maintain good communication with landowners, environment to 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 : _____

Appendix C – Weather Related Precautions

Supporting Information and Sources
CCOHS Volume 5, Issue 6 - June 2007, Environmental Canada, *National* Weather Service *US*

Lightning incidents can be prevented by having a preparedness plan and taking some basic safety measures.

Lightning tends to strike higher ground and prominent objects, especially materials that are good conductors of electricity, such as metal. Thunder can be a good indicator of lightning - loud crackling means its close, whereas rumbling means it's further away.

Because light travels faster than sound, you will see lightning before you hear the thunder. Each second between the flash and the thunderclap represents about 1000 feet. As a rule of thumb, if you can count less than 30 seconds between the lightning strike and the thunder, the storm is less than 6 miles away. There is an 80% chance that the next strike will happen within that 6 miles, and if you can hear thunder, you are within striking distance. Run immediately to the nearest safe building or a fully enclosed, metal-topped vehicle ... there is NO safe place to be outside in a thunderstorm.

Safe Shelters from Lightning
The safest place to be in a thunderstorm is in a safe building. A safe building is one that is fully enclosed and serviced. Keep as many walls as possible between you and the outside. Stay away from doors, windows, fireplaces, and anything that will conduct electricity such as radiators, stoves, sinks and metal pipes. Avoid handling electrical appliances and telephones. Use battery operated appliances only.

The next best source of shelter is an enclosed metal car, truck or van (but NOT a tractor, golf cart, topless or soft top vehicle). Make sure the vehicle is not parked near trees or other tall objects that could fall over during a storm. When inside a vehicle during a lightning storm, roll up the windows and sit with hands in lap, waiting out the storm. Don't touch any part of the metal frame or any wired device in the vehicle (including the steering wheel or plugged-in cell phone). A direct strike to your car will flow through the frame of the vehicle and usually jump over or through the tires to reach ground.

Be aware of downed power lines that may be touching your car. You are safe inside the car, but you may receive a shock if you step outside.

Unsafe Shelters
Buildings or structures without electricity or plumbing to ground the lightning do not provide any lightning protection. Shelters that are unsafe include covered picnic shelters, carports, tents, baseball dugouts as well as other small non-metal buildings (sheds and greenhouses).

If you absolutely can't get to safety ...
There is no safe place to be outdoors during a thunderstorm. However, there are areas that might be less dangerous - and help reduce the risk of being struck by lightning outside.

Stay away from things that are tall (trees, flagpoles or posts), water, and other objects that conduct electricity (tractors, metal fences, lawnmowers, golf clubs).

You do not want to become a prime target by being the highest object on the landscape. Take shelter in low-lying areas such as valleys or ditches but watch for flooding.

If you are in a group in the open, spread out several feet apart from one another.

If you get caught in a level field far from shelter and you feel your hair stand on end, lightning may be about to hit you. Crouch down on the balls of your feet immediately, with feet together, place your arms around your knees and bend forward. Be the smallest target possible, and minimize your contact with the ground. Don't lie flat.

Lightning is an electrical discharge caused when static electricity builds up between thunderclouds, or thunderclouds and the ground. Lightning strokes carry up to 100 million volts of electricity and leap from cloud to cloud, or cloud to ground and vice versa. Lightning tends to strike higher ground and prominent objects, especially good conductors of electricity such as metal.

Thunder is the noise caused by the explosive expansion of air due to the heat generated by a lightning discharge. Thunder may have a sharp cracking sound when lightning is close by, compared to a rumbling noise produced by more distant strokes.

Because light travels at a faster speed than sound, you can see a lightning bolt before the sound of thunder reaches you.

Lightning may strike several miles away from the parent cloud and precautions should be taken even if the thunderstorm is not directly overhead.

If caught outdoors:
Keep a safe distance from tall objects, such as trees, hilltops, and telephone poles

Avoid projecting above the surrounding landscape. Seek shelter in low-lying areas such as valleys, ditches and depressions but be aware of flooding.

Stay away from water. Don't go boating or swimming if a storm threatens and land as quickly as possible if you are on the water. Lightning can strike the water and travel some distance from its point of contact. Don't stand in puddles even if you are wearing rubber boots.

Stay away from objects that conduct electricity, such as tractors, golf carts, golf clubs, metal fences, motorcycles, lawnmowers and bicycles.

Avoid being the highest point in an open area. Swinging a golf club or holding an umbrella or fishing rod can make you the tallest object and a target for lightning. Take off shoes with metal cleats

You are safe inside a car during lightning, but don't park near or under trees or other tall objects which may topple over during a storm. Be aware of downed power lines which may be touching your car. You are safe inside the car, but you may receive a shock if you step outside.

In a forest, seek shelter in a low-lying area under a thick growth of small trees or bushes.

Keep alert for flash floods, sometimes caused by heavy rainfall, if seeking shelter in a ditch or low-lying area.
If caught in a level field far from shelter and you feel your hair stand on end, lightning may be about to hit you.

Kneel on the ground immediately, with feet together, place your hands on your knees and bend forward. Don't lie flat.

If you are in a group in the open, spread out, keeping people several yards apart.

Indoor Precautions:
Before the storm hits, disconnect electrical appliances including radios and television sets. Do not touch them during the storm.

Don't go outside unless absolutely necessary.

Keep away from doors, windows, fireplaces, and anything that will conduct electricity, such as radiators, stoves, sinks, and metal pipes. Keep as many walls as possible between you and the outside.

Don't handle electrical equipment or telephones. Use battery operated appliances only.

Note: Persons who have been struck by lightning receive an electrical shock but do not carry an electrical charge and can be safely handled. Victims may be suffering from burns or shock and should receive medical attention immediately. If breathing has stopped, mouth-to-mouth resuscitation should be administered. If breathing and pulse are absent, cardio-pulmonary resuscitation is required.

In the United States, there are an estimated 25 million lighting flashes each year. During the past 30 years, lighting killed an average of 58 people per year. This is higher than 57 deaths per year caused by tornadoes and average 48 deaths to hurricanes. Yet because lightning usually claims only one or two victims at a time and does not cause mass destruction of property, it is underrated as a risk. While documented lightning injuries in the United States average about 300 per year, undocumented injuries are likely much higher.

Watch for Developing Thunderstorms: Thunderstorms are most likely to develop on spring or summer days but can occur year round. As the sun heats the air, pockets of warmer air start to rise and cumulus clouds form. Continued heating can cause these clouds to grow vertically into towering cumulus clouds, often the first sign of a developing thunderstorm.

When to Seek Safe Shelter: Lightning can strike as far as 10 miles from the area where it is raining. That's about the distance you can hear thunder. If you can hear thunder, you are within striking distance. Seek safe shelter immediately.

Outdoor Activities: Minimize the risk of being struck Most lightning deaths and injuries occur in the summer. Where organized outdoor sports activities take place, coaches, camp counselors

and other adults must stop activities at the first roar of thunder to ensure everyone has time to get to a large building or enclosed vehicle. Leaders of outdoors events should have a written plan that all staff are aware of and enforce.

Indoor Activities: Inside buildings, stay off corded phones, computers and other electrical equipment that put you in direct contact with electricity. Stay away from pools (indoor or outdoor), tubs, showers and other plumbing. Buy surge suppressors for key equipment. Install ground fault protectors on circuits near water or outdoors. When inside, wait 30 minutes after the last clap of thunder, before going outside again

Helping a Lightning Strike Victim: Lightning victims do not carry an electrical charge, are safe to touch, and need urgent medical attention. Cardiac arrest is the immediate cause of death for those who die. Some deaths can be prevented if the victim receives the proper first aid immediately. Call 911 immediately and perform CPR if the person is unresponsive or not breathing. Use an Automatic External Defibrillator if one is available.

Summary: Lighting is dangerous. With common sense, you can greatly increase your safety and the safety of those you are with. At the first clap of thunder, go to a large building or fully enclosed vehicle and wait 30 minutes after the last clap of thunder before you to go back outside.

Appendix D **Marshall Spill Industrial Hygiene Plan**

Industrial Hygiene Air Monitoring/Sampling

Initial air testing requirements

- Testing shall be performed twice where the product accumulation is greatest. Except where the spill site is too small to do so, these samples should be taken at least 10 ft apart.
- Measurements should be taken 3 ft above the surface of the product and 1 ft inside the downwind side of the leak site boundary. Measurements should also be taken at the exact jobsite where activities could generate additional chemical emissions
- For each test:
    - Perform two (2) measurements for benzene with a grab sampling instrument such as Drager CMS, UltraRae 3000, or Gastec.
    - Perform two (2) measurements for total hydrocarbons (TVOCs) with a PID instrument such as ppbRae, UltraRae 3000, or UltraRae.
    - Perform two (2) measurements for hydrogen sulfide (H_2S) with a Drager CMS.
- Monitoring shall be conducted to delineate the perimeter where air contaminants or combustible vapors are at or below detectable levels. The *cold zone* must be established outside of this perimeter.
- Monitoring shall also be conducted at nearby facilities, commercial buildings, waterways, and residential houses.
- Air testers shall wear half-face respirator for the initial air testing. Respiratory protection requirements for repeating this sampling (as per the *Ongoing Air Testing* subsection below) shall be in accordance with Book 2: 13-02-07 and based upon previous air monitoring results (initial air testing, area or personal air monitoring).
- Respiratory Protection:
    - Half-face respirator: 0.5 ppm ≤ benzene <5.0 ppm; total VOCs ≥ 300 ppm; H_2S ≥ 10.0 ppm
    - Full-face respirator: 5.0 ppm ≤ benzene ≤ 25.0 ppm; total VOCs ≥ 500 ppm;
    - Supplied air respirator: benzene ≥ 25.0 ppm, or H_2S: 10.0 - 100 ppm
    - Cartridge replacement schedule: every one (1) hour when benzene ≥ 5.0 ppm; or total VOCs ≥ 1000 ppm; every two (2) hours when benzene ≥ 2.0 ppm; or total VOCs ≥ 500 ppm; every four (4) hours when benzene ≥ 1.0 ppm; or total VOCs ≥ 300 ppm; every eight (8) hours when benzene ≥ 0.5 ppm; or total VOCs ≥ 150 ppm.
- Hot Zone: where benzene ≥ 0.5 ppm, or H_2S ≥ 1.0 ppm, or TVOCs ≥ 300 ppm.
- Warm Zone: where benzene < 0.5 ppm, or H_2S < 1.0 ppm, or TVOCs < 300 ppm
- Cold Zone: where benzene < detection limit (0.2 ppm for Drager CMS, 0.05 ppm for UltraRae 3000), or H_2S < detection limit (0.2 ppm for Drager CMS), or TVOCs < 10 ppm.

Warning: suspend the activity and withdraw to a safe position if conditions encountered by the air tester exceed the level of respiratory protection worn, as detailed in Book 2: 13-02-07, or if any of the following conditions are found:

H_2S ≥ 100 ppm
O_2 < 19.5%
LEL ≥ 10%

Record the condition and location in the Incident Log – Safety.

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.

NOTE: For more information, see *Book 2 Safety, 13-02-07 Respiratory Protection* and Book 2, Safety: *14-02-02 Portable Gas Detectors*

Sample Results from responders, regulators and workers will be provided to the Safety Officer for consolidation. Enbridge sample data will be updated to the ftp:// site.

Ongoing Air Testing

Upon completion of the initial air testing:

- Ongoing area and personal air monitoring shall continue for the life of the emergency with the multi-head gas detectors as per Book 2, 14-02-02.
- Take a measurement at jobsites for benzene when the shift starts and ends
- Repeat benzene air monitoring every two hours if the initial reading of the shift is above 0.5 ppm, repeat benzene air monitoring every one hour if the initial reading of the shift is above 2.0 ppm
- Additional monitoring should be performed in response to any changes in work activity or climatic conditions (temperature, moisture, rain, wind speed and direction, etc.).

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, summa canisters, and cassettes

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, summa canisters, and cassettes

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, bulldozers, 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

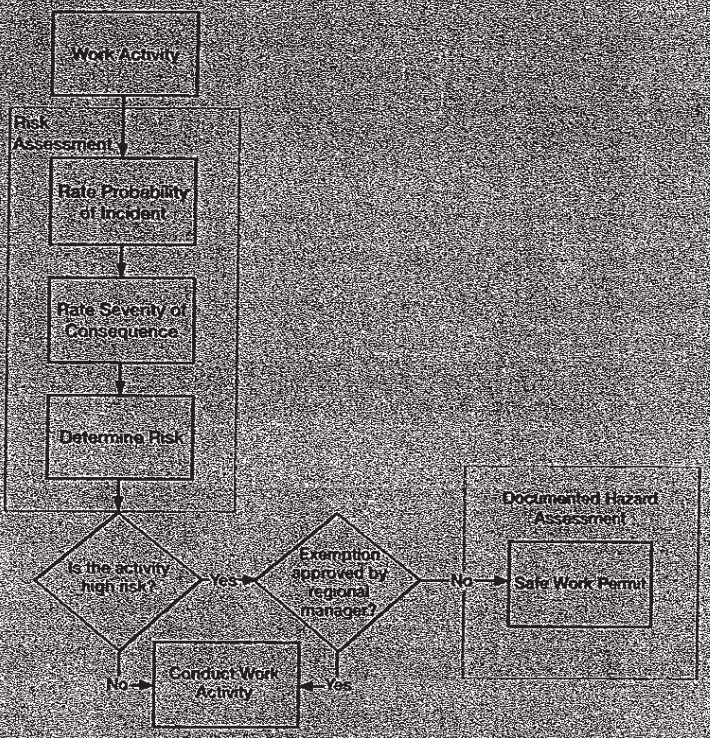
Appendix E
Hazard Assessment/Safe Work Permit

Risk Rating:

1. Rate the probability of an incident occurring that would typically result from how frequent the work activity is performed.
2. Rate the severity of consequences that would typically result from an incident involving the work activity.
3. Determine the risk based on the intersection of the probability and consequence ratings.
4. Take action corresponding with the risk:
   - For a high risk work activity, complete a Safe Work Permit—identifying existing and potential sources of hazards as well as controls to be implemented.
   - For a low risk work activity, no further action is required.

All work and risk assessment shall be documented. Enbridge employees and contractors shall use the Enbridge SAFE WORK PERMITT (Hazard Assessment) Form

Safe Work Permit - Hazard Assessment Process



Probability of Incident

Probability	Frequency Work Activity Performed			
	Never	Rarely (few times per year)	Occasionally (weekly/ monthly)	Frequently (hourly/daily)
High - likely to occur	4	4	4	4
Medium - could occur	3	2	2	1
Low - unlikely to occur	2	1	1	1

Severity of Consequence

Severity	Health	Cost
4	Fatality	Extensive damage, extended downtime for site
3	Serious injury (days away)	Major damage or downtime for site
2	Medical Aid injury	Minor damage or downtime for equipment or process
1	First Aid injury	Minor damage, no down time

Risk Rating

Probability					
	4	4	8	12	16
	3	3	6	9	12
	2	2	4	6	8
	1	1	2	3	4
		1	2	3	4
		Consequence			

Notes:

High Risk (score from 4 to 16)
Low Risk (score from 1 to 3)

Ergonomic Hazards

Repetitive Strain
Strain is defined as injury to a muscle or tendon. Repetitive strain can cause muscle stretching, which leads to intense aching and swelling. Repetitive strain can stem from frequent lifting, digging, climbing and other activities that require repetitive motion.

Tennis Elbow
Tennis elbow comes from irritation of the tendon attachments in the elbow. Turning screws, repetitive lifting and small parts assembly are workplace actions that often lead to tennis elbow.

Trigger Finger
Trigger finger is a condition in which a tendon becomes nearly locked so that its forced movement is not smooth, but snaps or jerks. Trigger finger may be caused by highly repetitive or forceful gripping of tools, such as screwdrivers, drills and welding tools.

Fatigue
Fatigue is reduced muscular ability to continue an existing effort. It can result from physical work intensity, lack or rest, poor eating habits, and various psychological factors. Fatigue causes you to feel very tired and unmotivated.

Tools or Equipment
Often tools will produce pressure points between the hand and the handle or require you to bend the wrist. These types of poor design can lead to very painful musculoskeletal disorders. Some tools that often have poor design are pliers and grinders.

Incorrect Workstation
Improper workspace layout can have a harmful affect on workers. Tools and equipment should be positioned in areas that will reduce reaching and twisting, or else musculoskeletal disorders could occur. For example, keep tools within arms length, or walk over to retrieve items instead of reaching for them.

Psychological Stress
Psychological stress often results from boring and repetitive tasks, high demanding or complex requirements, fear, or lack of coworker support. It can lead to lack of attention, impaired judgment, and other factors that will affect workplace safety.

Physical Stress
Physical stress is a factor that induces bodily tension as a result of physical activities. Some examples of what can cause physical stress are poor working postures, frequent material handling, repetitive movements, and poor workplace design.

Overexertion
Overexertion is the result of performing strenuous work or working too long. It can occur when performing excessive lifting, pushing, pulling, holding or any repetitive action. Overexertion may lead to injuries such as sprains or strains.

Awkward Position
Awkward position occurs from reaching up, bending over, or stooping down, or twisting of the body to do work. Awkward positions can lead to discomfort, reduced blood flow, fatigue, and various musculoskeletal problems. Avoid working in awkward positions for long periods of time.

Physical Hazards

Heat Stress / Cold
Heat stress disorders (i.e. heat exhaustion, heat cramps, heat stroke) can cause fatigue, blood clots, and even death. Cold strain disorders (i.e. hypothermia, frostbite) can cause irregular heartbeat, low blood pressure and skin damage. Heat/Cold disorders are likely to occur when performing any outdoor work during the summer/winter months and are affected by apparel and duration of work.

Biological Hazards

Bloodborne Pathogens
These are parasites that are transmitted through blood, bodily fluids and human derived cell linings and reagents and are capable of causing disease in humans. Examples of these diseases are Hepatitis B, Hepatitis C, and HIV.

Poisonous Plants
Various skin irritations can result from bodily contact with a poisonous plant, exposure to smoke from the burning of the plant, or contact with anything previously exposed to the plant. Examples of poisonous plants are poison ivy, poison oak and poison sumac. Poison ivy and poison oak have a grouping of three leaflets in each leaf and stiff clusters of berries that appear in the summer and fall. Poison sumac is tall and smooth-stemmed with berries similar to those in poison ivy.

Ticks
Ticks are known to transmit infectious diseases to humans. The adult tick has a mite like body with a tough skin and four pairs of clawed legs. Tick larvae have only three pairs of legs. Examples of diseases that can be transmitted through ticks are Lyme disease, malaria, and yellow fever. Ticks will be found mostly in woods, tall grass and shrubby vegetation.

Wildlife
The presence of wildlife poses the risk of animal attack, which is likely to cause physical harm. Also, diseases such as rabies are often transmitted through animal bites or scratches.

Mosquitoes
Mosquitoes are insects that feed on human and animal blood. They tend to breed around standing water and live in grassy areas. Some mosquitoes are known to carry infectious disease, such as the West Nile virus. West Nile is an infection that can cause serious illness and in some cases, death.

Dust / Mists / Fumes
These are particles dispersed in air that can be toxic if inhaled, absorbed or ingested. Welding can produce very toxic fumes, while abrasive blasting or digging could cause exposure to harmful dust. Applying herbicides and pesticides could lead to exposure to harmful mists. Each of these particles has the potential to produce various chronic respiratory problems such as lung disease.

Appendix F
Weston Solutions, Inc.
Site Safety Plan

SITE HEALTH AND SAFETY PLAN (*HASP*)

Office:	Detroit , MI
Site Name:	Marshall/Enbridge Emergency Response
Client:	U.S EPA
Work Location:	Marshall, MI
WO#:	20405.012.005.1154.00

SITE HEALTH AND SAFETY PLAN (HASP)
Including Environmental Protection and Sustainability Program (EPSP) Checklist

Review and Approval Documentation:

Reviewed by: SO/DEHSM/CEHS	Tonya Balla (Name Print)	Tonya Balla (Signature)	Date: 7/26/10
Environmental Compliance Advisor	(Name Print)	(Signature)	Date:
Approved by: Project Manager	Ben Maradkel (Name Print)	(Signature)	Date:

Hazard Assessment and Equipment Selection:

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132, at the site prior to personnel beginning work, the FSO and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to CEHS Program Manual Section 5, Personal Protection Program for guidance.)

☐ **FSO**	Name	Signature	Date:
☐ **Site Manager**	Name	Signature	Date:
☒ **Project Environmental Compliance Officer**	Dan Capone (Name)		Date:
☒ **Dangerous Goods Shipping Coordinator**	(Name)		Date:

Project start date: 7/26/10 End date: 8/30/10	This site HASP **must** be **reissued/reapproved** for any activities conducted after: Date: 7/26/11	Amendment date(s)	By:
		1.	
		2.	
		3.	
		4.	
		5.	

SITE HEALTH AND SAFETY PLAN (HASP)
Including Environmental Protection and Sustainability Program (EPSP) Checklist

Review and Approval Documentation

Reviewed by: SO/DEHSM/CEHS	Tonya Balla (Name (Print))	Tonya Balla (Signature)	Date: 7/26/10
Environmental Compliance Advisor	(Name (Print))	(Signature)	Date:
Approved by: Project Manager	Ben Maradkel (Name (Print))	(Signature)	Date: 7/26/10

Hazard Assessment and Equipment Selection

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132, at the site prior to personnel beginning work, the FSO and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist (Refer to CEHS Program Manual Section 5, Personal Protection Program for guidance.)

☐ **FSO**	Name	Signature	Date:
☐ **Site Manager**	Name	Signature	Date:

☒ **Project Environmental Compliance Officer**	Dan Capone (Name)	Date:
☒ **Dangerous Goods Shipping Coordinator**	(Name)	Date:

Project start date: 7/26/10 End date: 8/30/10	This site HASP **must** be **reissued/reapproved** for any activities conducted after: Date: 7/26/11	Amendment date(s)	By:
		1.	
		2.	
		3.	
		4.	
		5.	

SITE HEALTH AND SAFETY PLAN (HASP)
Including Environmental Protection and Sustainability Program (EPSP) Checklist

Prepared by: Breanna Bukowski	W.O. Number:	Date: 7/27/10

Project Identification Marshall/Enbridge Emergency Response
Office: Detroit, Michigan
Site Name: Marshall/Enbridge ER
Client: U.S. EPA
Work Location Address: 455 Leggett Road, Marshall, MI (command post)

Site History: Approximately 1 to 5 million gallons from a pipeline leak south of Marshall, Michigan has been released to surface water and has reached the Kalamazoo River.

Scope of Work: START field personnel, including Team Subs will conduct boating operations, sampling of surface water, soil and oil, may participate in helicopter reconnaisance operations, will support air monitoring and written and photographic documentation.

☐ Site visit only; site HASP not necessary. List personnel here and sign off below:

Regulatory Status

Site regulatory status:

CERCLA/SARA	RCRA	Other Federal Agency
☒ U.S. EPA	☐ U.S. EPA	☐ DOE
☐ State	☐ State	☐ USACE
☐ NPL Site	NRC	☐ Air Force
☒ OSHA	☐ 10 CFR 20	☐ ____

Hazard Communication (Req'd See Attachment D)
☒ 1910 ☐ 1926 ☐ State

Safety Officer Manual (Required to be On-Site)
Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

☐ Stack Test ☐ ____
☐ Air Emissions ☐ ____
☐ Asbestos ☐ ____
☐ Industrial Hygiene ☐ ____

Review and Approval Documentation

Reviewed by: SO/DEHSM/CEHS	Tonya Balla (Name Print)	Tonya Balla (Signature)	Date: 7/26/10
Environmental Compliance Advisor	(Name Print)	(Signature)	Date:
Approved by: Project Manager	Ben Maradkel (Name Print)	(Signature)	Date: 7/26/10

Hazard Assessment and Equipment Selection

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132, at the site prior to personnel beginning work, the FSO and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to CEHS Program Manual Section 5, Personal Protection Program, for guidance.)

☒ FSO	Name	Signature	Date:
☒ Site Manager	Name	Signature	Date:
☒ Project Environmental Compliance Officer	Dan Capone (Name)		Date:
☐ Dangerous Goods Shipping Coordinator	Name		Date:

Project start date: 7/26/10 End date: 8/30/10	This site HASP must be reissued/reapproved for any activities conducted after: Date: 7/26/11	Amendment date(s) 1. 2. 3. 4. 5.	By:

SITE HEALTH AND SAFETY PLAN (HASP)
Including Environmental Protection and Sustainability Program (EPSP) Checklist

Prepared by: Breanna Bukowski	W.O. Number:	Date: 7/27/10

Project Identification Marshall/Enbridge Emergency Response
Office: Detroit, Michigan
Site Name: Marshall/Enbridge ER
Client: U.S. EPA
Work Location Address: 455 Leggett Road Marshall MI (command post)

Site History: Approximately 1 to 5 million gallons from a pipeline leak south of Marshall, Michigan has been released to surface water and has reached the Kalamazoo River.

Scope of Work: START field personnel, including Team Subs will conduct boating operations, sampling of surface water, soil and oil may participate in helicopter reconnaisance operations, will support air monitoring and written and photographic documentation.

☐ Site visit only; site HASP not necessary List personnel here and sign off below:

Regulatory Status:

Site regulatory status:

CERCLA/SARA	RCRA	Other Federal Agency
☒ U S EPA	☐ U.S EPA	☐ DOE
☐ State	☐ State	☐ USACE
☐ NPL Site	NRC	☐ Air Force
☒ OSHA	☐ 10 CFR 20	☐ _____

Hazard Communication (Req'd See Attachment D)
☒ 1910 ☐ 1926 ☐ State

Safety Officer Manual (Required to be On-Site)
Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan

☐ Stack Test ☐ _____
☐ Air Emissions ☐ _____
☐ Asbestos ☐ _____
☐ Industrial Hygiene ☐ _____

Review and Approval Documentation:

Reviewed by: SO/DEHSM/CEHS	Tonya Balla (Name Print)	Tonya Balla (Signature)	Date: 7/26/10
Environmental Compliance Advisor	_____ (Name Print)	_____ (Signature)	Date: _____
Approved by: Project Manager	Ben Maradkel (Name Print)	_____ (Signature)	Date: _____

Hazard Assessment and Equipment Selection:

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910 132, at the site prior to personnel beginning work, the FSO and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist (Refer to CEHS Program Manual Section 5, Personal Protection Program, for guidance.)

