

3.0 RESPONSE ACTIONS

This section describes the action to take for the different types of emergencies that could arise at PMPL. Topics 3.1 – 3.11 enumerate steps to be taken for Fire Emergencies, Spills, Vessel and Gas Pipeline emergencies, beginning with initial response actions and ending with final documentation. Figure 3.1 provides a consolidated checklist to be followed during any of these emergencies. Topic 3.12 outlines steps for Bomb threats, Hostage Situations, Natural Disaster, and Medical Emergencies. Figure 3.3 provides a checklist for these types of emergencies.

3.1 INITIAL RESPONSE ACTIONS – FIRE, LEAKS, SPILLS, PNGTS

The Operation Section members of the SMT (described in Section 4.0) are the first operational responders to any type of fire, spill/leak or gas line incident at the facility. These include pipeline leak/break, tank leak/break, fire, rescue, etc. Timely implementation of these initial steps is of the utmost importance because they can greatly affect the overall response operation.

It is important to note that **these actions are intended only as guidelines**. The appropriate response to a particular incident may vary depending on the nature and severity of the incident and on other factors that are not readily addressed. Note that, **without exception, personnel and public safety is first priority**.

The first trained PMPL responder on scene will function as the Incident Commander until relieved by an authorized supervisor who will assume the role. Transfer of command will take place as more senior management respond to the incident. For response operations within the control of the Spill Management Team, the role of IC will typically be assumed and retained by Company Management. The IC also serves as the Emergency Coordinator for Hazardous Waste or Hazardous Material spills; for purposes of this plan the term Incident Commander will also mean Emergency Coordinator when the incident is a hazardous waste or hazardous materials spill.

The person functioning as **Incident Commander** during the initial response period **has the authority to take the steps necessary to control the situation and must not be constrained by these general guidelines**.

INITIAL RESPONSE ACTIONS – SUMMARY

- ◆ Personnel and Public Safety is first priority;
- ◆ Eliminate sources of ignition;
- ◆ Isolate the source of the discharge or the origin of the spill or fire (if the incident is a spill or a fire); Minimize the oil spillage;
- ◆ Make internal notifications;
- ◆ Make external notifications;
- ◆ Activate the Spill Management Team as necessary;
- ◆ Activate response contractors and other external resources as necessary;
- ◆ Monitor and control the containment and clean-up efforts.

3.1 INITIAL RESPONSE ACTIONS (cont'd)

In addition to the potential emergency events outlined in this section, PMPL has identified several “abnormal operations” that could be experienced in the pipeline facilities. The pipeline has defined the events and established procedures to identify, eliminate or mitigate the threat of worst case discharge due to these events. In compliance with 49 CFR 195.402(d), these procedures are defined in the Portland Montreal Pipe Line System Operations and Maintenance Manual.

3.1.1 Response Actions in Case of a Fire or an Explosion

It is the responsibility of the first employee on-scene (Incident Commander) to call the appropriate Fire Departments. The local or municipal Fire Departments will be called for assistance for any type of fire or explosion at all PMPL facilities

The primary objectives of Portland Montreal Pipe Line in the event of a fire/ explosion are:

Minimize the fire (area of conflagration)

When a fire is reported, the flow of oil from the pipeline must be stopped in the shortest possible time. This typically requires immediately reducing the pressure in the section of the line where the fire is occurring and stop the oil leaking from the lines if such is the case.

Rescue Injured Persons

When a fire is reported, a check must be made to determine whether there are any persons injured on the premises (see Appendix D, Evacuation Procedures). If so, a rescue plan must be developed immediately by the Emergency Response Team or the Unified Command Team as the case may be. Consult Section 3.6, Rescue for more information.

Protect the surrounding community

Attention must be given to the protection of the surrounding community. Issues such as the propagation of fire to the immediate neighbours (ex. Schools in South Portland or Shell Canada and Coastal Canada in Montreal) and emission of toxic fumes must be addressed.

Evacuation of the surrounding community, if necessary, is the responsibility of the municipal authorities (Consult Appendix D).

Protect PMPL facilities

Ultimately, all attempts should be made to minimize the loss of immovable facilities, equipment and materials giving **prime importance to the protection of personnel and of the environment**.

3.1 INITIAL RESPONSE ACTIONS (cont'd)

Unattended facilities:

An important concern is the fact that the premises are unattended at certain periods of time and that the local Fire Department could be first on site. Immediate initial response actions to be taken when a fire/explosion is first reported or observed are described in the Fire / explosion check-list.

The procedure related to **explosions** is identical to the one for fires. Nonetheless, the Incident Commander must make sure that no one has been injured by flying debris, and that no damage was caused by the debris. It is the responsibility of the Supervisor to have the area patrolled by PMPL Response Personnel, at a maximum distance of 500 metres / 550 yards from the site of the explosion, to verify the extent of the damages.

Also, if the explosion has affected an area outside of the site's property, the designated spokesperson (see Figure 4.3 or as designated by the Incident Commander) must call the local municipality in order to inform the surrounding population of the event.

North Tank Field Tank 663 and Tank 665 specific response:

Tank 663 and Tank 665 in the North Tank Field are equipped with semi-fixed firefighting foam deliver systems. The following procedure shall be utilized by Montreal Fire Services when responding to a Tank 663 or Tank 665 fire. This procedure along with D-4248 is readily available to MPLL First Responders and Montreal Fire Services in a weather proof container at the entrance gate via Avenue Broadway North as well in each equipment container. This procedure has been verified and validated using three (3) pumper trucks and Montreal Fire Services has indicated they would respond with five (5) trucks in an emergency to ensure back-up capacity. Any future required changes will be communicated and validated with Montreal Fire Services.

1. MPLL Personnel on scene or on call personnel will notify 9-1-1
2. There are two redundant manifold systems and equipment containers to allow for safe access to either tank. These manifolds and containers are identified on D-4248. Fire Response trucks shall be parked at an angle to allow for full set-up of the water hoses, foam supply hoses, and discharge nozzles.
3. Verify drain valve is closed
4. Connect the PRV to the 12-inch Fire water loop (red)
5. Connect the 5-inch flexible hose from the PRV to the Pumper
6. Connect the 2-inch rigid hose from the Foam Manifold to the educator
7. Connect the 3-inch flexible hose from the educator to the Pumper
8. Connect the 3-inch flexible hose from the Pumper to the educator
9. Connect the 5-inch flexible hose from the Pumper and to the 663 or 665 Manifold
10. Open the valves from the 12-inch Fire water loop (red)
11. Open the Gate valve
12. Start the Pumper
13. Inject the foam for 65 minutes at 3800 US Gallons per minute

3.1 INITIAL RESPONSE ACTIONS (cont'd)

3.1.2 North Tank Field specific responses; Line Break / Leak or Storage tank leak,

In both cases, O₂, explosivity (LEL), H₂S and benzene measurements must be taken in order to verify that the area is secure for response actions.

If a spill arises at the North Tank Field, two (2) submersible pumps are installed in the collection basins in order to discharge drainage water into the municipal sewer network located along Broadway North. In case of a spill or leak, oil eventually reaching the collection basin would accumulate at the water surface. Oil would not be discharged into the municipal sewer because the pump intakes are located at the bottom of the collection basin. It would be possible to transfer accumulated oil around a tank into the retention basin of an adjacent tank or towards the drainage collection basin where it could then be recovered using vacuum trucks.

3.1.3 Determination of Spill Volume and Extent

NOTE: Subsequent to the initial notifications, external communication of estimated physical volumes of a spill or leak must be cleared with the President or President's Delegate.

The volume of a spill should be determined as soon as possible in order to facilitate planning and initiate response actions. This volume will be needed to evaluate equipment and personnel needs as well as requirements for storage and disposal of recovered oil or hazardous material. A rough estimate of the spill volume should be attempted from visual observation of the oil or material on the surface of the water or on land. Estimated spill volumes should be rounded off to avoid the appearance of a precise determination.

In the event of a sizeable spill, a rough estimate of the spill's total volume provides preliminary data to plan and initiate clean-up operations. Generating this estimate early in the spill response aids in determining:

- ◆ The equipment and personnel needed;
- ◆ The amount of oil or material that may reach shorelines and/or sensitive areas;
- ◆ The requirements for temporary storage and disposal of recovered materials.

A rough estimate of spill volume can be generated from observations of the oil or hazardous material slick's size and thickness. However, in water, the appearance of oil varies with the oil type and thickness as well as ambient light conditions.

For example, slick thickness greater than 0.25 mm is preferable to obtain direct measurements of slick parameters, when feasible.

Reports of oil spills, both oral and written, should conform to the following guidelines:

1. Basic Definitions:

- Sheen The oil is visible on the water as a silvery sheen or with tints of color (rainbow colors). This is the thinnest thickness of oil.
- Dark Colors The oil is visible with dark colors; it will still have traces of the rainbow color but is not black or dark brown.

3.1 INITIAL RESPONSE ACTIONS (cont'd)

- **Black/Dark Brown** Fresh oil after the initial spreading will have a black or very dark brown color. This is the greatest thickness of non-emulsified oil.
- **Mousse** This is a water-in-oil emulsion, which is often orange to rust colored. It is very thick and viscous and may contain about 30% of oil.

2. Spill Factors

The factors given in the table below will be used to estimate the volume of oil contained in the spill unless a more accurate amount is known by other means. These factors should be compared whenever possible to volumes estimated from the source of the spill, for example, piping volume, sump volume, tank capacity, or compartment size. Exact calculations of the volume of a spill are not possible by visual observation of the oil on the surface of the water or on land. For this reason, the spill volumes should be rounded off to avoid the appearance of a very accurate determination.

Appearance of Oil (This gives the thickness of oil)	Assumed Thickness mm	Factor	
		Gallons/ Sq. Yd	BBL/ Sq. Nautical Miles
Sheen (silvery or with colors)	0.0003	0.000066	6.3
Dark Colors	0.002	0.00044	42
Black/Dark Brown	0.1	0.022	2100
Mousse (Note: 30% Oil)	1.0	0.066	6300

3. Estimating Procedures

Estimate dimensions (length and width) of each part of the spill in yards/meters or nautical miles (2,000 yards) for each of the four appearances that may be observed in the spill. Multiply length times width to calculate area covered by sheen, by dark colors, by black/brown oil, and by mousse.

Multiply each of the areas calculated in step (a) by the appropriate factor from the Spill Factor Table. Add the individual parts together.

The answer is the estimated volume of the spill in gallons or in barrels of oil. This volume is to be reported and entered on the accident report form (consult Appendix H). Spills that are calculated to be less than one gallon should be reported as "less than one gallon", rather than the decimal amount. Round off the volume to the nearest gallon or 0.1 barrel for spills less than 7 barrels. For spills larger than 7 barrels, round off to the nearest barrel or to no more than two significant Figures (i.e., 637 barrels would be reported as 640 barrels). Generally, any volume less than one barrel should be reported in gallons.

3.1 INITIAL RESPONSE ACTIONS (cont'd)

3.1.4 Toxicity of Hydrogen Sulfide

Portland Montreal Pipe Line transports oil containing hydrogen sulfide (H₂S). Any crude oil having an odor resembling the smell of "rotten eggs" should be suspected of containing H₂S and appropriate safety precautions should be implemented. However, it should be noted that the **sense of smell is not an adequate indicator of the presence of H₂S as at high concentration and with time, the odor will no longer be perceptible.**

The following list gives some characteristics of hydrogen sulfide.

- ◆ Highly toxic, flammable, and colorless gas;
- ◆ Heavier than air, will accumulate in low areas such as man holes, ditches, or other low lying areas;
- ◆ Detectable by smell only at low concentrations, higher concentrations can deaden the sense of smell;
- ◆ Can cause respiratory paralysis, sudden collapse and death.

Figure 3.5 contains the MSDS for Hydrogen Sulfide (from the PMPL MSDS Subscribed Solutions web site).

3.1.5 Emergency Operations Center (EOC)

When a crude-oil leak is discovered, it is important to set up an EOC as quickly as possible. This center enables the involved organizations (PMPL, municipalities, provincial, state and federal agencies or others, depending on the situation) to exchange information and plan their response according to the available resources and concerns of each party. The checklist following will help to establish quickly an EOC, in terms of logistics requirements. This EOC must be set up as close as possible to the site of the operations for an easier and more efficient information exchange.

The EOC's location must also be chosen according to the extent of the oil leak. For example, if a minor leak whose damaging effects are limited to the vicinity of the pipeline, the command center should be set up as close as possible to the pipelines.

The EOC may also be set up in a hotel or a municipal center in the area, depending on the extent of the oil slick. Generally, municipalities have access to command centers already equipped with the appropriate material. PMPL could make an arrangement with a municipality in order to use its command center during an emergency.

In the case of a major leak, spreading of the operations along the river should be planned. It would therefore be best to choose the EOC location downstream from the leak.

3.1 INITIAL RESPONSE ACTIONS (cont'd)

Emergency Operation Center - Checklist

Material Required

Most Recent Copy of the Emergency Response Plan

Blank Forms

Computer (s) and Printer (s)

Telephones

Faxes (incoming and outgoing) with refill paper

Photocopiers

Tables and Chairs

Maps (road, topographical, marine, etc.)

Camera and Video camera (to record the event and the operations)

Television and VCR/DVD (to view news bulletins and other televised information)

AM/FM Radio and Audio Recorders

Office Supplies

Log Books for each Responders

Other: _____

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3.2 STABILIZATION OF EMERGENCY SITE

Once the emergency phase of the response has been initiated and the response operations stabilized, the continuing response operations will be prioritized in such a way as to minimize the release volume and the extent of the impacted area while maintaining adequate responder and public safety. Repairs to the pipeline system that primarily serve to isolate the release source and prevent release of additional product shall take precedence over repairs which primarily serve to restore pipeline service. The practice is not intended to restrict repair activities which can accomplish both goals simultaneously. See Section 6.0 for additional discussion of the company's protection priorities.

3.2.1 Secure the Site

- The Operations Section Chief should place suitable warnings where the nature of the hazard and the likelihood of public access to the area warrant.
 - NO SMOKING, DANGER and/or CAUTION placards or signs should be posted about such defined areas.
 - Use of flash cameras in these areas should be forbidden.
- Surface terrain, direction and velocity of prevailing winds, and proximity to possible sources of ignition, such as found on highways, railroads, or in residences, should be considered by the Operations Section Chief. Roadblocks should be set up immediately if considered necessary in his judgment.
 - A "wind sock" or flag may be erected to assist in detecting changes in air currents.
- If working where the public normally has access, such as near streets, highways, etc:
 - Employees or barricades should be placed as necessary to prevent the public from entering the defined area.
 - Assistance from law enforcement agencies should be requested if necessary by the Incident Commander ("IC") or any other PMPL personnel designated by the IC.
 - Spectators should not be permitted within the work area at any time.

3.2.2 Initial Entry into Potentially Hazardous Areas

Consult the Emergency Response Site Safety and Health Plan (Appendix K) as needed.

- Using Level B Personal Protective Equipment and the Buddy System, have properly trained employees or contractors conduct an air monitoring survey of potentially hazardous areas for:

3.2 STABILIZATION OF EMERGENCY SITE (Cont'd)

3.2.2 Initial Entry into Potentially Hazardous Areas (cont'd)

- Oxygen levels. No personnel shall enter a confined space with Oxygen levels below 19.5% or above 23.0% unless a confined space entry permit has been issued.
- Explosive vapors. NO PERSONNEL SHALL ENTER ANY AREA WITH EXPLOSIVE VAPORS OVER 10% LEL. No personnel shall enter a confined space area with explosive vapors over 10% LEL unless the activity has been approved by the On-Scene Commander.
- Verify concentration of H₂S using the proper instrumentation;
 - If concentration exceeds 5 ppm, SCBA must be used;
 - Be aware of the wind direction when handling crudes containing even low concentrations of H₂S and remain upwind while avoiding low lying areas;
 - Good ventilation is the best safety precaution;
- Benzene and total hydrocarbon levels (Note: in areas where oxygen levels are within acceptable levels, this portion of the initial entry survey may be conducted using Level C Personal Protective Equipment).
- Establish "Warm" Zone(s) by marking the outer perimeter (include all areas above 10% LEL) with yellow safety ribbon, signs or barricades whenever practical.
- Establish "Hot" Zone(s) if needed within the Warm Zone based upon the results of the initial air monitoring survey. Isolate Hot Zones to the extent possible with red safety ribbon, signs or barricades
- Install portable windsocks or streamers to assist in monitoring for possible changes in wind direction.
- Establish "Cold" Zone(s) for site security. Control access with blue safety ribbon, signs or barricades if useful.
- Assign Safety Coordinator overall responsibility for controlling Warm and Hot Zone access. Request assistance as needed from local responders for controlling Cold Zone access. All responders except essential trained personnel should remain outside Hot and Warm Zones.

3.2 STABILIZATION OF EMERGENCY SITE (Cont'd)

3.2.2 Initial Entry into Potentially Hazardous Areas (cont'd)

- Should a person be overcome by petroleum vapours do not enter the area until testing and the use of SCBA assures your own safety (see 3.6 – Rescue) A victim who has passed out and stopped breathing should be removed as quickly as possible to a gas-free area and artificial respiration should begin immediately. Start CPR as soon as possible, do not waste time by trying to get help if you are alone and are trained to administer CPR, AR. Of course, if a second person is available, they should be sent to quickly summon help.
- Establish Forward Command Center upwind and upgrade of Warm Zone(s).
- Establish communications with Operations Section Chief.
- If evacuation has occurred, the Logistics Coordinator makes arrangements for transportation and accommodations of evacuees as needed.
- Trucks, hand tools, and power equipment should not be moved into the area of leak until the foregoing precautions have been taken.

3.2.3 Containment and Recovery of Spilled Product

- See Section 6.7 for detailed containment procedures.

3.3 ISOLATION OF RELEASE SOURCE POINT

Consult the following sections and appendices:

Section 3.1 Response Actions in Case of a Spill
Section 6, Spill Impact Considerations

3.3.1 Excavation

- Contact "one call" center.
- Continuously monitor air at appropriate intervals to ensure safety of personnel working in the immediate vicinity of the excavation site. Refer to Vapor Control Procedure below as needed for further precautionary activities (Section 3.7).
- Assign personnel to fire extinguishers upwind and around the sides of the active work area.
- Excavate with caution to prevent possible damage to unknown and unidentified underground facilities.

3.3 ISOLATION OF RELEASE SOURCE POINT (cont'd)

- Place excavated spoils that may contain hydrocarbon liquids or vapors downwind and handle in a manner that prohibits migration of vapors back into the work area if possible.
- Place spoils on plastic sheeting to prevent additional migration of hydrocarbons into the ground. Also, cover spoil with plastic sheeting to prevent rainfall from washing released product away.
- Slope or shore trench in accordance with current company standards.
- If repair work must be performed within a confined space, all work must be performed in accordance with Corporate Procedures.
- Whenever safely possible, make temporary repairs (without welding or torch cutting) to stop the release of product. Permanent repairs requiring welding and cutting shall be delayed until containment (free product cleanup and vapor dissipation) has been completed in the immediate surrounding area.
- Use mechanical pipe cutters. Use bonding cables. Refer to Vapor Control Procedure for further precautionary activities (Section 3.7).
- Remove free product and saturated soil from the source point excavation and adjacent areas prior to welding. Spread 6 to 12 inches of uncontaminated soil on bottom of excavation. Do not weld if atmosphere exceeds 10% LEL.

3.4 POST-STABILIZATION ACTIVITIES

3.4.1 Demobilization of Response Team

Once the Response Team has gained control of the incident, there is typically a strong incentive to remove personnel from the response organization as quickly as possible in order to return them to their regular duties. This action can have the unintended consequence of undermining the Response Team's ability to bring the incident to its most rapid and successful conclusion if not conducted in a coordinated fashion. As activities wind down in some functions of the response organization, the response can often be further supported by reassigning personnel to other functions within the ICS organization until the entire response is adequately completed. It is the responsibility of the Incident Commander to assure that Response Team demobilization occurs at a pace which best supports the successful conclusion of all aspects of the response. This is best achieved by gaining a consensus of the Section Chiefs prior to the release of personnel from their response duties.

3.4 POST-STABILIZATION ACTIVITIES (cont'd)

3.4.2 Clean-up Activities

- Emergency response personnel will complete the recovery of free product and dispose of contaminated soil and absorbent materials in an environmentally acceptable and safe manner (consult with the Environmental Specialist Unit Leader).
- Environmental Specialist will ensure that proper decontamination procedures are adhered to during release recovery as needed by site personnel.