☒ **FSO**	_____ (Name)	_____ (Signature)	Date: _____
☒ **Site Manager**	_____ (Name)	_____ (Signature)	Date: _____

☒ **Project Environmental Compliance Officer**	Dan Capone (Name)	Date: _____
☐ **Dangerous Goods Shipping Coordinator**	_____ (Name)	Date: _____

Project start date: 7/26/10 End date: 8/30/10	This site HASP **must** be **reissued/reapproved** for any activities conducted after: Date: 7/26/11	Amendment date(s) 1. 2. 3. 4. 5.	By:

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ATTACHMENTS

ATTACHMENT A	Chemical Contaminants Data Sheets
ATTACHMENT B	Material Safety Data Sheets
ATTACHMENT C	Safety Procedures/Field Operating Procedures (FLD Ops)
ATTACHMENT D	Hazard Communication Program
ATTACHMENT E	Air Sampling Data Sheets
ATTACHMENT F	Incident Reporting
ATTACHMENT G	AHA Checklist and Environmental Compliance
ATTACHMENT H	Traffic Control Plan
ATTACHMENT I	Audit Forms
ATTACHMENT J	Environmental Health & Safety Inspection Checklist
ATTACHMENT K	Environmental Protection and Sustainability Program Impact Checklist

1. PERSONNEL ON SITE INFORMATION

1.1 WESTON REPRESENTATIVES

Organization/Branch	Name/Title	Address	Telephone
WESTON Solutions/OMI	Dan Capone Chris Lantinga Brett Coulter	2501 Jolly Road Suite 100 Okemos, MI 48864	517-381-5932 (office) 313-218-2659 (cell) 616-550-5358 (cell)
WESTON Solutions/OMI	Katie Mooney Joe Victory Erik Martinson Paul Bartz	2501 Jolly Road Suite 100 Okemos, MI 48864	517-381-5920 (office) 517-256-7662 (Katie cell)
WESTON Solutions/OMI	Kevin Brown Steve Kidder Breanna Bukowski Linda Korobka	2501 Jolly Road Suite 100 Okemos, MI 48864	517-381-5920 (office) 517-896-1621 (Kevin cell) 989-666-5426 (Breanna cell)
WESTON Solutions/DET	Alex Clark Lori Kozel Lorie Ambrosio Matt Beer	360 E. Maple Road Suite R Troy MI 48083	248-658-5000 (office) 248-200-9825 (Alex cell) 586-524-0613 (Lori cell)
WESTON Solutions/CLV	T.J McFarland	6779 Engle Road Suite I Middleburg Heights, OH 44130	440-202-2802 (office) (740) 258-7551 (cell)
WESTON Solutions/VHI	Tonya Balla Ben Maradkel	750 East Bunker Court Suite 500 Vernon Hills, IL 60061	847 918-4094 (office) 847 528-2623 (cell) 773 294-0256 (cell)
Affiliated Researchers/START	Chris Martin Boat Captain	3585 North US23 Oscoda, MI 48750	989 739-5471 (office)
Professional Environmental Engineers	Tom Binz	500 Ewing St St. Louis, MO	314-581-0975
EDI	Kristin Templin John Wellman	33 W. Monroe Street, Suite 1825 Chicago, Illinois 60603	(312) 345-1400 (office)

Roles and Responsibilities:

Support will be provided by the Okemos, Detroit, Cleveland, Vernon Hills (and potentially other) offices. START responders will be responsible for coordinating and conducting sampling of surface water, soil, and oil as well as completing reconnaissance activities from a helicopter. Boating ops (sampling from) will also be included in activities. Tonya Balla will provide health and safety and analytical support.

1.2 WESTON SUBCONTRACTORS

Organization/Branch	Name/Title	Address	Telephone

SITE-SPECIFIC HEALTH AND SAFETY PERSONNEL

The Site Field Safety Officer (FSO) for activities to be conducted at this site is: Most senior WESTON person on-site during shift. This will be identified during each shift and documented.

The FSO has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore the personnel assigned as FSOs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120.
Qualifications: FSO Training, current HAZWOPER 40-hour, HAZWOPER 8-hour refresher, CPR & First-Aid certified
Designated alternates include: See list of personnel above

1.3 SITE PERSONNEL AND CERTIFICATION STATUS

1.3.1 Weston Employee Certification

Name: Dan Capone **Title: Project Manager** **Task(s): All** **Certification Level or Description:** B-S ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)	**Name: Chris Lantinga** **Title: START Member** **Task(s): All** **Certification Level or Description:** D-S ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☐Fit Test Current (Quant.)
Name: Kevin Brown **Title: Project Scientist (GIS)** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)	**Name: Steve Kidder** **Title: START Member** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)
Name: Joseph Victory **Title: Project Geologist** **Task(s): All** **Certification Level or Description: D-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)	**Name: Katie Mooney** **Title: Senior Project Scientist** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☒Fit Test Current (Qual.) ☒Fit Test Current (Quant.)
Name: Matt Beer **Title: START Member** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)	**Name: Lorie Ambrosio** **Title: START Member** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)
Name: Lori Kozel **Title: START Member** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)	**Name: T.J. McFarland** **Title: START Member** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)
Name: Erik Martinson **Title: Project Scientist** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)	**Name: Breanna Bukowski** **Title: Sr Proj Leader** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)
Name: Tom Binz **Title: Project Scientist** **Task(s): All** **Certification Level or Description: B-S** ☒Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☒Fit Test Current (Quant.)	**Name: Chris Martin** **Title:** **Task(s): All** **Certification Level or Description: D-S** ☐Medical Current ☒Training Current ☐Fit Test Current (Qual.) ☐Fit Test Current (Quant.)

TRAINING CURRENT - Training: All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910, 29 CFR 1926, or 29 CFR 1910 120.

FIT TEST CURRENT - Respirator Fit Testing: All persons, including visitors, entering any area requiring the use or potential use of any negative pressure respirator must have had, as a minimum, a qualitative fit test, administered in accordance with OSHA 29 CFR 1910.134 or ANSI, within the last 12 months. If site conditions require the use of a full-face, negative-pressure, air-purifying respirator for protection from asbestos or lead, employees must have had a qualitative fit test, administered according to OSHA 29 CFR 1910.1001 or 1025/1926, within the last 6 months. MEDICAL CURRENT - Medical Monitoring Requirements: All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 29 CFR 1926/1910, or 29 CFR 1910 120. The Site Field Safety Officer is responsible for verifying all certifications and fit tests.

SITE PERSONNEL AND CERTIFICATION STATUS

1.3.2 Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor:
Address:

Activities To Be Conducted by Subcontractor: Sample collection and boat operation

Evaluation Criteria

Medical program meets OSHA/WESTON criteria ☒ Acceptable ☐ Unacceptable Comments:	Personal protective equipment available ☒ Acceptable ☐ Unacceptable Comments:	On-site monitoring equipment available, calibrated, and operated properly ☐ Acceptable ☐ Unacceptable Comments:
Safe working procedures clearly specified ☐ Acceptable ☐ Unacceptable Comments:	Training meets OSHA/WESTON criteria ☐ Acceptable ☐ Unacceptable Comments:	Emergency procedures ☐ Acceptable ☐ Unacceptable Comments:
Decontamination procedures ☐ Acceptable ☐ Unacceptable Comments:	General health and safety program evaluation ☐ Acceptable ☐ Unacceptable Comments:	Additional comments: ☒ Subcontractor has agreed to and will conform with the WESTON HASP for this project. ☐ Subcontractor will work under his own HASP, which has been accepted by project PM.

Evaluation Conducted by: Certifications for all subcontractors personnel will be added to the HASP prior to beginning work. **Date:**

Subcontractor

Name: **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

2. HEALTH AND SAFETY EVALUATION

2.1 HEALTH AND SAFETY EVALUATION

2.1.1 Task Hazard Assessment

Background Review: ☒ Complete ☐ Partial If partial why?

Activities Covered Under This Plan:

No.	Task/Subtask	Description	Schedule
1	**Surface water, soil and oil sampling**	Surface water sampling may be conducted from shore, boat or in the creek (wearing waders). Soil and oil samples will also be collected.	**7/27/10-**
2	**Site Reconnaissance**	Site reconnaissance to determine how far oil has traveled will be conducted from a helicopter or boat	**7/27/10**

Types of Hazards:

Numbers refer to one of the following hazard evaluation forms Complete hazard evaluation forms for each appropriate hazard class.

Physiochemical 1

- ☒ Flammable
- ☐ Explosive
- ☐ Corrosive
- ☐ Reactive
- ☐ O_2 Rich
- ☐ O_2 Deficient

Chemically Toxic 1

- ☒ Inhalation ☒ Carcinogen
- ☒ Ingestion ☐ Mutagen
- ☐ Contact ☐ Teratogen
- ☒ Absorption
- ☐ OSHA 1910.1000 Substance (Air Contaminants)
- ☐ OSHA Specific Hazard Substance Standard (Refer to following page for listing)

Radiation 3

Ionizing:

- ☐ Internal exposure
- ☐ External exposure

Non-ionizing:

- ☒ UV ☐ IR
- ☐ RF ☐ MicroW
- ☐ Laser

Biological 2

- ☐ Etiological Agent
- ☒ Other (plant, insect, animal)

Physical Hazards 4

- ☐ Construction Activities

Source/Location of Contaminants and Hazardous Substances:

Directly Related to Tasks

- ☐ Air
- ☐ Other Surface
- ☐ Groundwater
- ☒ Soil
- ☒ Surface Water
- ☐ Sanitary Wastewater
- ☐ Process Wastewater
- ☒ Other **Oil**

Indirectly Related to Tasks — Nearby Process(es) That Could Affect Team Members:

- ☐ Client Facility/WESTON Work Location
- ☐ Nearby Non-Client Facility

Describe:

- ☐ Have activities (task[s]) been coordinated with facility?

Comments:

EPA OSC is coordinating access.

HEALTH AND SAFETY EVALUATION

2.1.2 Chemical Hazards of Concern

☐ N/A

Chemical Contaminants of Concern

Provide the data requested for chemical contaminants on HASP Form 25 or attach data sheets from an acceptable source such as NIOSH pocket guide, condensed chemical dictionary, ACGIH TLV booklet, etc. List chemicals and concentrations below and locate data sheets in Attachment B of this HASP.

☐ N/A

Identify hazardous materials used or on-site and attach Material Safety Data Sheets (MSDSs) for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances. Ensure that all subcontractors and other parties working nearby are informed of the presence of these chemicals and the location of the MSDSs. Obtain from subcontractors and other parties, lists of the hazardous materials they use or have on-site and identify location of the MSDSs here. List chemicals and quantities below and locate MSDSs in Attachment B of this HASP.

Chemical Name	Concentration (ppm)	Chemical Name	Quantity
Crude oil – naphthalene, Polycyclic aromatic hydrocarbons(PAHs)	Unknown	Gasoline or Diesel fuel Affiliated Researchers boat (s). Gasoline for generator if necessary to power equipment or lights.	
		Alconox	ltd qty
		Isobutylene calibration gas (100ppm in air)	14 L
		4-gas monitor calibration gas	14.L

OSHA-SPECIFIC HAZARDOUS SUBSTANCES

☐ 1910.1001 Asbestos	☐ 1910.1002 Coal tar pitch volatiles	☐ 1910.1003 4-Nitrobiphenyl, etc.	☐ 1910.1004 alpha-Naphthylamine
☐ 1910.1005 (Reserved)	☐ 1910.1006 Methyl chloromethyl ether	☐ 1910.1007 3,3'-Dichlorobenzidine (and its salts)	☐ 1910.1008 bis-Chloromethyl ether
☐ 1910.1009 beta-Naphthylamine	☐ 1910.1010 Benzidine	☐ 1910.1011 4-Aminodiphenyl	☐ 1910.1012 Ethyleneimine
☐ 1910.1013 beta-Propiolactone	☐ 1910.1014 2-Acetylaminofluorene	☐ 1910.1015 4-Dimethylaminoazobenzene	☐ 1910.1016 N-Nitrosodimethylamine
☐ 1910.1017 Vinyl chloride	☐ 1910.1018 Inorganic arsenic	☐ 1910.1025 Lead (Att. FLD# 46)	☐ 1910.1026 Chromium VI (att. FLD 53)
☐ 1910.1027 Cadmium (Att. 50 FLD)	☐ 1910.1028 Benzene (Att. FLD# 54 or 61)	☐ 1910.1029 Coke oven emissions	☐ 1910.1043 Cotton dust
☐ 1910.1044 1,2-Dibromo-3-chloropropane	☐ 1910.1045 Acrylonitrile	☐ 1910.1047 Ethylene oxide	☐ 1910.1048 Formaldehyde
☐ 1910.1050 Methylenedianiline	☐ 1910.1051 1,3 Butadiene	☐ 1910.1052 Methylene chloride	☐ 1926.60 Methylenedianiline
☐ 1926.62 Lead	☐ 1926.1101 Asbestos (Att. FLD 52)	☐ 1926.1127 Cadmium	

HEALTH AND SAFETY EVALUATION

2.1.3 Biological Hazards of Concern

☒ **Poisonous Plants** (FLD 43-D)

Location/Task No(s) All
Source: ☐ Known ☒ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion ☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☒ Yes ☐ No
Immunization required: ☐ Yes ☒ No

☒ **Insects** (FLD 43-B)

Location/Task No(s) All
Source: ☐ Known ☒ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No
Immunization required: ☐ Yes ☒ No

☒ **Snakes, Reptiles** (FLD 43-A)

Location/Task No(s) All
Source: ☐ Known ☒ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No
Immunization required: ☐ Yes ☒ No

☒ **Animals** (FLD 43-A)

Location/Task No(s) All
Source: ☐ Known ☒ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No
Immunization required: ☐ Yes ☒ No

FLD 43 — WESTON Biohazard Field Operating Procedures: Att. OP ☐

☐ **Sewage**

Location/Task No(s) :
Source: ☐ Known ☐ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

Tetanus Vaccination within Past 10 yrs: ☐ Yes ☐ No

☐ **Etiologic Agents** (FLD –C)(**List**)

Location/Task No(s) :
Source: ☐ Known ☐ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

FLD 43-C — Mold and Fungus. Att. OP ☐

FLD 44 — WESTON Bloodborne Pathogens Exposure Control Plan – First Aid Procedures: Att. OP ☒

FLD 45 — WESTON Bloodborne Pathogens Exposure Control Plan – Working with Infectious Waste: Att. OP ☐

HEALTH AND SAFETY EVALUATION

2.1.4 Radiation Hazards of Concern

NONIONIZING RADIATION

Task No.	Type of Nonionizing Radiation	Source On-Site	TLV/PEL	Wavelength Range	Control Measures	Monitoring Instrument
All	Ultraviolet	Solar			Appropriate clothing/ sunscreen	None
	Infrared	N/A				
	Radio Frequency	N/A				
	Microwave	N/A				
	Laser	N/A				

IONIZING RADIATION

Task No.	Radionuclide	Major Radiations	Radioactive Half-Life (Years)	DAC (µCi/mL)			Surface Contamination Limit	Monitoring Instrument
				D	W	Y		

HEALTH AND SAFETY EVALUATION

2.1.5 Physical Hazards of Concern

Physical Hazard Condition	Physical Hazard	Attach OP	WESTON OP Titles
Loud noise	Hearing loss/disruption of communication	☒	Section 7.0 - ECH&S Program Manual Occupational Noise & HC Program
Inclement weather	Rain/humidity/cold/ice/snow/lightning	☒	FLD02 - Inclement Weather
Steam heat stress	Burns/displaced oxygen/wet working surfaces	☐	FLD03 - Hot Process - Steam
Heat stress	Burns/hot surfaces/low pressure steam	☐	FLD04 - Hot Process - LT3
Ambient heat stress	Heat rash/cramps/exhaustion/heat stroke	☒	FLD05 - Heat Stress Prevention/Monitoring
Cold stress	Hypothermia/frostbite	☐	FLD06 - Cold Stress
Cold/wet	Trench/paddy/immersion foot/edema	☒	FLD02 - Inclement Weather
Confined spaces	Falls/burns/drowning/engulfment/electrocution	☐	FLD08 - Confined Space Entry
Industrial Trucks	Fork Lift Truck Safety	☐	FLD09 – Powered Industrial Trucks
Improper lifting	Back strain/abdomen/arm/leg muscle/joint injury	☐	FLD10 - Manual Lifting/Handling Heavy Objects
Uneven surfaces	Vehicle accidents/slips/trips/falls	☒	FLD11 - Rough Terrain
Poor housekeeping	Slips/trips/falls/punctures/cuts/fires	☒	FLD12 - Housekeeping
Structural integrity	Crushing/overhead hazards/compromised floors	☐	FLD13 - Structural Integrity
Improper cylinder. handling	Mechanical injury/fire/explosion/suffocation	☐	FLD16 - Pressure Systems - Compressed Gases
Water hazards	Poor visibility/entanglement/drowning/cold stress	☐	FLD17 - Diving
Water hazards	Drowning/heat/cold stress/hypothermia/falls	☒	FLD18 - Operation and Use of Boats
Water hazards	Drowning/frostbite/hypothermia/falls/electrocution	☒	FLD19 - Working Over Water
Vehicle hazards	Struck by vehicle/collision	☒	FLD20 - Traffic
Explosions	Explosion/fire/thermal burns	☐	FLD21 - Explosives
Moving mechanical parts	Crushing/pinch points/overhead hazards/electrocution	☒	FLD22 – Earth Moving Equipment
Moving mech. parts	Overhead hazards/electrocution	☐	FLD23 – Cranes, Rigging, and Slings
Working at elevation	Overhead hazards/falls/electrocution	☐	FLD24 - Aerial Lifts/Man lifts
Working at elevation	Overhead hazards/falls/electrocution	☐	FLD25 - Working at Elevation
Working at elevation	Overhead hazards/falls/electrocution/slips	☐	FLD26 - Ladders
Working at elevation	Slips/trips/falls/overhead hazards	☐	FLD27 - Scaffolding
Trench cave-in	Crushing/falling/overhead hazards/suffocation	☐	FLD28 - Excavating/Trenching
Physiochemical	Explosions/fires from oxidizing, flam./corr. material	☐	FLD30 - Hazardous Materials Use/Storage
Physiochemical	Fire and explosion	☐	FLD31 - Fire Prevention/Response Plan Required
Physiochemical	Fire	☒	FLD32 - Fire Extinguishers Required
Structural integrity	Overhead/electrocution/slips/trips/falls/fire	☐	FLD33 - Demolition
Electrical	Electrocution/shock/thermal burns	☐	FLD34 - Utilities
Electrical	Electrocution/shock/thermal burns	☐	FLD35 - Electrical Safety
Burns/fires	Heat stress/fires/burns	☐	FLD36 - Welding/Cutting/Brazing/Radiography
Impact/thermal	Thermal burns/high pressure impaction/heat stress	☐	FLD37 - Pressure Washers/Sand Blasting
Impaction/electrical	Smashing body parts/pinching/cuts/electrocution	☒	FLD38 - Hand and Power Tools
Poor visibility	Slips/trips/falls	☒	FLD39 - Illumination
Fire/explosion	Burns/impaction	☐	FLD40 - Storage Tank Removal/Decommissioning
Communications	Disruption of communications	☒	FLD41 - Std. Hand/Emergency Signals
Energy/release	Unexpected release of energy	☐	FLD42 - Lockout/Tag-out
Biological Hazards	Biological Hazards at site	☒	FLD43 - Biological Hazards
Animals	Animals	☒	FLD43A - Animals
Insects	Stinging and Biting Insects	☒	FLD43B - Stinging and Biting Insects
Molds/Fungi	Molds and Fungi	☐	FLD43C - Molds and Fungi
Hazardous Plants	Hazardous Plants	☒	FLD43D - Hazardous Plants
Etiologic Agents	Etiologic Agents	☐	FLD43E - Etiologic Agents

Biological Hazards/BBP	Biological Hazards/BBP at site/First Aid Providers	☒	FLD44 - Biological Hazards – Bloodborne Pathogens Exposure Control Plan – First Aid Providers

2.1.5 Physical Hazards of Concern (Continued)

Physical Hazard Condition	Physical Hazard	Attach OP	WESTON OP Titles
Infectious Waste	Infectious Waste at site/BBP/ at site/Infectious Waste	☐	FLD45 – Biological Hazards – Bloodborne Pathogens Exposure Control Plan – Work With Infectious Waste
Lead Contaminated sites	Lead poisoning	☐	FLD46 - Control of Exposure to Lead
Puncture/cuts	Cuts/ dismemberment/gouges	☐	FLD47 - Clearing, Grubbing and Logging Operations
Not applicable	Not applicable	☒	FLD48 – Federal State Local Regulatory Agency Inspections
Not applicable	Exposure to hazardous materials/waste	☐	FLD49 – Safe Storage of Samples
Cadmium	Exposure Control	☐	FLD50 – Cadmium Exposure Control Plan
Process Safety Procedure	Safety Procedure	☐	FLD51 – Process Safety Procedure
Asbestos	Asbestos Exposure	☐	FLD52 – Asbestos Exposure Control Plan
Hexavalent Chromium	Exposure Control Plan	☐	FLD53 – Hexavalent Chromium Exposure Control Plan
Benzene	Exposure Control Plan	☐	FLD54 - Benzene Exposure Control Plan
Hydrofluoric acid	Working with HF	☐	FLD55 – Working with Hydrofluoric Acid
Moving drill rig parts	Crushing/pinch points/overhead hazards/electrocution	☐	FLD56 – Drilling Safety
Vehicles/driving	Accidents,/fatigue/cell phone use	☒	FLD 57 – Motor Vehicle Safety
Improper material handling	Back injury/crushing from load shifts/equipment/tools	☐	FLD 58 – Drum Handling Operations
COC decontamination	COCs/slip,trip, and falls/waste generation/environmental compliance/PPE	☒	FLD59 - Decontamination
Drilling hazards	Electrocution/overhead hazards/pirch points	☐	Environmental Remediation Drilling Safety Guideline - 2005
Fatigue	Long work hours	☒	FLD60 – Employee Duty Schedule
Benzene/Gasoline	Benzene exposure	☒	FLD61 – Gasoline Contaminant Exposure

3. TASK BY TASK ASSESMENT

3.1 TASK-BY-TASK RISK ASSESSMENT

3.1.1 Task 1 Description

TASK 1: Surface water, soil, and oil sampling Surface water sampling (and potentially oil) may take place from a boat, shoreline, or from within the creek wearing waders. Air monitoring of the breathing zone will take place during sampling activities. WESTON is providing continuous 24-hour support.

EQUIPMENT REQUIRED/USED

Logbook	Mobile Phone	Boat (Sub – 15' Whaler)	Disposable sampling scoops	Flashlights
Digital camera	Marine Radio (Sub)	Tyvek Suit (as necessary)	Sample bottles	Reflective safety vests
Waterproof permanent markers	GPS	First Aid Kit	Sample coolers	Latex booties
Personal floatation devices	Nitrile Gloves	BBP kit	MultiRae	AreaRaes
Safety glasses	Alconox	H&S Manual	Head lamps	

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level?

Crude oil has been visually detected at locations within a creek which discharges to the Kalamazoo River. Breathing zone chemical hazards may be present; therefore breathing zone will be monitored with a MultiRae and AreaRaes during sampling activities. START personnel should avoid direct skin contact with sample media by wearing gloves and other PPE. Personnel should work upwind, when feasible.

Physical

☒ Hazard Present Risk Level: ☒ H ☐ M ☐ L

What justifies risk level?

START and START Team Subs will be working over water in the Kalamazoo River with other boat traffic during summer boating season. START should wear personal floatation device at all times and avoid leaning over the edge of the boat. Personnel should watch for slip/trip/fall hazards in the boat and when docking/accessing the boat. Personnel should monitor for heat stress an other heat related systems. Breaks should be taken in a shaded area and personnel should stay hydrated throughout each shift. Weather and weather forecasts must be monitored prior to departure and while on the boat. A float plan must be completed and submitted to the division safety officer and project manager prior to every boating trip, unless other schedule is deemed acceptable by the division safety officer. The float plan must include at a minimum the destination, time of departure and return, personnel on board the vessel and a description of the boat being used. Prior to departure the boat should be inspected to ensure that there is an adequate fuel supply, that the engine is in good working order, that all navigation and communication equipment is working and that all the safety equipment on board is accessible. **The Health and Safety Officer will be called at the start and end of every day on water.** START personnel will always operate under the "buddy system" but especially during sampling along river banks and if sampling within the creek in waders is necessary. A personal floatation devices will be worn during all sampling near or over water. In addition to WESTON's FLD 18 Operation and Use of Boats, and FLD 19 Working Over or Near Water, Affiliated's Standard Operating Procedures for Boating Safety will be adhered to. START is providing 24-hour support; therefore fatigue must be monitored. Personnel should take breaks if necessary and those scheduling activities should allow for sufficient rest between shifts.

Type of PFDs – 4 orange life vests, one life ring, and the boat captain wears an inflatable life vest – all type II
Boat - 15 foot Montauk Whaler Hull ID – BWCE3146D707 Registration Number – MC6817TZ

Biological

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level?

START and START Team Subs could encounter poisonous plants, insects, or animals. Extra care should be given when sampling along river bank, in the creek, or when walking to and from the boat docking area. Backwater shallow water areas may have more insect encounters due to slower moving backwater areas during probing activities. Chiggers could be present along the shorelines and in areas of high grass or trees. Personnel should tuck pantlegs into socks or booties and/or tape pantlegs to minimize route of exposure. Insect repellent is required. First aid kit must be available.

RADIOLOGICAL
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? No radiological sources are known or suspected in the work area Personnel should take standard precautions against overexposure to sunlight by wearing appropriate work clothing and using sun screen lotion, and working in shade when possible. Personnel should consider hats and/or visor and sun glasses.
LEVELS OF PROTECTION/JUSTIFICATION
Modified Level-D PPE START personnel must don this level of PPE at all times; including gloves, safety glasses, tyvek (if necessary), and personal floatation devices
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
All work will be performed in accordance with the provisions of this HASP, OSHA guidelines, and WESTON Standard Operating Procedures. FLD 18, FLD 19, and Affiliated's Standard Operating Procedures for Boating Safety should be adhered to at all times.

3.1 TASK-BY-TASK RISK ASSESSMENT

3.1.2 Task 2 Description

TASK 2: Site Reconnaissance from the water aboard the team Sub (Affliated's) 15 foot Whaler boat, or reconnaissance from the air aboard a helicopter.

EQUIPMENT REQUIRED/USED

Logbook	Nitrile Gloves
Digital Camera	Waterproof permanent
Personal floatation	markers
device	Hearing protection
H & S Manual	Mobile phone
First Aid and BBP kit	Marine Radio (Subs)

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level?

Crude oil has been visually detected at locations within a creek which discharges to the Kalamazoo River. Breathing zone chemical hazards may be present; therefore breathing zone will be monitored with a MultiRae during river or creek reconnassiance activities. Risk is low however; since no samples will be collected and conditions are just being observed. START personnel should avoid direct skin contact with sample media by wearing gloves and other PPE as necessary. Personnel should work upwind, when feasible.

Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level?

START and START Team Subs will be working over water in the Kalamazoo River with other boat traffic during summer boating season. START should wear personal floatation device at all times and avoid leaning over the edge of the boat. Personnel should watch for slip/trip/fall hazards in the boat and when docking/accessing the boat. Personnel should monitor for heat stress. Breaks should be taken as necessary and personnel should stay hydrated. Weather and weather forecasts must be monitored prior to departure and while on the boat. A float plan must be completed and submitted to the division safety officer and project manager prior to every boating trip. The float plan must include at a minimum the destination, time of departure and return, personnel on board the vessel and a description of the boat being used. Prior to departure the boat should be inspected to ensure that there is an adequate fuel supply, that the engine is in good working order, that all navigation and communication equipment is working and that all the safety equipment on board is accessible. **The Health and Safety Officer will be called at the start and end of every day on water.** START personnel will always operate under the "buddy system". A personal floatation devices will be worn during all reconnaissance activites near or over water. In addition to WESTON's FLD 18 Operation and Use of Boats, and FLD 19 Working Over or Near Water, Affiliated's Standard Operating Procedures for Boating Safety will be adhered to at all times. Proper hearing protection and safety belts must be worn while completing reconnaissance activities from the air aboard the helicopter. In addition, any and all procedures or protocol detailed by the operators will be followed during all air recon activities. **Personnel assisting with helicopter operations must be present for a pre-safety briefing with the pilot. The Health and Safety Officer should be notified of the following at the start and end of every shift aboard the helicopter: personnel aboard, duration of flight, and flight location/plan. In addition, the site lead and site FSO must be notified of the projected flight plan, duration, and occupants.**

START is providing 24-hour support; therefore fatigue must be monitored. Personnel should take breaks if necessary and those scheduling activities should allow for sufficient rest between shifts.

Type of PFDs – 4 orange life vests, one life ring, and the boat captain wears an inflatable life vest – all type II
Boat - 15 foot Montauk Whaler Hull ID – BWCE3146D707 Registration Number – MC6817TZ

Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level?

START and START Team Subs could encounter poisonous plants, insects, or animals. Extra care should be given when sampling along river bank, in the creek, or when walking to and from the boat docking area. Backwater shallow water areas may have more insect encounters due to slower moving backwater areas during probing activities. Chiggers could be present along the shorelines and in areas of high grass or trees. Personnel should tuck pantlegs into socks or booties and/or tape pantlegs to minimize route of exposure. Insect repellent is required. First aid kit must be available.

RADIOLOGICAL
☐ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? No radiological sources are known or suspected in the work area. Personnel should take standard precautions against overexposure to sunlight by wearing appropriate work clothing and using sun screen lotion, and working in shade when possible.
LEVELS OF PROTECTION/JUSTIFICATION
Modified Level-D PPE START personnel must don this level of PPE at all times; including gloves, safety glasses, tyvek (if necessary), and personal floatation devices while on the boat, and safety belts and hearing protection while in the air.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
All work will be performed in accordance with the provisions of this HASP, OSHA guidelines, and WESTON Standard Operating Procedures. FLD 18, FLD 19, and Affiliated's Standard Operating Procedures for Boating Safety should be adhered to at all times

3.2 PERSONNEL PROTECTION PLAN

Engineering Controls
Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s)

Administrative Controls
Describe Administrative Controls used as part of Personnel Protection Plan:

Task(s)	
1,2	Wear a PFD at all times and avoid working near the edges of the boat.
2	Wear safety belt and proper hearing protection at all times in the air

Personal Protective Equipment
Action Levels for Changing Levels of Protection. Refer to HASP Form 13 Site Air Monitoring Program—Action Levels Define Action Levels for up or down grade for each task:

Task(s)

Description of Levels of Protection

Level D		Level D Modified	
Task(s): 1,2		**Task(s):** 1,2	
☐ Head		☒ Head	Hard hat
☒ Eye and Face	Safety Glasses	☒ Eye and Face	Safety Glasses
☐ Hearing		☒ Hearing	Ear plugs
☐ Arms and Legs Only		☐ Arms and Legs Only	
☒ Appropriate Work Uniform	Tyvek as necessary	☒ Whole Body	Tyvek, personal floatation device
☒ Hand – Gloves	Nitrile Gloves	☐ Apron	
☐ Foot - Safety Boots		☒ Hand - Gloves	Double nitrile gloves
☐ Fall Protection		☐ Gloves	
☒ Flotation	Personal floatation device	☐ Gloves	
☐ Other		☒ Foot - Safety Boots	Steel-toed boots
		☒ Over Boots	Latex booties

3.3 DESCRIPTION OF LEVELS OF PROTECTION

Level C	Level B
Task(s):	**Task(s):**
☐ Head	☐ Head
☐ Eye and Face	☐ Eye and Face
☐ Hearing	☐ Hearing
☐ Arms and Legs Only	☐ Arms and Legs Only
☐ Whole Body	☐ Whole Body
☐ Apron	☐ Apron
☐ Hand – Gloves	☐ Hand - Gloves
☐ Gloves	☐ Gloves
☐ Gloves	☐ Gloves
☐ Foot - Safety Boots	☐ Foot - Safety Boots
☐ Outer Boots	☐ Outer Boots
☐ Boots (Other)	☐ Boots (Other)
☐ Half Face	☐ SAR - Airline
☐ Cart /Canister	☐ SCBA
☐ Full Face	☐ Comb Airline/SCBA
☐ Cart /Canister	☐ Cascade System
☐ PAPR	☐ Compressor
☐ Cart /Canister	☐ Fall Protection
☐ Type C	☐ Flotation
☐ Fall Protection	☐ Other
☐ Flotation	
☐ Other	

4. MONITORING PROGRAM

4.1 SITE OR PROJECT HAZARD MONITORING PROGRAM

4.1.1 Air Monitoring Instruments

Instrument Selection and Initial Check Record

Reporting Format: ☒ Field Notebook ☒ Field Data Sheets* ☒ Air Monitoring Log ☐ Trip Report ☐ Other

Instrument	Task No.(s)	Number Required	Number Received	Checked Upon Receipt	Comment	Initials
☐ **RAD**				☐		
☐ GM (Pancake)				☐		
☐ NaI (Micro R)				☐		
☐ ZnS (Alpha Scintillator)				☐		
☐ Other _____				☐		
☒ **PID**				☐		
☐ MiniRAE				☐		
☒ MultiRAE (LEL/O2/H2S/CO/PID)	1,2			☐		
☐ TVA 1000 (PID/FID)				☐		
☒ Other AreaRaes	1,2			☐		
☐ **FID**						
☐ TVA 1000 (FID/PID)				☐		
☐ Other _____				☐		
☐ **PDR 1000 (Particulate)**				☐		
☐ **Single Gas Meter (SGM)**				☐		
Specify Chemical:				☐		
☐ **Personal Sampling Pump**				☐		
Specify Media:				☐		
☐ Bio-Aerosol Monitor				☐		
☐ Detector Tube Pump:				☐		
Specify (MSA, Dräeger, Sensidyne)						
☐ Tubes/type: _____						
☐ Tubes/type: _____						
☐ Tubes/type: _____						
☐ Tubes/type: _____						

4.1 SITE OR PROJECT HAZARD MONITORING PROGRAM

4.1.1 Air Monitoring Instruments Calibration Record

Instrument, Mfg., Model, Equip. ID No.	Date	Time	Calib. Material	Calib. Method Mfg.'s	Other	Initial Setting and Reading	Final Setting and Reading	Calibrator's Initials

4.2 SITE AIR MONITORING PROGRAM

Action Levels

These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/TLV/REL. That number must also be adjusted to account for instrument response factors.

	Tasks	Action Level		Action
☐ **Explosive atmosphere**		Ambient Air Concentration	Confined Space Concentration	
		<10% LEL	0 to 1% LEL	Work may continue. Consider toxicity potential.
		10 to 25% LEL	1 to 10% LEL	Work may continue. Increase monitoring frequency.
		>25% LEL	>10% LEL	Work must stop. Ventilate area before returning.
☐ **Oxygen**		Ambient Air Concentration	Confined Space Concentration	
		<19.5% O_2	<19.5% O_2	Leave area. Re-enter only with self-contained breathing apparatus.
		19.5% to 25% O_2	19.5% to 23.5% O_2	Work may continue. Investigate changes from 21%.
		>25% O_2	>23.5% O_2	Work must stop. Ventilate area before returning.
☐ **Radiation**		< 3 times background		Continue work.
		3 times background to < 1 mR/hour		Radiation above background levels (normally 0.01-0.02 mR/hr) signifies possible radiation source(s) present. Continue investigation with caution. Perform thorough monitoring. Consult with a Health Physicist.
		> 1 mrem/hour		Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of Health Physicist.
☒ **Organic gases and vapors**	1,2	Benzene Under 0.5 ppm – level D 0.5 to 5 – level C (with qualitative fit test) 5 and above – level B SEE WESTON FLD 61		Other identified flammable liquids or chemicals could change action levels – check with H&S personnel as appropriate
☐ **Inorganic gases, vapors, and particulates**				

4.3 ACTION LEVELS

(Attach action level calculations)

5. HOSPITAL INFORMATION

5.1 CONTINGENCIES

5.1.1 Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
WorkCare WESTON Medical Director WorkCare WESTON Program Administrator	**Dr. Peter Greaney** **Heather Lind**	**From 6 am to 4:30 pm Pacific Time** call 800-455-6155 dial 0 or extension 175, Heather Lind to request the on-call clinician.
After-Business Hours Contact (In Case of Emergency Only)		**4:31 p.m. – 5:59 a.m. Pacific Time, all day Saturday, Sunday and Holidays** call 800-455-6155 Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.
WESTON Corporate Environmental Health & Safety Director	**Owen B. Douglass, Jr.**	**610.701.3065** **610.506.5392 (cell)**
WESTON Medical Programs Manager	**Owen B. Douglass, Jr.**	**610.701.3065** **610.506.5392 (cell)**
WESTON Health & Safety Division Safety Manager	Ted Deecke	(847) 337-4147
WESTON Health & Safety Local Safety Officer	Tonya Balla	(847) 528-2623
Fire Department	911	911
Police Department	911	911
WESTON FSO Cell Phone	Multiple	Check above list of personnel at the start of each shift
WESTON PM Cell Phone	Dan Capone	313-218-2659
Client Site Phone	Ralph Dollhopf	231-301-0559
Site Telephone	None – personal cell phones	
Nearest Telephone	Multiple	Check above list of personnel at the start of each shift
Poison Control		**(800) 222-1222**

Local Medical Emergency Facility(s)

Name of Hospital: ***Oaklawn Hospital***

Address: ***200 North Madison Street, Marshall, MI***		Phone No.: 269-781-4271
Name of Contact: ER Staff on duty		Phone No.: 911
Type of Service: ☒ Physical trauma only ☒ Chemical exposure only ☒ Physical trauma and chemical exposure ☒ Available 24 hours	**Route to Hospital:** **(See Attached)**	**Travel time from site:** 6 mins **Distance to hospital:** 1.75 mile **Name/no. of 24-hr ambulance service:** 911

Secondary or Specialty Service Provider

Name of Hospital:

Address:		Phone No.:
Type of Service: ☐ Physical trauma only ☐ Chemical exposure only ☐ Physical trauma and chemical exposure ☐ Available 24 hours	**Route to Hospital (see attached):**	**Travel time from site:** **Distance to hospital:** **Name/no. of 24-hr ambulance service:** /

See reporting an incident in Attachment F.

5.1.2 Hospital Map

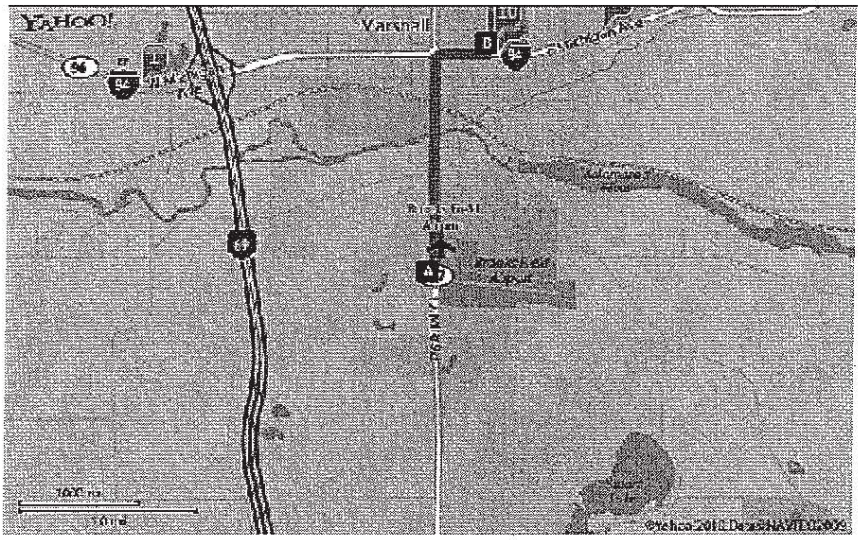
(Attach hospital map and directions)

Directions to Oaklawn Hospital (269) 781-4271 YAHOO!

Total Time: 6 mins, Total Distance: 1.75 mi

		Distance
A	1. Start at 455 LEGGITT RD, MARSHALL going toward 17 MILE RD	go 203 ft
	2. Turn L on 17 MILE RD(M-227)	go 1.01 mi
	3. Continue to follow M-227	go 0.28 mi
	4. Continue on 17 MILE RD	go 151 ft
	5. Bear R on W MICHIGAN AVE(I-94-BR E)	go 171 ft
	6. Bear R on W MICHIGAN AVE(I-94-BR)	go 0.29 mi
	7. Turn L on N MADISON ST	go 377 ft
B	8. Arrive at 200 N MADISON ST, MARSHALL, on the R	

Time: 6 mins, Distance: 1.75 mi



Your Points of Interest

1.	Oaklawn Hospital Phone: (269) 781-9119 ★★★★★ 15209 W Michigan Ave Marshall, MI 49068
2.	Oaklawn Hospital Phone: (269) 781-4271 ★★☆☆☆ 200 N Madison St Marshall, MI 49068
3.	Oaklawn Hospital Phone: (269) 781-4271 200 N Madison St Marshall, MI 49068
4.	Oaklawn Hospital Phone: (269) 789-0025 111 S Hamilton St Marshall, MI 49068
5.	Oaklawn Hospital Phone: (269) 789-7023 310 E Michigan Ave Marshall, MI 49068

http://maps.yahoo.com/print?mvt=m&ioride=us&tp=1&stx=Hospital&fcat=&frat=&clat=42.252674&clon=... 7/27/2010

5.1 CONTINGENCIES

5.1.3 Response Plans

Medical - General	First Aid Kit: ☒ Yes ☐ No Blood Borne Pathogens Kit: ☒ Yes ☐ No	**Type** Standard 20-man and infection control kit	**Location** R/V Mudpuppy 2 / START Team Sub Boat	Special First-Aid Procedures: Cyanides on-site ☐ Yes ☒ No If yes, contact LMF Do they have antidote kit? ☐ Yes ☐ No
Provide first aid, if trained; assess and determine need for further medical assistance. Transport or arrange for transport after appropriate decontamination.	Eyewash required ☐ Yes ☒ No	**Type**	**Location**	**HF** on-site ☐ Yes ☐ No If yes, need neutralizing ointment for first-aid kit. Contact LMF.
	Shower required ☐ Yes ☒ No	**Type**	**Location**	

Plan for Response to Spill/Release		**Plan for Response to Fire/Explosion**		**Fire Extinguishers**
In the event of a spill or release, ensure safety, assess situation, and perform containment and control measures, as appropriate.	a. Cleanup per MSDSs if small; or sound alarm, call for assistance, notify Emergency Coordinator b. Evacuate to pre-determined safe place c. Account for personnel d. Determine if team can respond safely e. Mobilize per Site Spill Response Plan	In the event of a fire or explosion, ensure personal safety, assess situation, and perform containment and control measures, as appropriate:	a. Sound alarm and call for assistance, notify Emergency Coordinator b. Evacuate to predetermined safe place c. Account for personnel d. Use fire extinguisher only if safe and trained in its use e. Stand by to inform emergency responders of materials and conditions	Type/Location: ABC/R/V/Mud Puppy 2 /START Team Sub boat _____ _____ / _____ / _____ / _____ / _____ / _____ /
Description of Spill Response Gear	Location	Description (Other Fire Response Equipment)		Location

Plan to Respond to Security Problems
Avoid confrontation, alert U S EPA, call 911 as necessary

6. DECONTAMINATION PLAN

6.1 GENERAL DECONTAMINATION PLAN

Personnel Decontamination

Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each level of protection are attached.

Levels of Protection Required for Decontamination Personnel

The levels of protection required for personnel assisting with decontamination will be:

☐ Level B ☐ Level C ☒ Level D

Modifications include:, Hearing Protection
Nitrile Gloves, Booties (as necessary), PFD

Disposition of Decontamination Wastes

Provide a description of waste disposition including identification of storage area, hauler, and final disposal site, if applicable

START PPE will be collected with subcontractor PPE for disposal.

Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows:

Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure:

Disposable sampling supplies will be used by START and disposed of in a separate garbage bag.

6.2 LEVEL D DECONTAMINATION PLAN

Check indicated functions or add steps, as necessary:

Function	Description of Process, Solution, and Container
☐ Segregated equipment drop	
☐ Boot cover and glove wash	
☐ Boot cover and glove rinse	
☒ Tape removal - outer glove and boot	
☒ Boot cover removal	
☒ Outer glove removal	
HOTLINE	
☐ Suit/safety boot wash	
☐ Suit/boot/glove rinse	
☐ Safety boot removal	
☒ Suit removal	
☐ Inner glove wash	
☐ Inner glove rinse	
☒ Inner glove removal	
☐ Inner clothing removal	
CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY	
☐ Field wash	
☐ Redress	

Disposal Plan, End of Day:
START PPE will be placed in plastic trash bags.

Disposal Plan, End of Week:

Disposal Plan, End of Project:

6.3 LEVEL C DECONTAMINATION PLAN

Check indicated functions or add steps, as necessary:

Function	Description of Process, Solution, and Container
☐ Segregated equipment drop	
☐ Boot cover and glove wash	
☐ Boot cover and glove rinse	
☐ Tape removal - outer glove and boot	
☐ Boot cover removal	
☐ Outer glove removal	
HOTLINE	
☐ Suit/safety boot wash	
☐ Suit/boot/glove rinse	
☐ Safety boot removal	
☐ Suit removal	
☐ Inner glove wash	
☐ Inner glove rinse	
☐ Facepiece removal	
☐ Inner glove removal	
☐ Inner clothing removal	
CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY	
☐ Field wash	
☐ Redress	

Disposal Plan, End of Day:

Disposal Plan, End of Week:

Disposal Plan, End of Project:

6.4 LEVEL B DECONTAMINATION PLAN

Check indicated functions or add steps, as necessary:

Function	Description of Process, Solution, and Container
☐ Segregated equipment drop	
☐ Boot cover and glove wash	
☐ Boot cover and glove rinse	
☐ Tape removal - outer glove and boot	
☐ Boot cover removal	
☐ Outer glove removal	
HOTLINE	
☐ Suit/safety boot wash	
☐ Suit/SCBA/boot/glove rinse	
☐ Safety boot removal	
☐ Remove SCBA backpack without disconnecting	
☐ Splash suit removal	
☐ Inner glove wash	
☐ Inner glove rinse	
☐ SCBA disconnect and facepiece removal	
☐ Inner glove removal	
☐ Inner clothing removal	
CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY	
☐ Field wash	
☐ Redress	

Disposal Plan, End of Day:

Disposal Plan, End of Week:

Disposal Plan, End of Project:

7. TRAINING AND BRIEFING TOPICS/SIGN OFF SHEET

7.1 TRAINING AND BRIEFING TOPICS

The following items will be covered at the site-specific training meeting, daily or periodically

☐ Site characterization and analysis, Sec 3 0, 29 CFR 1910.120 I	☐ Level A
☒ Physical hazards, HASP Form 07	☐ Level B
☒ Chemical hazards, HASP Form 04	☐ Level C
☒ Animal bites, stings, and poisonous plants	☒ Level D
☐ Etiologic (infectious) agents	☐ Monitoring 29 CFR 1910 120 (h)
☐ Site control, 29 CFR 1910 120 d	☒ Decontamination, 29 CFR 1910 120 (k)
☐ Engineering controls and work practices, 29 CFR 1910.120 (g)	☒ Emergency response, 29 CFR 1910 120 (l)
☐ Heavy machinery	☐ Elements of an emergency response, 29 CFR 1910.120 (l)
☐ Forklift	☒ Procedures for handling site emergency incidents, 29 CFR 1910.120 (l)
☐ Backhoe	☐ Off-site emergency response, 29 CFR 1910.120 (l)
☒ Equipment	☐ Handling drums and containers, 29 CFR 1910 120 (j)
☒ Tools	☐ Opening drums and containers
☐ Ladder, 29 CFR 1910 27 (d)/29 CFR 1926	☐ Electrical material handling equipment
☐ Overhead and underground utilities	☐ Radioactive waste
☐ Scaffolds	☐ Shock-sensitive waste
☐ Structural integrity	☐ Laboratory waste packs
☐ Unguarded openings - wall, floor, ceilings	☐ Sampling drums and containers
☐ Pressurized air cylinders	☐ Shipping and transport, 49 CFR 172 101, IATA
☒ Personal protective equipment, 29 CFR 1910 120 (g); 29 CFR 1910.134	☐ Tank and vault procedures
☐ Respiratory protection, 29 CFR 1910 120 (g); ANSI Z88 2	☒ Illumination, 29 CFR 1910 120 (m)
☒ Working over water FLD-19	☐ Sanitation, 29 CFR 1910 120 (n)
☒ Boating safety FLD-18	☐
☒ Heat Stress	☐
☐ Proper lifting techniques	☐

7.2 HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORM

Site Name: Marshall/ Enbridge Emergency Response	**WO#:**
Address: 455 Leggitt Road (Command Center) Marshall, MI	
I understand, agree to, and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the personnel health and safety briefing(s).	

Name	Signature	Date

ATTACHMENT A
CHEMICAL CONTAMINANTS DATA SHEETS

Insert sheets on following page.

Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

Benzene

Synonyms & Trade Names Benzol, Phenyl hydride

CAS No. 71-43-2	**RTECS No.** CY1400000	**DOT ID & Guide** 1114 130
Formula C_6H_6	**Conversion** 1 ppm = 3.19 mg/m³	**IDLH** Ca [500 ppm] See: 71432
Exposure Limits **NIOSH REL** : Ca TWA 0.1 ppm ST 1 ppm See Appendix A **OSHA PEL** : [1910.1028] TWA 1 ppm ST 5 ppm See Appendix F		**Measurement Methods** **NIOSH** 1500 , 1501 , 3700 , 3800 ; **OSHA** 12 , 1005 See: NMAM or OSHA Methods

Physical Description Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]

MW: 78.1	BP: 176°F	FRZ: 42°F	Sol: 0.07%	VP: 75 mmHg	IP: 9.24 eV
Sp.Gr: 0.88	FL.P: 12°F	UEL: 7.8%	LEL: 1.2%		

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers, many fluorides & perchlorates, nitric acid

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, blood, central nervous system, bone marrow

Cancer Site [leukemia]

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Provide: Eyewash, Quick drench

Respirator Recommendations
(See Appendix E)

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0015 See MEDICAL TESTS: 0022

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Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
?00-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

ATTACHMENT B
MATERIAL SAFETY DATA SHEETS

(ATTACH MSDSS)

Insert documents on following page.

ATTACHMENT C

SAFETY PROCEDURES/FIELD OPERATING PROCEDURES (FLD OPS)

Included in WESTON's Health and Safety Manual which will be on-site as hard copy or electronically.

FLD 54 BENZENE EXPOSURE CONTROL PLAN

This Exposure Control Plan will be reviewed annually and updated as appropriate to reflect any changes that may impact WESTON's compliance status.

RELATED PROGRAMS

Personal Protective Equipment Program
Respiratory Protection Program

EXPOSURE MONITORING

General Monitoring Requirements

WESTON will perform exposure monitoring for benzene at any workplace or work operation at a client's location that is covered by OSHA standard 29 CFR 1910 1028. The exposure evaluation will be performed at the earliest possible time when beginning activities at a site or during an operation to ensure the safety of personnel and confirm that effective controls are used.

- Determinations of employee exposure will be made from breathing zone air samples that reflect the monitored employee's regular, daily 8-hour time-weighted average (TWA) exposure to benzene. WESTON will determine if any employee may be exposed to benzene at or above the action level (AL) or the 8-hour TWA.
- 8-hour TWA exposures will be determined for each employee on the basis of one or more personal breathing zone air samples reflecting full shift exposure on each shift, for each job classification in each work area. Where employees perform the same job tasks, in the same job classification, on the same shift, in the same work area, and the length, duration, and level of benzene exposures are similar, WESTON may choose to sample a representative fraction of the employees instead of collecting samples on all employees in order to meet this requirement. When this representative sampling is performed, WESTON will sample the employee(s) expected to have the highest benzene exposures.
- Determinations to evaluate exposures with respect to the short-term exposure limit (STEL) shall be made from 15 minute employee breathing zone samples measured at operations where there is reason to believe exposures are high, such as where tanks are opened, filled, unloaded or gauged; where containers or process equipment are opened. Objective data, such as instantaneous measurements or from short periods, may be used to determine where STEL monitoring is needed.

Initial Monitoring

Initial monitoring will be performed in compliance with the following:

- Except as provided for in the following two paragraphs, WESTON will monitor employee exposures and will base initial determinations concerning controls, personal protective equipment (PPE) and the need for additional monitoring on the initial results. The results will also trigger requirements for re-sampling as defined by OSHA.
- Where WESTON has monitored under conditions that in all important aspects closely resemble those currently prevailing and where that monitoring satisfies all other requirements of this section, including the accuracy and confidence levels of subsection 6 of this section, WESTON

may rely on such earlier monitoring results to satisfy the requirements of potential exposure determination. Data used in this determination must be collected in the previous 12 months.

- Where WESTON has objective data demonstrating that employee exposure to benzene will not exceed the AL or STEL under the expected conditions of processing, use, or handling, WESTON may rely upon such data instead of implementing initial monitoring.
- The review of sampling results and the decision to use objective data will be made by the Division Environmental, Health, and Safety Manager (DEHSM), a Certified Industrial Hygienist, or the Corporate Environmental Health and Safety Director.

Monitoring Frequency (Periodic Monitoring)

- If the initial monitoring or periodic monitoring reveals employee exposures to be at or above the AL but at or below the TWA, WESTON will monitor at least every year.
- If the initial monitoring or periodic monitoring reveals employee exposures to be above the TWA, WESTON will monitor at least every 6 months.
- If the initial monitoring or the periodic monitoring indicates that employee exposures are below the AL and that result is confirmed by the results of another monitoring taken at least 7 days later, WESTON may discontinue the monitoring for those employees whose exposures are represented by such monitoring.
- Monitoring to evaluate the exposures with respect to the STEL will be completed as necessary.

Additional Monitoring

WESTON also will institute the exposure monitoring required in the Initial Monitoring and the Monitoring Frequency sections when there is a change in the production, process, control equipment, personnel or work practices which may result in new or additional exposure to benzene, or when WESTON has any reason to suspect a change which may result in new or additional exposures.

Employee Notification of Monitoring Results

Within 15 working days after the receipt of the results of any monitoring performed under this section, WESTON will notify each affected employee individually in writing of the results. In addition, within the same time period WESTON will post the results of the exposure monitoring at an appropriate location that is accessible to all affected employees.

Wherever monitoring results indicate an employee exposure exceeds the permissible exposure limit (PEL), WESTON will include in the written notice a description of the corrective action being taken by WESTON to reduce employee exposure to or below the PEL.

Accuracy of Measurement

WESTON will use a method of monitoring and analysis with a confidence level of 95% and an accuracy of plus or minus 25%, for airborne concentrations of benzene. OSHA Method 12 is identified in the OSHA standard for air sampling. WESTON will consult a qualified analytical laboratory to confirm the sampling method.