3.4.3 Restoration of Pipeline Service

- Obtain approval of completed repair from Operations Section Chief and the Operations or Quebec Area Manager responsible for area in which incident occurred regarding restart of the pipeline/ facility.
- Advise management of completed repairs and need to prepare for start up.
- Refer to Operations and Maintenance Procedures Manual for required management approvals prior to start-up. Obtain needed approvals.
- Follow LO/TO procedures to unlock and open and operationally lock line block valves.
- Start up at reduced rate.
- Vent air from the pipeline, if necessary, into a tank truck.
- Check all repairs during pipeline start up to ensure they are satisfactory.
- Turn on rectifiers.
- Complete onsite leak documentation and required inspection reports prior to backfilling excavations.
- Backfill excavations with uncontaminated soil

3.5 SITE DISCONTINUATION

- Notify all appropriate parties of intention to discontinue emergency response activities.
- Continue long-term clean-up and site remediation efforts if necessary as part of normal maintenance activities.

3.5 SITE DISCONTINUATION (cont'd)

- Consult the following appendices:
 - Appendix E, Follow up Investigation
 - Appendix F, Disposal Plan

3.6 RESCUE

3.6.1 Local responders

If a pipeline emergency occurs involving injuries, it is possible that rescues may become necessary. Time permitting, it is always preferable to have local responders (fire department, EMS, etc.) perform rescue work. These personnel will almost always be the best option in terms of adequate training and proper equipment to perform rescue work. Time permitted this option should always be exercised. The appropriate local responders should always be summoned to incidents involving injuries, as well as notified of incidents in progress where the threat to public safety is unusually high.

3.6.2 General

Decisions concerning rescue require careful judgment on the part of the potential rescuer. Do not attempt a rescue unless you are properly trained. There is no benefit gained from a rescue attempt that results in additional injuries to the rescued or to the rescuers. There can be several reasons not to attempt a rescue:

- Explosive atmosphere levels exceeding 10%.
- Confined space/unknown airborne hazards
- Proper personal protective equipment unavailable for site hazards
- Not enough time to complete the rescue without endangering your own and/or other lives
- Inadequate number of trained personnel available
- Lack of familiarity with the safety requirements to effect rescue at a hazardous site.

Ultimately, rescue decisions must be based on individual judgment, and this judgment should never unduly endanger additional lives. Before any rescue attempt is made, the conditions which caused a rescue to become necessary must be identified and corrected or controlled. Rescues should not be attempted unless the situation has been carefully evaluated and potential rescuer feels quite certain the rescue can be safely attempted.

3.6 RESCUE (cont'd)

3.6.3 Further Considerations

If a rescue becomes necessary, potential rescuers must always remember to be prepared in case the situation deteriorates. If time or the number of victims prevent potential rescuers from moving them to an area of complete safety, it may be wise to at least move them to a less hazardous area. Those victims who are easiest to rescue should be removed first, even if there are other victims who are injured more severely or who are exposed to a greater threat. This is a general rule observed by fire departments and other response agencies. The safety and well being of rescue personnel is the highest concern.

3.7 VAPOR CONTROL PROCEDURES

Caution must be utilized at all times to minimize the possibility of unnecessary creation or accidental ignition of vapors during emergencies as well as during routine maintenance of facilities. During routine maintenance activities involving potential fuel sources (liquids and vapors) and/or heat sources (flame and sparks), engineering controls and other safety devices can in most cases be utilized to minimize the likelihood of accidental ignition or exposure.

It is always good practice to pre-select an evacuation route for each work location where the potential exists for petroleum products or vapors to collect and/or be accidentally ignited. This includes discussing evacuation plans with all personnel planning to enter the area and a procedure for accounting for all personnel after evacuation occurs.

3.7.1 Spill Avoidance

An important first step in reducing the possibility of accidental ignition is in avoidance of spills (uncontrolled releases of petroleum products). This includes additional or unnecessary spills at a pipeline emergency site. Good practices that will help avoid spills include:

All Activities

- Follow lockout/tagout and other appropriate procedures for isolating work area from the system prior to commencing work.
- Place adequately sized containers under pipe openings to catch product that may seep or drip from openings in spite of the prior precautions.
- Care must be taken to avoid spilling products. Do not handle products in leaking containers or use damaged hoses or fittings.

3.7 VAPOR CONTROL PROCEDURES (cont'd)

3.7.1 Spill Avoidance (cont'd)

- Tank filling, product transfer, and other operations which involve exposure of product to air shall be carried out away from all possible ignition sources.
- Tank dike drain valves must be kept closed except when water is actually being drained from the dike area.
- If products are spilled, care must be taken to avoid physical contact with the spilled material. Employees must use their own judgment to determine the appropriate response to a spill, with this judgment always erring on the side of prudence and safety.
- Based on the size and volatility of a spill (and potential for explosive vapors to arise), employees must determine whether evacuation is necessary and/or whether the assistance of the Spill Management Team or local responders (fire & police) are needed. Spilled products must be contained in the immediate area and prevented from entering storm drains and other underground intakes to the extent that safety considerations will allow.

Maintenance and Emergency Response

- Estimate volumes conservatively when planning maintenance involving "drain-up" of petroleum products. An adequate number of tank trucks or other suitable containers should be arranged for in advance to collect all quantities of product anticipated to be removed from the system during maintenance.
- Always drain, displace or pump as much product from the line or appurtenance as possible before unbolting, cutting, or removing a section of pipe or equipment.
- After removal of product, close all valves that will prevent refilling of the drained section. Seal off any line where seepage occurs using spheres, plugs, or other approved sealing methods or devices. Proper lockout/tagout practices should be followed to protect against the accidental opening of valves or start up of units.

3.7.2 Vapor Avoidance

A second important step in minimizing the possibility of accidental ignition is the prevention or minimization of explosive vapors. Good practices that will reduce or eliminate these vapors include:

All Activities

- Action shall be taken whenever possible to prevent products from being released into the atmosphere in the form of a spray or mist.
- Product-soaked materials such as rags or clothing shall be stored well away from possible ignition sources.

3.7 VAPOR CONTROL PROCEDURES (Cont'd)

Maintenance and Emergency Response

- All work shall commence only after providing an adequate means of ventilation to disperse any vapors concentrated at levels above 10% LEL or remove them from areas with potential ignition sources. Never use an ordinary electric fan for ventilation purposes. Care shall be taken to minimize spark-producing activities (discussed later) in areas with vapor levels above 10% LEL. Petroleum products are heavier than air and will settle in any depression such as a trench or ditch and can migrate for long distances to areas of lower elevation.
- Material excavated from a release area should be stockpiled downwind of the work area and ventilated as necessary.
- Petroleum products shall not be used for cleaning purposes (clothes, floors, paint brushes) nor for killing grass, weeds or insects.
- Product samples shall be stored in sample storage buildings.

3.7.3 Vapor Detection

Under certain atmospheric conditions, a release of petroleum products will form a visible "vapor cloud" of misted product. All employees shall be made aware of the dangers of a vapor cloud situation. The only proper action in the presence of a vapor cloud is to get away from it and monitor the situation from a safe and prudent distance. Never enter a vapor cloud for any reason.

It is important to understand that unsafe atmospheric conditions can exist even when no visible vapor cloud is present. Thus, another vital step in minimizing the likelihood of an accidental ignition is the diligent use of explosive atmosphere detectors to detect explosive vapors seen or unseen.

PMPL occasionally transports oil containing hydrogen sulfide (H₂S). Any crude oil having an odor resembling the smell of "rotten eggs" should be suspected of containing H₂S. However, it should be noted that the **sense of smell is not an adequate indicator of the presence of H₂S** (consult Section 3.1 for additional toxicity information on H₂S).

If the stream in the section of the pipeline where the leak or break occurs contains a "sour" crude, the leak or oil-soaked ground should be approached cautiously, **testing with a hydrogen sulfide tester** from the point where the odor of the oil is first detected.

3.7 VAPOR CONTROL PROCEDURES (Cont'd)

3.7.3 Vapor Detection (cont'd)

Tests should be completed for:

- Oxygen (consult Appendix K Site Safety and Health Plan).
- L.E.L.;
- H₂S;
- Benzene;
- Total hydrocarbons (< 300ppm)

An area in which the H₂S test registers over 5 ppm H₂S must be marked by best means available and all persons, unless wearing approved personal protection equipment, must be kept out of the area until it tests less than 5 ppm H₂S. The Operations Section Chief will arrange for testing.

Fixed Detectors

The Company has permanently fixed explosive atmosphere detectors in strategic locations in station, terminal, pier and tank farm manifolds. These detectors sound an alarm in the control room at the appropriate staffed remote terminal or pumping station or control center. If the vapor detector alarm or the containment basin alarm at a remote terminal or pumping station is received, the controller should evaluate shutting down the facility and notify the appropriate maintenance personnel to take the appropriate action.

The rapid investigation of the causes of fixed vapor detector alarms and isolation of an uncontrolled product release point will reduce the likelihood of accidental ignition by passing motorists, smoking passersby, residential pilot lights, etc. It is important that these activities be conducted in accordance with the appropriate vapor cloud response procedures.

Portable Vapor Detectors

Portable vapor detectors should be diligently used at all work sites where the potential exists for an uncontrolled release of petroleum products. Knowledge of the presence of explosive vapors is imperative in reducing the possibilities of accidental ignition. If an explosive atmosphere reading of 10% LEL or greater is registered on a portable vapor detector, personnel are to evacuate the affected area until the vapors subside or can be otherwise dispersed.

3.7 VAPOR CONTROL PROCEDURES (Cont'd)

3.7.4 Spark And Flame Avoidance

When working around petroleum products or the vapors they can generate, it is important to take care in avoiding the creation of sparks or open flames which may result in accidental ignition.

Good practices that will help avoid spark or flame include:

All Activities

- Proper and functional fire extinguishing equipment must be on hand when released products are encountered or products are to be handled in the open.
- Remove all potential ignition sources (operating vehicles, electrical power sources, gasoline-powered appliances, open flames, pilot lights, etc.) from a release area, provided they can be eliminated without endangering human life. Electrical switches or power cords in the hazardous area should not be parted or unplugged, as these activities can generate an unwanted spark.
- Open flames are forbidden in areas above 10% LEL.
- Smoking is forbidden; or permitted only in specific pre-designated areas.
- Matches, cigarette lighters and torch lighters are not permitted in fenced areas or areas above 10% LEL .
- Always use spark-resistant tools and explosion-proof equipment where appropriate. To the maximum extent possible, avoid striking tools together and avoid striking rocks and stones with tools.
- Do not allow flash photography, video cameras, cell phones, or other spark-producing electronic devices to be used in a work area where explosive atmosphere conditions may exist.
- Sparks originating from static electricity discharge shall be avoided by:
 - Use bonding cables during the cutting, removal or replacement of pipe. Install the bonding cable across a section of pipe to be cut or removed. Leave the bonding cables in place until the pipe is rejoined. Turn off local cathodic protection rectifiers when a situation requires use of bonding cables.
 - For activities which involve removal and/or addition of product to the pipeline system (such as drain-ups), metal containers and hose nozzles should be properly bonded to the vessels supplying and receiving the product.
 - Rags of silk, wool, rayon or synthetic fabrics which can build up a static charge shall not be used in or near areas where petroleum product vapors are present. Avoid wearing clothing made of such materials in hazardous areas if possible.

3.7 VAPOR CONTROL PROCEDURES (Cont'd)

3.7.4 Spark And Flame Avoidance (cont'd)

Maintenance and Emergency Response

- Always approach a suspected uncontrolled release area from a higher elevation and/or upwind. Keep all nonessential vehicles and motorized equipment from the release site. Keep essential motorized equipment on the windward side and as far away as practical. Never attempt to start or drive a vehicle or other motorized equipment into or out of a vapor cloud.
- Take necessary steps (including enlisting the assistance of local law enforcement agencies if necessary) to warn and/or evacuate all persons in the release area, and to stop all traffic (foot, motor and rail) through an into the release area. Arrange detours as is necessary. Unauthorized personnel should be kept out of the release area if possible until the situation can be stabilized.
- When power equipment is moved into the area to expedite repairs, it should be done on a planned schedule. The equipment should be removed from the area as soon as the work has been completed. Personnel not required to operate this equipment should be kept out of the immediate work area.
- Matches, lighters (including friction lighters), and materials should be kept in a place designated as "SAFE" by the Operations Section Chief. Smoking will be permitted only at a safe location away from the defined area
- The hazard of fire and explosion should be recognized throughout any repair work. Fire extinguishers should be available and ready for instant use while the work is in progress.
- When excavating or digging is required in congested municipal or residential areas, the Incident Commander should contact the city engineer, fire chief, police, other utilities, or other indicated public officials to obtain assistance in providing spectator barricades and in the elimination of potential ignition sources such as cigarettes, lighters, flash cameras, etc.
- A flow of carbon dioxide or other inert gas, water, or good grade of cutting oil should be used to eliminate sparks when cutting pipe.
- The following precautions should be taken when making emergency welding repairs to damaged facilities:
 - A safety meeting specific to the planned welding activities at hand shall be conducted, with all personnel involved at the work being assigned specific duties and having a definite understanding of what to do in case of fire or accident.
 - Where possible, delay making welding repairs to damaged facilities until vapors have had ample time to dissipate.

3.7 VAPOR CONTROL PROCEDURES (Cont'd)

3.7.4 Spark And Flame Avoidance (cont'd)

- If possible, clear the area of all product, then cover soil and bottom of bell hole with product-free dirt.
- Monitoring of the area by portable vapor detector shall be conducted while welding is in progress. If vapor levels of 10% LEL or higher are detected, welding shall cease until the area is properly ventilated to reduce these levels.
- Care must be taken that welding sparks are prevented from causing fires.
- At least two fire extinguishers shall be manned and readily available during welding operations.

Operations and Tank Cleaning

- Keep water bottoms at a minimum on a tank that is being filled.
- Never take a product sample, then pour it freely back into the gauge hatch or tank. Ropes made of nylon or other synthetic fiber shall not be used as rope for sample containers.
- Before using a hose and water to wash down a tank, attach a bonding cable to the tank and the hose nozzle.
- Tank gauge lines shall remain in contact with the edge or side of the gauging hatch at all times including raising and lowering.
- Care in general shall be taken around all tanks which contain or have recently contained petroleum products. Tanks shall not be entered by Company employees until they have been properly declared gas-free.

3.8 PROCEDURE FOR EMERGENCY INVOLVING NATURAL GAS

This section of the emergency manual is intended to give Company employees general guidance in dealing with possible contingencies associated with the 24-inch third party natural gas pipeline owned by Portland Natural Gas Transmission System (PNGTS). In addition, this section provides the basis for instructions to appropriate operating and maintenance personnel which will minimize the hazard resulting from a gas pipeline emergency.

Portland Montreal Pipe Line System (PMPL) may be notified of a Portland Natural Gas Transmission System natural gas emergency because the PNGTS and PMPL pipeline facilities occupy parallel rights of way between Gorham, New Hampshire and Westbrook, Maine. Although the primary responsibility for a natural gas emergency belongs to PNGTS, PMPL personnel may be the first to arrive at the site in an emergency. PMPL personnel should assist in securing the affected area until PNGTS representatives arrive. Emergency control of a natural gas incident is the responsibility of PNGTS. PMPL's primary responsibility in a natural gas emergency is the maintenance and protection of the PMPL crude oil pipelines that are adjacent to the PNGTS natural gas pipeline.

3.8 PROCEDURE FOR EMERGENCY INVOLVING NATURAL GAS (cont'd)

3.8.1 Receipt of emergency notice by Controller

The Controller receives notification of a natural gas incident via telephone and takes actions as outlined in Figure 3.1.

3.8.2 Immediate Response Steps

Field response to the notification of a natural gas emergency is the responsibility of PNGTS. However, due to the close proximity of the crude oil pipeline and the PNGTS pipeline, PMPL field personnel may be the first field personnel on site. A common sense approach, together with a policy of mutual cooperation with PNGTS personnel, is expected to be followed.

The National Incident Management System (NIMS) Incident Command System provides for modular expansion to include appropriate specialists/teams as determined by situation objectives.

The importance of PNGTS representatives assuming immediate responsibility for supervising the emergency actions required must be emphasized. PMPL representatives on site will exercise due diligence in taking logical and timely action in the field as requested by PNGTS for assistance only. PNGTS has full responsibility for emergency activities related to their PNGTS pipeline.

The list of field responses in Figure 3.1 is not meant to be all inclusive, but is shown merely as a suggested guide for actions or responses which may be taken by a company Field representative. Obviously these tasks may be rearranged and modified depending on the particular circumstances of an emergency at any specific time. While awaiting the arrival of the PNGTS Supervisor in charge of the natural gas pipeline emergency, the company On-Site Representative should confirm that actions on the list have been completed as appropriate for the situation.

3.8.3 Emergency Assessment and Control

In the event that a company Field Representative arrives at the scene first, the Field Representative should make every effort to use judgment to assess the danger of the situation and minimize the potential safety hazard to people in the immediate area. Communication should be established as soon as practicable with the Controller and the PNGTS Dispatcher. If a fire or explosion has already occurred prior to the Field Representative's arrival, he/she should identify himself/herself to the local police/fire officials in charge who may have arrived before him. In addition, he/she should advise these officials of the location of the crude oil pipelines and make sure that any emergency containment proposals do not adversely inflict additional damage to the pipeline system.

The PMPL Field Representative should maintain communications with the controller and be prepared to provide information and possible response to special requests from PNGTS personnel prior to their arrival on site. Upon arrival of the PNGTS supervisor, the PMPL Supervisor should be prepared to brief the PNGTS supervisor on any emergency actions that were implemented prior to the PNGTS supervisor's arrival.

3.8 PROCEDURE FOR EMERGENCY INVOLVING NATURAL GAS (cont'd)

The Incident Commander serves as the central point in the company system for information control. All requests from outside sources regarding the Company position relative to contingency results should be referred to the Incident Commander. The Incident Commander will direct outside inquiries to the Public Affairs Officer, the

President, or the President's authorized representative.

3.9 THIRD PARTY VESSEL OWNERS/OPERATORS (SOUTH PORTLAND TERMINAL)

It is the responsibility of third party vessel owners/operators to have spill contingency plans developed and in place. In the event of a spill involving a third party vessel at the Facility, it is the responsibility of the vessel owner/operator to immediately respond and mitigate the spill and to coordinate response efforts with the Spill Management Team.

If a spill occurs when the vessel is enroute to the company's docks, it is the responsibility of the vessel owner/operator to immediately respond and mitigate the spill. PMPL will advise the shipper of record and the PMPL Board of Directors.

3.10 DOCUMENTATION OF INITIAL RESPONSE ACTIONS

Although it is difficult, particularly during the first few minutes of an initial response operation to think about the importance of documentation, each responder with some level of authority in the Plan (e.g., the Incident Commander, the Deputy Incident Commander, the Operations Section Chief, the Environmental Specialist, etc.) has to keep a log during an emergency response. The Controller must also keep a log of all the calls made and actions performed during the emergency response. PMPL Uses NIIMS ICS 214 CG unit log form for logging incident events (See Appendix K-16)

Also, since actions taken during an emergency might have legal implications, the logbook becomes instrumental in legal proceedings. It is therefore important to fill out the log carefully and to avoid omitting any details; therefore, here are some important guidelines for documentation of response actions:

- Write your name on the top of the first page.
- Record only factual information, avoid personal comments, opinions or speculation.
- Do not criticize the efforts and / or methods of other people / operations.
- Do not speculate on the cause of the spill.
- Do not skip lines between entries or make erasures. If an error is made, draw a line through it, add the correct entry above or below it, and initial the change.
- Record the recommendations, instructions, and actions taken by government / regulatory officials.

3.10 DOCUMENTATION OF INITIAL RESPONSE ACTIONS (cont'd)

- Document conversations (telephone or in person) with government / regulatory officials.
 - Request that government / regulatory officials document and sign their recommendations or orders (especially if company personnel do not agree with the suggestions, instructions, or actions).
- Write legibly.
 - Record information concisely and in the following order: date, time (00:00), individual/organization contacted, description of the actions/calls.
 - When the logbook is transmitted to the Documentation Leader, note the date and time of transmittal, as well as the recipient's name.
 - Leave a margin for special notes.
 - Never remove any pages of the logbook. To make a correction, just cross out the incorrect entry and initial it.