Establishment

WESTON will establish a regulated area at a Client's work site when an employee's exposure to airborne concentrations of benzene exceeds or can reasonably be expected to exceed the PELs, either the 8-hour TWA exposure of 1 ppm or the STEL of 5 ppm for 15 minutes.

Demarcation

Regulated areas will be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees of the boundaries of the regulated area.

Access

Access to regulated areas will be limited to authorized persons.

Provision of Respirators

Each person entering a regulated area will be supplied with and required to use a respirator, selected in accordance with 29 CFR 1910.134(b) through (d) (except (d)(1)(iii), (d)(3)(iii)(B)(1) and (2), and (f) through (m) and compliant with WESTON's Respiratory Protection Program.

Prohibited Activities

WESTON will ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, carry the products associated with these activities into regulated areas, or store such products in those areas.

METHODS OF COMPLIANCE

Compliance Hierarchy

WESTON will implement engineering and work practice controls to reduce and maintain employee exposure to benzene at or below the PEL, except to the extent that WESTON can demonstrate that such controls are not feasible.

Wherever engineering and work-practice controls are required and are not sufficient to reduce employee exposure to or below the PEL, WESTON will implement such controls to reduce exposures to the lowest levels achievable. WESTON will supplement such controls with respiratory protection that complies with the requirements of the PEL.

WESTON will not use employee rotation as a method of compliance.

Compliance Program

Where the PEL is exceeded, WESTON will establish and implement a written site-specific compliance program within its Health and Safety Plan (HASP) to reduce employee exposure to or below the PEL by means of engineering and work practice controls, as required by the previous subsection. To the extent that engineering and work-practice controls cannot reduce exposures to or below the PEL, WESTON will include in the written compliance program the use of appropriate respiratory protection to achieve compliance with the PEL.

Written site-specific compliance programs will include at least the following:

- A description of each operation in which benzene is emitted; e.g., machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices;
- A description of the specific means that will be employed to achieve compliance, including engineering plans and studies to determine the methods to control exposure to benzene, and, where necessary, the use of appropriate respiratory protection to achieve the PEL;
- A report of the technology considered to control exposures below the PEL;
- Air monitoring data that document the sources of benzene emissions;
- A detailed schedule for implementing the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;
- A work practice program;
- A written plan for emergency situations; and
- Other relevant information.

The written compliance program will be reviewed and updated at least annually, if the project site duration makes this requirement necessary, or more often, if necessary, to reflect significant changes in WESTON's compliance status.

The written compliance program will be provided upon request for examination and copying to the OSHA Assistant Secretary and/or Director, affected employees, and designated employee representatives.

Respiratory Protection

WESTON maintains a Respiratory Protection Program as required by 29 CFR 1910.134 and substance-specific standards. For employees who use respirators required by this section, WESTON will provide respirators that comply with the requirements of this subsection. Respirators must be used during:

- Periods necessary to install or implement feasible engineering and work-practice controls.
- Maintenance and repair activities, and brief or intermittent operations, where employee exposures exceed the PEL or STEL, and engineering and work-practice controls are not feasible;
- Activities in regulated areas;
- Work operations for which WESTON or the Client has implemented all feasible engineering and work-practice controls and such controls are not sufficient to reduce employee exposures to or below the PEL;
- Work operations for which an employee is exposed to benzene at or above the AL, and the employee requests a respirator;
- Work operations for which an employee is exposed above the PEL and engineering controls are not required by exemption; and
- Emergencies.

No employee will be permitted to use a respirator if, based on their recent medical examination, the examining physician determines that they will be unable to continue to function normally while using a respirator. If the physician determines that the employee must be limited in, or removed from, their

current job because of their inability to use a respirator, the limitation or removal will be in accordance with WESTON's Human Resources policies and practices.

Respirator Selection

WESTON will use the assigned protection factors (APFs) listed in Table 1 to select a respirator that meets or exceeds the required level of employee protection. When using a combination respirator (e.g., airline respirators with an air-purifying filter), WESTON will ensure that the APF is appropriate to the mode of operation in which the respirator is being used. WESTON will select the appropriate respirator from Table 1.

Table 1. -- Assigned Protection Factors[5]

Type of respirator[1], [2]	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	[3]10	50	.....	.....
2. Powered Air-Purifying Respirator (PAPR)	.....	50	1,000	[4]25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	.....	10	50	.....	.....
• Continuous flow mode	.....	50	1,000	[4]25/1,000	25
• Pressure-demand or other positive-pressure mode	.....	50	1,000	.....	.....
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	.....	10	50	50	.....
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	.....	10,000	10,000	.....

Notes:

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

Emergency Situations

WESTON will develop and implement a written plan for dealing with emergency situations involving substantial releases of benzene on a site-specific, as-needed basis. The plan will include provisions for the use of appropriate respirators and PPE. In addition, employees not essential to correcting the emergency situation will be restricted from the area and normal operations halted in that area until the emergency is abated.

Protective Work Clothing and Equipment

Personal protective clothing and equipment shall be worn to prevent eye contact and limit dermal exposure to liquid benzene. Protective clothing and equipment shall be impermeable to liquid benzene and will be provided by WESTON at no cost to the employee. Eye and face protection shall meet the requirements of 29 CFR 1910.133. Protective work clothing and equipment includes, but is not limited to:

- Benzene resistant coveralls or similar full-body work clothing;
- Benzene resistant gloves, head coverings, and boots or foot coverings; and
- Face shields, vented goggles, or other appropriate protective equipment.

Employees shall remove all protective clothing and equipment worn for protection from benzene at the completion of the work shift at identified change areas.

In the event that protective clothing or PPE becomes wetted with benzene or when rips or tears are detected while an employee is working, the protective clothing or equipment will be replaced as soon as possible.

WESTON will arrange for the laundering or disposal of protective clothing and equipment. Employees will not take off the site, protective clothing or equipment contaminated with benzene. WESTON will ensure that the disposal or cleaning of contaminated protective clothing and equipment is done in a manner that prevents the release of airborne benzene in excess of the PEL.

Hygiene Areas and Practices

WESTON will provide hand-washing facilities, showers for personnel to use when leaving the work area and before eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.

Housekeeping

All spills and sudden releases of material containing benzene will be cleaned up as soon as possible.

Waste, scrap, debris, bags, containers, PPE, and clothing contaminated with benzene and consigned for disposal must be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers will be labeled appropriately.

MEDICAL SURVEILLANCE

WESTON maintains a medical surveillance program for:

- All employees who are or may be exposed to benzene at or above the AL unless WESTON demonstrates that the employee is not, and will not be, exposed at or above the AL 30 or more days per year (12 consecutive months); and
- Employees who might previously have been exposed to benzene at or above the AL while employed by WESTON, unless WESTON demonstrates that the employee did not work for WESTON in jobs with exposure to benzene.

To determine an employee's fitness to use a respirator, WESTON will provide the medical examination to obtain a physician's certification that includes a cardiopulmonary evaluation and a pulmonary function test.

All medical examinations and procedures required by this standard will be performed by or under the supervision of a licensed physician, who has read and is familiar with the health effects of benzene and the requirements detailed in 29 CFR 1910.1028. All laboratory tests will be conducted by an accredited laboratory. These examinations and procedures will be provided without cost to the employee and at a time and place that is reasonable and convenient to employees.

Initial Examination

WESTON will provide an initial (pre-placement) examination to all employees who are or may be exposed to benzene at or above the AL 30 or more days per year, for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year, for employees who have been exposed to more that 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by WESTON. The initial (pre-placement) medical examination will include:

- A detailed medical and occupational work history, with emphasis on exposure to benzene or any other hematological toxins;
- A family history of blood dyscrasias including hematological neoplasms;
- A history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements;
- A history of renal or liver dysfunction;
- A history of medicinal drugs routinely taken;
- A history of previous exposure to ionizing radiation;
- Exposure to marrow toxins outside the current work situation;
- A complete physical examination; and
- Laboratory tests as required by the OSHA Standard.

Recent Examination: An initial examination is not required to be provided if adequate records show that the employee has been examined in accordance with the requirements of this subsection within the past twelve months. In that case, such records will be maintained as part of the employee's medical record and the prior exam will be treated as if it were an initial examination for the purposes of the following 2 subsections, "Actions Triggered by Initial Biological Monitoring" and "Periodic Medical Surveillance".

Actions Triggered by Initial Biological Monitoring

If the results of the initial and periodic examination indicate any of the following abnormal conditions exist, then the blood count shall be repeated within 2 weeks.

- The hemoglobin level or the hematocrit falls below the normal limit (outside the 95% confidence interval [C.I.]) as determined by the laboratory for the particular geographic area and/or these indices show a persistent downward trend from the individual pre-exposure norms; provided these findings cannot be explained by other medical reasons.
- The thrombocyte (platelet) count varies more than 20 percent below the employee's most recent values or falls outside the normal limit (95% C.I.) as determined by the laboratory.
- The leukocyte count is below 4,000 per mm^3 or there is an abnormal differential count.

If the abnormality persists, the examining physician shall refer the employee to a hematologist or an internist for further evaluation unless the physician has good reason to believe such referral is unnecessary. If the hematologist's or internist's evaluation determines the need for additional tests, WESTON shall ensure that these tests are provided.

Periodic Medical Surveillance

For each employee who is covered under "Medical Surveillance" subsection, WESTON will provide at least the minimum level of periodic medical surveillance, which consists of periodic medical examinations and periodic biological monitoring. A periodic medical examination will be provided within one year after the initial examination required by the Initial Examination subsection and thereafter at least yearly. Biological sampling will be provided at least annually, either as part of a periodic medical examination or separately as periodic biological monitoring.

The periodic medical examination will include:

- A brief history regarding any new exposure to potential marrow toxins, changes in medical drug use; and the appearance of physical signs relating to blood disorders.
- A complete blood count including a leukocyte count with differential, quantitative thrombocyte count, hemoglobin, hematocrit, erythrocyte count and erythrocyte indices (mean corpuscular volume [MCV], mean corpuscular hemoglobin [MCH], mean corpuscular hemoglobin concentration [MCHC]); and
- Appropriate additional tests as necessary, in the opinion of the examining physician, in consequence of alterations in the components of the blood or other signs which may be related to benzene exposure.

Where the employees develops signs and symptoms commonly associated with toxic exposure to benzene, WESTON shall provide the employee with an additional medical examination which shall include those elements considered appropriate by the examining physician.

For persons required to use respirators for at least 30 days a year, a pulmonary function test shall be performed every 3 years. A specific evaluation of the cardiopulmonary system shall be made at the time of the pulmonary function test.

Emergency Examinations

In addition to the medical surveillance required in this Medical Surveillance section, WESTON will provide a medical examination as soon as possible to any employee who may have been acutely exposed to benzene because of an emergency.

The examination will be coordinated through the WESTON medical provider. At a minimum the test will involve having the employee provide a urine sample at the end of the employee's shift and having a urinary phenol test performed within 72 hours. Based on the results for this sample, the medical provider will determine the need for additional testing, for example a complete blood count including an erythrocyte count, leukocyte count with differential and thrombocyte count at monthly intervals for a 3-month duration following the emergency.

Information Provided to the Physician

WESTON will provide the following information to any examining physician, including hematologists or internists:

- A copy of OSHA's Benzene Standard (29 CFR 1910.1028) and appendices;
- A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to benzene;
- The employee's former, current, and anticipated future levels of occupational exposure to benzene;
- Relevant results of previous biological monitoring and medical examinations.

Physician's Written Medical Opinion

WESTON will promptly obtain a written, signed medical opinion from the examining physician and provide a copy of the document to the employee within 15 days of the examination. This written opinion will contain:

- The physician's diagnosis based on occupationally pertinent results of the medical examination and tests;
- The physician's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to benzene;
- Any recommended limitations on the activities or duties of the employee and exposure to benzene or on the employee's use of PPE, clothing, and respirators;
- A statement that the physician has clearly and carefully explained to the employee the results of the medical examination, including all biological monitoring results, and any medical conditions related to benzene exposure that require further evaluation or treatment.

WESTON will instruct the physician not to reveal orally or in the written medical opinion given to WESTON specific findings or diagnoses unrelated to occupational exposure to benzene.

Medical Removal Plan

WESTON will temporarily remove an employee from work where there is excess exposure to benzene on each occasion that medical removal is required, such as when a physician makes a referral to a hematologist/internist, and until the physician determines the employee can safely return to work.

Following the examination and evaluation by the hematologist/internist, a decision to remove an employee from areas where benzene exposure is above the AL or to allow the employee to return to areas where benzene exposure is above the AL shall be made by the physician in consultation with the hematologist/internist. The physician will communicate the decision in writing to WESTON and the employee. In the case of removal, the physician shall state the required probable duration of removal from occupational exposure to benzene above the AL and the requirements for future medical examinations to review the decision.

When an employee is medically removed, WESTON shall provide a follow-up examination. The physician, in consultation with the hematologist/internist, shall make a decision within 6 months of the

date the employee was removed concerning whether the employee shall be returned to the usual job or whether the employee should be removed permanently.

Whenever an employee is medically removed under this subsection, WESTON will transfer the removed employee to a job where the exposure to benzene is less than the AL and will meet the OSHA requirements with respect to medical removal protection benefits.

Reporting

In addition to other medical events that are required to be reported on the OSHA Form No. 300, WESTON will report any abnormal condition or disorder caused by occupational exposure to benzene associated with employment.

COMMUNICATION OF BENZENE HAZARDS TO EMPLOYEES

As required by OSHA, WESTON's Hazard Communication Program transmits information on the hazards of chemicals to employees. The Hazard Communication Program has been established as part of the Corporate EHS Program available on-line or as hard copy to all WESTON employees. Additionally, WESTON transmits the following communications specific to benzene

Warning Signs

Warning signs will be provided and displayed in regulated areas and at all approaches to regulated areas. Where warning signs are posted, employees must take necessary protective steps before entering the area. The warning signs will include the following information:

DANGER
BENZENE
CANCER HAZARD
FLAMMABLE – NO SMOKING
AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

WESTON will ensure that signs required by this subsection are illuminated, cleaned, and maintained as necessary so that the legend is readily visible.

Warning Labels

Warning labels or other appropriate forms of warning will be provided for containers of benzene within the workplace. There is no requirement to label pipes. The label shall comply with the requirements of 29 CFR 1900.1200(f) and in addition shall include the following information:

DANGER
CONTAINS BENZENE
CANCER HAZARD

WESTON will ensure that labels required by this subsection are cleaned and maintained as necessary so that the labels are readable.

Employee Information and Training

WESTON will provide employees with information and training at the time of initial assignment to a work area where benzene is present, and will provide training at least annually thereafter if exposures are above the AL. WESTON will ensure employee participation in the program and maintain a record of the contents of such program.

The training shall be in accordance with the requirements of the Hazard Communication Standard [29 CFR 1910.1200(h)(1) and (2)] and will include:

- Reviewing benzene material safety data sheets;
- Providing the employees with an explanation of the contents of 29 CFR 1910.1028 and a description of the medical surveillance program requirements. The following appendices of 29 CFR 1910.1028 will also be provided and requirements explained:
  - Appendix A – Benzene Substance Safety Data Sheet (reprinted as part of this FLD)
  - Appendix B – Benzene Substance Technical Guidelines (reprinted as part of this FLD)
  - Appendix C – Medical Surveillance Guidelines for Benzene
- Informing personnel where the standard and appendices can be found.

RECORDKEEPING

Exposure Monitoring Records

WESTON will establish and keep an accurate record of all air monitoring for benzene in the workplace. WESTON will maintain this record for at least 30 years, in accordance with OSHA requirements. This record will include at least the following information:

- The monitoring date, number, duration, and results for each sample taken, including a description of the procedures used to determine representative employee exposures;
- The name, social security number, and job classification of the employees monitored and of all other employees whose exposures the monitoring is intended to represent;
- A description of the sampling and analytical methods used and evidence of their accuracy;
- The type of respiratory protective device, if any, worn by the monitored employee;
- A notation of any other conditions that might have affected the monitoring results.

Medical Surveillance Records

WESTON will establish and maintain an accurate record for each employee covered by medical surveillance. WESTON will ensure that this record is maintained for the duration of employment plus 30 years. The record will include at least the following information about the employee:

- Name, social security number, and description of the duties;
- A copy of the physician's written opinions on the initial, periodic, and special examinations including results of medical examinations and all tests, opinions, and recommendations.
- Any employee medical complaints related to exposure to benzene;

- A copy of the medical and work history related to benzene exposure or any other hematologic toxins; and
- A copy of the information provided to the physician

Availability

WESTON will ensure that all required records are maintained in accordance with current OSHA requirements and made available upon request to the Assistant Secretary and the Director for examination and copying.

WESTON will provide required employee exposure monitoring records upon request for examination and copying to employees, employee representatives, and the Assistant Secretary.

WESTON will provide required employee medical records upon request for examination and copying to the subject employee and anyone having specific written consent of the subject employee, and the Assistant Secretary.

Transfer of Records

If WESTON ceases to do business and there is no successor employer to receive and retain records, WESTON will notify the Director at least 3 months prior to disposal and will transmit them to the Director if required by the Director, within that period.

OBSERVATION OF MONITORING

Employee Observation

WESTON will provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to benzene.

Observation Procedures

When observation or monitoring requires entry into an area where the use of protective clothing or equipment is required, WESTON will provide the observer with that clothing and equipment and will ensure that the observer uses such clothing and equipment and complies with all other applicable safety and health procedures.

DEFINITIONS

Action level (AL): An airborne concentration of benzene of 0.5 parts per million (ppm) calculated as an 8-hour time-weighted average (TWA).

Assistant Secretary: The Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized Person: Any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as designated representative of employee for the purpose of exercising the right to observe monitoring.

Benzene (CAS Registry No 71-43-2): Liquefied or gaseous benzene. It includes benzene contained in liquid mixture and the benzene vapors released by these liquids. It does not include trace amount of unreacted benzene contained in solid materials.

Container: Any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, or the like, but does not include piping system.

Day: Any part of the calendar day.

Emergency: Any occurrence such as, but not limited to, equipment failure, rupture of containers, or failures of control equipment which may or does result in an unexpected significant release of benzene.

Employee exposure: Exposure to airborne benzene which would occur if the employee were not using respiratory protective equipment.

Final medical determination: The written medical opinion of the employee's health status by the examining physician.

High-efficiency particulate air (HEPA) filter: A filter capable of trapping and retaining at least 99.97% of mono-dispersed particles of 0.3 micrometers in diameter.

Permissible exposure limit (PEL): The OSHA regulatory limit as a TWA limit is one part of benzene per million parts of air (1 ppm). WESTON will ensure that no employee is exposed to an airborne concentration of benzene in excess of 1 ppm as an 8-hour TWA.

Regulated area: Any area where airborne concentrations of benzene exceed or can reasonably be expected to exceed the PELs, either the 8-hour TWA exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes.

Short-term exposure limit (STEL): The OSHA regulatory limit over a 15-minute period is 5 ppm. WESTON will ensure that no employee is exposed to an airborne concentration of benzene in excess of 5 ppm as averaged over any 15-minute period.

Vapor control system: Any equipment used for containing the total vapors displaced during the loading of gasoline, motor fuel, or other fuel tank trucks and the displacing of these vapors through a vapor processing system or balancing the vapor with the storage tank.

29 CFR 1910.1028, Appendix A
Substance Safety Data Sheet
(Verified against Standard January 2008)

I. Substance Identification

A. Substance: Benzene.

B. Permissible Exposure: Except as to the use of gasoline, motor fuels and other fuels subsequent to discharge from bulk terminals and other exemptions specified in 1910.1028(a)(2):

1. Airborne: The maximum time-weighted average (TWA) exposure limit is 1 part of benzene vapor per million parts of air (1 ppm) for an 8-hour workday and the maximum short-term exposure limit (STEL) is 5 ppm for any 15-minute period.

2. Dermal: Eye contact shall be prevented and skin contact with liquid benzene shall be limited.

C. Appearance and odor: Benzene is a clear, colorless liquid with a pleasant, sweet odor. The odor of benzene does not provide adequate warning of its hazard.

II. Health Hazard Data

A. Ways in which benzene affects your health. Benzene can affect your health if you inhale it, or if it comes in contact with your skin or eyes. Benzene is also harmful if you happen to swallow it.

B. Effects of overexposure. 1. Short-term (acute) overexposure: If you are overexposed to high concentrations of benzene, well above the levels where its odor is first recognizable, you may feel breathless, irritable, euphoric, or giddy; you may experience irritation in eyes, nose, and respiratory tract. You may develop a headache, feel dizzy, nauseated, or intoxicated. Severe exposures may lead to convulsions and loss of consciousness.

2. Long-term (chronic) exposure. Repeated or prolonged exposure to benzene, even at relatively low concentrations, may result in various blood disorders, ranging from anemia to leukemia, an irreversible, fatal disease. Many blood disorders associated with benzene exposure may occur without symptoms.

III. Protective Clothing and Equipment

A. Respirators. Respirators are required for those operations in which engineering controls or work practice controls are not feasible to reduce exposure to the permissible level. However, where employers can document that benzene is present in the workplace less than 30 days a year, respirators may be used in lieu of engineering controls. If respirators are worn, they must have joint Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) seal of approval, and cartridge or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. If you experience difficulty

breathing while wearing a respirator, you may request a positive pressure respirator from your employer. You must be thoroughly trained to use the assigned respirator, and the training will be provided by your employer.

B. Protective Clothing. You must wear appropriate protective clothing (such as boots, gloves, sleeves, aprons, etc.) over any parts of your body that could be exposed to liquid benzene.

C. Eye and Face Protection. You must wear splash-proof safety goggles if it is possible that benzene may get into your eyes. In addition, you must wear a face shield if your face could be splashed with benzene liquid.

IV. Emergency and First Aid Procedures

A. Eye and face exposure. If benzene is splashed in your eyes, wash it out immediately with large amounts of water. If irritation persists or vision appears to be affected see a doctor as soon as possible.

B. Skin exposure. If benzene is spilled on your clothing or skin, remove the contaminated clothing and wash the exposed skin with large amounts of water and soap immediately. Wash contaminated clothing before you wear it again.

C. Breathing. If you or any other person breathes in large amounts of benzene, get the exposed person to fresh air at once. Apply artificial respiration if breathing has stopped. Call for medical assistance or a doctor as soon as possible. Never enter any vessel or confined space where the benzene concentration might be high without proper safety equipment and at least one other person present who will stay outside. A life line should be used.

D. Swallowing. If benzene has been swallowed and the patient is conscious, do not induce vomiting. Call for medical assistance or a doctor immediately.

V. Medical Requirements

If you are exposed to benzene at a concentration at or above 0.5 ppm as an 8-hour time-weighted average, or have been exposed at or above 10 ppm in the past while employed by your current employer, your employer is required to provide a medical examination and history and laboratory tests within 60 days of the effective date of this standard and annually thereafter. These tests shall be provided without cost to you. In addition, if you are accidentally exposed to benzene (either by ingestion, inhalation, or skin/eye contact) under emergency conditions known or suspected to constitute toxic exposure to benzene, your employer is required to make special laboratory tests available to you.

VI. Observation of Monitoring

Your employer is required to perform measurements that are representative of your exposure to benzene and you or your designated representative are entitled to observe the monitoring procedure. You are entitled to observe the steps taken in the measurement procedure, and to

record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you or your representative must also be provided with, and must wear the protective clothing and equipment.

VII. Access to Records

You or your representative are entitled to see the records of measurements of your exposure to benzene upon written request to your employer. Your medical examination records can be furnished to yourself, your physician or designated representative upon request by you to your employer.

VIII. Precautions for Safe Use, Handling and Storage

Benzene liquid is highly flammable. It should be stored in tightly closed containers in a cool, well ventilated area. Benzene vapor may form explosive mixtures in air. All sources of ignition must be controlled. Use non-sparking tools when opening or closing benzene containers. Fire extinguishers, where provided, must be readily available. Know where they are located and how to operate them. Smoking is prohibited in areas where benzene is used or stored. Ask your supervisor where benzene is used in your area and for additional plant safety rules.

29 CFR 1910.1028, Appendix B
Substance Technical Guidelines for Benzene
(Verified against Standard January 2008)

I. Physical and Chemical Data

A. Substance identification.

1. Synonyms: Benzol, benzole, coal naphtha, cyclohexatriene, phene, phenyl hydride, pyrobenzol. (Benzin, petroleum benzin and Benzine do not contain benzene)

2. Formula: C(6)H(6) (CAS Registry Number: 71-43-2)

B. Physical data.

1. Boiling Point (760 mm Hg); 80.1 deg. C (176 deg. F)

2. Specific Gravity (water = 1): 0.879

3. Vapor Density (air = 1): 2.7

4. Melting Point: 5.5 deg. C (42 deg. F)

5. Vapor Pressure at 20 deg. C (68 deg. F): 75 mm Hg

6. Solubility in Water: .06%

7. Evaporation Rate (ether = 1): 2.8

8. Appearance and Odor: Clear, colorless liquid with a distinctive sweet odor.

II. Fire, Explosion, and Reactivity Hazard Data

A. Fire.

1. Flash Point (closed cup): - 11 deg. C (12 deg. F)

2. Autoignition Temperature: 580 deg. C (1076 deg. F)

3. Flammable limits in Air. % by Volume: Lower: 1.3%, Upper: 7.5%

4. Extinguishing Media: Carbon dioxide, dry chemical, or foam.

5. Special Fire-Fighting procedures: Do not use solid stream of water, since stream will scatter and spread fire. Fine water spray can be used to keep fire-exposed containers cool.

6. Unusual fire and explosion hazards: Benzene is a flammable liquid. Its vapors can form explosive mixtures. All ignition sources must be controlled when benzene is used, handled, or stored. Where liquid or vapor may be released, such areas shall be considered as hazardous locations. Benzene vapors are heavier than air; thus the vapors may travel along the ground and be ignited by open flames or sparks at locations remote from the site at which benzene is handled.

7. Benzene is classified as a 1 B flammable liquid for the purpose of conforming to the requirements of 29 CFR 1910.106. A concentration exceeding 3,250 ppm is considered a potential fire explosion hazard. Locations where benzene may be present in quantities sufficient to produce explosive or ignitable mixtures are considered Class I Group D for the purposes of conforming to the requirements of 29 CFR 1910.309.

B. Reactivity.

1. Conditions contributing to instability: Heat.

2. Incompatibility: Heat and oxidizing materials.

3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide).

III. Spill and Leak Procedures

A. Steps to be taken if the material is released or spilled. As much benzene as possible should be absorbed with suitable materials, such as dry sand or earth. That remaining must be flushed with large amounts of water. Do not flush benzene into a confined space, such as a sewer, because of explosion danger. Remove all ignition sources. Ventilate enclosed places.

B. Waste disposal method. Disposal methods must conform to other jurisdictional regulations. If allowed, benzene may be disposed of: (a) By absorbing it in dry sand or earth and disposing in a sanitary landfill; (b) if small quantities, by removing it to a safe location from buildings or other combustible sources, pouring it in dry sand or earth and cautiously igniting it; and (c) if large quantities, by atomizing it in a suitable combustion chamber.