3.11 DOCUMENTATION OF INCIDENT

3.11.1 Documentation of Incident - General

Documentation of an incident provides an historic account of the events during the entire period from the occurrence of the incident, to clean-up actions, to final post assessment. It will provide the necessary data to determine the accuracy of the prediction of the event's progression, of the assessment of the extent of the emergency, of the success of the mitigation methods and clean-up operations with a view of modifying and improving the existing emergency response plan. It will also be used to determine what further control and monitoring actions need to be undertaken.

Documentation should commence immediately upon notification of the incident with the writing of logbooks by ERT members and by gathering of information by the Documentation Leader. It is the duty of the Documentation Leader to ensure adequate documentation is being made throughout the emergency. The Documentation will continue until termination of all operations, including clean up and rehabilitation operations and will continue until termination of all operations. The Documentation Leader will compile a master file, which will contain a complete and comprehensive set of all documentation gathered.

The Documentation Unit Leader will coordinate and retain the documentation of the incident. The information gathered will be utilized to prepare the necessary reports to government agencies, to keep owners informed and to provide information to the news media, and to produce final reports on the incident.

The following table indicates the type of information required, providing adequate documentation, and the person who will be in charge of obtaining/gathering this information or ensuring it is gathered/obtained.

3.11 DOCUMENTATION OF INCIDENT (cont'd)

Person responsible for ensuring the information is obtained	Type of information
<input type="checkbox"/> Controller	Cause of Incident: Information described in the Emergency Response Check-List
<input type="checkbox"/> Deputy Incident Commander	1. Emergency's Characteristics: information reported in the Incident Reports sent to the TSB and NEB (see App. K forms) 2. Preliminary Incident Report
<input type="checkbox"/> Incident Commander	Detailed Incident Report (See App. K forms)
<input type="checkbox"/> Documentation Leader	Field Information Photographic Survey Weather Reports
<input type="checkbox"/> Documentation Leader in collaboration with Environmental Specialist and Legal/Regulatory Advisor	Records of: 1) contacts with and directives from regulatory agencies, 2) all permits obtained for specific operations which are subject to regulations
<input type="checkbox"/> Logistic Section Chief	1) Costs Analyses: prepared for the Finance/Accounting Advisor, 2) Equipment utilization and evaluation,
<input type="checkbox"/> Finance/Accounting Advisor	Costs analyses and claims,

The following paragraphs describe the above documentation requirements.

1. Emergency's Characteristics

All relative information pertaining to the emergency should be recorded throughout the incident. Records should include, but not be limited to, the following information:

- Person first noticing the incident;
- Date and time incident occurred or was first observed;
- Location of incident and geographical area affected by the incident;
- If a spill, actual or estimated spill volume and direction of movement;
- Type of pollutant involved;
- Rate of release, known or estimated, if a spill or leak of hazardous material;
- Injuries, if any, and possible hazards to human health and/or the environment;
- This information will be recorded in the Emergency Reporting Check-List by the Controller

3.11 DOCUMENTATION OF INCIDENT (cont'd)

2. Cause of the incident

All factors, which led to the emergency, must be documented. This should include such information as:

- Description of exact piece of equipment that failed;
- Persons responsible for causing the emergency, including their affiliation with contractors or other organizations;
- Apparent cause of equipment failure;
- If safety or operation practices were violated, state details;
- If act of vandalism, report any indications leading to identity of persons involved.
- Effectiveness of containment;
- Apparent cause of incident.

This information will be recorded in the different Incident Reports which must be sent to different governmental authorities. It is the duty of the Deputy Incident Commander to complete these reports and to send them to the appropriate authority.

3. Photographic Surveys

Photographic coverage of all phases of the incident will commence as soon as safely possible and should provide representative coverage of the incident until termination of all operations. Photographic record of the incident from aircraft may be taken during initial assessment procedures if light conditions are adequate. It is the responsibility of the Surveillance Unit Leader to take photographs and the Documentation Unit Leader to obtain the photographs taken by other SMT member.

All photographs must be properly identified with respect to location, date, subject, time, direction, photographer's name, and any witnesses present.

4. Climate Reports

Meteorological data to be gathered for the affected areas during the incident will include:

- Temperature;
- Precipitation;
- Humidity;
- Wind direction and speed;
- Surface currents (estimate velocity), if spill in a waterway;
- Wave heights;
- Ice and snow cover;

It is the responsibility of the Situation Unit Leader to fill climate reports for every day of the response.

3.11 DOCUMENTATION OF INCIDENT (cont'd)

5. Cost Information

A complete record of all costs incurred during the incident will be maintained, including costs of:

- Equipment;
- Contractual support (labour and equipment);
- Supplies and materials;
- Property damage claims;
- Repairs;
- Support services (photographic, sample analysis, transportation, food, etc.);
- Legal services.

The Logistic Section Chief will have to periodically prepare Cost Analyses for the Finance/Accounting Advisor. The latter will provide the Documentation Contractor with complete analyses of all costs, claims, etc., related to the incident.

6. Equipment Utilization and Evaluation

The Logistics Section Chief will maintain records of all equipment utilized during the incident. He/She will obtain necessary data and information to allow an evaluation of the performance of major equipment items, i.e., skimmers, booms, fire protection equipment, utilized during the incident.

7. Record of Contacts and Permits Obtained from Regulatory Agencies

The Documentation Unit Leader will, in cooperation with the Regulatory/Legal Advisor and the Environmental Specialist, record all contacts with and directives from regulatory agencies and will record all permits obtained for specific operations which are subject to regulations such as disposal of oil materials, utilization of government owned equipment, access to land and utilization of chemical agents.

8. Reports to Governmental Agencies See Figures 2.8 – 2.12 for definitions of reportable incidents to various agencies.

3.12 INITIAL RESPONSE ACTIONS – BOMB THREATS, HOSTAGE SITUATIONS, NATURAL DISASTERS, EMERGENCY MEDICAL SITUATIONS

Initial response actions are those taken by local personnel immediately upon becoming aware of an emergency incident, before Senior Management or others are notified. Timely implementation of these initial steps is of the utmost importance because they can greatly affect the overall outcome of the emergency.

It is important to note that **these actions are intended only as guidelines**. The appropriate response to a particular incident may vary depending on the nature and severity of the incident and on other factors that are not readily addressed. Note that, **without exception, personnel and public safety is first priority**.

3.12 INITIAL RESPONSE ACTIONS – BOMB THREATS, HOSTAGE SITUATIONS, NATURAL DISASTERS, EMERGENCY MEDICAL SITUATIONS (cont'd)

The first Company person on scene will function as the Incident Commander until relieved by an authorized supervisor. Transfer of command will take place as more senior management respond to the incident.

The person functioning as **Incident Commander** during the initial response period has the authority to take the steps necessary to control the situation and must not be constrained by these general guidelines.

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3.12.6 MEDICAL EMERGENCY

The procedure in Figure 3.3 Check-List will be used when there is a medical emergency at a PMPL facility.

The Company has arrangements for medical emergencies and first aid. Local ambulance services and hospitals will be utilized for the transportation and care of injured employees. This information can also be found on the bulletin boards at the various locations. On-site emergency medical response requires the same rapid assessment of the patient as any other situation, but requires the responders to be aware of other considerations that may affect the way they handle the patient. These considerations include the following:

- The potential for contamination of the patient, responders, and equipment should be addressed. Responders should arrange to treat all patients **AFTER** the injured party has been decontaminated.
- Site personnel should make the initial assessment of the patient and determine the severity of the injury/illness.
- If the treatment needed is critical care or "life saving" treatment, rapid decontamination of the injured/ill party should be started. Refer to the Site Safety and Health Plan for steps to be taken in an "abbreviated" decontamination for medical treatment.
- **The need for full decontamination should be carefully weighed against the need for prompt medical treatment.**
- The ambulance responding to medical emergencies shall be contacted as soon as possible and instructed exactly where to respond when needed and the nature of the contaminant. Telephone references are provided in Figure 2.10 – 2.13.
- MSDS information is available in Figure 3.4 & 3.5. The MSDS of the product involved in the medical emergency shall be provided to medical personnel in order to alert them of decontamination requirements.

Acknowledgment to the family of an injured worker

The family of an injured employee will be advised when:

- ◆ There is a critical injury or an unconscious victim ;
- ◆ Victim is sent to a hospital.

The Incident Commander shall give the following information to the family of the injured employee:

3.12 INITIAL RESPONSE ACTIONS – BOMB THREATS, HOSTAGE SITUATIONS, NATURAL DISASTERS, EMERGENCY MEDICAL SITUATIONS (cont'd)

- The IC's name and phone number (identification of the speaker);
- The name of the victim (confirmation that you have the right person);
- Location of the victim.

It is important to remember the following guidelines:

- Remain event oriented;
- Do not add personal comments on the seriousness of the injury;
- Always talk to an adult. Do not give details to a person under 16 years of age ;
- Do not give details on the circumstances of the incident as they will be investigated in details later on.

Whatever the nature of the injury, only a medical doctor may confirm a death.

FIGURE 3.1 FIRE EMERGENCY / SPILL RESPONSE CHECKLIST INITIAL RESPONSE ACTIONS

Remember, Without Exception, Personnel Safety Is First Priority.

FIRST COMPANY PERSON NOTIFIED/ ON SCENE (All Incidents)

- _____ Call the pipeline controller to activate Company Response.
- _____ **Within your competences and abilities**, take safe measures to control the situation until the arrival of the First Operational Responders / Spill Management Team
- _____ If possible and safe, make a quick initial assessment of the hazards and of the potential risks to health, safety, environment, equipment, and property.
- _____ Unless personal safety is at risk, stays on-site until authorized to leave by the Operations Section Chief.

FIRST OPERATIONAL RESPONDER (All Incidents)

- _____ Assume the role of **Incident Commander** until relieved or incident is over.
- _____ Call the pipeline controller to activate Company Response.
- _____ Ensure Notifications are being made. (Figures 2.2 & 2.3)
- _____ Take steps necessary to minimize threats to public health and safety and to reduce the severity of the incident.
- _____ Utilize local emergency services as necessary (police, fire, medical, 911 and Figures 2.10 -2.13)

For EXPLOSIONS AND/OR FIRE, SPECIFIC RESPONSE

- _____ Call the Fire Department (911 or Figures 2.10 – 2.13) Be certain to clearly state your name, company, location and the type and extent of the emergency. Stay on the phone until instructed to hang up.
- _____ Sound the nearest fire alarm / Alert all facility areas of the exact location and extent of the fire.
- _____ Return to the scene and check to see if there are injured persons and form a rescue plan if needed.

INITIAL FIRE EXPLOSION

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

- _____ If practical, extinguish the fire IF SAFE TO DO SO.
- _____ In the event the fire is too large for an individual to fight alone, the individual sounding the alarm or making the phone call should stand by at a safe distance to direct the fire department to the scene of the fire and keep personnel and vehicles from entering the danger area.
- _____ Alert all terminal areas of the exact location and extent of the fire.
- _____ Evacuate area, as the situation demands.

ADDITIONAL GENERAL PROCEDURES FOR TERMINALS AND PUMP STATIONS

- _____ Shut off pumps or call pipeline controller to shut off pumps.
- _____ If product is being received from pipelines or ships, notify the appropriate pipeline personnel of the fire and request that the pipeline or ship be shut down. The tank which is receiving product must not be closed until assurance is received that the pipeline or vessel is down, unless that tank is involved in the fire.
- _____ After confirmation has been received that pipelines have been shut down, close the pipeline header valves as directed by the controller.
- _____ Close valves for the tanks in the tank farm / field as directed by the controller.

ALL SPILL RESPONSE INCIDENTS – INITIAL RESPONSE

- _____ Restrict access to the spill site and adjacent area except by emergency personnel.
- _____ Take any other steps necessary to minimize any threat to personal, public, and safety.
- _____ Stop all traffic in hazardous area (inside and outside of property boundaries), as the situation demands.
- _____ Take appropriate personal protective measures to ensure safety of personnel.
- _____ Use testing and sampling equipment to determine potential safety hazards, as the situation demands including; Combustible Gas Indicator, O₂ meter, H₂S meter, proper colorimetric indicators (e.g. Benzene) and other air sampling measurements to assure that areas are safe to enter for continued response operations.

INITIAL FIRE EXPLOSION

INITIAL ALL SPILLS

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

INITIAL MAIN LINE

MAIN LINE BREAK/LEAK SPILL RESPONSE INCIDENTS – INITIAL RESPONSE

- _____ Shut down Pipeline System and isolate emergency site from pipeline system.
 - Verify that Operations has shutdown appropriate portion of the system (See Appendix I for pipeline valve locations).
 - Close, tag, and lock upstream and downstream block valves if removed from potentially hazardous area.
 - Attempt to drain line section, as the situation permits.

- _____ Eliminate possible sources of ignition in the near vicinity of the spill to minimize potential for fire or explosion.

- _____ Turn off power to area facility rectifiers (if removed from potentially hazardous area).

- _____ Contact appropriate authorities to isolate known public water supply intakes from emergency if necessary. Water intake contact phone numbers are listed in Figure 2.10.

- _____ If possible, verify the type of product and quantity released (Material Safety Data Sheets are in Section 3 and are available separately at the Facility).

- _____ Identify/Isolate the source and minimize the loss of product.

INITIAL PIPING / MANIFOLD

STATION/ TERMINAL PIPING OR MANIFOLD BREAK/ LEAK – INITIAL RESPONSE

- _____ Shut down pumping equipment.

- _____ Close upstream and downstream (Incoming / Outgoing) block valves.

- _____ If located within containment area, ensure that drainage valve(s) is “closed”.

STORAGE TANK LEAK OR OVERFLOW, INITIAL RESPONSE

INITIAL TANK

- _____ Shut down all tank battery product movement operations and isolate the tank.

- _____ Initiate Confined Space Entry procedures, as applicable.

- _____ Ensure that the containment area drainage valve(s) is “closed”.

- _____ If near tank bottom, consider filling tank with water and maintain water bottom to suspend the discharge.

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

- _____ Block drainage of spilled material from traveling offsite.
- _____ Remove product from containment area (at a sump or in a low area) with an explosion proof pump, oil skimmer, and/or vacuum truck w/ skimmer attachments.
- _____ If applicable, process remaining product through the separator system.
- _____ Empty tank as soon as possible.

UNLOADING ARM OR TRANSFER EQUIPMENT FAILURE – INITIAL RESPONSE

- _____ Shut down all unloading operations by emergency stop methods (Marine Terminal Operations Manual).
- _____ Stop all transfer operations from terminal to tank farm.
- _____ Close upstream and downstream block valves.
- _____ If located within containment area, ensure that drainage valve(s) is “closed”.

EQUIPMENT FAILURE, INITIAL RESPONSE

- _____ Shut down pumping equipment.
- _____ Close upstream and downstream block valves.
- _____ If located within containment area, ensure that drainage valve(s) is “closed”.

ALL SPILL RESPONSE INCIDENTS – CONTINUED INITIAL RESPONSE

- _____ Mitigate spreading of the product, as the situation demands. Potential containment strategies include:
 - Containment Booms
 - Earthen dike/berm
 - Ditching
 - Spreading sorbent material over the spill
- _____ Prevent the spill from entering the waterways, sewer, etc. to the greatest extent possible.
- _____ Clean up spilled product to eliminate any possible environmental problems. Be alert for underground cables.

INITIAL UNL ARM

INITIAL EQUIPT.

CONTINUED RESPONSE

FIGURE 3.1 (cont'd)
FIRE EMERGENCY/ SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

- _____ Determine the direction and expected duration of spill movement. Refer to the maps in Section 6.0.
- _____ Drain the line section or empty the tank, as the situation demands.

ALL SPILL RESPONSE INCIDENTS – CONTINUED RESPONSE

- _____ Inform local operators such as utilities, telephone company, railway.
- _____ If the spill escapes the containment area, review the location of socio-economic and environmentally sensitive areas identified in Section 6.0. Determine which of these may be threatened by the spill and direct the response operation to these locations. Initiate protection and recovery actions.

ALL SPILL RESPONSE INCIDENTS – FINAL RESPONSE

- _____ Make all necessary repairs. Return the line/ piping / tank / equipment to service when repairs are complete and tested.
- _____ If necessary, call one of the approved waste removal companies to remove the remaining sludge and residue from the containment area. Contact the SMT Environmental Specialist, if necessary, to remove waste from the Facility for disposal. During temporary storage on site, ensure proper containerization and labeling and locate in designated area for storing the identified type of waste.
- _____ Complete follow-up and written reporting, as the situation demands.

VAPOR CLOUD (from a massive spill, line rupture, etc.), SPECIFIC RESPONSE

- _____ The person who discovers the vapor cloud will sound the alarm, call the appropriate fire department, and notify the supervisor on duty and vacate the area.
- _____ **Remember: the only proper action in the presence of a vapor cloud is to get away from it. Do not shut off electrical equipment.**
- _____ Vapor may travel to source of ignition and cause “flash back” fire.
- _____ Vapor explosion hazard is confined spaces (indoor, outdoor, or sewer).
- _____ All personnel will report to the evacuation muster point for roll call and further instructions.
- _____ Shut down pipeline.
- _____ Evacuation of adjacent property.

FINAL RESPONSE

VAPOR CLOUD

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

- _____ Permit only the fire department to enter the terminal.
- _____ Contact the appropriate agencies and potentially affected neighbors (refer to Figures 2.8-2.15).

EMERGENCY INVOLVING PNGTS NATURAL GAS PIPELINE

- _____ Minimize the risk to public health, safety, and private property by isolating the affected surrounding areas.
- _____ Evaluate the risk to the crude oil pipelines and establish immediate contact with the Controller.
- _____ Initiate the obvious field procedures deemed necessary to protect and minimize the potential hazards to the PMPL system, including, with the cooperation of the Controller, a shutdown of the crude oil mainlines.
- _____ Contact the local law enforcement/fire chiefs and enlist their assistance in providing public safety.
- _____ Use judgment in deciding if it is safe and appropriate to implement any interim field procedures requested by PNGTS Dispatcher, pending on-site arrival of PNGTS Field Supervisors. Emergency shutdown and pressure reduction in any section of the natural gas pipeline system is the responsibility of PNGTS.
- _____ Refer all questions about property damage, personal injury, and liability from outside sources, including the news media, to PNGTS.
- _____ Be prepared to brief the PNGTS supervisor on any emergency actions taken upon arrival on scene.

PNGTS

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

Remember, Without Exception, Personnel Safety Is First Priority.

PIPELINE CONTROLLER (All Incidents)

_____ Initiate the Internal Emergency Notification Procedure (Figures 2.2 & 2.3).

ALL SPILL RESPONSE INCIDENTS – INITIAL RESPONSE

- _____ Identifies the location of the emergency / leak.
- _____ Minimizes the line pressure at the leak's location.
- _____ Shuts down pump stations.
- _____ Isolates the leak by closing remotely operated block valves and directing field people to the closest main line manual block valves.

For EXPLOSIONS AND/OR FIRE, SPECIFIC RESPONSE

CONTROLLER RECEIVING NOTIFICATION OF FIRE

Fire Reported On Main Line

- _____ Verify that the appropriate fire department has been notified (911 or Fig. 2.10-2.13).
- _____ Reduce the Main Line Operating Pressure.

Fire Signaled Or Reported From Remotely Operated Station

- _____ Evaluate the need to shut down all pumping units at the involved station.
- _____ Verify that the appropriate fire department has been notified.
- _____ Ensure nearest available PMPL field representative has been notified.

Fire Signaled or Reported at North Tank Field

- _____ Evaluate the need to shut down all NTF pumping units and/or Enbridge Line 9
- _____ Initiate Internal and external notifications procedures (Figure 2.2, 2.3 & Figure 2.8)
- _____ The first PMPL person notified support fire department on site

Additional Procedures for the South Portland Marine Terminal

- _____ In the event of a fire on a vessel, a series of ten (10) - second blasts on the ship's whistle would be sounded.

FIRE / EXPLOSIONS

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

_____ Terminal personnel shall raise alarm at fire box mounted on the Dock Building and alert all ship / shore personnel via radio or voice command. (Refer to the Marine Terminal Operations Manual, Figure 8A – Instructions in Case of Fire.)

Additional procedures for the Montreal Terminal

_____ Evaluate the need to shut down the main lines or Enbridge Line 9

_____ Notify Shift Supervisor at Suncor and Valero (Figure 2.15)

_____ Initiate the Internal Emergency Notification Procedure. (Figures 2.2 & 2.3)

EMERGENCY INVOLVING PNGTS NATURAL GAS PIPELINE

_____ Log the information reported in the Emergency Reporting Checklist (Figure 2.1)

_____ Immediately calls the PNGTS controller (See Figure 2.10) and communicate all pertinent information, noting the time and determining when other representatives will be on site.

_____ Initiate the Internal Emergency Notification Procedure. (Figures 2.2 & 2.3)

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

Remember, Without Exception, Personnel Safety Is First Priority.

OPERATIONS SECTION CHIEF (All Incidents)

- _____ Ensure the area has been secured.
- _____ Determine accurate location and cause of the emergency / threat / leak in collaboration with the Controller or First Company Person Notified / On scene.
- _____ Evaluate emergency / leak potential (quantity, type, which line, speed and direction of flow, how far it has already travelled, weather conditions).
- _____ Coordinate safety precautions to minimize hazards of fire and road mishaps if oil flow is on travelled ways.
- _____ Direct line or other repair operations, as necessary.

COMPANY MANAGEMENT (All Incidents)

- _____ **Evaluate the Severity**, Potential Impact, Safety Concerns, and Response Requirements based on the initial data provided by the first person on scene.
- _____ Assume the role of **Incident Commander**.
- _____ **Confirm safety** aspects at site, including need for personal protective equipment, sources of ignition, and potential need for **evacuation**.
- _____ Contact and involve local **Law Enforcement / Fire Officials** as needed.
- _____ Activate the **Spill Management Team and primary response contractors**, as the situation demands. The South Portland Marine Terminal has designated personnel listed in Figure 2.6.
- _____ Coordinate/perform **activation of additional spill response contractors**, as the situation demands (telephone reference is provided in Figures 2.14 & 2.15).
- _____ Perform further/ additional notifications as per Figures 2.2 & 2.3.
- _____ Coordinate/perform **regulatory agency notification**, as the situation demands (notification procedures and telephone references are provided in Figure 2.8-2.13).
- _____ Proceed to spill site and **coordinate response and clean-up operations**.
- _____ Direct containment, dispersion, and/or clean-up operations.

FIGURE 3.1 (cont'd)
FIRE EMERGENCY / SPILL RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

SPILL MANAGEMENT TEAM (All Incidents)

- _____ Assigned personnel will immediately respond to an emergency /discharge from the Facility, as the situation demands.
- _____ Perform response / clean-up operations as directed or coordinated by the Incident Commander.
- _____ Assist as directed at the emergency / spill site.

FIGURE 3.2

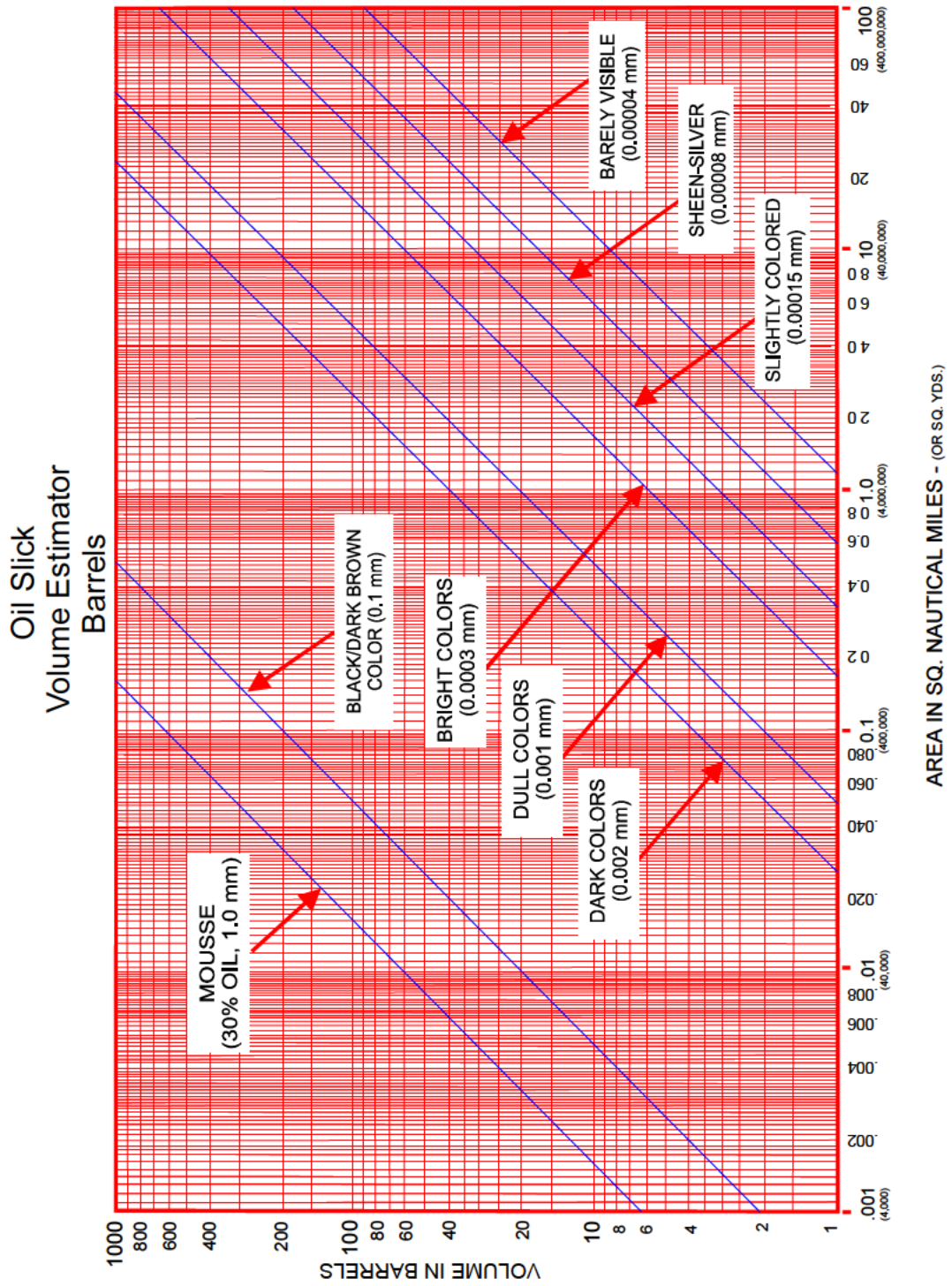


FIGURE 3.3 (cont'd)

(b) (7)(F) [Redacted text block]

[Redacted text block]

[Redacted text block]

NATURAL DISASTER (Tornado and Severe Storms), SPECIFIC RESPONSE

Although many disasters cannot be prevented or predicted, preparation can significantly reduce losses. In the event of a severe weather condition or a natural disaster, the most senior member present will be the Incident Commander.

Be Aware of Changing Weather Conditions

- 1. Tornado watch - conditions are right for the formation of a tornado.
- 2. Hurricane watch – there is a threat of a hurricane.
- 3. Tornado warning - a tornado has been sighted but is not in the area at this time.
- 4. Hurricane warning – a hurricane is expected within 24 hours.
- 5. Tornado alert - a tornado has been sighted in the immediate area - take cover immediately.

If Severe Weather Conditions Threaten

- 1. Sound fire alarm.

HOSTAGE

NATURAL DISASTER

FIGURE 3.3 (cont'd)
BOMB THREAT, HOSTAGE CRISIS, NATURAL DISASTER, MEDICAL
EMERGENCY RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

2. Alert terminal personnel of condition.
3. If time permits, all personnel should assemble at the terminal warehouse or in an inside room in the terminal office for shelter.
4. If time does not permit, seek shelter in low level area away from glass.
5. Make certain terminal personnel are aware of the condition.
6. Stay in shelter until "all clear" has been issued.

Immediately After the Storm

1. Account for all personnel.
2. Survey for damages to terminal property.
3. Initiate team for any repairs if needed (i.e. high tank alarms, lighting, etc.).
4. Refer to this Plan for additional response guidance regarding fires, spills, etc., as needed.

MEDICAL EMERGENCY, SPECIFIC RESPONSE

DO NOT ENDANGER YOURSELF ATTEMPTING A RESCUE. Call 911 or rescue squad instead.

If victim can be reached safely and can be moved, move them to fresh air.

Apply appropriate first aid, if trained to do so, for injury and shock, exercising care not to cause further injury.

If victim is unconscious and not breathing, immediately apply artificial respiration (if trained in CPR) and continue without interruption until natural breathing is restored or revived by other CPR trained personnel or other qualified medical personnel.

Call for ambulance or other medical evacuation resources, if appropriate.

Notify hospital of patient arrival and extent of injury.

The Incident Commander will notify victim's immediate family.

Complete follow-up and written reporting, as the situation demands.

In case of contact with released material:

- Immediately flush eyes with running water for at least 15 minutes.
- Wash skin with soap and water.
- Remove and isolate contaminated clothing and shoes at the site.

FIGURE 3.3 (cont'd)
BOMB THREAT, HOSTAGE CRISIS, NATURAL DISASTER, MEDICAL
EMERGENCY RESPONSE CHECKLIST
INITIAL RESPONSE ACTIONS

PIPELINE CONTROLLER (All Incidents)

- _____ Initiate the Internal Emergency Notification Procedure (Figure 2.2 & 2.3).
- _____ Ensure nearest available PMPL field representative has been notified.
- _____ Implement the Incident Commander's instructions for shutting down and securing operations and facilities. Support IC's evaluation of the following potential actions:
 - _____ Evaluate shutting down individual pump stations based on the threat/ incident.
 - _____ Evaluate the need to shutdown the main lines
- _____ For Montreal Terminal, notify Shift Supervisor at Suncor Sulfur Plant, Shell Terminal and Dispatcher at Valero, Suncor and Enbridge (Figure 2.15)

COMPANY MANAGEMENT (All Incidents)

- _____ **Evaluate the Severity**, Potential Impact, Safety Concerns, and Response Requirements based on the initial data provided by the first person on scene.
- _____ Assume the role of **Incident Commander**.
- _____ **Confirm safety** aspects at site, including need for personal protective equipment, sources of ignition, and potential need for **evacuation**.
- _____ Contact and involve local **Law Enforcement / Fire Officials** as needed.
- _____ Perform further/ additional notifications as per Figures 2.2 & 2.3.
- _____ Coordinate/perform **regulatory agency notification**, as the situation demands (notification procedures and telephone references are provided in Figure 2.8-2.13).

ALL INCIDENTS

**FIGURE 3.4
CRUDE OIL
MATERIAL SAFETY DATA SHEET**

SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: CRUDE OIL, SWEET
Product Description: Petroleum Crude Oil
SDS Number: 21341

Intended Use: Feedstock

COMPANY IDENTIFICATION

Supplier: Imperial Oil - Crude Oil Supply & Marketing
P.O. Box 2480, Station M
Calgary, ALBERTA T2P 3M9 Canada

24 Hour Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
Supplier General Contact	1-800-567-3776

SECTION 2 HAZARD IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

CLASSIFICATION:

Flammable Liquids — Category 2
Eye Irritation — Category 2A
Carcinogenicity — Category 1B
Specific Target Organ Toxicity — Single Exposure (Central Nervous System) — Category 3
Specific Target Organ Toxicity — Repeated Exposure — Category 2
Aspiration Hazard — Category 1

LABEL:

Pictogram:





Signal Word: Danger

Hazard Statements:

H225: Highly flammable liquid and vapour. H304: May be fatal if swallowed and enters airways. H319: Causes serious eye irritation. H336: May cause drowsiness or dizziness. H350: May cause cancer. H373: May cause damage to organs through prolonged or repeated exposure. Blood, Liver, Spleen, Thymus

Precautionary Statements:

P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P337 + P313: If eye irritation persists: Get medical advice/attention. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage. P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up. P501: Dispose of contents and container in accordance with local regulations.

Contains: PETROLEUM CRUDE OIL

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Hydrogen sulphide, a highly toxic gas, is expected to be present. Signs and symptoms of overexposure to hydrogen sulphide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odour does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Repeated exposure may cause skin dryness or cracking. May be irritating to the skin, nose, throat, and lungs. May cause central nervous system depression. Exposure to benzene is associated with cancer (acute myeloid leukaemia and myelodysplastic syndrome), damage to the blood-producing system, and



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serious blood disorders (see Section 11).

ENVIRONMENTAL HAZARDS

Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID: Health: 2 Flammability: 3 Reactivity: 0
HMIS Hazard ID: Health: 2* Flammability: 3 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a complex substance.

Hazardous Substance(s) or Complex Substance(s) in Hazardous product

Name	CAS#	Concentration*	GHS Hazard Codes
PETROLEUM CRUDE OIL	8002-05-9	100%	H225, H304, H336, H350(1B), H319(2A), H373, H401, H411

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	GHS Hazard Codes
Benzene	71-43-2	0.1 - < 1%	H225, H303, H304, H340(1B), H350(1A), H315, H319(2A), H372, H401
CYCLOHEXANE	110-82-7	1 - < 5%	H225, H304, H336, H315, H400(M factor 1), H410(M factor 1)
HYDROGEN SULPHIDE	7783-06-4	0.002 - 0.005%	H220, H280, H330(2), H400(M factor 1)
n-Hexane	110-54-3	1 - < 5%	H225, H304, H336, H361(F), H315, H373, H401, H411
Naphthalene	91-20-3	1 - < 5%	H228(2), H302, H351, H400(M factor 1), H410(M factor 1)
Toluene	108-88-3	1 - < 5%	H225, H304, H336, H361(D), H315, H373, H401, H412
XYLENES	1330-20-7	1 - < 5%	H226, H303, H304, H312, H332, H335, H315, H320(2B), H373, H401, H412

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4 FIRST-AID MEASURES

INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental



oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. For hot product: Immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This material, or a component, may be associated with cardiac sensitization following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5

FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Extremely Flammable. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Exposure to fire can generate toxic fumes. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Hydrogen sulphide, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

FLAMMABILITY PROPERTIES



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Flash Point [Method]: -20°C (-4°F) - 35°C (95°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D

SECTION 6	ACCIDENTAL RELEASE MEASURES
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NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H₂S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Chemical goggles are recommended if splashes or contact with eyes is possible. Work gloves that are resistant to aromatic hydrocarbons are recommended. If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated. Note: gloves made of PVA are not water-resistant, and are not suitable for emergency use. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic and, if necessary, heat resistant and thermal insulated material is recommended.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Warn other shipping. Allow liquid to evaporate from the surface. Remove from the surface by skimming or with suitable absorbents. If permitted by regulatory authorities, the use of suitable dispersants should be considered where permitted in local oil spill contingency plans. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS



Use booms as a barrier to protect shorelines. Use containment booms when the ambient temperature is below the flash point of the material. Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

H2S is present. Avoid all personal contact. Crude oils can contain trace levels of natural impurities including heavy metals, such as mercury, nickel or lead, as well as naturally occurring radioactive material. As the impurity content may concentrate during refining/processing, process operations, including equipment, materials and products should be evaluated to identify and manage any potential risks to health, safety or the environment or regulatory concerns.

Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Do not enter storage areas or confined spaces unless adequately ventilated. The toxic and olfactory (sense of smell) fatigue properties of hydrogen sulfide require that air monitoring alarms and respiratory protection be used where the concentration might be expected to reach a harmful level, such as in an enclosed space, heated transport vessel, or in a spill or leak situation.

Material may contain trace amounts of naturally occurring radioactive material (NORM), which will accumulate in process equipment and storage vessels. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard			Note	Source
Benzene		STEL	1 ppm			Supplier
Benzene		TWA	0.5 ppm			Supplier

Benzene		STEL	2.5 ppm		Skin	ACGIH
Benzene		TWA	0.5 ppm		Skin	ACGIH
CYCLOHEXANE		TWA	100 ppm			ACGIH
HYDROGEN SULPHIDE		STEL	14 mg/m ³	10 ppm		Supplier
HYDROGEN SULPHIDE		TWA	7 mg/m ³	5 ppm		Supplier
HYDROGEN SULPHIDE		STEL	5 ppm			ACGIH
HYDROGEN SULPHIDE		TWA	1 ppm			ACGIH
n-Hexane		TWA	50 ppm		Skin	ACGIH
Naphthalene		TWA	10 ppm		Skin	ACGIH
Toluene		TWA	20 ppm			ACGIH
XYLENES		STEL	150 ppm			ACGIH
XYLENES		TWA	100 ppm			ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Positive-pressure, air-supplied respirator in areas where H₂S vapours may accumulate.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves.

Eye Protection: Chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Colour: Dark Brown
Odour: Rotten Egg
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.661 - 1.013
Flammability (Solid, Gas): N/A
Flash Point [Method]: -20°C (-4°F) - 35°C (95°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: $\geq 20^{\circ}\text{C}$ (68°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): N/D
Vapour Pressure: 0 kPa (0 mm Hg) at 20°C - 106.4 kPa (800 mm Hg) at 20°C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: < 7 cSt (7 mm²/sec) at 40°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: $< 32^{\circ}\text{C}$ (90°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Not determined.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation: Data available.	May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation: Data available.	Irritating and will injure eye tissue. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 474 479
Carcinogenicity: Data available.	Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 414 421

Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: Data available.	May cause drowsiness or dizziness. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401 402
Repeated Exposure: Data available.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 411

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
HYDROGEN SULPHIDE	Inhalation Lethality: 4 hour(s) LC50 444 ppm (Gas) (Rat)
Naphthalene	Inhalation Lethality: 4 hour(s) LC50 > 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD 50 533 mg/kg (Mouse)

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Blood, Liver, Spleen, Thymus

Vapour/aerosol concentrations above recommended exposure levels are irritating to the eyes and respiratory tract, may cause headaches, dizziness, anaesthesia, drowsiness, unconsciousness and other central nervous system effects including death. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug.

Crude oil: Contains polycyclic aromatic compounds (PACs). Prolonged and / or repeated exposure by skin or inhalation of certain PACs may cause cancer of the skin, lung, and of other sites of the body. In animal studies, some crudes produced skin tumors in mice, while other crudes produced no tumors. Developmental studies of crude oil in lab animals showed reduced fetal weight and increased fetal resorptions at maternally toxic levels. Repeated dermal exposure to crude oils in rats resulted in toxicity to the blood, liver, thymus, and bone marrow.

Contains:

BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer in laboratory animal studies.

Crude oil: Contains polycyclic aromatic compounds (PACs). Prolonged and / or repeated exposure by skin or inhalation of certain PACs may cause cancer of the skin, lung, and of other sites of the body. In animal studies, some crudes produced skin tumors in mice, while other crudes produced no tumors. Developmental studies of crude oil in lab animals showed reduced fetal weight and increased fetal resorptions at maternally toxic levels. Repeated dermal exposure to crude oils in rats resulted in toxicity to the blood, liver, thymus, and bone marrow.

HYDROGEN SULPHIDE: Chronic health effects due to repeated exposures to low levels of H₂S have not been established. High level (700 ppm) acute exposure can result in sudden death. High concentrations will lead to cardiopulmonary arrest due to nervous system toxicity and pulmonary edema. Lower levels (150 ppm) may overwhelm sense of smell, eliminating warning of exposure. Symptoms of overexposure to H₂S include headache, fatigue, insomnia, irritability, and gastrointestinal problems. Repeated exposures to approximately 25 ppm will irritate mucous membranes and the respiratory system and have been implicated in some eye damage. **NAPHTHALENE:** Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene

caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.

N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown. **TOLUENE :** Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects. **ETHYLBENZENE:** Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

CMR Status:

Chemical Name	CAS Number	List Citations
Benzene	71-43-2	1, 4, 5
CYCLOHEXANE	110-82-7	4
ETHYL BENZENE	100-41-4	3, 4
HYDROGEN SULPHIDE	7783-06-4	4
n-Hexane	110-54-3	4
Naphthalene	91-20-3	3, 4
Toluene	108-88-3	4
XYLENES	1330-20-7	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1
 2 = IARC 2A

3 = IARC 2B
 4 = ACGIH ALL

5 = ACGIH A1
 6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Low molecular wt. component -- Expected to be inherently biodegradable



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High molecular wt. component -- Expected to biodegrade slowly.

Photolysis:

More water soluble component -- Expected to degrade at a moderate rate in water when exposed to sunlight.

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Components -- Has the potential to bioaccumulate.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Invertebrate	EC50 10 - 100 mg/l: data for similar materials

SECTION 13

DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14

TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
UN Number: 1267
Packing Group: I
Special Provisions: 92,106,150



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LAND (DOT)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
ID Number: 1267
Packing Group: I
ERG Number: 128
Label(s): 3
Transport Document Name: UN1267, PETROLEUM CRUDE OIL, 3, PG I

SEA (IMDG)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1267
Packing Group: I
Marine Pollutant: Yes
Label(s): 3
Transport Document Name:

AIR (IATA)

Proper Shipping Name: PETROLEUM CRUDE OIL
Hazard Class & Division: 3
UN Number: 1267
Packing Group: I
Label(s) / Mark(s): 3
Transport Document Name: UN1267, PETROLEUM CRUDE OIL, 3, PG I

SECTION 15

REGULATORY INFORMATION

CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.

Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA): AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
CYCLOHEXANE	110-82-7	6
n-Hexane	110-54-3	6
Naphthalene	91-20-3	6
Toluene	108-88-3	6



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XYLENES	1330-20-7	6
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--REGULATORY LISTS SEARCHED--

1 = TSCA 4
2 = TSCA 5a2
3 = TSCA 5e
4 = TSCA 6
5 = TSCA 12b
6 = NPRI

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

- H220: Extremely flammable gas; Flammable Gas, Cat 1
- H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
- H226: Flammable liquid and vapour; Flammable Liquid, Cat 3
- H280: Contains gas under pressure; may explode if heated; Pressurized Gas
- H302: Harmful if swallowed; Acute Tox Oral, Cat 4
- H303: May be harmful if swallowed; Acute Tox Oral, Cat 5
- H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
- H312: Harmful in contact with skin; Acute Tox Dermal, Cat 4
- H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
- H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
- H320(2B): Causes eye irritation; Serious Eye Damage/Irr, Cat 2B
- H330(2): Fatal if inhaled; Acute Tox Inh, Cat 2
- H332: Harmful if inhaled; Acute Tox Inh, Cat 4
- H335: May cause respiratory irritation; Target Organ Single, Resp Irr
- H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
- H340(1B): May cause genetic defects; Germ Cell Mutagenicity, Cat 1B
- H350(1A): May cause cancer; Carcinogenicity, Cat 1A
- H350(1B): May cause cancer; Carcinogenicity, Cat 1B
- H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
- H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
- H361(F): Suspected of damaging fertility; Repro Tox, Cat 2 (Fertility)
- H372: Causes damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 1
- H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
- H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
- H401: Toxic to aquatic life; Acute Env Tox, Cat 2
- H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
- H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
- H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Updates made in accordance with implementation of GHS requirements.

THIS SDS COVERS THE FOLLOWING MATERIALS: BAKKEN SASKATCHEWAN | BC LT | BONNIE GLEN SWEET | DRAYTON VALLEY SWEET | GIBSONS MIXED BLEND SWEET-HARDISTY | KOCH SWEET BLEND | MIXED BLEND SWEET | NEXUS SWEET | NORMAN WELLS | ONT. SWEET | PEACE SWEET | RAINBOW | RANGELAND LT SWEET | SWAN HILLS | TERRA NOVA | WTI LIGHT



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**FIGURE 3.5
HYDROGEN SULFIDE
MSDS**

Material Safety Data Sheet



Hydrogen sulfide

1. Product and company identification

Product name	: Hydrogen sulfide
Synonym	: Hydrogen sulfide; Hydrogen sulfide (H ₂ S); Sulfuretted hydrogen; Sewer gas; Hydrosulfuric acid; dihydrogen sulfide
Material uses	: Various
CAS number	: 7783-06-4
Supplier/Manufacturer	: Air Liquide Canada Inc. 1250, René-Lévesque West, Suite 1700 Montreal, QC H3B 5E6 www.airliquide.ca 1-800-817-7697
Prepared by	: IHS
In case of emergency	: (514) 878-1667

2. Hazards identification

Physical state	: Gas. [Compressed gas.]
Color	: Colorless.
Odor	: Rotten eggs. [Strong]
Emergency overview	
Signal word	: DANGER!
Hazard statements	: FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS. HARMFUL IF INHALED. INHALATION CAUSES HEADACHES, DIZZINESS, DROWSINESS AND NAUSEA AND MAY LEAD TO UNCONSCIOUSNESS. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY CAUSE SKIN IRRITATION. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
Precautions	: Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not breathe gas. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling. Keep container tightly closed.
Routes of entry	: Dermal contact. Eye contact. Inhalation.
Potential acute health effects	
Inhalation	: Toxic by inhalation. Can cause central nervous system (CNS) depression. Irritating to respiratory system.
Ingestion	: As this product is a gas, refer to the inhalation section.
Skin	: Slightly irritating to the skin. Contact with rapidly expanding gas may cause burns or frostbite.
Eyes	: Irritating to eyes. Contact with rapidly expanding gas may cause burns or frostbite.
Potential chronic health effects	
Chronic effects	: May cause target organ damage, based on animal data.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.

2. Hazards identification

- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : May cause damage to the following organs: cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS).

Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:
nausea or vomiting
respiratory tract irritation
coughing
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness
- Ingestion** : No specific data.
- Skin** : Adverse symptoms may include the following:
irritation
redness
- Eyes** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

3. Composition/information on ingredients

Name	CAS number	%
hydrogen sulfide	7783-06-4	100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

4. First aid measures

- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Antidote information

Product/ingredient name	Antidote information
No antidote information known	

- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : Contains gas under pressure. Flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Extinguishing media

- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
sulfur oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

- Personal precautions** : Accidental releases pose a serious fire or explosion hazard. Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8). If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. Never fix a leak while the system is under pressure. If leak is on container or container valve, contact the closest Air Liquide Canada location.
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

6. Accidental release measures

Methods for cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Contains gas under pressure. Do not get in eyes or on skin or clothing. Do not breathe gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to usage point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure 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 to the cylinder. Do not tamper with (valve) safety device. Close valve after each use and when empty.
- Storage** : Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52°C/125°F. Cylinders must 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. Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Protect from sunlight. Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use.

8. Exposure controls/personal protection

<u>Occupational exposure limits</u>		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
hydrogen sulfide	US ACGIH 6/2013	1	-	-	5	-	-	-	-	-	
	AB 4/2009	10	14	-	-	-	-	15	21	-	
	BC 7/2013	-	-	-	-	-	-	10	-	-	
	ON 1/2013	10	-	-	15	-	-	-	-	-	
	QC 12/2012	10	14	-	15	21	-	-	-	-	

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

8. Exposure controls/personal protection

- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

- Physical state** : Gas. [Compressed gas.]
- Flash point** : Not available.
- Auto-ignition temperature** : 259.85°C (499.7°F)
- Flammable limits** : Lower: 4%
Upper: 44%
- Color** : Colorless.
- Odor** : Rotten eggs. [Strong]
- Molecular weight** : 34.08 g/mole
- Molecular formula** : H₂S
- pH** : <7 [Conc. (% w/w): 10%]
- Boiling/condensation point** : -59.99°C (-76°F)

9. Physical and chemical properties

Melting/freezing point	: -82.77°C (-117°F)
Density	: Not available.
Vapor pressure	: Not available.
Vapor density	: 1.19 [Air = 1]
Odor threshold	: 0.13 ppm
Evaporation rate	: Not available.
Viscosity	: Not available.
Solubility	: Partially soluble in the following materials: cold water.
Water solubility (g/l)	: 5 g/l
LogK_{ow}	: Not available.

10. Stability and reactivity

Chemical stability	: The product is stable.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Incompatible materials	: Reactive or incompatible with the following materials: oxidizing materials, metals, acids and alkalis.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
	Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
hydrogen sulfide	LC50 Inhalation Gas.	Rat	444 ppm	4 hours
	LC50 Inhalation Vapor	Rat	700 mg/m ³	4 hours

Chronic toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitizer

Not available.

Carcinogenicity

Classification

Not available.

Mutagenicity

Not available.

Teratogenicity

Not available.

11. Toxicological information

Reproductive toxicity

Not available.

12. Ecological information

Ecotoxicity : This material is very toxic to aquatic life with long lasting effects.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
hydrogen sulfide	Acute EC50 62 µg/l Fresh water	Crustaceans - Gammarus pseudolimnaeus	2 days
	Acute LC50 2 µg/l Fresh water	Fish - Coregonus clupeaformis - Yolk-sac fry	96 hours

Persistence/degradability

Not available.

Partition coefficient: n-octanol/water : Not available.

Bioconcentration factor : Not available.

Mobility : Not available.

Toxicity of the products of biodegradation : Not available.

Other adverse effects : No known significant effects or critical hazards.



13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled.

Disposal should be in accordance with applicable regional, national and local laws and regulations.






Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1053	HYDROGEN SULFIDE	2.3 (2.1)	-	 	<u>Explosive Limit and Limited Quantity Index</u> 0 <u>ERAP Index</u> 500 <u>Passenger Carrying Ship Index</u> Forbidden <u>Passenger Carrying Road or Rail Index</u> Forbidden

Hydrogen sulfide

14. Transport information

IMDG Class	UN1053	HYDROGEN SULPHIDE. Marine pollutant (hydrogen sulfide)	2.3 (2.1)	-	  	<p>The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.</p> <p>Emergency schedules (EmS) F-D, S-U</p>
IATA-DGR Class	UN1053	Hydrogen sulphide	2.3 (2.1)	-	 	<p>The environmentally hazardous substance mark may appear if required by other transportation regulations.</p> <p>Passenger and Cargo Aircraft Quantity limitation: Forbidden Packaging instructions: Forbidden</p> <p>Cargo Aircraft Only Quantity limitation: Forbidden Packaging instructions: Forbidden</p> <p>Limited Quantities - Passenger Aircraft Quantity limitation: Forbidden Packaging instructions: Forbidden</p> <p>Special provisions A2</p>

PG* : Packing group

15. Regulatory information

United States inventory (TSCA 8b) : This material is listed or exempted.

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : This material is listed.

CEPA Toxic substances : This material is not listed.

Canada inventory : This material is listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

15. Regulatory information

International lists	: Australia inventory (AICS): This material is listed or exempted. China inventory (IECSC): This material is listed or exempted. Japan inventory: This material is listed or exempted. Korea inventory: This material is listed or exempted. Malaysia Inventory (EHS Register): Not determined. New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted. Philippines inventory (PICCS): This material is listed or exempted. Taiwan inventory (CSNN): This material is listed or exempted.
Chemical Weapons Convention List Schedule I Chemicals	: Not listed
Chemical Weapons Convention List Schedule II Chemicals	: Not listed
Chemical Weapons Convention List Schedule III Chemicals	: Not listed

16. Other information

Label requirements : FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS. HARMFUL IF INHALED. INHALATION CAUSES HEADACHES, DIZZINESS, DROWSINESS AND NAUSEA AND MAY LEAD TO UNCONSCIOUSNESS. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY CAUSE SKIN IRRITATION. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :

Health	*	2
Flammability		4
Physical hazards		2
Personal protective equipment		G

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

Date of issue : 5/1/2014.

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Indicates information that has changed from previously issued version.

Notice to reader

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4.0 RESPONSE TEAMS

4.1 INTRODUCTION

The Company uses the National Incident Management System (NIMS)-Incident Command System (ICS) (Figure 4.1) to manage emergency response activities. The NIMS-ICS is a management tool which is readily adaptable to very small incidents as well as those of considerable significance and will be implemented for all discharge incidents with staffing levels adjusted as required to meet the specific needs (size and severity) of the incident.

First response to a discharge will be provided by the Local Response Team (Section 4.3). **In the event that the response operation is beyond the capability of the Local Response Team (LRT)**, the Incident Commander will consult with Management to evaluate the severity of the situation and determine whether activation of the Spill Management Team (SMT) is necessary.

The Company has adapted the NIMS-ICS-based response team to facilitate a rapid and efficient assessment of the situation and transition from reactive to proactive response operations. The activation, notification and roles and responsibilities of key Spill Management Team members are included within this Plan.

The goal of incident and crisis response operations is the restoration of normal operations while minimizing impacts to people, property, the environment, and the Company. To achieve this goal, response personnel must be able to move from a reactive to a project mode of operations by establishing and maintaining command and control over the situation. For incident response operations, this objective should be addressed by observing standard operating procedures that allow response personnel to rapidly and efficiently determine and communicate effectively about the incident and what is being done to address the incident.

During crisis response operations, crisis managers should address this objective by analyzing the information generated by incident response personnel and determining the implications of the incident on the Company. The analysis should focus on human resource, financial, business, legal, and external affairs issues.

If an incident escalates to require significant NIMS-ICS staffing, then additional support resources may be activated. Corporate Office management may activate supplemental team members to travel to the site to evaluate the incident, report back and to provide staffing to the NIMS-ICS if required. Additional support can be established at a Command Center to provide technical, logistical and operational support. Finally, a team of senior management and staff can be formed to provide a focal point for communications and coordination. This group coordinates policies, procedures, and develops and selects appropriate strategies.

A detailed explanation of the NIMS-ICS and the roles and responsibilities for primary members of the Spill Management Team is provided in Appendix B.

4.2 QUALIFIED INDIVIDUAL

Vital duties of the Qualified Individual (QI) include ensuring the following are accomplished:

- Activate internal alarms and hazard communication systems to notify all Facility personnel.
- Notify all response personnel, as needed.
- Identify the character, exact source, amount, and extent of the release, as well as the other items needed for notification.
- Notify and provide necessary information to the appropriate Federal, State, Provincial and Local authorities with designated response roles, including the National Response Center (NRC) and State Emergency Response Commission (SERC) in the U.S., the Transportation Safety Board (TSB) and MDDELCC in Canada, concerned municipalities in Quebec, and local response agencies.
- Assess the interaction of the spilled substance with water and/or other substances stored at the Facility and notify response personnel at the scene of that assessment.
- Assess the possible hazards to human health and the environment due to the release. This assessment must consider both the direct and indirect effects of the release (i.e., the effects of any toxic, irritating, or asphyxiating gases that may be generated, or the effects of any hazardous surface water runoffs from water or chemical agents used to control fire and heat-induced explosion).
- Assess and implement prompt removal actions to contain and remove the substance released.
- Coordinate rescue and response actions as previously arranged with all response personnel.
- Activate and engage in contracting with oil spill removal organizations.
- Use authority to immediately access company funding to initiate clean-up activities.
- Direct clean-up activities until properly relieved of this responsibility.

Specific Requirements for Qualified Individual

- Available on a 24 hour basis and able to arrive at the facility in a reasonable time.
- Be familiar with the implementation of the facility response plan.
- Be trained in the responsibilities of the qualified individual under the response plan.
- Be located in the United States (for U.S. Spills / Emergencies).
- Must speak fluent English (for U.S. Spills / Emergencies).

4.2 QUALIFIED INDIVIDUAL (cont'd)

Training / Experience Requirements for the Qualified Individual (computer - based and seminar).

- Training in or has knowledge of applicable OSHA standards.
- Knowledge of how to implement response plan.
- Knowledge of the US National Contingency Plan (NCP) and US Area Contingency Plan (APC) requirements.
- Knowledge of response plan scope and qualified individual responsibilities.
- Has authority to commit resources and effectively assess and adjust resource requirements.
- Knowledge of procedures to obtain and obligate funds.
- "First Responder Awareness Level" training and refresher per U. S. 29 CFR 1910.120(q) (for US Emergencies).

4.3 LOCAL RESPONSE TEAM (LEVEL 1 AND 2)

- The first person on scene will function as the Incident Commander and person-in-charge until relieved by an authorized supervisor.
- Once the Operations Manager arrives on-scene, he will assume the position of Incident Commander (IC). Depending on the circumstances, transfer of command may take place as more senior management respond to the incident.
- The number of positions/personnel required to staff the Spill Management Team will depend on the size and complexity of the incident. The duties of each position may be performed by the IC directly or delegated as the situation demands. The IC is always responsible for directing the response activities and will assume the duties of all the primary positions until the duties can be delegated to other qualified personnel.
- A typical Local Response Team is detailed in Figure 4.2. Job descriptions are detailed in Appendix B for the primary response team positions.
- Response times for the Local Response Team is as follows:
 - South Portland Tank Farm & Pier - immediate to 30 minutes
 - Mainline and Pump Stations - Immediate to 2 hours
 - Montreal terminal - Immediate to 2 hours

4.4 SPILL MANAGEMENT TEAM (LEVEL 2 AND 3)

For spill response operations outside the capabilities of the Local Response Team, the QI (or QI/A) and Incident Commander will determine the need for mobilization of the PMPL Spill Management Team (SMT). The members of the Local Response Team will become members of the Spill Management Team. The

4.4 SPILL MANAGEMENT TEAM (LEVEL 2 AND 3) (cont'd)

number of positions/personnel required to staff the Spill Management Team will depend on the size and complexity of the incident. PMPL's Spill Management Team is detailed in Figure 4.3.

Organization

The Spill Management Team includes five (5) functional areas: Command, Operations, Planning, Logistics, and Finance. The functional areas are illustrated in Figure 4.3.

Responsibilities

The responsibilities of the Spill Management Team are as follows:

- Operations, Planning, Logistics, and Finance report directly to Command.
- When IC does not assign the position, IC retains that responsibility.
- The five (5) functional areas of the Team are modular in design and can be expanded with additional staff, reporting under the main areas, to meet the requirements of large scale or complex emergencies.
- The IC can set up functional groups or assign groups that are assigned to geographical areas.

The Spill Management Team job positions are described in Appendix B. Response time for the Spill Management Team is: immediate to 2 hours.

4.5 RESPONSE TEAM TRAINING

Knowledge of roles and responsibilities

One of the key elements of a well-planned emergency response is the knowledge that each responder has of their role and responsibilities. If everyone knows what their tasks are, if there is a trained substitute for all the key positions, then the response will be coordinated and tasks will not be duplicated. These roles and responsibilities must be well understood and accepted by every responder. It is the responsibility of every responder to have a trained substitute, who comprehends well his role and responsibilities as a substitute. The responder, in choosing his substitute, must make sure that he has the appropriate authority to perform his tasks during an emergency. It is important to verify that the emergency response responsibilities of a responder are not in conflict with his normal responsibilities at the Facility. During an emergency, the responders must safely stop their assigned duties and establish a priority of actions that must be performed in order to terminate the emergency.

Emergency responders have two levels of responsibilities:

A legal responsibility is associated with the National, Provincial and State Laws.

A moral responsibility since when a procedure is not observed, there could be
4.5 RESONSE TEAM TRAINING (cont'd)

consequences for the responder himself, for other employees, for the surrounding population, for the environment, and for the Company.

The Company provides training related to discharge prevention, testing and response, including measures to repair pipeline ruptures and mitigate discharges, as well as emergency measures regarding Fire/Explosion, Security and medical incidents.

The Department Heads are responsible for the coordination of employee schedules, location and implementation of the emergency response training exercises throughout the year. The Operations Manager is responsible for coordinating the annual corporate exercise. The Human resources specialist is responsible for records maintenance for the training and exercises.

The effectiveness of each training program is closely monitored by the Department Heads.

Through the various training methods described below the Company's training program is intended to ensure the following results:

That all personnel know:

- Their responsibilities under the Plan.
- The name, address and procedures for contacting the operator on a 24-hour basis.
- The name of, and procedures for contacting the Qualified Individual on a 24-hour basis.

That all reporting personnel know:

- The storage facilities, pipelines and response zone details for the affected area (Figures 1.5, 1.10 & 1.11).
- The telephone number of the National Response Center or MELCC and other required notifications (Section 2.0 & Figures 2.8 – 2.13).
- The notification process. (Section 2.0 & Figures 2.2 & 2.3).

That all response personnel know:

- The characteristics and hazards of the oil possibly discharged from PMPL installations (Section 3.0).
- The conditions that are likely to worsen emergencies, including the consequences of facility malfunctions, and the appropriate corrective actions.
- The steps necessary to control any accidental discharge of oil and to minimize the potential for fire, explosion, toxicity or environmental damage (Section 3.0).
- The Company requires that all response personnel, including contractors and casual labor, have the appropriate training necessary to serve on a response team during an emergency. Team members will receive training in the following:

4.5 RESPONSE TEAM TRAINING (cont'd)

Response Plan Review

- All Local Response Team Members should review their Integrated Contingency Plan whenever their job position or responsibilities change under the Plan. A copy of this Plan will be available at all times to Team Members.

HAZWOPER (29 CFR 1910.120)

- In the U.S., Federal and state regulations require that response team members maintain up-to-date HAZWOPER training necessary to function in their assigned positions. At a minimum, The U.S. Company employees will receive "First Responder Awareness Level" training. All "Non-Company" personnel responding to an incident must satisfy the applicable HAZWOPER training requirements of 29 CFR 1910.120.