IV. Miscellaneous Precautions

A. High exposure to benzene can occur when transferring the liquid from one container to another. Such operations should be well ventilated and good work practices must be established to avoid spills.

B. Use non-sparking tools to open benzene containers which are effectively grounded and bonded prior to opening and pouring.

C. Employers must advise employees of all plant areas and operations where exposure to benzene could occur. Common operations in which high exposures to benzene may be encountered are: the primary production and utilization of benzene, and transfer of benzene.

FLD 61 GASOLINE CONTAMINANT EXPOSURE

RELATED FLDs

FLD54 – Benzene Exposure Control Plan

Note: This FLD replaces the Benzene Guideline from the 2003 Safety Officer Manual. Use of the previous Benzene Guideline is no longer valid or authorized.

If gasoline contamination is a concern, there may be the potential for benzene to be present in the breathing zone at concentrations reaching or exceeding the OSHA Permissible Exposure Level (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) A determination of the magnitude of worker exposure must be made to allow use of this guideline and of the applicability of the gasoline TLV/Time Weighted Average (TWA) or establish the need to follow the OSHA Benzene exposure requirements (29 CFR 1910.1028 and FLD 54).

Actions for this guide are based upon the ACGIH TLV/TWA for Gasoline of 300 ppm.

Assume worst case as 5% benzene by volume in gasoline, therefore "units" as measured by a photoionization detector (PID) or flame ionization detector (FID) can be paired with Levels of Protection (LOP) as follows:

0-10 units	=	Level D (at 10 units see below)
10-150 units (benzene less than 0.5 ppm)	=	Level D
150-250 units (benzene less than 0.5 ppm)	=	Level C
250 units or greater (benzene less than 0.5 ppm)	=	Level B

Monitoring Requirements

A properly calibrated PID or FID must be used to monitor exposure. At 10 units site personnel must evaluate the potential for benzene-specific exposure. The RAE Systems UltraRAE with the RAE-SEP benzene tubes (see RAE Systems Guide TN-127) is the PID of choice as cross-sensitivities are eliminated or greatly minimized. The LOP identified above may be used provided benzene exposures remain below 0.5 ppm.

An alternative, but less accurate procedure using colorimetric chemical detector tubes (Draeger benzene 0.5/c or equivalent tube) may be used to quantify benzene concentration. If less than 0.5 ppm, continue with LOP as above.

RAE-SEP tube or colorimetric tube readings must be made and documented at 60 minute (maximum) intervals during exposure situations when the PID/FID readings are 10 units or greater.

If benzene exposures are equal to, or greater than 0.5 ppm, compliance with FLD 54 and OSHA's Benzene standard (29 CFR 1910.1028) is required.

For Level C operations, a full-face air-purifying respirator must be used. Cartridges must be changed at end or service life or at no greater than 4-hour periods.

All air monitoring needs to be conducted within the employee's breathing zone.

ATTACHMENT D
HAZARD COMMUNICATION PROGRAM

SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM

Location-Specific Hazard Communication Program/Checklist

To ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will use this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communication Program as a means of meeting site- or location-specific requirements.

While responsibility for activities within this document reference the WESTON Safety Officer (SO), it is the responsibility of all personnel to effect compliance. Responsibilities under various conditions can be found within the WESTON Written Hazard Communication Program.

To ensure that information about the dangers of all hazardous chemicals used by WESTON are known by all affected employees, the following Hazard Communication Program has been established. All affected personnel will participate in the Hazard Communication Program. This written program, as well as WESTON's Corporate Hazard Communication Program, will be available for review by any employee, employee representative, representative of OSHA, NIOSH, or any affected employer/employee on a multi-employer site.

☒ Site or other location name/address: Marshall/Enbridge ER/ 455 Leggitt Road, Marshall, MI (Command center)

☒ Site/Project/Location Manager: Dan Capone

☒ Site/Location Safety Officer: Various (check site personnel listed above and verify at the beginning of each 12 hour shift.

☒ List of chemicals compiled, format: ☒ HASP ☐ Other: _____

☒ Location of MSDS files: HASP

☐ Training conducted by: Name: _____ Date: _____

☐ Indicate format of training documentation: ☐ Field Log: ☐ Other: _____

☐ Client briefing conducted regarding hazard communication: _____

☐ If multi-employer site (client, subcontractor, agency, etc.), indicate name of affected companies:

_____

☐ Other employer(s) notified of chemicals, labeling, and MSDS information: _____

☐ Has WESTON been notified of other employer's or client's hazard communication program(s), as necessary? ☐ Yes ☐ No

List of Hazardous Chemicals

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or placed in a centrally identified location with the MSDSs. Further information on each chemical may be obtained by reviewing the appropriate MSDS. The list will be arranged to enable cross-reference with the MSDS file and the label on the container. The SO or Location Manager is responsible for ensuring the chemical listing remains up-to-date.

Container Labeling

The WESTON SO will verify that all containers received from the chemical manufacturer, importer, or distributor for use on-site are clearly labeled

The SO is responsible for ensuring that labels are placed where required and for comparing MSDSs and other information with label information to ensure correctness.

Material Safety Data Sheets (MSDSs)

The SO is responsible for establishing and monitoring WESTON's MSDS program for the location. The SO will ensure that procedures are developed to obtain the necessary MSDSs and will review incoming MSDSs for new or significant health and safety information. He/she will see that any new information is passed on to the affected employees. If an MSDS is not received at the time of initial shipment, the SO will call the manufacturer and have an MSDS delivered for that product in accordance with the requirements of WESTON's Written Hazard Communication Program.

A log for, and copies of, MSDSs for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDSs will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or the designated alternate. When a revised MSDS is received, the SO will immediately replace the old MSDS.

Employee Training and Information

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees

At the time of initial assignment for employees to the work site, or whenever a new hazard is introduced into the work area, employees will attend a health and safety meeting or briefing that includes the information indicated below

- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee's work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, nonroutine tasks to be performed (if any).
- Chemicals within unlabeled piping (if any).

Hazardous Nonroutine Tasks

When employees are required to perform hazardous nonroutine tasks, the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may use during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee, and emergency procedures.

Chemicals in Unlabeled Pipes

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee will contact the SO, at which time information as to the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and the safety precautions that should be taken will be determined and presented.

Multi-Employer Work Sites

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of the SO and the Site Manager to obtain information about hazardous chemicals used by other employers to which WESTON employees may be exposed. WESTON's chemical listing will be made available to other employers, as requested. MSDSs will be available for viewing, as necessary.

The location, format, and/or procedures for accessing MSDS information must be relayed to affected employees.

ATTACHMENT E
AIR SAMPLING DATA SHEETS

SITE AIR MONITORING PROGRAM

Field Data Sheets

Location:

% LEL	% O_2	PID (units)	FID (units)	Aerosol Monitor (mg/m^3)	GM: Shield Probe/ Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		

Monitox (ppm)				Detector Tube(s)				

Sound Levels (dBA)	Illumination	pH	Other	Other	Other	Other	Other

Location:

% LEL	% O_2	PID (units)	FID (units)	Aerosol Monitor (mg/m^3)	GM: Shield Probe/ Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		

Monitox (ppm)				Detector Tube(s)				

Sound Levels (dBA)	Illumination	pH	Other	Other	Other	Other	Other

AIR MONITORING/SAMPLING DATA LOG

Client:	W.O. No.:	Sample No.:
Address:	**Sampled By:**	**Date:**

Employee and Location Information

Employee Name:	Employee No.:	Job Title:

Respirator	☐ APR ☐ ½ Mask ☐ Full Face ☐ PAPR ☐ ½ Mask ☐ Full Face ☐ Hood ☐ SAR ☐ ½ Mask ☐ Full Face ☐ Hood ☐ SCBA	Manufacturer:	Cartridge Type:

PPE: ☐ Hard Hat ☐ HPD ☐ Gloves ☐ Safety Shoes ☐ Coveralls ☐ Other:

Sampling Data

Sampling Type: ☐ Personal ☐ TWA ☐ STEL ☐ Area ☐ Source ☐ Full Shift ☐ Partial Shift ☐ Grab	Media:	Pump Type/Serial No.: /
Calibrator/Serial No.: /	Pre-Calibration: 1. 2 3 avg-pre:	Post-Calibration: 1. 2 3. avg-post:

Start Time:	Restart Time:	Restart Time:	Avg. Flowrate:	% Change:
1st Stop Time:	2nd Stop Time:	3rd Stop Time:	Total Time:	Volume:

Multiple Samples for this TWA:	Multiple Chemical Exposures:	Exposure Time:
☐ Yes ☐ No	☐ Yes ☐ No	☐ Normal ☐ Worst Case

Sampling Conditions

Weather Conditions: Temp: R.H: B.P.: Other:

Engineering Controls:

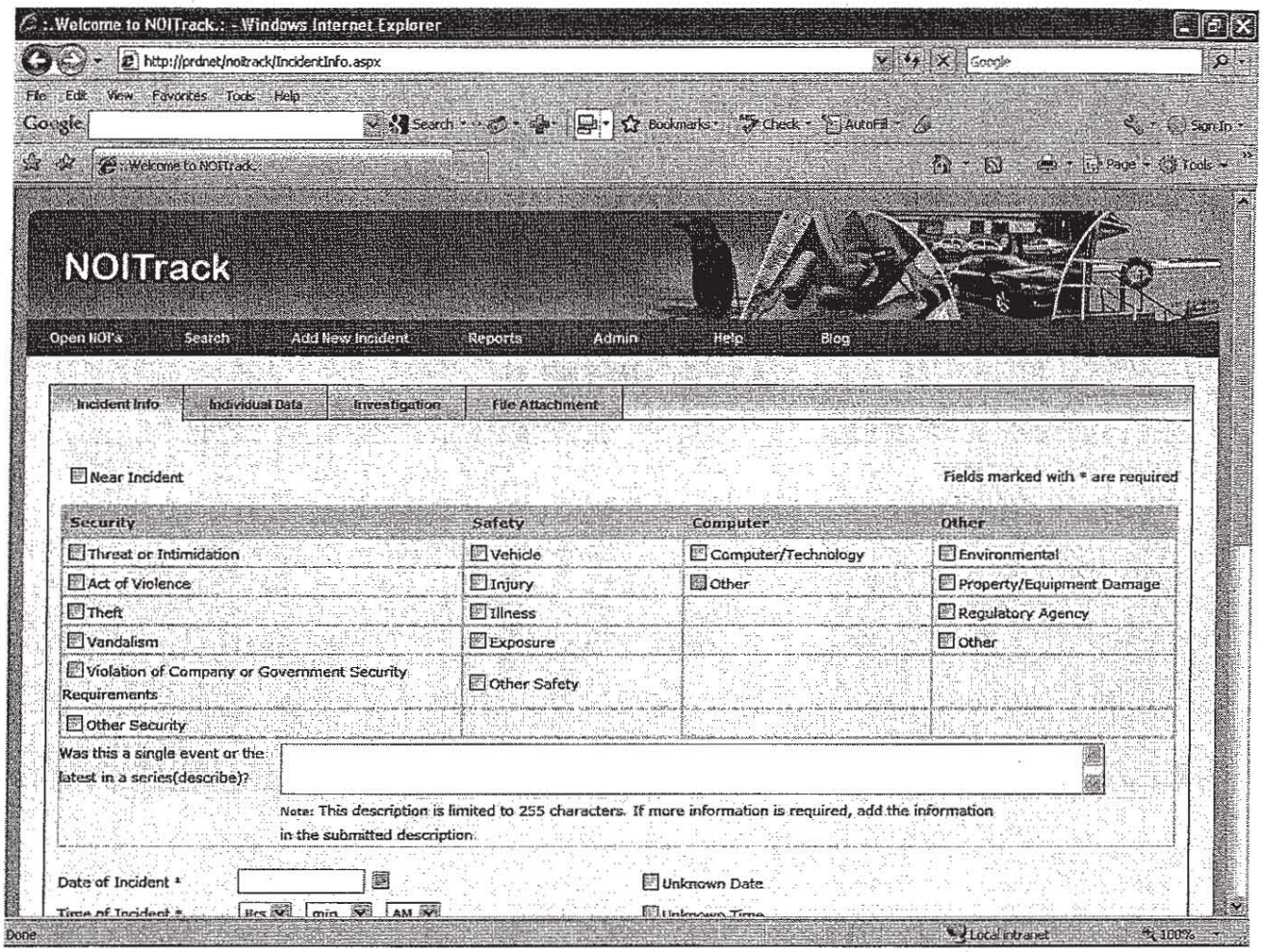
Substances Evaluated

Substance	Result	Substance	Result	Substance	Result

Observations and Comments

QA by: _____ **Date:** _____

ATTACHMENT F
INCIDENT REPORTING



Please go to NOITrack using the following link to complete incident reporting. If you are in the field and do not have access to NOITrack, please contact someone in your office to do the reporting for you.

http://prdnet/noitrack/IncidentInfo.aspx

Questions can be directed to Susan Hipp-Ludwick at 610.701.3046 or Matt Dillon at 610.701.3667

ATTACHMENT G
AHA CHECKLIST AND ENVIRONMENTAL COMPLIANCE

HAZARD CHECKLIST Site Manager/EHS Officer:
Date:
Location: Manistique River and Harbor Site
Address: Manistique, MI

Task Team (name or reference via daily sign-in sheet)

HAZARDS IDENTIFIED (check those applicable)

	Chemical		Biological		Physical		Aerial lifts		Remote Areas
☒	Flammable/combustible	☒	Insects	☒	Noise	☐	Man. Material Handling	☐	Materials handling
☐	Corrosive	☒	Animals	☒	Heat	☐	Demolition	☐	High Pressure Washers
☐	Oxidizer	☒	Plants	☐	Cold	☐	Excavation	☒	Hand and Power Tools
☒	Reactive	☐	Mold/Fungus	☒	Inclement Weather	☐	Pile Driving	☐	Low Illumination
☐	Toxic	☐	Viral/Bacterial	☐	Hot Work	☐	Welding/Cutting/Burn	☐	Drilling & Boring
☒	Inhalation	☐	Density Gauges	☐	Confined Spaces	☐	Hot Surfaces	☐	Striking against/Struck-by
☒	Eyes/Skin	☐	Radiological	☐	Stored hazardous Energy	☐	Hot Materials	☐	Caught-in/Caught between
☐	Pesticides	☐	Ultra-Violet	☐	Elevation	☒	Rough Terrain	☐	Pushing/pulling
☐	Carcinogen	☒	Sunlight	☐	Utilities	☐	Compressed Gases	☒	Falls at same level
☐	Asbestos	☐	Infrared	☐	Machinery	☐	Hazardous Mat. Storage	☐	Falls from elevation
☐	Lead	☐	Lasers	☐	Mobile equipment	☐	Diving	☐	Repetitive motion
☐	UXO/OE/ CWM	☐	XRF	☐	Cranes	☒	Operation of Boats	☐	High (>110v) Electricity
☐	Process Safety	☐	Isotopes	☐	Manual Material Handling	☒	Working Over Water	☐	Slippery surface Ice/Snow
☐	Applying Paint/Coatings	☐		☐	Ladders	☐	Traffic	☐	
☐		☐		☐	Scaffolding	☐	Site Security	☐	

REQUIRED PROTECTION (check those applicable)

	Engineering Controls		Administrative Control		PPE				Contingency
☐	Guard Rails	☐	Qualified for task	☐	Air Supplying Respirator	☒	Tyvek coveralls	☐	Emergency Signal Known
☐	Machine Guards	☐	Trained/Certified	☐	Air Purifying Respirator	☐	Coated Coveralls	☐	Eye wash/shower Location
☐	Sound Barriers	☐	Hot Work Permit	☐	SCBA	☐	Welding leathers	☒	First Aid Kit Location
☐	Enclosure	☐	CSE Permit	☒	Hard Hat	☐	CWM	☒	Fire Extinguisher Location
☐	Elevation	☐	Lockout/Tag Out	☒	Ear Plugs	☒	Safety Shoes/Boots	☐	Spill Kit Location
☐	Isolation	☐	Work Permit	☐	Ear Muffs	☐	Rubber Boots	☐	Severe weather shelter
☐	GFCI	☐	Dig Safe Permit	☒	Safety Glasses	☒	Gloves	☐	Evacuation Routes
☐	Assured Ground Program	☐	Contingency Plan	☐	Goggles	☐	Cooling Suits		
☐	Apply Anti-slip/skid Mat	☐	Critical Lift Plans	☐	Chemical Goggles	☐	Ice Vests		
		☐	Equip. Inspection Sheets	☐	Face Shield	☐	Radiant heat Suits		
				☐	Thermal Shield	☐	Fall Arrest		
				☐	Welding Mask	☒	PFD		
				☐	Cutting Glasses	☐	Electrical insulation		

Any Modification to Tasks (list)	Other tasks or activities that may affect my activity	Reasons for any changes indicated above

Environmental Compliance Considerations:

☐	Generation of Hazardous Waste*	☐	→Waste Identification & Manifesting - Marking, Placarding, Labeling
☐	Generation of Investigation Derived Waste*	☐	→Training & Licensing for Use of Radioactive Materials/Sources
☐	Treatment, Storage, or Disposal of Hazardous Waste*	☐	→ Containers: dated, labeled, closed, full, stored less than 90 days
☐	Contingency to prevent or contain hazardous materials or oil spills or discharges to drains, body of water, soil*	☐	→ Risk of explosion or catastrophic release due to chemical storage or processing involving reactivity, flammables, solvents or explosives
☐	Disturbing of Asbestos Containing Materials (ACM)*	☐	→Training & Licensing for Asbestos Remediation Activities
☐	Application of Pesticides or Herbicides*	☐	
☐	Work on Above or Under-ground Storage Tanks*	☐	
☐	Transportation, Storage or Disposal of Radioactive Material*	☐	
☐	Activities producing or generating Air Emissions (or fugitive "fence-line" emissions) requiring either monitoring and/or permit*	☐	
☐	Excavations, Drilling, Probing or other activities that could impact underground utilities, pipelines, sewer or treatment systems.	☐	
☐	Shipment of Hazardous Waste off-site* Shipment of Samples in accordance with DOT/IATA	☐	

* Indicates need for an environmental compliance plan.

ATTACHMENT H
TRAFFIC CONTROL PLAN

NOT NEEDED

ATTACHMENT I
AUDIT FORMS

Insert documents on following page.

ATTACHMENT J
ENVIRONMENTAL HEALTH & SAFETY INSPECTION CHECKLIST

ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST

Project Name: _____

Inspector: _____

Submit to: _____

Date: _____

ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST

THE WESTON SITE APPEARANCE

YES	NO		COMMENT
☐	☐	Is the site secured to prevent inadvertent, unnecessary, or unauthorized access? Are gates closed and locked at any time that the access point is not occupied or visible to site workers?	
☐	☐	Are access points posted with signs to indicate client and end-user client name, WESTON's name and logo, names of other contractors and sub-contractors, project name and location, and appropriate safety messages?	
☐	☐	Are required postings in place (e.g., Labor Poster, Emergency Phone Numbers, Site Map, etc.)?	
☐	☐	Are site trailers tied down per local code and provided with stairs that have a landing platform with guard and stair railings?	
☐	☐	Is a Site Safety file system established in the office to maintain records required by applicable safety regulations	
☐	☐	Is the Health and Safety Plan (HASP) or Accident Prevention Plan (APP) amended as scope of work changes, hazards are discovered or eliminated or if risk change?	
☐	☐	Is the Site Safety Plan and the Safety Officers Field Manual on site?	
☐	☐	Is new employee indoctrination provided?	
☐	☐	Have site Rules been provided, discussed and signed off on by all employees	
☐	☐	Incident Reporting procedure explained to all?	
☐	☐	Is site management trained in the WESTON (and client as applicable) Incident Reporting system?	
☐	☐	Are NOI and Supplemental Report forms and OSHA 300 Log available on site?	
☐	☐	Is Site Management aware of the Case Management and Incident Investigation Procedures?	
☐	☐	Is there a list of preferred provider medical facilities available?	
☐	☐	Has the "Inspection By A Regulatory Agency" procedure been reviewed by all site management?	
☐	☐	Will Competent Persons be required because of activities to be performed, equipment to be used or hazards to be encountered?	

POLICIES

YES	NO		COMMENT
☐	☐	Each individual employee is aware that he or she responsible for complying with applicable safety requirements, wearing prescribed safety equipment and preventing avoidable accidents.	
☐	☐	Do employees understand that they will wear clothing suitable for existing weather and work conditions and the minimum work uniform will include long pants, sleeved work shirts, protective footwear, hard hat, and safety glasses unless otherwise specified via the HASP.	
☐	☐	Are employees provided safety and health training to enable them to perform their work safely ? Is all training documented to indicate the date of the session, topics covered, and names of participants?	
☐	☐	Safety meetings are conducted daily. The purpose of the meetings are to review past activities, review pertinent tailgate safety topics and establish safe working procedures for anticipated hazards encountered during the day.	
☐	☐	Training has been provided to all personnel regarding handling of emergency situations that may arise from the activity or use of equipment on the project.	
☐	☐	Employees/contractors are informed and understand that they may not be under the influence of alcohol, narcotics, intoxicants or similar mind-altering substances at any time. Employees found under the influence of or consuming such substances will be immediately removed from the job site.	
☐	☐	Site workers and operators of any equipment or vehicles are able to read and understand the signs, signals and operating instructions of their use.	
☐	☐	Have contractors performing work provided copies of relevant documentation (such as medical fit-for-duty, training certificates, fit-tests, etc.) prior to initiation of the project?	

SANITATION
29 CFR 1926 Subparts C, D. EM 385-1-1, Section 2

YES	NO		COMMENT
☐	☐	Is an adequate supply of drinking water provided. Is potable/drinking water labeled as such? Are there sufficient drinking cups provided?	
☐	☐	Is there a sufficient number of toilets?	
☐	☐	Are washing facilities readily available and appropriate for the cleaning needs?	
☐	☐	Are washing facilities kept sanitary with adequate cleansing and drying materials?	
☐	☐	Waste is secured so as not to attract rodents, insects or other vermin?	
☐	☐	Is an effective housekeeping program established and implemented?	

ACCIDENT PREVENTION SIGNS, TAGS, LABELS, SIGNALS, AND PIPING SYSTEM IDENTIFICATION
29 CFR 1926 Subpart G. EM 385-1-1, Section 8

YES	NO		COMMENT
☐	☐	Are signs, tags, and labels provided to give adequate warning and caution of hazards and instruction/directions to workers and the public?	
☐	☐	Are all employees informed as to the meaning of the various signs, tags and labels used in the workplace and what special precautions are required?.	
☐	☐	Are construction areas posted with legible traffic signs at points of hazard?	
☐	☐	Are signs required to be seen at night lighted or reflectorized?	
☐	☐	Tags contain a signal word ("danger" or "caution") and a major message to indicate the specific hazardous condition or the instruction to be communicated to the employee. Tags follow requirements as outlined in 29 CFR 1926.200.	

MEDICAL SERVICES AND FIRST AID
29 CFR 1926 Subparts C, D. EM 385-1-1, Section 3

YES	NO		COMMENT
☐	☐	Is a local medical emergency facility (LMEF) identified in the HASP or APP?	
☐	☐	Has the LMEF been visited to verify the directions and establish contacts?	
☐	☐	Has site management reviewed WESTON's incident management procedures?	
☐	☐	Have clinics and specialists that will help WESTON manage injuries and illnesses been identified?	
☐	☐	Is there at least two (2) people certified in First Aid and CPR?	
☐	☐	Are first aid kits available at the command post and appropriate remote locations?	
☐	☐	Are first Aid Kits and Eyewash/Safety Showers inspected weekly?	
☐	☐	Are 15 minute eyewash/safety showers in place if required.	

FIRE PREVENTION AND PROTECTION
29 CFR 1926 Subpart F. EM 385-1-1, Section 9

YES	NO		COMMENT
☐	☐	Is an Emergency Response and Contingency Plan in place?	
☐	☐	Are emergency phone numbers posted?	
☐	☐	Are fire extinguishers selected and provided based on the types of materials and potential fire classes in each area.	
☐	☐	Are fire extinguishers provided in each administrative and storage trailer, within 50 ft but no closer than 25 ft of any fuel or flammable liquids storage, on welding and cutting equipment, on mechanical equipment?	
☐	☐	Are fire extinguishers checked daily and inspected monthly?	
☐	☐	Do site personnel know the location of fire extinguishers and how to use them?	
☐	☐	Are flammable and combustible liquids stored in approved containers?	
☐	☐	Safety cans are used for dispensing flammable or combustible liquids in 5 gallon or less volumes.	
☐	☐	Are flammable and combustible liquids stored in flammable storage cabinets or appropriate storage areas?	
☐	☐	Are flammable materials separated from oxidizers by at least 20 feet (or 5 foot tall, ½ -hour rated fire wall) when in storage?	
☐	☐	Are fuel storage tanks double walled or placed in a lined berm?	
☐	☐	Spills are cleaned up immediately and wastes are disposed of properly.	
☐	☐	Combustible scrap, debris and waste material (oily rags) are stored in closed metal containers and disposed of promptly.	
☐	☐	Vehicle fueling tanks are grounded and bonding between the tank and vehicle being fueled is provided?	
☐	☐	LPG is stored, handled and used according to OSHA regulations 29 CFR 1926.	
☐	☐	LPG cylinders are not stored indoors.	
☐	☐	Is a hot work permit program in place? See WESTON FLD-36	
☐	☐	Is smoking limited to specific areas, prohibited in flammable storage areas and are signs posted to this effect?	

HAZARDOUS SUBSTANCES, AGENTS AND ENVIRONMENTS
29 CFR 1926 Subparts D, Z. EM 385-1-1, Sections 6, 28

YES	NO		COMMENT
☐	☐	Are operations, materials and equipment evaluated to determine the presence of hazardous contaminants or if hazardous agents could be released in the work environment?	
☐	☐	Are MSDS for substances made available at the work-site when any hazardous substance is procured, used, or stored?.	
☐	☐	Are all containers and piping containing hazardous substances labeled appropriately?	
☐	☐	Is there an inventory of hazardous substances?	
☐	☐	Is there a site Specific Hazard Communication Program?	
☐	☐	Spill kits appropriate for the hazardous materials present are on site and their location is known to spill responders.	
☐	☐	Is disposal of excess hazardous chemicals performed according to WESTON's guidelines and RCRA regulations.	
☐	☐	Before initiation of activities where there is an identified asbestos or lead hazard, is there a written plan detailing compliance with OSHA and EPA asbestos or lead abatement requirements? Does the plan comply with state and local authority, and USACE requirements, as applicable?	
☐	☐	Are personnel trained and provided with protection against hazards from animals, poisonous plants and insects?	

PERSONAL PROTECTIVE AND SAFETY EQUIPMENT, RESPIRATORY AND FALL PROTECTION
29 CFR 1926 Subparts D, E, M. EM 385-1-1, Section 5

YES	NO		COMMENT
☐	☐	Do employees understand that the minimum PPE is hard hat, safety glasses with side shields and safety shoes or boots and that long pants and a sleeved shirt are required?	
☐	☐	Has the SSHC reviewed the PPE requirements in the HASP against actual site conditions and certified that the PPE is appropriate? (see Field Manual, PPE Program)	
☐	☐	PPE is inspected, tested and maintained in serviceable and sanitary condition as recommended by the manufacturer. Is defective or damaged equipment taken out of service and repaired or replaced?	
☐	☐	Are workers trained in the use of the PPE required?	
☐	☐	Are personnel exposed to vehicular or equipment traffic, including signal persons, spotters or inspectors required to vests or apparel marked with a reflective or high visibility material?	
☐	☐	Is there a noise hazard? If yes, hearing protection will be required.	
☐	☐	Is there a splash or splatter hazard? Face shields or goggles will be required.	
☐	☐	Will personnel be working in or over water? Personnel Floatation devices will be required.	
☐	☐	Is there a welding hazard? Welding helmet and leathers will be required. Is there a cutting torch hazard? Goggles and protective clothing will be required.	
☐	☐	Is each person on a walking/working surface with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level protected from falling by the use of guardrail systems, safety net systems or personal fall arrest systems? See WESTON FLD 25 (Note General Industry standard is four feet).	
☐	☐	Guardrail systems are used as primary protection whenever feasible. Guardrail construction meets criteria in 29 CFR 1926.502(b).	
☐	☐	Personal fall arrest systems (PFAS) are inspected and appropriate for use.	
☐	☐	Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses are from synthetic fibers.	
☐	☐	Safety nets and safety net installations are constructed, tested and used according to 29 CFR 1926.502.c	
☐	☐	Is respirator use required? See WESTON Respiratory Protection Program	
☐	☐	Persons using respiratory protection have been successfully medically cleared, trained and fit tested.	
☐	☐	Respirators are used according to the manufacturer's instructions, regulatory requirements, selection criteria and health and safety plan provisions.	
☐	☐	For Level C operations with organic vapor contamination, is the cartridge change-out schedule documented?	
☐	☐	Is breathing certified as Grade D, or better, and certification available on-site?	

ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST

MACHINERY AND MECHANIZED EQUIPMENT
29 CFR 1926 Subparts N, O. EM 385-1-1, Sections 16, 17, 18

YES	NO		COMMENT
☐	☐	Are inspections of machinery by a competent person established?	
☐	☐	Is equipment inspected daily before its next use?	
☐	☐	Equipment inspection reports are reviewed, followed-up on negative findings and records of inspections are maintained?	
☐	☐	Machinery or equipment found to be unsafe is taken out of service until the unsafe condition has been corrected.	
☐	☐	Is there a preventive maintenance program established?	
☐	☐	Are operators of equipment qualified and authorized to operate?	
☐	☐	Is all self-propelled construction and industrial equipment equipped with a reverse signal alarm?	
☐	☐	Are seats or equal protection provided for each person required to ride on equipment. Are seatbelts installed and worn on motor vehicles, as appropriate.	
☐	☐	All equipment with windshields is equipped with powered wipers. If fogging or frosting is possible, operable defogging or defrosting devices are required.	
☐	☐	Internal combustion engines are not operated in enclosed areas unless adequate ventilation are made. Air monitoring is conducted to assure safe working conditions.	
☐	☐	Is each bulldozer, scraper, dragline, crane, motor grader, front-end loader, mechanical shovel, backhoe, or similar equipment equipped with at least one dry chemical or carbon dioxide fire extinguisher with a minimum rating of 5-B:C?	
☐	☐	Will cranes or other lifting devices be used? If so, are the following documents available on site: 1) a copy of the operating manual, 2) load rating chart, 3) log book, 4) a copy of the last annual inspection and 5) the initial on-site inspection?	
☐	☐	Do operators have certificates of training to operate the type of crane(s) to be used?	
☐	☐	Is a signal person provided when the point of operation is not in full view of the vehicle, machine or equipment operator? When manual (hand) signals are used, is only one person designated to give signals to the operator?	
☐	☐	Signal persons back one vehicle at a time. While under the control of a signal person, drivers do not back or maneuver until directed. Drivers stop if contact with the signal person is lost.	
☐	☐	Is a critical lift plan prepared by a competent person whenever: a lift is not routine, or a lift exceeds 75% of a crane's capacity, a lift results in the load being out of the operator's line of sight, or a lift involves more than one crane, a man basket is used, or the operator believes there is a need for a critical lift plan.	
☐	☐	Fork Lifts (Powered Industrial Trucks) - Will forklifts be used on site?	
☐	☐	All fork lifts meet the requirements of design, construction, stability, inspection, testing, maintenance and operation as indicated in ANSI/ASME B56.1 Safety Standards for Low Lift and High Lift Trucks.	
☐	☐	Do forklift operators have certificates of training?	
☐	☐	Are pile driving operations conducted according to EM 385-1-1, Section 16.L?	
☐	☐	Is drilling equipment operated, inspected, and maintained as specified in the manufacturer's operating manual? Is a copy of the manual available at the work-site? See also the Drilling Safety Guide in the Safety Officers Field Manual.	
☐	☐	Are flag persons provided when operations or equipment on or near a highway expose workers to traffic hazards? Do flag persons and persons working in proximity to a road wear high visibility vests? Are persons exposed to highway vehicle traffic protected by signs in all directions warning of the presence of the flag persons and the work? Do signs and distances from the work zone conform to federal and local regulations?	

ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST

MOTOR VEHICLES
29 CFR 1926 Subpart O. EM 385-1-1, Section 18

YES	NO		COMMENT
☐	☐	Motor vehicle operators have a valid permit, license, or certification of ability for the equipment being operated.	
☐	☐	Inspection, maintenance and repair is according to manufacturer's requirements by qualified persons.	
☐	☐	Vehicles are inspected on a scheduled maintenance program.	
☐	☐	Vehicles not in safe operating condition are removed from service until defects are corrected.	
☐	☐	Glass in windshields, windows, and doors is safety glass. Any cracked or broken glass is replaced.	
☐	☐	Seatbelts are installed and worn.	
☐	☐	The number of passengers in passenger-type vehicles does not exceed the number which can be seated.	
☐	☐	Trucks used to transport personnel have securely anchored seating, a rear endgate, and a guardrail.	
☐	☐	No person is permitted to ride with arms or legs outside of a vehicle body; in a standing position on the body; on running boards; seated on side fenders, cabs, cab shields, rear of the truck or on the load.	
☐	☐	ATV operators possess valid state drivers license, have completed an ATV training course prior to operation of the vehicle, and wear appropriate protective equipment such as helmets, boots, and gloves.	

EXCAVATING AND TRENCHING
29 CFR 1926 Subpart P. EM 385-1-1, Section 25

YES	NO		COMMENT
☐	☐	Has the known or estimated location of utility installations such as sewer, telephone, fuel, electric, water lines, or any other underground installations that may be expected to be encountered during excavation been determined before excavation? Have utility locations been verified by designated state services according to state regulations? Has the client provided clearance where state jurisdiction doesn't apply?	
☐	☐	Have overhead utilities in excavation areas been identified and either de-energized, shielded or barricaded so excavating equipment will not come within 10 feet?	
☐	☐	Are inspections of the excavation, the adjacent areas, and protective systems made daily and as necessary by a competent person?	
☐	☐	Are Protective systems in place as prescribed by the competent person?	
☐	☐	Is material removed from excavations managed so it will not overwhelm the protective systems?	
☐	☐	Are barriers provided between excavations and walkways?	
☐	☐	Are excavations by roadways barricaded to warn vehicles of presence or to prevent them from falling in?	
☐	☐	Is there a means of exit from the excavation every 25 feet?	
☐	☐	Is air monitoring required? If yes, Is it performed?	

CONFINED SPACES
29 CFR 1910 Subpart J. EM 385-1-1, Section 6

YES	NO		COMMENT
☐	☐	Is there a Confined Space Entry Program in place?	
☐	☐	Are the confined Spaces identified and labeled?	
☐	☐	Will the Confined Spaces be entered?	
☐	☐	Is appropriate entry documentation used and on-file?	

ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST

ELECTRICAL
29 CFR 1926 Subpart K. EM 385-1-1, Section 11

YES	NO		COMMENT
☐	☐	Are electrical installations made according to the National Electrical Code and applicable local codes?	
☐	☐	Qualified electricians make all connections and perform all work within 10 feet of live electric equipment.	
☐	☐	Location of underground, overhead, under floor, behind wall electrical lines is known and communicated. Lines are documented by qualified person as de-energized where necessary.	
☐	☐	Workers understand they must not work near live parts of electric circuits, unless they are qualified as required by OSHA or are protected by de-energizing and grounding the parts, guarding the parts by insulation, or other effective means?	
☐	☐	Employees who regularly work on or around energized electrical equipment or lines are instructed in the cardiopulmonary resuscitation (CPR) methods.	
☐	☐	Workers are prohibited from working alone on energized lines or equipment over 600 volts.	
☐	☐	Are Ground-fault circuit interrupters (GFCI's) or is ground fault circuit protection provided to protect employees from ground-fault hazards for all 115 – 120 Volt, 15 and 20 amp receptacle outlets which are not a part of the permanent wiring of a building or structure at construction sites?	
☐	☐	Circuit breakers are labeled.	
☐	☐	Circuit breaker and all cabinets with exposed electric conductors are kept tightly closed.	
☐	☐	Unused openings (including conduit knockouts) in electrical enclosures and fittings are closed with appropriate covers, plugs or plates.	
☐	☐	Sufficient access and working space is provided and maintained about all electrical equipment to permit ready and safe operations and maintenance.	
☐	☐	Motors are located within sight of their controllers or controller disconnecting means are capable of being locked in the pen position or is a separate disconnecting means installed in the circuit within sight of the motor.	
☐	☐	Are visual inspections of extension cords and cord-and plug-connected equipment conducted daily? Is equipment found damaged or defective tagged and removed from service, and not used until repaired?	
☐	☐	Wet Areas - Is portable lighting used in wet or conductive locations, such as tanks or boilers operated at no more than 12 volts and protected by GFCIs.	
☐	☐	Are electrical installations in hazardous areas to NEC?	
☐	☐	Metal ladders and tools including tape measures or fabric with metal thread are prohibited where contact with energized electrically parts is possible.	
☐	☐	All extension cords are the three-wire type, designed and rated for hard or extra hard usage?	
☐	☐	Worn or frayed electrical cords or cables are taken out of service. Fastening with staples, hanging from nails or suspending extension cords by wire is prohibited.	
☐	☐	Electric wire/flexible cord passing through work areas is protected from damage such as foot traffic, vehicles, sharp corners, projections and pinching? Flexible cords and cables passing through holes are protected by bushings or fittings?	
☐	☐	Before an employee or contractor performs any service or maintenance on a system where the unexpected energizing, start up, or release of kinetic or stored energy could occur and cause injury or damage, the system is to be isolated. Only authorized persons may apply and remove lockouts and tags.	
☐	☐	Contractors planning to use hazardous energy control procedures submit their hazardous energy control plan to the WESTON site safety officer or designee before implementing lockout/tagout procedures.	
☐	☐	There is a site specific hazardous energy control plan that clearly and specifically outlines the scope, purpose, authorization, rules and techniques to be used for the control of hazardous energy.	
☐	☐	Workers possess the knowledge and skills required for the safe application, usage and removal of energy controls.	

WELDING AND CUTTING
29 CFR 1926 Subpart J. EM 385-1-1, Section 10

YES	NO		COMMENT
☐	☐	Prior to performing welding, cutting or any other heat or spark producing activity, an assessment of the area is made by a competent person to identify combustible materials and potential sources of flammable atmospheres.	
☐	☐	Welders, cutters and their supervisors are trained in the safe operation of their equipment, safe welding and cutting practices, hot work permit requirements, and fire protection.	
☐	☐	Welding and cutting equipment is inspected daily before use. Unsafe equipment is taken out of use, replaced or repaired.	
☐	☐	Workers and the public is shielded from welding rays, flashes, sparks, molten metal and slag.	
☐	☐	Employees performing welding, cutting or heating are protected by PPE appropriate for the hazards (e.g., respiratory, vision and skin protection).	
☐	☐	Compatible fire extinguishing equipment is provided in the immediate vicinity of welding or cutting operations.	
☐	☐	Drums, tanks, or other containers and equipment which have contained hazardous materials shall be thoroughly cleaned before welding or cutting. Cleaning shall be performed in accordance with NFPA 327, Cleaning or Safeguarding Small Tanks and Containers, ANSI/AWS F4.1, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, and applicable health and safety plan requirements.	

HAND AND POWER TOOL SAFETY
29 CFR 1926 Subpart I. EM 385-1-1, Section 13

YES	NO		COMMENT
☐	☐	Power tools are from a manufacturer listed by a nationally recognized testing laboratory for the specific application for which they are to be used.	
☐	☐	Hand & power tools are inspected, maintained, tested and determined to be in safe operating condition before use.	
☐	☐	Tools found to be unsafe are not used, tagged and repaired or destroyed.	
☐	☐	Users of tools are trained in safe use.	
☐	☐	Electrical tools have cords and plug connections in good repair.	
☐	☐	Electrical tools are effectively grounded or approved double insulated.	
☐	☐	Reciprocating, rotating, and moving parts of equipment are guarded if they may be accessed by employees or they otherwise create a hazard.	
☐	☐	Safety clips/retainers are installed and maintained on pneumatic impact tool connections.	
☐	☐	Chain saws have an automatic chain brake or anti-kickback device.	
☐	☐	Pneumatic and hydraulic hoses and fittings are inspected regularly.	
☐	☐	Employees who operate powder actuated tools are trained and carry valid operators cards.	
☐	☐	Powder activated tools are stored in individual locked containers, when not in use and are not loaded until ready to use.	
☐	☐	Powder actuated tools are inspected for obstructions or defects daily before use.	
☐	☐	Powder actuated tool operators have appropriate PPE.	

RIGGING
29 CFR 1926 Subpart H. EM 385-1-1, Section 15

YES	NO		COMMENT
☐	☐	Rigging equipment is inspected as specified by the manufacturer, by a qualified person, before use on each shift and as necessary to assure that it is safe.	
☐	☐	Defective equipment is removed from service.	
☐	☐	Rigging not in use is removed from the work area, properly stored, and maintained in good condition.	
☐	☐	Wire rope removed from service for defects is cut up or plainly marked as unfit for use as rigging.	
☐	☐	The number of saddle clips used to form eyes in wire rope conforms with Table H-20, are spaced evenly and the saddles are on the live side.	
☐	☐	Chain rigging has a tag clearly indicating load limits, is inspected before initial use, then weekly, and is of alloyed metal.	
☐	☐	Fiber rope rigging is not used if it is frozen or has been subject to acids or excessive heat.	
☐	☐	Slings and their fittings and fastenings are inspected before use on each shift and as needed during use.	
☐	☐	Drums, sheaves, and pulleys on rigging hardware are smooth and free of surface defects that can damage rigging.	

MATERIAL HANDLING, STORAGE, AND DISPOSAL
29 CFR 1926 Subpart H. EM 385-1-1, Section 14

YES	NO		COMMENT
☐	☐	Employees are trained in and use safe lifting techniques.	
☐	☐	Materials are not moved or suspended over workers unless positive precautions have been taken to protect workers.	
☐	☐	Conveyors are constructed, inspected, & maintained by qualified persons according to manufacturer's recommendations.	
☐	☐	All conveyors are to be equipped with emergency stopping devices.	
☐	☐	Hazardous exposed moving machine parts are guarded mechanically, electrically or by location.	
☐	☐	Controls are clearly marked and/or labeled to indicate the function controlled.	
☐	☐	Taglines are used for suspended loads where the movement may be hazardous to persons.	
☐	☐	Material in storage is protected from falling or collapse by effective stacking, blocking, cribbing, etc.	
☐	☐	Walkways and aisles are to be kept clear.	
☐	☐	Materials are not stored on scaffolds or runways in excess of normal placement or in excess of safe load limits.	
☐	☐	Work areas and means of access are maintained safe and orderly.	
☐	☐	Tools, materials, extension cords, hoses or debris do not cause tripping or other hazards.	
☐	☐	Storage and construction sites are kept free from the accumulation of combustible materials.	
☐	☐	Waste materials and rubbish are placed in containers or, if appropriate, in piles. Waste materials are disposed of in accord with applicable local, state, or federal requirements.	

FLOATING PLANT AND MARINE ACTIVITIES
29 CFR 1926 Subpart O. EM 385-1-1 Section 19

YES	NO		COMMENT
☐	☐	Floating plants that are regulated by the USCG have current inspections and certificates.	
☐	☐	Before any floating plant is brought to the job site and placed in service it is inspected and determined to be in safe operating condition	
☐	☐	Periodic inspections are made such that safe operating conditions are maintained. Strict compliance with EM 385-1-1, Section 19 is expected.	
☐	☐	Plans are in place for removing or securing the plant and evacuation of personnel endangered by severe weather and other marine emergencies such as; fire, flooding, man overboard, hazardous materials incidents, etc..	
☐	☐	Means of access are properly secured, guarded, and maintained free of slipping and tripping hazards.	
☐	☐	Dredging operations follow guidelines as established in EM 385-1-1, Section 19.D.	

PRESSURIZED EQUIPMENT AND SYSTEMS
29 CFR 1926 Subparts I, F. EM 385-1-1, Section 20

YES	NO		COMMENT
☐	☐	Pressurized equipment and systems are inspected before being placed into service.	
☐	☐	Pressurized equipment or systems found to be unsafe are tagged "Out of Service-Do Not Use".	
☐	☐	Systems and equipment are operated, inspected and maintained by qualified, designated personnel.	
☐	☐	Safe clearance, lockout/tagout procedures are followed as appropriate during maintenance or repair.	
☐	☐	Air hose, pipes, fittings are pressure-rated for the activity. Defective hoses are removed from service.	
☐	☐	Hoses aren't laid over ladders, steps, scaffolds, or walkways in a manner that creates a tripping hazard.	
☐	☐	The use of compressed air for personal cleaning is prohibited. The use of compressed air for other cleaning is restricted to less than 30 psig.	
☐	☐	Compressed gas cylinders are stored in well-ventilated locations.	
☐	☐	Cylinders in storage are separated from flammable or combustible liquids and from easily ignitable materials by at least 40 feet or by a minimum five feet tall, ½-hour fire resistive partition.	
☐	☐	Stored cylinders containing oxidizing gases are separated from fuel gas cylinders by at least 20 feet or by a minimum five feet tall, ½-hour fire resistive partition.	
☐	☐	Cylinder valve caps are in place when cylinders are in storage, in transit, or a regulator is not in place.	
☐	☐	Compressed gas cylinders in service are secured in substantial fixed or portable racks or hand trucks.	
☐	☐	Oxygen cylinders and fittings are kept away from, and free from oil and grease.	
☐	☐	Cylinder Storage areas are posted with the names of the gases in storage and with signs indicating "No Smoking or Open Flame".	
☐	☐	Cylinders are to be stored such that mechanical and corrosion damage is avoided. Cylinders are not to be stored in areas required as an egress path.	
☐	☐	Cylinders may be stored in the open outdoors, however, they must be protected from the ground to prevent corrosion and must be protected from temperatures that may exceed 125 degrees F.	

WORK PLATFORMS/SCAFFOLDS
29 CFR 1926 Subparts L, M, N. EM 385-1-1 Sections 21, 22

YES	NO		COMMENT
☐	☐	Work platforms are erected, used, inspected, tested, maintained and repaired according to manufacturer's requirements.	
☐	☐	Construction, inspection, and disassembly of scaffolds is under the direction of a competent person.	
☐	☐	Workers on scaffolding have been trained by a qualified person.	
☐	☐	Scaffolds are erected on a firm and level surface and are square and plumb.	
☐	☐	Scaffolds are not loaded in excess of rated capacity.	
☐	☐	Working levels of work platforms are fully planked or decked.	
☐	☐	Planks are in good condition and free from obvious defects.	
☐	☐	Fabricated frame scaffolding four times higher than the base width is secured to building/structure according to manufacturer's instruction and/or OSHA requirements.	
☐	☐	Working platforms of scaffolding over ten feet in height have guard rails meeting OSHA specifications. Fall protection is suggested at four feet or greater.	
☐	☐	Scaffolding/work platforms are accessed by means of a properly secured ladder or equivalent. Built on ladders conform to scaffold ladder requirements. Climbing of braces is not allowed.	
☐	☐	Crane supported work platforms are designed and used in accordance with OSHA standards.	
☐	☐	Elevating work platforms are operated, inspected and maintained according to the equipment operations manual.	
☐	☐	Employees working in aerial lifts remain firmly on the floor of the basket. Employees use fall protection while in an aerial lift basket.	

WALKING AND WORKING SURFACES AND STAIRS
29 CFR 1926 Subparts L, M, X. EM 385-1-1, Sections 21, 22, 24

YES	NO		COMMENT
☐	☐	Work areas are clean, sanitary, and orderly	
☐	☐	Work surfaces are kept dry or appropriate means are taken to assure the surfaces are slip-resistant	
☐	☐	Accumulations of combustible dust are routinely removed.	
☐	☐	Aisles and passageways are kept clear and marked as appropriate.	
☐	☐	There is safe clearance for walking in aisles where motorized or mechanical handling equipment is operating.	
☐	☐	Materials or equipment is stored in such a way that sharp projections will not interfere with the walkway.	
☐	☐	Changes of direction or elevation are readily identifiable.	
☐	☐	Aisles or walkways that pass near moving or operating machinery, welding operations or similar operations are arranged so employees will not be subjected to potential hazards.	
☐	☐	Standard guardrails are provided wherever aisle or walkway surfaces are elevated more than 30 inches above any adjacent floor or the ground and bridges provided where workers must cross over conveyors and similar hazards.	
☐	☐	There are standard stair rails or handrails on all stairways having four or more risers or with an elevation of 30 or more inches.	
☐	☐	Stairways are at least 22 inches wide. (General Industry Standard)	
☐	☐	Stairs angle no more than 50 and no less than 30 degrees, risers are uniform from top to bottom (plus or minus 1/4 inch) and are provided with a surface that renders them slip resistant.	
☐	☐	Stairway handrails are not less than 36 inches above the leading edge of stair treads and have at least 3 inches of clearance	

		between the handrails and the wall or surface they are mounted on.	
☐	☐	Where doors or gates open directly on a stairway, there is a platform provided so the swing of the door does not reduce the width of the platform to less than 20 inches.	
☐	☐	Where stairs or stairways exit directly into any area where vehicles may be operated, there are adequate barriers and warnings provided to prevent employees stepping into the path of traffic.	
☐	☐	Signs are posted showing the load capacity of elevated storage areas.	
☐	☐	An appropriate means of access and egress is provided for surfaces with 19 or more inches of elevation change.	
		Material on elevated surfaces is minimized, with that necessary for immediate work requriements piled, stacked or racked in a manner to prevent it from tipping, falling, collapsing, rolling or spreading.	

FLOOR AND WALL HOLES AND OPENINGS
29 CFR 1926 Subpart M. EM 385-1-1, Section 24

YES	NO		COMMENT
☐	☐	Floor and roof openings that persons can walk into or fall through are guarded by a physical barrier or covered.	
☐	☐	Holes (defined as equal to or greater than 2 inches in least dimension) where person could trip must be covered/protected.	
☐	☐	Unprotected sides and edges on a walking/working surface six feet or more (note four feet in General Industry) are protected by guardrail system, safety net or Personal Fall Arrest System (PFAS).	
☐	☐	Unused portions of service pits and pits not actually in use are either covered or protected by guardrails or equivalent.	
☐	☐	Coverings for holes or other openings must be constructed of sufficient strength to support any anticipated load, must be secured in place to prevent accidental removal or displacement and must be marked indicating purpose (e.g., stenciled "Hole" or painted contrasting color to surroundings).	

LADDERS
29 CFR 1926 Subpart X. EM 385-1-1, Section 21

YES	NO		COMMENT
☐	☐	Portable ladders are used for their designed purpose only.	
☐	☐	Portable ladders are examined for defects prior to, and after use.	
☐	☐	Ladders found to be defective are clearly tagged to indicate "DO NOT USE" if repairable, or destroyed immediately if no repair is possible.	
☐	☐	Workers are trained in hazards associated with ladder use and how to inspect ladders.	
☐	☐	Ladders have secure footing provided by a combination of safety feet, top of ladder tie-offs and mud cills or a person holding the ladder to prevent slipping.	
☐	☐	The handrails of a straight ladder used to get from one level to another extend at least 36 inches above the landing.	
☐	☐	Ladders conform to construction criteria of ANSI Standards A-14.1 and A-14.2.	
☐	☐	Wooden ladders are not painted with an opaque covering such that signs of flaws, cracks or drying are obscured.	
☐	☐	Fixed ladders are constructed and used according to OSHA Standards, 29 CFR 1910.27 and ANSI A-14.3.	
☐	☐	Rungs, cleats or steps, and side rails that may be used for handholds when climbing, offer adequate gripping surface and are free of splinters, slivers or burrs, and substances that could cause slipping.	
☐	☐	Fixed ladders of greater than 24 feet have cages or other approved fall protection devices. (note General Industry is 20 feet).	
☐	☐	Where fall protection is provided by ladder safety systems (body belts or harnesses, lanyards and braking devices with safety lines or rails), systems meet the requirements of and are used in accordance with WESTON Fall Protection Standard Practices and are compatible with construction of the ladder system.	

DEMOLITION
29 CFR 1926 Subpart T. EM 385-1-1, Section 23

YES	NO		COMMENT
☐	☐	Prior to initiating demolition activities an engineering survey (by a competent person) and a demolition plan (by a competent person) is completed.	
☐	☐	All employees engaged in demolition activities are instructed in the demolition plan.	
☐	☐	It has been determined through the engineering survey and outlined in the plan, if any hazardous materials, or conditions (e.g., asbestos, lead, utility connections, etc.) exist. Such hazards are controlled or eliminated before demolition is started.	
☐	☐	Continued inspections, by a competent person, are conducted to ensure safe employee working conditions.	

TREE MAINTENANCE AND REMOVAL
29 CFR 1910 Subpart R. EM 385-1-1, Section 31

YES	NO		COMMENT
☐	☐	Tree maintenance or removal is done is under the direction of a qualified person.	
☐	☐	Tree work, in the vicinity of charged electric lines, is by trained persons qualified to work with electricity and tree work. Appropriate distances are maintained for all workers who are not qualified.	
☐	☐	Equipment is inspected, maintained, repaired and used in accordance with the manufacture's directions.	
☐	☐	Prior to felling actions are planned to include clearing of the area to permit safe working conditions and escape.	
☐	☐	Employees must be trained in the safe operation of all equipment.	
☐	☐	All equipment and machinery is inspected and determined safe prior to use.	
☐	☐	Work is performed under requirements of FLD 43.	

BLASTING
29 CFR 1926 Subpart U. EM 385-1-1, Section 29

YES	NO		COMMENT
☐	☐	A blasting safety plan is developed prior to bringing explosives on-site.	
☐	☐	The transportation, handling, storage, and use of explosives, blasting agents, and blasting equipment must be directed and supervised by a person with proven experience and ability in blasting operations. Licensing of person is verified.	
☐	☐	Blasting operations in or adjacent to cofferdams, piers, underwater structures, buildings, structures, or other facilities must be carefully planned with full consideration to potential vibration and damage.	