OSHA HAZWOPER TRAINING REQUIREMENTS		
Responder Classification	Required Training Hours	Refresher
29 CFR 1910.120(q) Emergency Response		
First Responder - Awareness Level	2-4 hrs demonstration of competency	same
First Responder - Operations Level	8 hrs	8 hrs
Hazardous Materials Technician	24 hrs plus competency	8 hrs
Hazardous Materials Specialist	24 hrs plus competency in specialized areas	8 hrs
Incident Commander	24 hrs plus competency	8 hrs
29 CFR 1910.120(e) Clean Up Sites		
General Site Workers	40 hrs / 3 days on the job training	8 hrs
Occasional Workers (Limited Tasks)	24 hrs / 1 day on the job training	8 hrs
General Site Workers (Low Hazard)	24 hrs / 1 day on the job training	8 hrs
Supervisors	8 hrs supervisor training	8 hrs
29 CFR 1910.120(p)(7)(8) RCRA TSD Sites		
New Employees	24 hrs	8 hrs
Current Employees*	24 hrs	8 hrs

* Previous work experience and/or training certified as equivalent by employer.

Incident Command System

- Response team members will receive ICS training and may also receive supplemental training in other, related general topics.

Volunteers

- The Company will not use volunteers for emergency incident response and no company provisions exist to train them. Volunteers may be used by government response entities, as allowed by applicable policies/procedures.

4.5 RESPONSE TEAM TRAINING (cont'd)

Supervisor/Team Meetings

- Periodic Supervisor/Team meetings are conducted by the various Areas and Teams with essential personnel assigned to the Response Team in attendance. These meetings typically include a review of various emergency response procedures contained in this Plan. The standard agenda could include some or all of the following:
 - Overview of emergency response.
 - Review and discussion of the Company response actions (with a focus on notification, assessment of severity of the event, functional activities/roles, and organization structure).
 - Review of the emergency response equipment and site plans.
 - A table top emergency response exercise.

Training Records Maintenance

- The Company maintains records sufficient to document training of its facility personnel and Spill Management Team. In the US, these records will be maintained at the company's Corporate Headquarters in South Portland for as long as individuals are assigned duties under the emergency response plan and will be made readily available for inspection upon request by the U.S. Coast Guard, U.S. Environmental Protection Agency, U.S. DOT-PHMSA or any other regulatory agency. In Canada, these records will be maintained at the Montreal Pipe Line Offices in Montreal and will be made readily available for inspection upon request by Environment Canada, MELCC, CER or any other regulatory agency. PMPL's oil spill recovery organizations will maintain records sufficient to document training of the organization's personnel for as long as individuals are assigned duties under the emergency response plan. These records would be readily available for inspection upon request by PMPL's management personnel, its Qualified Individual(s), the U.S. Coast Guard, the U.S. Environmental Protection Agency, and the Canada Energy Regulator, Environment Canada or other regulatory agencies.

Contractor Training

- The Company also recognizes that contract personnel must also have sufficient training to respond to the Company's emergency response situations. In the US, at a minimum, contractors are required to be trained in accordance with US 29 CFR 1910.120. The Company communicates this training need to its key contractors during contract negotiations and often specifically spells out this requirement in its contracts. The Company also tends to use well-known spill response contractors whose reputation and experience levels help ensure personnel who respond will be trained to appropriate levels.

4.5 RESPONSE TEAM TRAINING (cont'd)

Training Qualifications

- As no formalized method of certifying training instructors has been provided by OSHA or by Canadian Legislation, the Company ensures the competency of its instructors and training organizations by selecting trainers and/or organizations with professional reputations and extensive hands-on and classroom experience in their subject matter. Company personnel with responsibility to coordinate the training program also conduct periodic informal audits of training courses selected for the Company's training program to ensure their suitability for the program.

Educating and Informing Municipalities and Associated Response Agencies

- The Onshore Pipeline Regulation, specifies education and information responsibilities in Articles 33, 34 and 35. See Appendix A, "Onshore Pipeline Regulations" (SOR 99/294) for descriptions.

Onshore Pipeline Regulation requirements - Canada

- The Onshore Pipeline Regulation, specifies:

A company shall take all reasonable steps to inform all persons who may be associated with an emergency response activity on the pipeline of the practices and procedures to be followed and make available to them the relevant information that is consistent with that which is specified in the emergency procedures manual.

A company shall develop a continuing education program for the police, fire departments, medical facilities, other appropriate organizations and agencies and the public residing adjacent to the pipeline to inform them of the location of the pipeline, potential emergency situations involving the pipeline and the safety procedures to be followed in the case of an emergency.

4.6 RESPONSE TEAM EXERCISES

Local and Spill Management Team members, government agencies, contractors, and other resources must participate in response exercises required by Federal, state, or local regulations and as detailed in the "National Preparedness for Response Exercise Program (PREP) Guidelines". The Company will conduct announced and unannounced drills to maintain compliance, and each plan-holder must conduct at least one exercise annually. The following table lists the triennial exercise cycle for U.S. facilities (see PREP Guidelines for full details).

4.6 RESPONSE TEAM EXERCISES (cont'd)

Triennial Cycle		
Total Number	Frequency	Exercise Type/Description
12	Quarterly	QI Notification Exercise
6	Annual (DOT) Semi-Annual (EPA)	Equipment Deployment Exercise <i>(May consist entirely of operator owned equipment, a combination of OSRO and operator equipment or OSRO equipment).</i>
3	Annual	Response Team Tabletop Exercise
3	Not more than Tri-annually	Unannounced Exercise <i>(not a separate exercise)</i> Actual response can be considered as an unannounced exercise.
NOTE: All response plan components must be exercised at least once in the Cycle.		

Quarterly QI Notification Exercise

- **Scope:** Exercise notification process between key facility personnel and the qualified individual to demonstrate the accessibility of the Qualified Individual.
- **Objective:** Contact by telephone, radio, message-pager, or facsimile and confirmation established as indicated in Response Plan.
- **General:** All personnel receiving notification shall respond to the notification and verify their receipt of the notification. Personnel who do not respond should be contacted to determine whether or not they received the notification.

Annual and Semi-Annual Equipment Deployment Exercise (for facilities with equipment)

- **Scope:** Demonstrate ability to deploy spill response equipment identified in the ICP.
 - May consist entirely of operator owned equipment, a combination of OSRO and operator equipment, or OSRO equipment.
 - The number of equipment deployment exercises conducted should be such that equipment and personnel assigned to each response zone are exercised at least once a year. If the same personnel and equipment respond to multiple zones, they need only exercise once per year. If different personnel and equipment respond to various response zones, each must participate in an annual equipment deployment exercise.

4.6 RESPONSE TEAM EXERCISES (cont'd)

- **Objective:** Demonstrate personnel's ability to deploy and operate response equipment. Ensure that the response equipment is in proper working order. Test different intervention scenarios that reflect all circumstances of its operations such as winter operations.
- **General:** The Facility may take credit for actual equipment deployment to a spill, or for training sessions, as long as the activities are properly documented.

Annual Response Team Tabletop Exercise

- **Scope:** Demonstration of the response team's ability to organize, communicate, and make strategic decisions regarding population and environmental protection during a spill event.
- **Objective:** Designated Spill Management Team members should demonstrate the following:
 - Knowledge of the Plan.
 - Ability to organize team members effectively.
 - Communications system.
 - Interface with a unified command.
 - Coordination for response capability as outlined in Response Plan.
- **General:** Credit should be taken for an actual spill response when these objectives are met, the response is evaluated and, a proper record is generated.

Government-Initiated Unannounced Exercise (US Only)

- **Scope:** Demonstrate ability to respond to a worst case discharge spill event.
- **Objectives:** Designated Spill Management Team members should demonstrate adequate knowledge of their Response Plan and the ability to organize, communicate, coordinate, and respond in accordance with that plan.
- **General:** Maximum of 20 unannounced PHMSA exercises conducted annually for the pipeline industry as a whole. A single owner or operator will not be required to participate in a PHMSA-initiated unannounced exercise, if they have already participated in one within the previous 36 months.

4.6 RESPONSE TEAM EXERCISES (cont'd)

Exercise Documentation

- PMPL would ensure that records sufficient to document drills for its facility personnel and the Spill Management Team and equipment are maintained for a minimum of three years following completion of drills. Similarly, PMPL would ensure that records sufficient to document the drills of its oil spill response organization and response resources identified in this plan are maintained for a minimum of three years. In the US, all records will be stored at the corporate headquarters and made readily available for inspection upon request by the U.S. Coast Guard, the U.S. Environmental Protection Agency, or any other regulatory agency. In Canada, these records will be maintained at the Montreal Pipe Line Offices in Montreal and will be made readily available for inspection upon request by Environment Canada and Climate Change, MELCC or other regulatory agency.
- PMPL conducts its exercises in accordance with the National Preparedness for Response Exercise Program guidelines in the US and CAN/CSA Z731-03 in Canada. These exercises are self-evaluated and certified. Detailed records of these drills are maintained by the Operations Manager and typically consist of:
 - The type of exercise;
 - Date and time of the exercise;
 - A description of the exercise;
 - Agendas;
 - Attendance Rosters/ Sign-in sheets;
 - The objectives met in the exercise;
 - Exercise critique comments;
 - National Preparedness for Response Exercise Program and Exercise forms;
 - Exercise supporting documentation;
 - Certificates of completion for personnel and the organization
 - Photographs of exercise; and
 - Evaluation forms

How to conduct exercises

The following information are excerpts of guidelines taken from CAN/CSA Z731-03. An exercise enables a person to learn by putting into practice concepts learned in courses. There are two categories of exercises: management exercises and operational exercises. Management exercises are the more difficult exercises to plan. The objective of these exercises is to determine, to mobilize, to direct, and to support personnel, equipment, and response procedures necessary during an incident at the facility. Management exercises may be of two types: a functional management exercise and a combined management exercise. The functional exercise will test a specific function without any regards to other functions normally managed during an incident (ex.: how to obtain the necessary resources during a major spill). A combined exercise will test more than one function: safety of employees, cleanup of the site, etc.

4.6 RESPONSE TEAM EXERCISES (cont'd)

How to conduct exercises (Cont'd)

Amongst the principal activities to consider during a response are:

- Gathering and assessing appropriate data;
- Acknowledgement of major problems and their classification by priority;
- Problem solving;
- Assignment of human resources and material;
- Decision making;
- Elaboration of strategic and tactical action plans.

The goals of a management exercise are to verify the ability of the company to manage effectively different response functions (see list below), to assess the knowledge of the response teams (Local Response Team – LRT and Spill Management Team- SMT), and to promote collaboration between the responders. A response function has:

- A clearly stated objective and realistic and reachable sub-objectives;
- A series of tasks performed in order to reach the different objectives;
- Means, such as human resources and equipment, needed to reach the objectives;
- Terms and conditions for the organization, the classification and the orientation of tasks needed to reach the objectives.

The following list describes the major response functions and their management objective during an exercise:

1. Notification: The capacity of PMPL to notify, to inform, and to mobilize the necessary personnel during an emergency;
2. Management of incident/integration of plans (e.g. municipal Plan, governmental procedures, etc.): The ability of PMPL to direct, coordinate and control a response operation with an appropriate response structure;
3. Analysis of the situation: The capacity of PMPL to evaluate the gravity and the consequences of an incident, as well as to determine the major problems associated with the incident;
4. Elaboration of a strategy: The ability of PMPL to establish an appropriate response strategy, as well as a resource mobilization strategy;
5. Utilization of emergency equipment: The level of preparation of the LRT and SMT, and of the LRT and SMT to deploy the proper equipment;
6. Rescue: Ability of the LRT / SMT to arrange for rescue of personnel with appropriate equipment and in collaboration with other external resources;
7. Protection of the environment: Ability of the LRT / SMT to protect the environment using appropriate equipment;

4.6 RESPONSE TEAM EXERCISES (cont'd)

How to conduct exercises (Cont'd)

8. Evaluation and clean-up of the site: Ability of PMPL to coordinate the clean-up actions in order to mitigate the impacts of the incident on the environment;
9. Specific procedures: Ability of the LRT/SMT to react to specific risks associated with the activities of the Company and according to specific weather or seasonal conditions;
10. Communications: Ability of the Company to allow easy communications between internal and external responders, and between the EOC and the field personnel;
11. Logistics: Ability of the Company to ensure the availability of personnel and equipment during an emergency response;
12. Management of wastes and clean-up: Ability of the Facility to manage all wastes produced during the emergency, with respect to provincial and federal legislations;
13. Public affairs and media relation: Ability of the Facility to forward precise information to the media (on a regular basis);
14. Legal support: Documentation and legislative conformity with respect to prevention of incidents, emergency procedures, notification procedures, and responsibility during emergencies;
15. Safety of operations: Ability of the Facility to give information relative to the risks involved with response operations and clean up of sites during an emergency.

4.7 SITE SAFETY AND HEALTH PLAN(S) DEVELOPMENT

The Safety Representative will be responsible for preparing a Site Safety and Health Plan (SSHP) that will establish site specific policies, practices, and procedures to protect workers and the public from coming into contact with potential chemical and/or physical hazards. The SSHP or designee must be available at the site for worker and government review (upon request). Workers entering the site for the first time must review the SSHP prior to entry. Daily SSHP briefings should be conducted. The SSHP must be modified as necessary and address multiple work environments, if applicable. The SSHP will contain the following information:

- Guidance on who is responsible for monitoring site safety.
- A characterization of the risks associated with each operation that will be conducted in the area covered by the plan.
- A description of known chemical and physical hazards, and the measures that have been instituted to eliminate the hazards or reduce them to an acceptable level.
- Guidance on the level of HAZWOPER training required for workers commensurate with their job responsibilities.
- A definition of site control measures, including a site map.

4.7 SITE SAFETY AND HEALTH PLAN(S) DEVELOPMENT (cont'd)

- A description of decontamination procedures for personnel and equipment.

The following should be included:

- Contaminated Personnel Protective Equipment (PPE) cleaning and removal Procedures
- Containment PPE cleaning precautions for decontaminating personnel.

The Site Safety and Health Plan format that will be used is located in Appendix K.

**FIGURE 4.1
NATIONAL INCIDENT MANAGEMENT SYSTEM
INCIDENT COMMAND SYSTEM
(NIMS – ICS)**

Sample Incident Command Organizational Chart

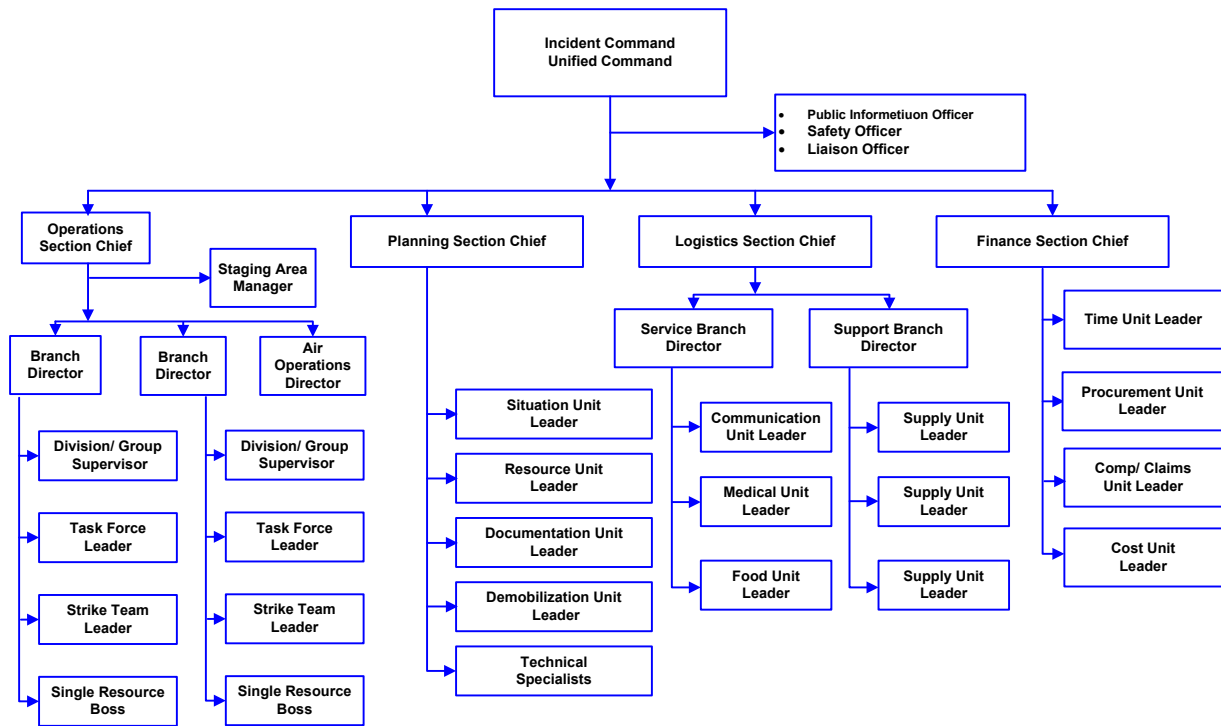


FIGURE 4.2

LOCAL RESPONSE TEAM

(Level 1 and Level 2 Spills)

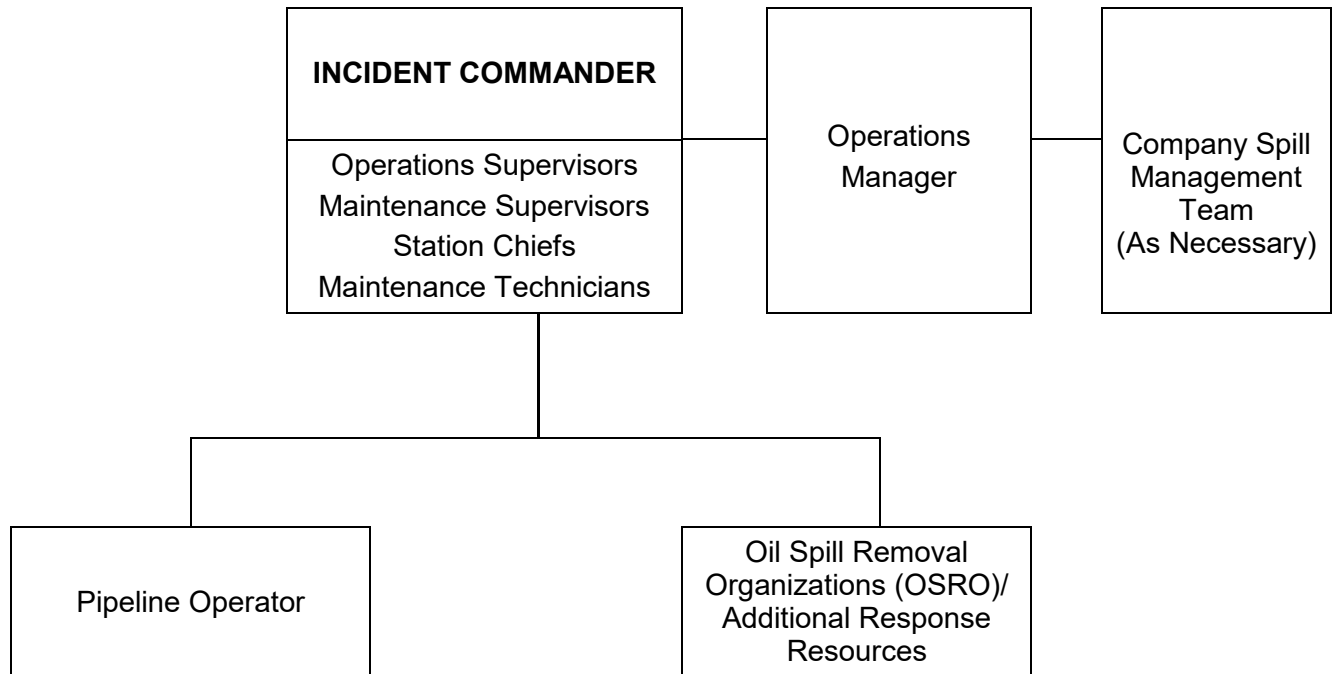
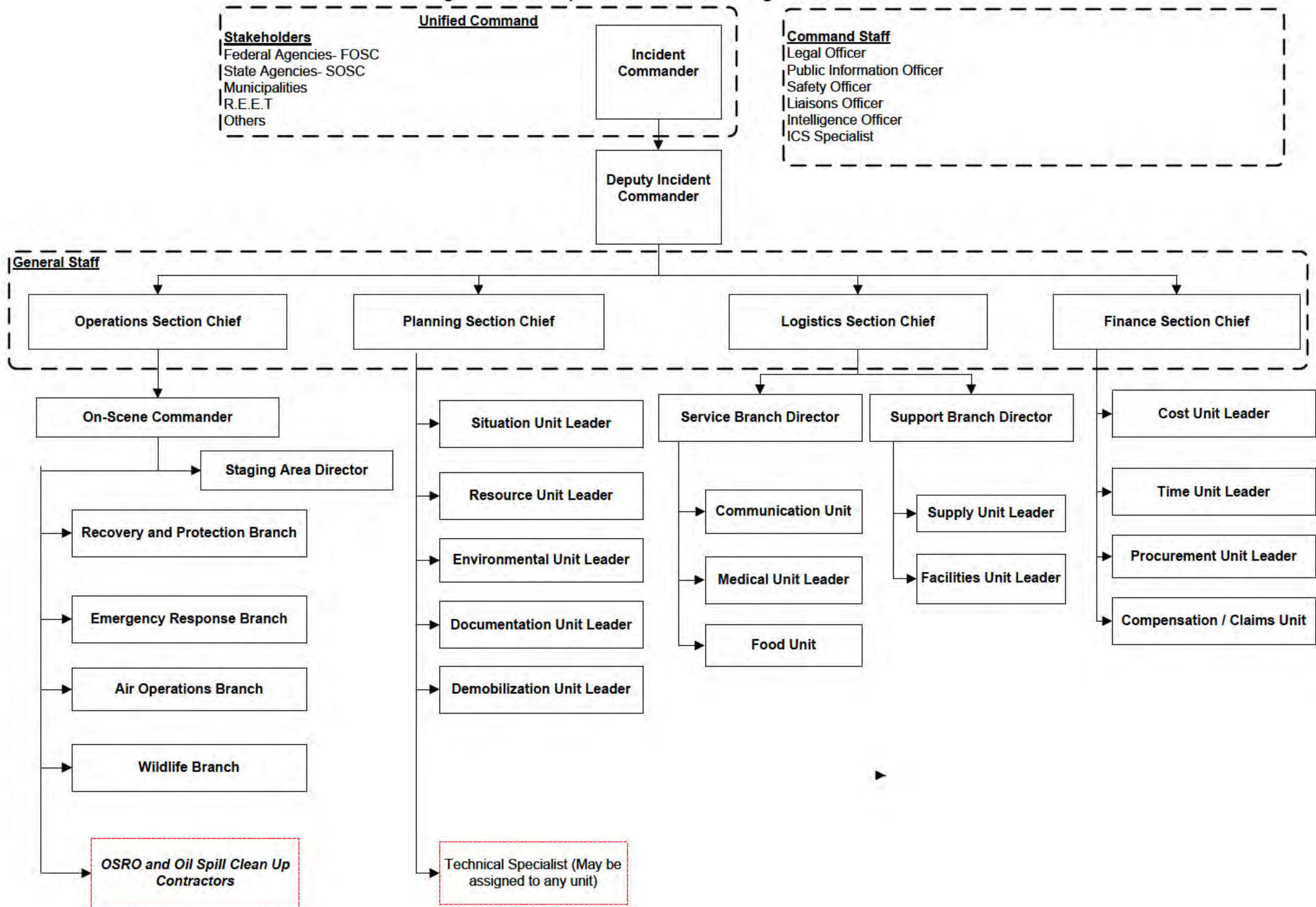