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE AND UNDERGROUND STORAGE TANK (UST) ACTIVITIES
29 CFR 1926 Subpart D. EM 385-1-1, Section 28

YES	NO		COMMENT
☐	☐	All construction activities performed with known or potential exposure to hazardous waste are conducted in accordance with Hazardous Waste Operations and Emergency Response requirements.	

CONCRETE and MASONRY CONSTRUCTION
29 CFR 1926 Subpart Q. EM 385-1-1, Section 27

YES	NO		COMMENT
☐	☐	Construction loads are not placed on a concrete or masonry structure or portion of a concrete or masonry structure unless the employer determines, based on information from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.	
☐	☐	Employees are not permitted to work above or in positions exposed to protruding reinforcing steel or other impalement hazards unless provisions have been made to control the hazard.	
☐	☐	Sections of concrete conveyances and airlines under pressure are secured with wire rope (or equivalent material) in addition to the regular couplings or connections.	
☐	☐	Structural and reinforcing steel for walls, piers, columns, and similar vertical structures is supported and/or guyed to prevent overturning or collapse	
☐	☐	All form-work, shoring, and bracing is designed, fabricated, erected, supported, braced, and maintained so it will safely support all vertical and lateral loads that may be applied until the loads can be supported by the structure.	
☐	☐	Shoring equipment is inspected prior to erection to determine that it is specified in the shoring design. Any equipment found to be damaged is not used.	
☐	☐	Erected shoring equipment is inspected immediately prior to, during, and immediately after the placement of concrete. Any shoring equipment that is found to be damaged, displaced, or weakened is immediately reinforced or re-shored.	
☐	☐	Shoring, vertical slip forms and jacks conform with requirements of Section 27.B.08-13 of USACE EM 385-1-1.	
☐	☐	Forms and shores (except those on slab or grade and slip forms) are not removed until the individual responsible for forming and/or shoring determines that the concrete has gained sufficient strength to support its weight and all superimposed loads.	
☐	☐	Precast concrete members are adequately supported to prevent overturning or collapse until permanent connections are complete	
☐	☐	No one is permitted under pre-cast concrete members being lifted or tilted into position except employees required for the erection of those members.	
☐	☐	Lift slab operations are planned and designed by a registered engineer or architect.	
☐	☐	Hydraulic jacks used in lift slab construction have a safety device that causes the jacks to support the load in any position if the jack malfunctions	
☐	☐	No one is permitted under the slab during jacking operations.	
☐	☐	A limited access zone is established whenever a masonry wall is being constructed.	
☐	☐	Fall protection is provided to masonry workers exposed to falls of 6 feet or more.	

STEEL ERECTION
29 CFR 1926 Subpart R. EM 385-1-1, Section 27

YES	NO		COMMENT
☐	☐	Impact wrenches have a locking device for retaining the socket. Containers shall be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.	
☐	☐	Structural and reinforcing steel for walls, piers, columns, and similar vertical structures shall be guyed and supported to prevent collapse	
☐	☐	No loading is placed upon steel joists until all bridging is completely and permanently installed.	
☐	☐	Workers are provided fall protection whenever they are exposed to falls of 1.8 m (6 ft) or more (EM 385-1-1).	
☐	☐	Temporary flooring in skeleton steel erection conforms with Section 27.F of USACE 385-1-1	

ROOFING
29 CFR 1926 Subpart M. EM 385-1-1, Sections 21, 22, 24, 27

Yes	No		Comments
☐	☐	In the construction, maintenance, repair, and demolition, of roofs, fall protection systems is provided that will prevent personnel from slipping and falling from the roof and prevent personnel on lower levels from being struck by falling objects	
☐	☐	On all roofs greater than 4.8 m (16 ft) in height, a hoisting device, stairways, or progressive platforms are furnished for supplying materials and equipment.	
☐	☐	Roofing materials and accessories that could be moved by the wind, including metal roofing panels, that are on the roof and unattached are secured when wind speeds are greater than, or are anticipated to exceed, 10 mph.	
☐	☐	Level, guarded platforms are provided at the landing area on the roof.	
☐	☐	When their use is permitted, warning line systems comply with USACE Section 27.07 of EM 385-1-1.	
☐	☐	Workers involved in roof-edge materials handling or working in a storage area located on a roof with a slope -/= to four vertical to twelve horizontal and with edges 6 ft or more above lower levels are protected by the use of a guardrail, safety net, or personal fall arrest system along all unprotected roof sides and edges of the area.	

ENVIRONMENTAL COMPLIANCE

Yes	No		Comments
☐	☐	Environmental Compliance and Waste Management Plan on file.	
☐	☐	Waste Determination Made.	
☐	☐	Manifest and/or Shipping Papers prepared and filed.	
☐	☐	Manifest Exception Reports Prepared, as necessary. Procedures to track manifests in place.	
☐	☐	State Annual and EPA Biennial Reporting Information Available.	
☐	☐	RCRA Personnel Training Records on file.	
☐	☐	CAA Permits on file.	
☐	☐	CWA Permits on file.	
☐	☐	RCRA Permits on file.	
☐	☐	State and/or Local Permits on file.	
☐	☐	RCRA Inspections conducted and Documentation on file.	
☐	☐	Transporter and TSD compliance information on file.	
☐	☐	Waste Accumulation Areas Managed Properly.	
☐	☐	Wetlands Areas Identified and Protected.	
☐	☐	Endangered, Threatened or Special Concern Species or Areas Identified and Protective Methods Determined.	
☐	☐	Runon and Runoff Concerns Identified and Managed.	
☐	☐	Adjacent Land Areas Protected as Necessary.	
☐	☐	Non-Hazardous Solid Wastes Managed Properly.	

MISCELLANEOUS REGULATORY and POLICY COMPLIANCE

Yes	No		Comments
☐	☐	Personnel Training Records for DOT Materials Handling on file.	
☐	☐	Noise Control Issues Addressed and Managed.	
☐	☐	Site Security Issues Identified and Managed.	
☐	☐	Known Historical, Archeological and Cultural Resources Identified and Managed.	
☐	☐	WESTON EHS Analysis Checklist In Use.	
☐	☐	Safety Observation and Recognition Program in place.	
☐	☐	Weekly EHS Report Card System in place.	
☐	☐	Federal, State and Local Required Postings in place.	
☐	☐	Site specific Lockout/Tagout Program is in place.	
☐	☐	Site-specific Confined Space Program is in place.	
☐	☐	Site Safety Officer filing system is in place and up to date.	

ATTACHMENT K
ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PROGRAM
IMPACT CHECKLIST

ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PROGRAM IMPACT CHECKLIST

PRE-PROPOSAL AND EHS COMPLIANCE PLANNING

1. BACKGROUND

Client name, address, phone number, and Point of Contact:

USEPA Large Lakes Research Station/ORD
USEPA Region 5 Emergency Response # 1
9311 Groh Road
Mail Code: SE-GI
Grosse Ile, MI 48138-1697

Ralph Dollhopf 231-301-0559

a. Name/Identifier of proposal, if applicable: Marshall/Enbridge ER

b. Prepared by: Breanna Bukowski

c. Project Manager (PM) Signature: Dan Capone

2. DESCRIPTION

a. Description, justification for, and location of Scope of Work in the proposal (i.e. training, activity, construction, regulation, license; include site location map):

Approximately 1to 5 million gallons of crude oil has been spilled into a creek south of Marshall, MI that discharges to the Kalamazoo River. Oil has been reported in the Kalamazoo River

b. Environmental setting and present land use of the proposed site:

The creek and Kalamazoo River are located in southwest MI, just south of Marshall, MI

3. KNOWN OR POTENTIAL EHS IMPACTS

Note that this checklist cannot completely anticipate all regulatory requirements, and that use of this checklist outlines only certain Federal criteria of specific interest (it is by no means a complete listing). State (http://www.envcap.org/statetools/srt/srt.html) and local requirements must also be evaluated.

- The **Project Manager and Project Team** are responsible for evaluating project-specific environmental, health and safety needs that may be beyond those outlined in this checklist.
- Assistance is available through the Division Environmental, Health, and Safety (EHS) Managers and Corporate EHS Department. Early engagement of EHS support is a key to success.
- **"NA"** response indicates all answers for the section are based on specific knowledge
- **"Yes"** responses will require a plan to address a specific issue. "No" responses must be based upon specific knowledge. "Unknown" responses require appropriate follow-up for confirmation.

3.1 CLEAN AIR ACT (CAA) ☒ NA

The basic purpose of the CAA is to control air pollution by instituting point source controls (fixed and/or mobile) and establishing maximum pollutant levels for the ambient air. Permits to construct and/or operate are required for sources that meet regulatory requirements. These sources include, but may not be limited to: major stationary sources, hazardous air pollution sources, and sources subject to new source performance standards.

Yes	No	Unknown	Criteria for Evaluation	Comments
			General and Miscellaneous	
☐	☐	☐	Will the project release contaminants to the air from a new or existing source of air contaminants?	
☐	☐	☐	Does the project have the potential for deterioration of air quality?	
☐	☐	☐	Will there be the introduction of smoke, suspended particles, or noxious gases/vapors (e.g., open burning, open detonation, etc.)?	
☐	☐	☐	Will there be real or potential for particulate/dust migration beyond facility/site boundaries?	
☐	☐	☐	Will WESTON own or operate a source of air emissions (e.g., air stripper, incinerator, thermal desorption system, soil vapor extraction system, fuel tanks or dispensers, electric generators, turbines) or disturb land?	
☐	☐	☐	Will WESTON own or operate an air pollution control device (e.g., scrubber, vapor-phase activated carbon system)?	
☐	☐	☐	Is fugitive emissions and/or perimeter air monitoring specified in the scope of work?	
☐	☐	☐	Has client specified air monitoring methods or real-time monitoring?	
			Prevention of Significant Deterioration (PSD) Permits (40 CFR 52)	
☐	☐	☐	Is site within an attainment area? (See 40 CFR 81 301-356).	
☐	☐	☐	Will the project involve construction or operation of a new major source with the potential to emit more than 100 tons/year for those specific listed emissions sources or 250 tons/year for all other emission sources types or a major modification of an existing major source with pollutant emission increases exceeding Prevention of Significant Deterioration (PSD) rates? (see 40 CFR 52.21(b) and/or CAA Section 169).	
			Non-Attainment Permits (40 CFR 52)	

Yes	No	Unknown	Criteria for Evaluation	Comments
☐	☐	☐	Is site within a non-attainment area? (See 40 CFR 81.301-356). If known, indicate which criteria pollutant(s) are not met.	
			New Source Performance Standards (40 CFR 60)	
☐	☐	☐	Will the project involve the release of contaminants to the air from a new or modified non-exempt source?	

			NESHAPS Standards for Air Toxics (40 CFR 61, 63) See also TSCA and OSHA	
☐	☐	☐	Will the project involve the demolition or renovation of any structure containing asbestos?	
☐	☐	☐	Will the project involve a stationary source or group of stationary sources with the potential to emit 10 or more tons per year (tpy) of a single HAP, or 25 tpy or more of multiple HAPs?	
			Accidental Release and Risk Management Planning (40 CFR 68)	
☐	☐	☐	Will the project involve storage and/or use of any chemical listed under 40 CFR 68.115 at or greater than its Threshold Planning Quantity (TPQ)?	
			Operating Permits (40 CFR 70, 71)	
☐	☐	☐	Will the project involve obtaining any permit as required under the CAA?	
			Reduction in Use of Ozone Depleting Substances (40 CFR 82)	
☐	☐	☐	Will site tasks involve repair, maintenance or decommissioning of objects containing ozone depleting substances (e.g., air conditioning/heat pump/refrigeration systems)?	

State-Specific Requirements

As with many environmental regulations, States may have specific and/or additional regulations and laws associated with air and air quality. Remember to evaluate State and/or Local requirements.

3.2 CLEAN WATER ACT ☐ NA

The stated objective of the Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's water by regulating discharges of pollutants into water bodies. Major requirements to plan for include; point source discharges, stormwater discharges, pretreatment prior to sewer system discharge, spill prevention and response, and wetland modification and/or dredge and fill activities.

Yes	No	Unknown	Criteria for Evaluation	Comments
			General and Miscellaneous	
☒	☐	☐	Will the project location involve fresh water, marine environment, ground water impact or other?	
☐	☒	☐	Will the project involve impact to water movement (e.g., construction of dam)?	
☐	☒	☐	Will the project involve any change in the quantity and/or quality of ground water?	
☒	☐	☐	Is there any potential for spills of hazardous materials/substances/wastes that could subsequently impact water quality (surface or ground)?	Spill of crude oil has already occurred
☒	☐	☐	Will the project involve any impact to wetlands or floodplains?	Crude oil spilled could impact wetlands or floodplains
☐	☐	☒	Is the project in a well head protection area?	
☐	☒	☐	Will there be any injection of waste materials into the ground?	
☐	☒	☐	Will unimproved roads or new haul roads be required?	
☐	☒	☐	Will the project involve a change in topography at the site?	
☐	☒	☐	Will the project create an increase in wind or water erosion of soils (either on or off-site)?	
			NPDES Point Source Discharge Permit (40 CFR 122)	
☐	☒	☐	Will the project involve a point source discharge into surface water?	
			Stormwater Discharge Permit (40 CFR 122.26)	
☐	☒	☐	Will the project involve an industrial facility with potential for stormwater discharges to surface water or to a storm sewer system?	
☐	☒	☐	Will the project involve the disturbance of one or more acres of land?	
			Pretreatment Requirements (40 CFR 403)	
☐	☒	☐	Will there be a discharge (e.g , process water, groundwater, cooling water) to a sewer authority or public sewer system? (Do not include proper connections from domestic-type sources such as toilets or kitchens).	
			Discharge of Oil and SPCC Plans (40 CFR 110, 112)	
☐	☒	☐	Will oil or petroleum products be stored at the site/operation?	
☐	☒	☐	Will the storage capacity of oil or petroleum products exceed 1320 gallons in above ground storage (include only containers equal to or larger than 55 gallons), or 42000 gallons underground?	
			Wetlands Modification and/or Dredge and Fill Requirements (40 CFR 230-233)	

Yes	No	Unknown	Criteria for Evaluation	Comments
☐	☒	☐	Will the project involve excavation in or the discharge or dredge or fill material into water or wetlands?	
☐	☒	☐	Will the project involve site clearing, or dredging or filling on/near water or wetlands?	

State Requirements

As with many environmental regulations, States have specific regulations and laws associated with water protection and quality. Remember to evaluate State and/or Local requirements.

3.3 SAFE DRINKING WATER ACT (SDWA) ☒ NA

The SDWA regulates the quality of drinking water. Requirements typically relate to providing public drinking water, waste disposal in underground injection wells and establishing criteria for CERCLA remediation.

Yes	No	Unknown	Criteria for Evaluation	Comments
Public Water Supplies and Drinking Water Standards (40 CFR 141-143)				
☐	☐	☐	Will WESTON be providing a drinking water supply to the public?	
Sole-Source Aquifer Protection (40 CFR 149)				
☐	☐	☐	Will the project involve operating a public water supply system that has 15 or more services or serves more than 25 people per day for more than 60 days per year?	
Underground Well Injection (40 CFR 144-148)				
☐	☐	☐	Will the project involve the placing of fluids into a bored, drilled, driven, or dug well?	

State Requirements

In addition to compliance (and/or more restrictive) with above Federal criteria, States are responsible for implementing and enforcing well-head protection standards.

3.4 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) ☐ NA

RCRA provides the classic "cradle-to-grave" concept for waste materials, i.e., management of the waste material from generation to final disposal. RCRA requirements apply to those who generate, transport, store and dispose of wastes. Permits and identification numbers may be required for all categories with limited exceptions.

Yes	No	Unknown	Criteria for Evaluation	Comments
Non-Hazardous Solid Wastes (40 CFR 257, 258)				

Yes	No	Unknown	Criteria for Evaluation	Comments
☒	☐	☐	Will WESTON or the site generate any non-hazardous solid wastes?	PPE and disposable sampling materials.
Universal Wastes (40 CFR 273)				
☐	☒	☐	Will WESTON or the site generate any universal wastes?	
☐	☒	☐	Will WESTON generate any hazardous wastes?	
Hazardous Wastes Generation and Management (40 CFR 260-262)				
☐	☒	☐	Will WESTON be responsible for managing hazardous wastes generated by the client?	
☐	☒	☐	Will site activities result in quantities that result in Conditionally Exempt Small Quantity Generator (CESQG), Small Quantity Generator (SQG), or Large Quantity Generator (LQG)?	
☐	☒	☐	Has on-site accumulation of waste stream (areas, containers or other device) been evaluated?	
Hazardous Waste Treatment and Disposal Permit (40 CFR 264-270)				
☐	☒	☐	Will on-site treatment of waste(s) be conducted?	
☐	☒	☐	If off-site disposal has TSDF been evaluated and accepted?	
☐	☒	☐	Will the project involve clean-up of hazardous waste or hazardous waste constituents from a RCRA-regulated facility?	
Hazardous Waste Transportation (40 CFR 263)				
☐	☒	☐	Will WESTON be responsible for preparing hazardous wastes for transportation?	
☐	☒	☐	If transporting wastes, has transporter been evaluated and accepted?	
☐	☒	☐	Will WESTON sign manifest? If yes, as Generator or as "Agent" for client?	
Underground Storage Tanks (USTs) (40 CFR 280)				
☐	☒	☐	Will WESTON activities involve the installation, use, maintenance, spill or release clean-up, or decommissioning of a UST storing petroleum or CERCLA-listed hazardous substance?	

Yes	No	Unknown	Criteria for Evaluation	Comments
Used Oil (40 CFR 279)				
☐	☒	☐	Will site activities involve the generation, storage or transportation of used/waste oil?	
Land Disposal Restrictions (40 CFR 268)				
☐	☒	☐	Will the project involve the generation of wastes meeting Land Disposal Restriction (LDR) criteria?	

State Requirements

Most States have primacy for both hazardous and non-hazardous solid waste; ensure knowledge of specific state requirements for such waste streams.

3.5 COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA) ☐ NA

CERCLA provides a mechanism to clean up uncontrolled or abandoned contaminated sites and hold potentially responsible parties accountable for clean-up costs.

Yes	No	Unknown	Criteria for Evaluation	Comments
Release Reporting (40 CFR 300.302				
☐	☒	☐	Are any of the chemicals stored or used on site listed as a hazardous substance (40 CFR 302.4)?	
☐	☒	☐	Is there a potential for an unpermitted release of a hazardous substance to the environment in excess of its 24-hour Reportable Quantity (RQ)?	
Remediation Efforts (40 CFR 300)				
☒	☐	☐	Are site remediation efforts under control of Federal Government?	
☐	☐	☐	Are site remediation efforts under control of a State or Local Government?	
☐	☒	☐	Are site remediation efforts under Private control?	

State Requirements

Many states have enacted Superfund-type programs. Although many are similar to the Federal program, others may have significant differences to include broader ranges of hazardous substances.

3.6 EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW (EPCRA) ☐ NA

EPCRA established a process for developing state and local emergency planning and information programs on hazardous chemicals located at and/or emitted from facilities. Planning requirements apply to any facility that produces, uses or stores threshold quantities or more of any substance on the EPA list

of extremely hazardous substances. There are also requirements for facilities that are required to maintain Material Safety Data Sheets (MSDSs) to notify the local fire department of those materials.

Yes	No	Unknown	Criteria for Evaluation	Comments
			General	
☒	☐	☐	Will WESTON or WESTON subcontractor have chemicals on site?	See HASP for MSDS sheets

Yes	No	Unknown	Criteria for Evaluation	Comments
Emergency Planning Notifications (40 CFR 355)				
☐	☒	☐	Do any of the chemicals used or stored on site meet the definition of a hazardous substance and meet or exceed the threshold planning quantity (TPQ) for that chemical or 500 pounds, whichever is lower? (See 40 CFR Part 355 Appendix A and B). If inventory meets criteria (material and quantity) then reports to LEPC, local Fire Department, and SERC are required. (See 40 CFR 370.21).	
Emergency Release Notifications (40 CFR 370)				
☐	☒	☐	Is there the potential for a release of listed substances (see 40 CFR 355, Appendices A and B and 40 CFR 302) that could result in exposure to persons off-site?	
Community Right to Know/Hazardous Chemical Inventory Reporting (40 CFR 370)				
☐	☒	☐	At any point in time is any chemical in a quantity at or more than 10,000 pounds that requires an MSDS?	

State Requirements

There are specific reporting and documentation requirements under EPCRA for state and local entities.

3.7 FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA) ☒ NA

The purpose of FIFRA is to protect public health and the environment from the misuse of pesticides by regulating the labeling and registration of pesticides. In addition to data necessary for the registration of pesticides sold there are requirements for the certification of applicators of those pesticides listed as restricted use.

Yes	No	Unknown	Criteria for Evaluation	Comments
Labeling and Packaging Requirements (40 CFR 156, 157)				
☐	☐	☐	Does the project involve the use or application of pesticides?	
Certification of Applicators (40 CFR 171)				
☐	☐	☐	Is the use of a licensed pesticide applicator required (use of restricted use pesticides)?	

3.8 TOXIC SUBSTANCES CONTROL ACT (TSCA) *SEE ALSO OSHA REQUIREMENTS* ☒ NA

Much of TSCA deals with the manufacture, use and distribution of chemicals in commerce with limited impact to WESTON. There are, however, management requirements (to include remediation and disposal efforts) for specific chemicals (most importantly lead-based paint, PCBs, and asbestos).

Note: A "Yes" will require an appropriate technical approach to address the toxic material and must be included within the project-specific HASP. A "No" will require appropriate documentation from the Client or their designee describing how this determination was reached. An "Unknown" will require follow-up and receipt of documentation prior to proceeding

WESTON may conduct its own survey and analysis to resolve "No" and "Unknown" responses if necessary.

Yes	No	Unknown	Criteria for Evaluation	Comments
Lead-Based Paint (40 CFR 745)				
☐	☐	☐	Has the site been evaluated for the presence of lead or lead-containing materials?	Not applicable
☐	☐	☐	Will the project involve the removal of lead-contaminated materials?	Not applicable
Polychlorinated Biphenyls (PCBs) (40 CFR 761)				
☐	☐	☐	Has the site been evaluated for the presence of PCBs or PCB-contamination?	
☐	☐	☐	Will the project involve the removal or handling of PCBs?	
Asbestos (40 CFR 762)				
☐	☐	☐	Does the site or structures contain asbestos containing material (ACM)?	Not applicable
☐	☐	☐	Will the project involve the disruption or removal of ACM?	Not applicable

3.9 NATURAL RESOURCES AND THE ENDANGERED SPECIES ACT ☐ NA

The Endangered Species Act (ESA) was passed to designate and protect fish, wildlife and plant species that are endangered or threatened as well as designate critical habitat for those species. Compliance with the ESA is required within the context of this checklist for not only necessary permits (e.g., Stormwater), but, as a means of understanding the potential environmental impact of our work efforts.

Yes	No	Unknown	Criteria for Evaluation	Comments
General				
☐	☐	☒	Is the project site in an area identified as habitat for endangered, threatened or special interest species?	Unknown at this time due to unknown extents of contamination
☐	☐	☒	Will the project result in a change in the diversity or numbers of any species of plants or animals?	Unknown at this time due to unknown extents of contamination
☐	☐	☒	Will the project result in the reduction of numbers or habitat damage to any unique, rare, threatened or endangered species of plants or animals?	Unknown at this time due to unknown extents of contamination
☐	☒	☐	Will the project result in the introduction of new species of plant or animal (including microbes, etc.)?	
☐	☒	☐	Will the project result in any barrier(s) to the migration or movement of animals?	
☐	☐	☒	Will the project result in any significant alteration, deterioration, or destruction of habitat?	Unknown at this time due to unknown extents of contamination

Yes	No	Unknown	Criteria for Evaluation	Comments
☐	☐	☒	Will the project result in the alteration, destruction, or significant impact to any environmentally sensitive areas (e.g., wetlands, floodplains, critical habitat, prime farm land, coastal zones, etc.)?	Unknown at this time due to unknown extents of contamination

Note that a location-specific understanding of the ESA is necessary for completion of applications relating to air quality permitting, stormwater permitting and potentially others.

3.10 NATIONAL ENVIRONMENTAL POLICY ACT ☒ NA

The purpose of the National Environmental Policy Act (NEPA) is to encourage harmony between man and the environment, promote efforts to prevent or eliminate damage and stimulate the health and welfare of man, and to enrich the understanding of the ecological systems and natural resources that are important to the Nation. In context, NEPA requires federal agencies to prepare an environmental impact statement covering proposed actions that could significantly affect the quality of the human environment.

Yes	No	Unknown	Criteria for Evaluation	Comments
General				
☐	☐	☐	Is the project a major Federal action, or project, or a project requiring a federal permit, receiving federal funds, or located on federal land? (NEPA)	

3.11 NOISE *(SEE ALSO OSHA REQUIREMENTS)* ☐ NA

The Noise Control Act promotes the policy that the environment is to be free of noise that jeopardizes health or welfare. While there are limited Federal/EPA regulations, there are State and Local regulations/ ordinances that are applicable to work tasks.

Yes	No	Unknown	Criteria for Evaluation	Comments
General				
☒	☐	☐	Will the project cause an increase in noise levels?	
☒	☐	☐	Is the project site near sensitive receptor populations (e.g., residences, hospitals, schools, etc.)?	
☒	☐	☐	Will site activities extend beyond typical daylight hours?	
☐	☒	☐	Are there local noise ordinances in effect?	
☐	☒	☐	Does the contract (or specifications) identify noise monitoring or other criteria?	

3.12 OCCUPATIONAL SAFETY AND HEALTH *(SPECIFICALLY 29 CFR 1910 AND 1926)* ☐ NA

The overall goal of the Occupational Safety and Health Act (OSH Act) is to assure that employees are not adversely affected to hazards that they may be exposed to in the course of employment. All work activities conducted by WESTON must comply with applicable components of the General Industry

Standards, the Construction Standards, or the applicable requirements of Client-specific criteria (e.g., the Corps of Engineers).

Yes	No	Unknown	Criteria for Evaluation	Comments
			General	
☐	☒	☐	Will project activities be conducted under OSHA Construction Standards?	
☒	☐	☐	Will project activities be conducted under OSHA General Industry Standards?	
☐	☒	☐	Will project activities be conducted under the requirements of EM 385-1-1 (USACE)?	
☒	☐	☐	Does the client have any specific occupational/safety requirements for the site work?	See PPE requirements in HASP
☐	☒	☐	Will project activities be conducted under other standards?	

Based upon site activities, location and tasks follow all applicable criteria outline in WESTON's Safety and Health requirements guidelines.

3.13 TRANSPORTATION *(SPECIFICALLY 49 CFR PARTS 171-179, 383, 390-399)* ☒ NA

Transportation in the context of this checklist typically relates to the transportation of hazardous chemicals. The Department of Transportation (DOT) has specific regulatory requirements that must be met if WESTON either conducts or oversees the preparation for transport or actual transportation of hazardous chemicals/materials designated by DOT.

Note: Security Plans are required for transporting hazardous materials in an amount that must be placarded, hazardous materials in a bulk packaging having a capacity equal to or greater than 3,500 gallons for liquids or gases or more than 468 cubic feet for solids, or a select agent or toxin regulated by the Centers for Disease Control and Prevention under 42 CFR Part 73. Contact your local Dangerous Goods Advisor for assistance.

Yes	No	Unknown	Criteria for Evaluation	Comments
			General	
☐	☐	☐	Will site activities involve the transportation (or storage incidental to transportation) of hazardous materials?	
☐	☐	☐	Will WESTON personnel be transporting hazardous materials (in any amount)?	
☐	☐	☐	Will WESTON personnel be operating vehicles meeting the definition of a commercial vehicle?	
☐	☐	☐	Will WESTON personnel be operating vehicles transporting a hazardous material in a placarded amount?	

3.14 RADIATION ☒ NA

Various regulations under the auspices of the Nuclear Regulatory Agency (10 CFR) require specific procedures for the handling, training, storage and maintenance of nuclear materials.

Yes	No	Unknown	Criteria for Evaluation	Comments
General (For the following questions indicate whether these tasks are by WESTON, Subcontractor, Client or Vendor.)				
☐	☐	☐	Will Radiation sources be used or present?	
☐	☐	☐	Will the project involve the transportation of radioactive material?	
☐	☐	☐	Will the project involve the storage of radioactive material?	
☐	☐	☐	Will the project involve the disposal of radioactive material?	
☐	☐	☐	Will the project involve the use or storage of a radioactive source (e.g., troxler gauge, XRF)?	
☐	☐	☐	Have users been properly trained and certified?	
☐	☐	☐	Are users operating under a radiation monitoring program?	
☐	☐	☐	Have rad licenses been transferred and/or the client notified of the presence of rad sources?	

Based upon site activities, location and tasks follow all applicable criteria outlined in WESTON's EHS Program.

3.15 HISTORIC/ARCHAEOLOGICAL ☒ NA

There are numerous Federal, State, Local and Tribal requirements outlining procedures to protect historic and cultural properties. These include those that exist as well as those that are discovered during work activities.

Yes	No	Unknown	Criteria for Evaluation	Comments
General				
☐	☐	☐	Is the site or project in an area that is of historic or archeological interest?	
☐	☐	☐	Will the project result in alteration or destruction of an archeological or historical site, structure, object or building that is on or eligible for inclusion in the National Register of Historic Places?	
☐	☐	☐	Will the project involve the excavation, altering, defacing, or removal of archaeological objects or resources or Native Indian graves, cairns, or glyptic records?	

Note that a location-specific understanding of historic and archaeological issues is necessary for completion of applications relating to air quality permitting, stormwater permitting and potentially others.

3.16 MISCELLANEOUS ☐ NA

The following items are included based upon information that must be evaluated for certain WESTON work criteria, for certain sites e.g., real-estate transactions, military locations and for specific hazards.

Yes	No	Unknown	Criteria for Evaluation	Comments
			General	
☒	☐	☐	Have subcontractors been screened by Procurement and an EHS Manager or Safety Officer?	
☒	☐	☐	Has a Client Services Manager (CSM), Project Manager (PM), or WESTON Officer engaged WESTON's Subcontractors using the Subcontractor Talking points?	
☐	☐	☐	Has a project Kick-off meeting been planned?	
☐	☐	☐	Will a Safety Officer or an EHS Manager be involved in the kick-off meeting?	
☒	☐	☐	Will the average work day including driving to and from the site exceed 12 hours? If yes, there must be a plan for addressing driving safety and fatigue.	
☐	☒	☐	Will project personnel be driving vehicles they are not familiar with? If yes, there must be a plan for addressing driving safety.	
☐	☒	☐	Will there be work at elevation (greater than 4 foot difference in elevations between working levels, work from ladders, work from scaffolding, use of aerial lifts, floor openings, wall openings)?	
☐	☒	☐	Will there be potential for struck by hazards (moving equipment, thrown or falling objects or material)?	
☐	☒	☐	Will there be potential for being caught in (conveyors, power-take-off, screens, etc) or between moving machinery?	
☐	☒	☐	Will there be work with or within 10 feet of exposed electrical conductors?	
☐	☒	☐	Are there overhead utilities?	
☐	☒	☐	Are there underground utilities?	
☐	☒	☐	Will the project add additional traffic volume or types (material or equipment haul trucks) that may require community approval or plans?	
☐	☒	☐	Will there be a traffic control plan for off-site and on-site vehicles?	
☐	☒	☐	Is the facility a military facility?	
☐	☒	☐	Has the potential for UXO/MEC encounter been objectively evaluated?	
☒	☐	☐	Will there be slip, trip and fall hazards	
☐	☒	☐	Will there be repetitive and or heavy lifting?	
☐	☒	☐	If demolition work has the demolition plan, engineering survey and required components been addressed?	

Yes	No	Unknown	Criteria for Evaluation	Comments
☐	☒	☐	Are there OSHA Specific Standards applicable (asbestos, lead, cadmium, arsenic, hexavalent chromium, benzene, vinyl chloride, methylene chloride, butadiene, formaldehyde, dibromochloropropane?	
☒	☐	☐	Will work be performed over or near water or boats?	PFDs will be used at all times and care will be taken not to lean on or over boat railings.
☒	☐	☐	Will boats be used?	WESTON will not operate boats under any circumstances.
☐	☒	☐	Will Lifting Equipment and rigging be used?	
☒	☐	☐	Is there a communication Plan for letting neighbors know of WESTON activities that may impact them?	

3.17 REAL ESTATE AND TENANT ISSUES ☒ NA

WESTON as an owner or operator assumes liability for actions or activities conducted by ourselves or by others (tenants). We must ensure compliance with Federal, State and Local requirements. The following outline major issues, however, as indicated previously for the EHS Checklist, it is not meant to be comprehensive. Remember, if we have tenants occupying portions of facilities that are under our control, we have an obligation to understand and assure compliance. For the following issues compliance may be by WESTON, by various tenants or a combination, ensure that each tenant is evaluated. Note that various components of the previous EHS Checklist sections may be appropriate.

Yes	No	Unknown	Criteria for Evaluation	Comments
			Air	
☐	☐	☐	Are boilers or other pressure vessels (e g , chillers, air receivers) located within our work space or at tenant locations?	
☐	☐	☐	Have they been certified and inspected?	
☐	☐	☐	Do emission sources (e.g., boilers, chillers, bulk oil storage, etc.) have proper registration (federal, state or local)?	
☐	☐	☐	Are tenants responsible for compliance with inspections and permits?	
☐	☐	☐	Is WESTON responsible for inspections and permits?	
			Occupancy and Other Permits	
☐	☐	☐	Do Business Permits/Certificate of Occupancy Requirements: State, County, City/Municipality need to be addressed? If yes, is WESTON responsible? and/or are tenants responsible?	

Yes	No	Unknown	Criteria for Evaluation	Comments
☐	☐	☐	Are Fire Code Inspections (e g , materials storage, electrical, suppression systems) due? Are Corrective Actions due from past inspections? If yes, is WESTON responsible? and/or are tenants responsible?	
☐	☐	☐	Are local permits and/or registrations for USTs or ASTs available or needed?	
			RCRA	
☐	☐	☐	Is the facility a Hazardous Waste Generator? If yes, what size? Is WESTON responsible? What is the waste stream?	
☐	☐	☐	Do tenants generate Hazardous Wastes? If yes, what quantity? What is the waste stream?	
☐	☐	☐	Are appropriate permits available for waste generation?	
☐	☐	☐	Is facility and/or are tenants under litigation or regulatory action for non-compliance with RCRA?	
☐	☐	☐	Are USTs or ASTs on site? If yes, what are type, size, contents?	
☐	☐	☐	Have USTs been upgraded for overflow and spill control protection?	
			Water and Stormwater	
☐	☐	☐	Is a stormwater permit and plan necessary for the site?	
☐	☐	☐	Is a NPDES and/or local discharge permit necessary for the site?	
			EPCRA	
☐	☐	☐	Do any of the chemicals used or stored on site meet the definition of a hazardous substance and meet or exceed the threshold planning quantity (TPQ) for that chemical or 500 pounds, whichever is lower? (See 40 CFR Part 355 Appendix A and B). If inventory meets criteria (material and quantity) then reports to LEPC, local Fire Department and SERC required. (See 40 CFR 370.21).	
☐	☐	☐	Is WESTON responsible for compliance?	
☐	☐	☐	Are Tenants responsible for compliance?	
			SPCC and Oil	
☐	☐	☐	Will oil or petroleum products be stored at the site/operation?	

Yes	No	Unknown	Criteria for Evaluation	Comments
☐	☐	☐	Will the storage capacity of oil or petroleum products exceed 1320 gallons in above ground storage (include only containers equal to or larger than 55 gallons), or 42000 gallons underground?	
☐	☐	☐	Is WESTON responsible for compliance?	
☐	☐	☐	Are Tenants responsible for compliance?	
			Compliance	
☐	☐	☐	Is the site under enforcement action for regulatory non-compliance?	
☐	☐	☐	Is any Tenant under enforcement action for regulatory non-compliance?	

3.18 EXPLOSIVES ☒ NA

Various regulations under the auspices of the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE), 27 CFR Part 55 – Commerce in Explosives and 27 CFR Part 55 the Safe Explosives Act, require specific procedures for the purchase, use, storage, handling and sale of explosives or explosive containing items. Attention to these questions will help to manage our risk when developing projects that may involve explosives or munitions.

Yes	No	Unknown	Criteria for Evaluation	Comments
			General	
☐	☐	☐	Will the project involve the handling or use of explosives or munitions that are either new or recovered (e.g. dynamite, military munitions, UXO, detonating cord, TNT, etc.)?	
☐	☐	☐	Will the project involve the storage of explosives?	
☐	☐	☐	Will the project involve the transportation of explosives?	
☐	☐	☐	Have project personnel been cleared by BATFE as either a Possessor or Responsible Party to handle explosives?	
☐	☐	☐	Will the project require a State Licensed Blaster?	
☐	☐	☐	Will WESTON's Explosives Users Permit be required to execute the project? If yes, has the UXO Service Line Manager been notified?	

3.19 SUSTAINABILITY ☐ NA

There are a wide range of options for integrating sustainability into the execution of projects, far beyond what can be incorporated into this checklist. The following are a few broad questions which are designed to stimulate thinking about how sustainable approaches could be utilized throughout project execution. A checklist of credits used in evaluating projects for LEED (Leadership in Energy and Environmental Design) could be used here in addition to the checklist below. Inclusion of an employee who is LEED AP Certified in the development of the work plan could help add other considerations, such as sustainable

sites and efficient materials and resources. See the WESTON Sustainability Portal for further details. http://westonportal/sites/sustainability/default.aspx

Yes	No	Unknown	Criteria for Evaluation	Comments
			General	
☒	☐	☐	Are there opportunities to reduce travel-related energy and environmental impacts associated with the project through such techniques as carpooling, use of videoconferencing, telecommuting or utilization of local personnel?	Car pooling and use of local personel and team subs with closer proximity to the site.
☐	☒	☐	Has consideration been given to the potential for beneficial reuse or recycling of materials that will be excavated, removed or discarded during project execution?	
☐	☒	☐	Are there opportunities to utilize alternative or renewable energy on the project, through applications such as photovoltaics (solar) or wind power for remote sensing and/or trailer power, or alternative fuel (e.g. biodiesel) for fleet vehicles or equipment?	
☒	☐	☐	Have "green" considerations been integrated into the procurement process for materials and or equipment (e.g. recycled content, energy efficiency, recyclability, minimal packaging)?	
☐	☒	☐	Are there opportunities to increase energy or water efficiency in the execution of the project through selection of appropriate equipment or technical approaches?	
☐	☒	☐	Are there opportunities to offset some of the environmental impacts of the project through purchase of carbon credits, renewable energy credits or wetlands banking?	
☐	☒	☐	Could a Community Partnering/Make-a-Difference event be coordinated or integrated with this project?	

WESTON SOLUTIONS
Restoring Resource Efficiency

DATE: August 2, 2010 **Amendment No.1**

Project: Enbridge Oil Response – Marshall, Michigan

Reason for Amendment: Additional START Activities **WO#: 20405.012.005.1154.00**

Amendment Description:

This amendment discusses updates to the original HASP (dated 7/27/10). It provides update on PPE requirements, staffing, scope updates, etc.

Task Timing and Duration:

START shifts are primarily designated as 6am to 6pm and 6pm to 6am. However, there are GIS personnel and other command staff that are working staggered shifts throughout the 24 hours per day. Work is ongoing.

Work Site Location:

The command post is located at 705 N. Marshall Road in Marshall, Michigan, at the Marshall High School. START is stationed at a work trailer in the school parking lot and at a GIS trailer in a parking lot behind the school. Personnel are at these locations 24 hours per day. Field teams are working in Marshall, Battle Creek, Galesburg, and Kalamazoo and other locations throughout Calhoun County. Work locations include along the river, Morrow Lake, the source area, residential neighborhoods, and wherever else tasked by the U.S. EPA.

Personnel:

As of August 1, 2010, personnel onsite include WESTON personnel from throughout the company and Team Subcontractors from Affiliated Researchers, Dynamac, Professional Environmental Engineers, Environmental Design International (EDI), MECx, and Global Remediaton Technology (GRT).

Personnel staffing the GIS positions and a number of admin positions do not require 40hour training. Most other positions require 40 hour, medical, etc.

Description of work to be performed:

START continues to support air monitoring operations, boom operations, boat operations (including GLNPO mudpuppy support), odor complaints, and hot spot air monitoring hot zone delineation.

Operation Conditions:

The weather for August 1 through August 10 is projected to be 81 to 88 degrees, mostly sunny with 0 to 30% change of precipitation.

SITE HEALTH AND SAFETY PLAN (HASP)
Including Environmental Protection and Sustainability Program (EPSP) Checklist

Prepared by: Breanna Bukowski	W.O. Number:	Date: 7/27/10

Project Identification Marshall/Enbridge Emergency Response
Office: Detroit, Michigan
Site Name: Marshall/Enbridge ER
Client: U.S. EPA
Work Location Address: 455 Leggett Road, Marshall, MI (command post)

Site History: Approximately 1 to 5 million gallons from a pipeline leak south of Marshall, Michigan has been released to surface water and has reached the Kalamazoo River.

Scope of Work: START field personnel, including Team Subs will conduct boating operations, sampling of surface water, soil and oil, may participate in helicopter reconnaisance operations, will support air monitoring and written and photographic documentation.

☐ Site visit only; site HASP not necessary. List personnel here and sign off below:

Regulatory Status

Site regulatory status:

CERCLA/SARA	RCRA	Other Federal Agency
☒ U S EPA	☐ U S EPA	☐ DOE
☐ State	☐ State	☐ USACE
☐ NPL Site	NRC	☐ Air Force
☒ OSHA	☐ 10 CFR 20	☐ _____

Hazard Communication (Req'd See Attachment D)
☒ 1910 ☐ 1926 ☐ State

Safety Officer Manual (Required to be On-Site)
Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

☐ Stack Test ☐ ____
☐ Air Emissions ☐ ____
☐ Asbestos ☐ ____
☐ Industrial Hygiene ☐ ____

Review and Approval Documentation

Reviewed by: SO/DEHSM/CEHS	Tonya Balla (Name Print)	Tonya Balla (Signature)	Date: 7/26/10
Environmental Compliance Advisor	(Name Print)	(Signature)	Date:
Approved by: Project Manager	Ben Maradkel (Name Print)	(Signature)	Date: 7/26/10

Hazard Assessment and Equipment Selection

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132, at the site prior to personnel beginning work, the FSO and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to CEHS Program Manual Section 5, Personal Protection Program, for guidance.)

☒ FSO	Name	Signature	Date:
☒ Site Manager	Name	Signature	Date:
☒ Project Environmental Compliance Officer	Dan Capone (Name)		Date:
☐ Dangerous Goods Shipping Coordinator	Name		Date:

Project start date: 7/26/10 End date: 8/30/10	This site HASP must be reissued/reapproved for any activities conducted after: Date: 7/26/11	Amendment date(s) 1. 2. 3. 4 5.	By:

DATE: August 2, 2010 **Amendment No.1**

Project: Enbridge Oil Response – Marshall, Michigan

Reason for Amendment: Additional START Activities **WO#: 20405.012.005.1154.00**

Amendment Description:

This amendment discusses updates to the original HASP (dated 7/27/10). It provides update on PPE requirements, staffing, scope updates, etc.

Task Timing and Duration:

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Work Site Location:

The command post is located at 705 N. Marshall Road in Marshall, Michigan, at the Marshall High School. START is stationed at a work trailer in the school parking lot and at a GIS trailer in a parking lot behind the school. Personnel are at these locations 24 hours per day. Field teams are working in Marshall, Battle Creek, Galesburg, and Kalamazoo and other locations throughout Calhoun County. Work locations include along the river, Morrow Lake, the source area, residential neighborhoods, and wherever else tasked by the U.S. EPA.

Personnel:

As of August 1, 2010, personnel onsite include WESTON personnel from throughout the company and Team Subcontractors from Affiliated Researchers, Dynamac, Professional Environmental Engineers, Environmental Design International (EDI), MECx, and Global Remediaton Technology (GRT).

Personnel staffing the GIS positions and a number of admin positions do not require 40hour training. Most other positions require 40 hour, medical, etc.

Description of work to be performed:

START continues to support air monitoring operations, boom operations, boat operations (including GLNPO mudpuppy support), odor complaints, and hot spot air monitoring hot zone delineation.

Operation Conditions:

The weather for August 1 through August 10 is projected to be 81 to 88 degrees, mostly sunny with 0 to 30% change of precipitation.

Work Crews:

Personnel are working in teams with CST personnel, CTEH, ERRs, and other contractors supporting the response.

Personal Protective Equipment:

Personnel working near the source are required to wear the following PPE: hard hat, safety glasses, safety vest, nomex, level C PPE, and safety shoes.

Field personnel on the night shift are required to wear safety vests (non-command post or GIS personnel).

Additional Monitoring Equipment:

U.S. EPAs Interscan H_2S monitors are onsite and being calibrated/used as applicable. START is also using multiRAEs and ultraRAEs.

Passive Diffusion Monitor:

CTEH, a consultant for Enbridge, is providing 3M 3500 Organic Vapor Monitors for daily use by personnel in the field. The information recorded for each monitor is:

- Monitor No. (number on the actual monitor/sample)
- Date Exposed Employee I.D.
- Sampled by Exposure time

In addition to the filling on the label on each form, a separate tracking form is also required. The forms with the monitor/sample are given to CTEH at the end of each shift. CTEH will send the monitor/sample to the lab on a daily basis. They will receive preliminary lab results the day after receipt. CTEH will reportedly receive the final validated data on day 6 and share the results. An example form is attached.

Other:

The following items are covering in the original HASP but are being stressed on a daily basis:

- Heat stress monitoring / hydration
- Safe/defensive driving to and from work locations. Personnel should be cautious in the morning when commuting due to foggy conditions.
- Bug spray / sun screen is available and should be used daily
- There have been safety concerns at other areas on the project. Personnel must work in the buddy system, especially during all night operations. Any safety concerns should be relayed to the START IC and/or shift field team leader (FTL) as soon as possible. In addition, the information should be shared at the shift changeover meetings.

SO/DSM/CHS: Tonya Balla Date: 8/1/10

FSO/Site Manager:_____ Date:_____

Project Manager:_____ Date:_____

PROJECT MI	STAGING REGION MI	WORK LOCATION _____LAND ____WATER	SAMPLE Coordinator
STAGING SITE - START Command Post – near elementary school			
COMPANY - U.S. EPA START Contractor		**SUPERVISOR (H&S Contact)**-	
TASK			
FULL NAME		**DOB** (mm/dd/yyyy)	**Current Smoker** Y or N
PHONE NUMBER		**JOB TITLE**	**Social** (last 4 digits)
SAMPLE BADGE ID/Monitor No:		**SAMPLE TYPE** - field	**Sample Oversight** - unattended
START DATE / TIME (mm/dd/yy HH:MM)			**Calculated Time** (min)
STOP TIME DATE / TIME (mm/dd/yy HH:MM)			
Comments – include work locations			

PROJECT MI	STAGING REGION MI	WORK LOCATION _____LAND ____WATER	SAMPLE Coordinator
STAGING SITE - START Command Post – near elementary school			
COMPANY - U.S. EPA START Contractor		**SUPERVISOR (H&S Contact)**-	
TASK			
FULL NAME		**DOB** (mm/dd/yyyy)	**Current Smoker** Y or N
PHONE NUMBER		**JOB TITLE**	**Social** (last 4 digits)
SAMPLE BADGE ID/Monitor No:		**SAMPLE TYPE** - field	**Sample Oversight** - unattended
START DATE / TIME (mm/dd/yy HH:MM)			**Calculated Time** (min)
STOP TIME DATE / TIME (mm/dd/yy HH:MM)			
Comments – include work locations			

PROJECT MI	STAGING REGION MI	WORK LOCATION _____LAND ____WATER	SAMPLE Coordinator
STAGING SITE - START Command Post – near elementary school			
COMPANY - U.S. EPA START Contractor		**SUPERVISOR (H&S Contact)**-	
TASK			
FULL NAME		**DOB** (mm/dd/yyyy)	**Current Smoker** Y or N
PHONE NUMBER		**JOB TITLE**	**Social** (last 4 digits)
SAMPLE BADGE ID/Monitor No:		**SAMPLE TYPE** - field	**Sample Oversight** - unattended
START DATE / TIME (mm/dd/yy HH:MM)			**Calculated Time** (min)
STOP TIME DATE / TIME (mm/dd/yy HH:MM)			
Comments – include work locations			

Material Safety Data Sheet

This material safety data sheet (MSDS) is provided as a courtesy in response to a customer request. This product is not regulated under, and a MSDS is not required for this product by the OSHA Hazard Communication Standard (29 CFR 1910.1200) because, when used as recommended or under ordinary conditions, it should not present a health and safety hazard. However, use or processing of the product not in accordance with the product's recommendations or not under ordinary conditions may affect the performance of the product and may present potential health and safety hazards.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 3M Brand Personal Difussional Air Sampling Devices
MANUFACTURER: 3M
DIVISION: Occupational Health & Environ. Safety

ADDRESS: 3M Center
St. Paul, MN 55144-1000

EMERGENCY PHONE: 1-800-364-3577 or (651) 737-6501 (24 hours)

Issue Date: • •/28/10
Supercedes Date: • •/22/04

Document Group: 09-1922-5

Product Use:
Intended Use: Monitors for detection of organic vapors

SECTION 2: INGREDIENTS

Ingredient	C.A.S. No.	% by Wt
Pigmented & Clear Molded Plastic Parts	Unknown	50 - 80
Metal parts	Unknown	15 - 40
Carbon Wafer	Unknown	1 - 5
Proprietary Chemistry	Unknown	0 - 1

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Odor, Color, Grade: Odorless, injection molded, pan shaped plastic object

General Physical Form: Solid
Immediate health, physical, and environmental hazards: This product, when used under reasonable conditions and in accordance with the 3M directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for use may affect the performance of the product and may present potential health and safety hazards.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:
No health effects are expected.

Skin Contact:
No health effects are expected.

Inhalation:
No health effects are expected.

Ingestion:
No health effects are expected.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

Not determined.

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: No need for first aid is anticipated.

Skin Contact: No need for first aid is anticipated.

Inhalation: No need for first aid is anticipated.

If Swallowed: No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	*No Data Available*
Flash Point	*No Data Available*
Flammable Limits - LEL	*No Data Available*
Flammable Limits - UEL	*No Data Available*
OSHA Flammability Classification:	Not Applicable

5.2 EXTINGUISHING MEDIA
Use fire extinguishers with class B extinguishing agents (e g., dry chemical, carbon dioxide)

5.3 PROTECTION OF FIRE FIGHTERS

Special Fire Fighting Procedures: Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA)

Unusual Fire and Explosion Hazards: No unusual fire or explosion hazards are anticipated

Note: See STABILITY AND REACTIVITY (SECTION 10) for hazardous combustion and thermal decomposition information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures:

Not applicable

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING
This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.

7.2 STORAGE
Not applicable

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS
Not applicable.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection
Not applicable.

8.2.2 Skin Protection
Not applicable.

8.2.3 Respiratory Protection

Not applicable

8.2.4 Prevention of Swallowing
Not applicable.

8.3 EXPOSURE GUIDELINES

None Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Odor, Color, Grade:	Odorless, injection molded, pan shaped plastic object
General Physical Form:	Solid
Autoignition temperature	*No Data Available*
Flash Point	*No Data Available*
Flammable Limits - LEL	*No Data Available*
Flammable Limits - UEL	*No Data Available*
Boiling point	*Not Applicable*
Vapor Density	*Not Applicable*
Vapor Pressure	*Not Applicable*
Specific Gravity	*Not Applicable*
pH	*Not Applicable*
Melting point	*No Data Available*
Solubility In Water	*Not Applicable*
Evaporation rate	*Not Applicable*
Volatile Organic Compounds	*Not Applicable*
Kow - Oct/Water partition coef	*No Data Available*
Percent volatile	*Not Applicable*
VOC Less H2O & Exempt Solvents	*Not Applicable*
Viscosity	*Not Applicable*

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid:
10.1 Conditions to avoid
None known

10.2 Materials to avoid
None known

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

Substance	Condition
Hydrocarbons	Not Specified
Carbon monoxide	Not Specified
Carbon dioxide	Not Specified

Hazardous Decomposition: Under recommended usage conditions, hazardous decomposition products are not expected Hazardous decomposition products may occur as a result of oxidation, heating, or reaction with another material.

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not applicable

CHEMICAL FATE INFORMATION

Not applicable.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose of unused product in a sanitary landfill. Disposal of the used product should be in accordance with any manner in which the product was used. Consult you federal, state and local authorities for additional information

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14:TRANSPORT INFORMATION

ID Number(s):
70-0160-2828-7, 70-0700-3214-2, 70-0700-6199-2, 70-0700-6485-5, 70-0700-7139-7, 70-0704-0567-8, 70-0706-1495-6, 70-0706-1496-4, 70-0707-9747-0, 70-0708-8989-7

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

Contact 3M for more information

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

STATE REGULATIONS

Contact 3M for more information.

CHEMICAL INVENTORIES

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Contact 3M for more information

INTERNATIONAL REGULATIONS

Contact 3M for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA Hazard Classification

Health: 0 **Flammability:** 0 **Reactivity:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification

Health: 0 **Flammability:** 0 **Reactivity:** 0 **Protection:** X - See PPE section

Hazardous Material Identification System (HMIS(r)) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS(r) ratings are to be used with a fully implemented HMIS(r) program. HMIS(r) is a registered mark of the National Paint and Coatings Association (NPCA)

Revision Changes:
Copyright was modified.
Section 9: Property description for optional properties was modified.
Section 14: ID Number Heading Template 1 was added.
Section 14: ID Number(s) Template 1 was added.
Section 2: Ingredient table was added.
Section 8: Exposure guidelines information - none - was added.
Section 10.1 Conditions to avoid heading was added.
Section 10.2 Materials to avoid heading was added.
Section 6: Environmental procedures information was added.
Section 10: Materials to avoid physical property was added
Section 10: Conditions to avoid physical property was added
Section 6: Release measures information was deleted.
Section 10: Materials and conditions to avoid physical property was deleted.

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