Figure 4.3 Response Incident Management Team



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5.0 RESPONSE EQUIPMENT/RESOURCES

The following sections outline the various response equipment/resources available from the Facility, Oil Spill Removal Organizations, and other outside resources.

5.1 COMPANY RESPONSE EQUIPMENT

Various locations along the pipeline system are equipped with response equipment including response trailers and command vehicles, pipeline repair equipment, personal protection equipment, and boom and sorbents. This equipment is stored at nine primary locations throughout the system as detailed in Appendix C. Section 1 provides directions to all response equipment storage locations. All PMPL owned response equipment is available 24 hour a day.

The Company also has contracts in place with Oil Spill Removal Organizations and other clean-up contractors for response to a discharge. Appendix C lists the Company's contracted OSRO's and other companies available to the company in the event of a spill.

The Qualified Individual has the authority to activate these and other Company resources or that of private contractors (OSRO's) and other experts and consultants as the situation demands.

5.2 EQUIPMENT TESTING

The Company conducts regular maintenance testing of all equipment along the system as part of its scheduled maintenance program.

System Equipment

- Line maintenance personnel conduct a scheduled inspection of all equipment in accordance with either 49 CFR Part 195.420 (for DOT regulated items such as valves) CSA Z-662, Oil and Gas Pipeline Systems, the Onshore Pipeline Regulations or company policy.
- Discharge prevention and mitigation equipment, including block valves, are included in a scheduled maintenance program.

Emergency Response Equipment

- Response equipment is checked by Company personnel and any deficiencies noted on the Equipment Maintenance Log.
- Motorized equipment (compressors, generators, boat motors, etc.) are also checked regularly and any deficiencies noted accordingly.
- The communications equipment for these systems is owned by PMPL and maintained under a maintenance contract. Repair and maintenance contracts will be coordinated by the Maintenance Department. Radio users should not contact service providers directly, except in case of emergency. If a unit requires repairs, the Supervisor for the particular district to which the unit is assigned should be contacted to arrange for repairs with the local service shop.

5.3 OTHER COMPANY RESOURCES

- A general inventory of communications equipment, audio/video equipment, and other support items are available from the various office/facility locations of the company through all Company field locations.

5.4 CONTRACT RESOURCES

In the event of a discharge which is beyond the initial response capabilities of the local responders and response equipment, contract manpower and equipment resources can be obtained through Oil Spill Removal Organization(s) (OSRO). These OSROs can provide manpower and containment/clean-up equipment for the response operation on land, water, or adjacent shorelines. The resources will be secured from an approved contractor. Notification/implementation of these resources will typically be handled by the QI. OSRO data, including equipment inventories and/or USCG certification data, is provided in Appendix C. **Telephone references are provided in Figures 2.14 and 2.15.** (Note: *Portland Pipe Line Corporation has a program in place to ensure that each OSRO has a maintenance program and applicable training / drills programs in place.*)

5.5 COOPERATIVE/MUTUAL AID RESOURCES

Cooperative/Mutual Aid resources will be utilized when available and/or necessary. (See Section 2, Figure 2.15)

5.6 MARINE SPILL RESPONSE CORPORATION (MSRC)

Marine Spill Response Corporation (MSRC) resources are available and will be utilized if necessary.

EASTERN CANADA RESPONSE CORPORATION (ECRC / SIMEC)

ECRC resources are available and will be utilized if necessary, consult Appendix B, response team job descriptions, for the responsibilities of ECRC during a spill in a waterway.

5.7 EXPERTS AND CONSULTANTS

The Company maintains a relationship with various environmental and technical consultants that can provide support in the event of an emergency incident. These consultants can provide expertise and support in the areas of emergency response management, environmental services, site assessment, permitting, waste treatment, recycling, dewatering, hazardous waste disposal, and remediation. Implementation of these services should be coordinated through the Incident Commander. Various telephone references are provided in Section 2.0.

5.8 VOLUNTEERS

Volunteers will not be utilized for responding to spills. All volunteers will be referred to the State or Federal On-Scene Coordinator.

5.9 COMMUNICATIONS

Effective and efficient communications systems are essential for emergency response at every level. The communications system will be utilized to gather information and current status reports as well as to provide coordination and direction to widely separated work groups involved in search, containment/ diversion, repair, traffic control, public control or evacuation, and restoration.

Lines of communication between the Incident Commander, local responders, and the Emergency Response Team members are demonstrated in the organization charts provided at the end of this section. Communication of the overall spill response operation between the Company and the responsible government agencies in the Federal Regional Response Team (RRT) will occur between the Incident Commander and the Federal On-Scene Coordinator. Appendix J provides additional detail on the U.S. Federal Response Organization.

5.9.1 Central Communications System

Prearranged communication channels are of the utmost importance in dealing with System emergencies. The notification procedures and telephone contacts documented in Section 2.0 will be reviewed in accordance with the earlier documented updating procedures. The predetermined communications channels include the following:

- A list of emergency telephone numbers for internal management and emergency response personnel (Figures 2.4 – 2.7).
- A list of emergency telephone numbers for various external resources such as the fire and police department, medical, and regulatory agencies (Figure 2.8-2.15).
- A list of emergency telephone numbers for contract response resources (Figure 2.14 – 2.15).

5.9.2 Communications Equipment

Field communications during a spill response to a small or medium discharge will be handled via the existing System communications network. This network will utilize existing radios, telephones, beepers, FAX machines, and computers and will be maintained by System personnel. In the event of a Worst Case Discharge, field communications will be enhanced with other Company and contract resources as the situation demands.

PMPL has handheld intrinsically safe radios that are used for internal operation communications. During the initial response activities, these would be temporarily used for short term emergency communications until contracted OSRO's arrive with their radios with separate frequencies. Contractor radios would include those from Clean Harbors, MSRC and ECRC (See Equipment Lists in Appendix C for Clean Harbors' radios and MSRC's Communications Suite).

It is the responsibility of the Logistics Section Chief to provide all responders with appropriate means of communications during and emergency. The Communication Contractor will provide the Logistics Section Chief with proper equipment.

5.9 COMMUNICATIONS (cont'd)

5.9.3 Communication Types

VHF/UHF Radios - Handheld radio sets are the most effective means of communication for the field response operation. The units are battery operated, multi-channelled, and have a typical range that will cover the area of the response operation. Additional radio sets and battery packs/charges will be necessary in the event of a prolonged response operation.

Telephone (Conventional) - Conventional land line telephones are the most effective means of communication for regulatory and advisory notifications during a spill response operation. Additional telephone lines can be installed in the event of a prolonged response operation.

Telephone (Cellular) - Cellular telephones allow for added mobility and response effectiveness. Cellular phones are commonly maintained by certain Facility personnel. Additional cellular phones can be secured in the event of a prolonged response operation.

FAX Machines - FAX machines allow for a rapid transfer of urgent information/documentation such as status reports/updates, written notifications, and purchase orders.

Computers - Computers are commonly used in networks which allow access to various other locations and company personnel. Computers also speed the consolidation of information and preparation of written reports.

6.0 SPILL IMPACT CONSIDERATIONS

6.1 CRITICAL AREAS TO PROTECT

During an emergency situation, it is important to identify all critical areas which may be impacted by the incident, in order to minimize the damages caused by the incident. The major critical areas for a spill in a waterway have been identified in the Environmental Sensitivity maps (Figure 6.1). Whenever there is an environmental emergency, the Environmental Specialist will identify, in collaboration with governmental authorities, which critical area is susceptible to being affected. The appropriate government (United States and Canada) authorities will further clarify these categories at the time of the response. These critical areas will require mitigation measures to be implemented by the Incident Commander.

The critical areas to protect are classified as high, moderate, and low sensitivity to oil for coastal and inland environments. The categories are defined as follows:

HIGH SENSITIVITY

- Areas which are high in productivity, abundant in many species, extremely sensitive, difficult to rehabilitate, or inhabited by threatened/endangered species.
- Areas which consist of forested areas, brush/grassy areas, wooded lake areas, freshwater marshes, wildlife sanctuaries/refuges, and vegetated river/stream banks.
- Areas which consist of shallow seagrass flats, tidally influenced marshes/wetlands, and sheltered tidal flats with vegetated margins.
- Areas which are abundant in many species and are very difficult to clean and rehabilitate.

MODERATE SENSITIVITY

- Areas of moderate productivity, somewhat resistant to the effects of oiling.
- Areas which consist of degraded marsh habitat, clay/silt banks with vegetated margins, and gravel/cobble beaches.
- Areas which consist of the riparian zone along freshwater rivers with saltwedge, oyster reefs, exposed tidal flats, dredged spoil deposits, and partially exposed bay margins.

6.1 CRITICAL AREAS TO PROTECT (cont'd)

LOW SENSITIVITY	
●	Areas of low productivity, man-made structures, and/or high energy.
●	Areas which consist of gravel, sand, or clay material, barren/ rocky riverbanks and lake edges, man-made structures, and concrete/compacted earthen drainage ditches.
●	Areas which consist of sand-shell substrate, fine-grained sand, seawalls, jetties, bulkheads, revetments, and erosional scarps.

6.2 ENVIRONMENTAL/SOCIO-ECONOMIC SENSITIVITIES

Environmental/Socio-economic Sensitivities are of extreme importance when planning a response effort. The health and safety of the public and the environment, as well as the protection of the various socio-economic sensitivities, must be promptly addressed in order to mitigate the extent of damage and minimize the cost of the clean-up effort.

Measures to prevent damages to the fauna and flora and response techniques will be determined by the IC assisted by the Environmental Specialist, in collaboration with external authorities (governmental authorities, fire department, police, etc.).

All environmental/socio-economic sensitivities are worthy of protection, but must be prioritized during a response effort. When making decisions on which areas to designate as collection areas and which to protect, the following sources may be consulted:

- U.S. Fish and Wildlife Service and related state agencies
- Canadian Wildlife Services and related provincial and local agencies;
- Environment Canada;
- Ministère du Développement durable, de l'environnement et des Parcs
- Applicable Area Contingency Plans
- Environmental Sensitivity Maps (Section 6.0; Figure 6.1)
- Section 7.2 MPL Oil Spill Specific Response Plan
- Other industry and private experts
- Municipalities

The environmental and socio-economic sensitivities in the vicinity of the incident can be divided into a number of categories. The following environmental/socio-economic sensitivity summary describes these categories which may be impacted by a discharge and should be addressed in the response:

6.2 ENVIRONMENTAL/SOCIO-ECONOMIC SENSITIVITIES (cont'd)

Environmental:

- Environmentally sensitive areas are prevalent throughout any marine and/or terrestrial environment and may be affected by any potential discharge incident.
- Environmentally sensitive areas subjected to stress and sudden change may be severely damaged. All means of exclusion/diversion should be utilized during a response effort to minimize the impact on these areas.

Historical Areas:

- Properties listed in the National Register of Historic Places and Natural Landmarks in the US.
- Properties listed as Historical Sites by the Ministry of Canadian Heritage (Canadian Conservation Institute) and by Parks Canada.
- These areas may need to be boomed off or otherwise protected to minimize impact.

Major Recreational Areas:

- A discharge affecting these areas may pose a public safety/health risk during a response effort.
- Shoreline access for personnel and equipment deployment (boats, boom, etc.) is typically available in these areas.

Marinas:

- These areas have a high degree of public exposure (personal and property) and should be boomed for protection.
- Boats and other water deployed equipment can often be deployed and/or obtained in these areas.

Commercial Navigation:

- These areas have a high public and business disruption impact.
- Clean up should focus on maintaining or re-opening waterway access for commercial traffic.

Residential Areas:

- These are areas with high public impact and may warrant evacuation in extreme cases.
- Cleanup must be performed with extreme caution due to extensive public exposure.

6.2 ENVIRONMENTAL/SOCIO-ECONOMIC SENSITIVITIES (cont'd)

Commercial Farming/Ranching Areas:

- Commercial Farming/Ranching Areas have the potential of human and livestock impact, as well as socio-economic impact in the potential loss of crops or loss of property use.

Water Intake Points:

- Commercial, industrial, municipal, and private water intakes are subject to impact.
- These areas may need to be boomed off or otherwise protected to minimize impact.
- Water Intakes in each applicable watersheds are listed in Watershed Section.

Wildlife Management Areas and Refuges:

- These areas have a high degree of exposure to threatened/endangered species and many other types of wildlife.
- Protection booming and clean-up efforts are high priority in these areas.

6.3 WILDLIFE PROTECTION AND REHABILITATION

The Company will work with federal, provincial, state, and local agency personnel to provide labor and transportation to retrieve, clean, and rehabilitate birds and wildlife affected by an oil spill, as necessary. Oversight of the coordination of Company's wildlife preservation activities with federal, provincial, state, and local agencies during an oil spill is the responsibility of the Incident Commander as part of the Unified Command. The Operations Section implements wildlife protection in the field supported by the Planning Section to identify potential areas or locations for wildlife protection. Contractors specializing in wildlife protection will provide the Incident Commander and the SMT with guidance on the proper handling of impacted wildlife and the necessary permits required for such efforts.

Special consideration should be given to the protection and rehabilitation of endangered species and other wildlife and their habitat in the event of an oil spill and subsequent response. Jurisdictional authorities should be notified and worked with closely on all response/clean-up actions related to wildlife protection and rehabilitation. Laws with significant penalties are in place to ensure appropriate protection of these species.

6.3.1 Endangered/Threatened Species

The U.S. Fish and Wildlife Service (USFWS) and related state agencies classify the status of various wildlife species in the potentially effected states. A summary of critical birds, reptiles, mammals, and plant species status as related to the Facility's operating areas (area of highest oil spill potential) is presented in Figure 6.2. Additional detail is also provided in the "Emergency Response Mapping" booklets contained under separate cover (See Figure 6.1 for a listing).

6.3 WILDLIFE PROTECTION AND REHABILITATION (cont'd)

The Canadian Wildlife Service and related provincial agencies have numerous available inventories on:

- Threatened bird species in Quebec
- Threatened bird breeding sites in Quebec
- Migratory bird sanctuaries sites
- List of species at risk in Canada
- Lists of National wildlife areas

6.3.2 Wildlife Rescue

The following are items which should be considered for wildlife rescue and rehabilitation during a spill response:

- Bird relocation can be accomplished using a variety of deterrents, including encouraging birds to avoid areas of spilled oil. Bird relocation can be accomplished by utilizing deterrent methods including:
 - Use of visual stimuli, such as inflatable bodies, owls, stationary figures, or helium balloons, etc.
 - Use of auditory stimuli, such as propane cannons, recorded sounds, or shell crackers.
 - Use of herding with aircraft, boats, vehicles, or people (as appropriate).
 - Use of capture and relocation.

6.3.3 Search and Rescue - Points to Consider

- **The Company's involvement should be limited to offering assistance as needed or requested by the agencies.**
- Prior to initiating any organized search and rescue plan, **authorization must be obtained from the appropriate federal/provincial/state agency and the Incident Commander.**
- **Initial search and rescue efforts, if needed, should be left up to the appropriate agencies.** They have the personnel, equipment, and training to immediately begin capturing contaminated wildlife.
- With or without authorization it must be anticipated that volunteer citizens will aid distressed/contaminated wildlife of their own. It is important to communicate that it may be illegal to handle wildlife without express authority from appropriate agencies. Provisions should be made to support an appropriate rehabilitator, however, **no support should be given to any unauthorized volunteer rescue efforts.**
- The regulatory agencies and response personnel should be providing the name and location of a qualified rehabilitator in the event contaminated wildlife is captured.

6.3 WILDLIFE PROTECTION AND REHABILITATION (cont'd)

- External resources and contacts that can assist with wildlife rescue and rehabilitation are provided in Figures 2.14 & 2.15. This list includes:
 - Outside rehabilitation organizations
 - Other resources
 - Regulatory agencies that can assist with wildlife rescue and rehabilitation are in Figures 2.8 – 2.13

6.4 STAGING AREAS

When establishing personnel and equipment staging areas for a response to a Facility discharge, the following criteria should be evaluated:

- Access to waterborne equipment launching facilities and/or land equipment.
- Access to open space for staging/deployment of heavy equipment and personnel.
- Access to public services utilities (electricity, potable water, public phone, restroom and washroom facilities, etc.)
- Access to the environmental and socio-economically sensitive areas which are projected for impact.

See mapsets listed Figure 6.1 for pre-identified staging areas.

6.5 SPILL VOLUME ESTIMATES

Consult Section 3.13 “Determination of Spill Volume and Extent”.

6.6 TRAJECTORY ANALYSIS

Oil spilled on water will react primarily to the effects of wind and current. The oil will tend to spread to a thin layer under the influence of gravity (primary) and chemical (secondary) forces. The following describes the behavior of oil on water:

- Oil will move in the direction and at the rate of the current under negligible wind conditions.
- Oil will move in the direction and at approximately 3.4 % of the velocity of the wind under negligible current conditions.
- The combined effects of wind and current on the oil should be carefully analyzed. A method of vector analysis can be performed to determine the net direction of movement (wind forces can work in addition to, against, or in many other combinations with the current).
- The primary method of surveillance for the Facility will be visual. Visual surveillance is not effective however in rain, fog, darkness, or heavy cloud cover. It is difficult to observe a slick on the water from a boat, dock or land due to the angle of observation. Aerial surveillance is the preferred method of visual surveillance because of the elevated view and the ability to cover a large area in a short period.

6.6 TRAJECTORY ANALYSIS (cont'd)

During immediate response stages of a spill, the Clean-up Unit Leaders will be responsible for estimating the trajectory of an oil spill. As the spill management progresses from the emergency to the project phase, the Environmental Specialist will do so.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT

When deciding on an appropriate response method, the most important considerations are the efficient removal of the oil threat **and** the effective protection of fish and wildlife habitats and sensitive environments. The advantages and disadvantages of various removal or countermeasure techniques should be carefully evaluated to maximize net environmental benefit.

In-Situ Burning

The use of in-situ burning as a removal method requires appropriate approval as specified in both the U.S. EPA Inland Area Contingency Plan for Region 1 and the Maine and New Hampshire Area Contingency Plan. The Incident Commander / Unified Command shall refer to Appendix 9- *Region 1 In-situ Burning Memorandum of Understanding* which establishes decision authority for use of in-situ burning (absent the use of burning agents) within zones within Region 1. In general, the FOSC has decision authority beyond 6 miles. In between 1 to 6 miles, it is a joint FOSC/SOSC decision. Inward of 1 mile, the decision must be made in consultation of trustees. The MOU also outlines Special Consideration Areas (SCAs) which may affect the decision making process. A checklist has been developed by the Regional Response Team (RRT) that includes necessary steps and considerations in making the decision to use in-situ burning in a response which is available in Appendix 10 of the U.S. EPA Inland Area Contingency Plan for Region 1 and the Maine and New Hampshire Area Contingency Plan. Potential adverse effects include smoke plume air quality concerns; riparian wildlife nesting, denning and feeding habitat may be permanently or temporarily damaged; and substrate contamination. Despite the potential adverse effect, in-situ burning used as a countermeasure may minimize physical disturbance of sensitive areas/habitats, or limit wildlife contact with cleaning/bioremediation agents.

Dispersants and other Chemicals

Subpart J of the National Oil and Hazardous Substances Pollution Contingency Plan (the NCP) addresses the use of dispersants and other chemical countermeasures. The use of dispersants is highly controlled and requires specific approvals prior to use. As described in the U.S. EPA Inland Area Contingency Plan for Region 1 the RRT policy on the use of chemical countermeasures varies by area. Use of chemical countermeasures during response operations within in USCG Sector Northern New England (SNNE) is governed by Section 9508 *Dispersants Preauthorization* of the Maine and New Hampshire ACP. This preauthorization is designed to implement Subpart J of the NCP and implement the requirements of the Federal Water Pollution Control Act (FWPCA). This Plan provides preauthorization for the use of dispersants by the FOSC within the COTP SNNE geographic areas of responsibility. These policies have been approved by all responsible natural resource trustees. Additionally, the RRT has developed a unified command decision worksheet to aid responders in making the decision to use dispersants throughout Region 1 (Appendix 13 of the Inland Area Contingency Plan listed above). Adverse effects of disperants include chemical impacts to the water

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

column and disturbance of rafting birds or marine life. Despite the potential adverse effects, the use of dispersants as a countermeasure can dissipate oil from surface water and speed up dissolution or reduce shoreline impacts from oil slick and minimize potential effects.

General descriptions of various specific response techniques that may be applied during a response effort are discussed below. Company responders are free to use all or any combination of these methods as incident conditions require, provided they meet the appropriate safety standards and other requirements relative to the situation encountered. Data was obtained from reports, manuals and pamphlets prepared by the American Petroleum Institute, Environmental Protection Agency and the United States Coast Guard. The most effective cleanup of a product spill will result from an integrated combination of clean-up methods. Each operation should complement and assist related operations and not merely transfer spillage problems to areas where they could be more difficult to handle.

The spill should be assessed as soon as possible to determine the source, extent and location of travel. Terrain and other physical conditions downgradient of the spill site will determine the methods of control at a point in advance of the moving product. Often, the bulk of a spill can be contained at a single location or a few key locations in the immediate vicinity of the source point. When possible the executions of these types of initial containment strategies help confine a spill to a relatively limited area.

General procedures applicable to all containment activities include:

- Operations Section Chief will discuss with work crews before entering Warm or Hot Zones:
 - Work plan
 - Emergency Response Site Safety and Health Plan
 - Evacuation signals and routes
 - Fire safety precautions
 - Other site safety considerations
- Place air driven blowers on the upwind side of Hot Zones to purge explosive vapors and contaminated air from work site, if necessary, and complete atmospheric testing before entering without SCBA protection. Refer to Vapor Control Procedures as needed for further precautionary activities (Section 3.0).
- The operations section will contain product.
- Allow only trained and permitted personnel and needed equipment to enter and work in the designated Hot, Warm and Cold Zones
- Operations Sections Chief will assign relief personnel to the emergency site as needed.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.1 Spill on Land (Soil Surfaces)

● Confinement Methods

Product can be trapped in ditches and gullies by earth dams. Where excavating machinery is available, dams can be bulldozed to contain lakes of product. Dams, small and large, should be effectively employed to protect priority areas such as inlets to drains, sewers, ducts and watercourses.

These can be constructed of earth, sandbags, absorbents, planks or any other effective method. If time does not permit a large dam, many small ones can be made, each one holding a portion of the spill as it advances. The terrain will dictate the placement of the dams. If the spill is minor, natural dams or earth absorption will usually stop the product before it advances a significant distance. Cleanup is the main concern in such situations.

● Removal Methods

The recovery and removal of free product from soil surfaces is a difficult job. The best approaches at present seem to be:

- Removal with suction equipment to tank truck if concentrated in volumes large enough to be picked up. Channels can be formed to drain pools of product into storage pits. The suction equipment can then be used.
- Small pockets may have to be dipped up by hand.
- If practicable after removal of the bulk of the spill, controlled burning presents the possibility of a fast, simple, and inexpensive method of destruction of the remainder of the product. If all other options have been executed and the site is still unsafe for further activity because explosive vapors persist, the vapors may need to be intentionally ignited to prevent an accumulation sufficient to become an explosive mixture, provided the other requirements of these guidelines for controlled burning are met.

Intentional ignition to remove released product should be utilized only if all of the following conditions are met:

- Other steps and procedures have been executed and a determination has been made that this is the safest remaining method of control.
- Intentional burning will not unduly damage the pipeline, adjacent property, or the environment.
- Controlled burning is permitted by some government authorities. Local government authorities to be contacted may include city council, county board of commissioners, city or county fire chiefs, the county forestry commission or firetower, and the local environmental protection agency. In seeking permission from these authorities, be prepared to convince

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.1 Spill on Land (Soil Surfaces) (cont'd)

them that adequate safety precautions have been and will be taken during the operation.

- Controlled burning is conducted with the consent of local landowners.
- Safety must always be a prime consideration when considering controlled burning of product. Sparks and heat radiation from large fires can start secondary fires and strong winds make fire control difficult. There must be no danger of the fire spreading beyond control limits. All persons must be at a safe distance from the edge of the inflammable area. Remember that all burning must be controlled burning.
- Considerations for contaminants in smoke plume.

6.7.2 Spill on Lake or Pond (calm or slow-moving water)

● **Confinement Methods**

A lake or pond offers the best conditions for removal of product from water. Although the removal is no easy task, the lake or pond presents the favorable conditions of low or no current and low or no waves.

The movement of product on a lake or pond is influenced mainly by wind. The product will tend to concentrate on one shore, bank or inlet. Booms should be set up immediately to hold the product in the confined area in the event of a change in wind direction.

If the spill does not concentrate itself on or near a shore (no wind effect), then a sweeping action using boats and floating booms will be necessary. The essential requirement for this operation is that it be done very slowly. The booms should be moved at not more than 40 feet per minute, approximately 0.5 mph. Once the slick is moved to a more convenient location (near shore), the normal operations of removal should begin.

If the slick is small and thin (rainbow effect) and not near the shoreline, an absorbent boom instead of a regular boom should be used to sweep the area very slowly and absorb the slick. The product may not have to be moved to the shoreline.

● **Removal Methods**

If the confined slick is thick enough, regular suction equipment may be used first; however, in most instances, a floating skimmer should be used. If judged appropriate or useful, a surface collecting agent should be applied once the slick is isolated to facilitate the removal. The surface collecting agent will concentrate the product into a smaller area and make the floating skimmer work more efficiently. If the floating skimmer starts picking up excess water (slick becomes thin), stop using it if it is not removing any appreciable amount of product.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.2 Spill on Lake or Pond (calm or slow-moving water) (cont'd)

Additions of more surface collecting agent from time to time may improve the skimming efficiency of the skimmer. It will continue to concentrate the slick into a smaller area, thus making the film thickness greater. Drawing the boom closer to the bank as product is removed will also keep film of product thicker. However, when the slick becomes too thin, the skimmer should be stopped and an absorbent applied (with a boat if necessary) to remove the final amounts.

The floating skimmer (if speed is a must) or hand skimmers (if water is shallow enough) or both can be used to pick up the product-soaked absorbent. Before pumping the product-soaked absorbent with a floating skimmer, insure that the absorbent in question can be pumped and will not harm the pump. Several types are nonabrasive to pump internals. If the floating skimmer is used first, the product-soaked absorbent/water mixture should be pumped into a tank truck.

A better method of retrieving the product-soaked absorbent is to draw it in as close to the shore as possible with the booms used to confine the product initially. The absorbent can then be hand skimmed from the water surface and placed in drums, on plastic sheets or in lined roll-off boxes. It should then be disposed of by acceptable means.

The final rainbow on the surface can be removed with additions of more absorbent.

6.7.3 Spill on Small to Medium Size Streams (relatively fast-flowing creeks)

● Confinement Methods

The techniques used for product containment on fast-flowing shallow streams are quite different from the ones used on lakes, ponds, or other still bodies of water. The containment and removal processes require a calm stretch of water to allow the product to separate onto the surface of the water. If a calm stretch of water does not exist naturally, a deep slow-moving area should be created by damming. The dam can be constructed by using sandbags, planks or earth. If a dam is required, it should be situated at an accessible point where the stream has high enough banks. The dam should be constructed soundly and reinforced to support the product and water pressure.

- Underflow dam - The underflow dam is one method that can be used, especially on small creeks. The water is released at the bottom of the dam using a pipe or pipes which are laid during construction of the dam. The flow rate through the pipe must be sufficient to keep the dam from overflowing. One method is to lay the pipe at an angle through the dam (while dam is being constructed) so that the height of the downstream end of the pipe will determine the height the water will rise behind the dam.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.3 Spill on Small to Medium Size Streams (relatively fast-flowing creeks) (Cont'd)

- Overflow dam – Another method of containment is the overflow type dam. The dam is constructed so that water flows over the dam, but a deep pool is created which slows the surface velocity of the water. Therefore, the condition of a calm stretch of water is met. The overflow dam may be used where larger flow rates (medium size creeks) of water are involved. With this type dam, a separate barrier (floating or stationary boom) must be placed across the pool created by the dam. The separate barrier arrests the surface layer of product, at the same time, the water is flowing under the barrier and over the top of the dam. The barrier should be placed at an angle of 45 % across the pool to decrease the effective water velocity beneath it. Also, it helps to concentrate the product at the bank and not all along the barrier. A second barrier should be placed approximately 10 to 15 feet downstream of the first one as a secondary back-up.

The stationary boom type barrier should be made of wood planks or other suitable material. The stationary boom should be soundly constructed and sealed against the bank. The ends of the planks can be buried in the banks of the stream and timber stakes driven into the stream bed for support as needed. The necessary length of the boom will be approximately 1-1/2 times the width of the waterway. The plank boom should extend six to eight inches deep into the water and about two inches or higher above the water level. If the increase in velocity under the stationary boom is causing release of trapped product, it should be moved upward slightly. At no time should barrier be immersed more than 20% of the depth of the pool at the barrier location; that is, if the pool created by damming is three feet deep, do not exceed an immersion depth of seven inches with the barrier at the position the barrier is installed.

Another method used with the underflow dam is having the pipe or pipes sized to carry only a portion of the flow needed. The pipe would be placed at the bottom of the dam and level with the creek bed. The remaining flow of the creek could be siphoned or preferably pumped around the dam from a point away from the dam and from the deepest portion of the pool. The pumping or siphoning can be controlled to maintain the desired water level at the dam. The key is the removal of water through or around the dam at the lowest point in the basin. This prevents the oil from escaping with the released water.

A floating boom can be used in place of the stationary type if the created pool's size (bank to bank) and depth will permit. The advantages of using a floating boom are the speed of deployment and the fact that there is not need for additional support as with the stationary boom.

Multiple Impoundments – Since emergency built dams (either underflow or overflow) are seldom perfect, a series of dams is usually required. The first one or two will trap the bulk and the ones that are downstream will trap the last traces of product. Precautions should be taken to ensure that the foundations of emergency dams are not washed away by the released water. If earth is used to construct an overflow dam, a layer of earth-filled bags should be placed on top of the dam so erosion will not take place.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.3 Spill on Small to Medium Size Streams (relatively fast-flowing creeks) (Cont'd)

- **Removal Methods**

Once the containment dams are constructed, the problem or removal of the product from the water surface should be the prime consideration. The removal must be continuous or else build-up of product behind the dams or booms might lead to product escaping the traps.

The type of removal procedures used depends largely on the amount of product being trapped in a given span of time, if the amount of product moving down the stream is of sufficient quantity, the first dam or fixed boom would quite possibly trap enough for the floating skimmer to work efficiently. The skimmer will pump the product and possibly some water to a tank truck or other holding tank. Separated water may, with regulatory approval, be released from the bottom of the tank truck if it becomes necessary. It is inadvisable to place an absorbent in the stream prior to or at the first dam in anticipation of the arriving product. Let the product accumulate at the first dam and use the floating skimmer to recover the product.

Follow directions on use of each absorbent. Plastic sheets should be used to place the product-soaked absorbent on as it is removed from the water. Alternatively, the material may be placed in drums or lined roll-off boxes. Disposal of gross amount of product-soaked absorbent would not then be a problem.

If the amount of product in the stream is minor, a straw-bale dam may be constructed to filter out the product. The slowing of the water would not be necessary, but several dams might be necessary to ensure complete removal. The downstream dams would also offer protection when the upstream bales are removed, releasing traces of product. Straw-bale dams can also be used downstream from underflow and overflow dams for added protection.

Thus, the containment and removal of spilled product on small to medium fast-flowing streams might require a combination of underflow or overflow dams, fixed booms, skimmers, absorbents, and straw-bale dams to ensure a complete cleanup.

6.7.4 Spill on Large Streams and Rivers

- **Confinement Methods**

The containment techniques differ considerably on large streams and rivers versus small streams. First, the smooth calm area of water necessary for product-water separation must be found along the stream or river rather than making one as with small streams. Floating booms (rather than fixed booms or dams) must be used to trap the surfaced product.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.4 Spill on Large Streams and Rivers (Cont'd)

Local conditions of current and wind must be considered when selecting the site for the boom. A point with a low water velocity near the bank, sufficient depth to operate the product removal equipment, and good access are required. The fact that wind may tend to concentrate the product against one bank must be considered. A smooth, undisturbed area of water is required immediately upstream of the boom to ensure that the product has opportunity to separate out onto the surface. The boom should be positioned where the current is at a minimum. It is more effective to boom at a wide, slow position than on a narrow, fast stretch of water.

If the booms are positioned straight across a river or stream, at right angles to the flow, surface water tends to dive beneath the barrier (boom) when current velocities exceed about $\frac{1}{2}$ knot (0.8 ft./sec.). However, if the current of the entire river is $\frac{1}{2}$ knot or less, then a boom can be positioned straight across the river or large stream, but angled slightly in relation of the banks. By placing the boom at an angle to the banks, product on the surface is diverted along the boom to the side of the river.

The current velocity is usually much slower near the river bank than in the center and the product will move along the boom toward the bank for removal. A water-tight seal between the bank and the boom is essential. A secondary boom should be set up immediately downstream of the first one to capture the amounts that escape the upstream boom. A boom can be employed parallel to the river flow at the bank to form the seal with the booms used to trap the product.

Where the current velocity of the chosen site exceeds $\frac{1}{2}$ knot, the boom should be positioned in two smooth curves from a point of maximum velocity (usually the center of the river) to both banks. However, this double-boom requires product to be removed from both sides of the river. To determine the appropriate angle of boom placement and support (mooring) needed to hold the booms in position, the current velocity should be measured by timing a floating object which is 80% submerged over a distance of 100 feet. A time of 60 seconds over this distance indicates a water current of approximately 1 knot. For currents from 1 to 2.5 knots (1.7 to 4.2 ft./sec.), the more the boom will have to be angled acute to the bank. The length of the boom will have to be such to reach the center of the river. For currents between $\frac{1}{2}$ and 1 knot (0.8 and 1.7 ft./sec.), the angle of employment can be enlarged.

The major load on the boom is taken by the terminal moorings, particularly the one in the center of the river. However, intermediate moorings are also required both to maintain the smooth curve of the boom to prevent breaking of the boom and to assist with preventing skirt deflection. The intermediate moorings are preferably positioned every 25 feet and must be adjusted to avoid the formation of indentations in the boom profile. These trap product in pockets, prevent its deflection to the bank, and also encourage diving currents. The moorings' ropes should be five times the water depth.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.4 Spill on Large Streams and Rivers (Cont'd)

In certain situations, it might be advantageous to position booms to deflect the approaching spilled product to a slower moving area. Naturally, additional booms would have to be positioned around this slower moving area prior to deflecting the product to the area. This approach has been used along rivers which have lagoons, etc., with a very low current action. The recovery would take place in the lagoons and not along the river bank.

● **Removal Methods**

The product collected upstream of the floating booms in a large stream or river should be removed from the water surface as it accumulates. Regular suction equipment, a floating skimmer, and/or absorbents (including absorbent booms) should be used to remove the product as appropriate to the quantity being trapped in a given span of time. If the amount moving down the stream is of sufficient quantity, the primary floating boom would possibly trap enough for the floating skimmer to work efficiently. The skimmer will pump the product and some water to a tank truck or other holding tank.

The absorbents (type that can be placed on water before product arrival) would then be used upstream of the secondary boom to absorb the underflow from the primary boom. An absorbent boom can also be placed between the primary and secondary booms to help the other absorbents control the underflow from the primary boom. If the underflow from the primary boom is significant, then the type absorbent which can be placed on the water only after product is collected may be used. It is best to hand skim the saturated absorbents and place on plastic sheets. However, if the absorbent used can be pumped after product absorption and speed of removal is a necessity, the floating skimmer can be used to remove the product-soaked absorbent.

The disadvantage of pumping the product-soaked absorbent to a truck is the volume that will accumulate (skimmer will pump excess water) and the disposal problems associated with the large water/product-soaked absorbent mixture.

If the volume of product moving toward the boomed area is expected to be small, an absorbent should be placed in the river upstream of the primary and secondary booms. If regular booms are not necessary, an absorbent boom could be stretched across the river to contain the oil. Boats (either rented or furnished by contractors) would be necessary to retrieve the product-soaked absorbent boom.

6.7.5 Spill on Stream which Flows into Lake or Pond

There are certain locations along the pipeline where streams (small and large ones) flow into lakes or ponds at relatively short distances from the pipeline. It is conceivable that a spill that reached the streams in question could reach or almost reach the lakes before containment and recovery operations could be set up. If time permits for containment operations to be set up on the stream in question, it then would be handled as described above depending upon the stream size involved.

6.7 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT (cont'd)

6.7.5 Spill on Stream which Flows into Lake or Pond (Cont'd)

However, if product in the stream is near the lake site or if product is flowing into the lake with a significant amount yet to arrive, a different containment should be employed.

- **Confinement Methods**

Product on a stream flowing into a lake should be boomed as close to the entrance as possible. The boom should be positioned on the lake at an angle to the residual stream current so as to direct the surface water to a slower moving area. The area where the product is being deflected should be enclosed by booms to contain it. An additional boom for sweeping the product to the bank will be required. This area of containment should not have a current velocity of more than 1/2 knot (0.8 ft./sec.), preferably less.

- **Removal Methods**

The removal of product from the lake or pond's surface would be handled as described earlier.

For sizable releases, collected product will usually be pumped into tank trucks and transported to a storage facility. Tank trucks are available at several locations throughout.

FIGURE 6.1

ENVIRONMENTAL SENSITIVITY MAPS

The following sets of Environmental Sensitivity Maps have been prepared as an aid to identify sensitive areas in the area of PMPL Operations. The maps include a key to the reference symbols located on each map.

- South Portland Marine Terminal Emergency Response Mapping, including:
 - Casco Bay Region – Geographic Response Plans*
 - Maine Environmental Vulnerability Index Maps*
- Portland Pipe Line Corporation Trunk Lines – Emergency Response Mapping
- Montreal Pipe Line Limited Trunk Lines - Emergency Response Mapping
- Montreal Pipe Line Limited Oil Spill Specific Response Plans
 - Environmental Socio-Economic Sensitivities Maps
 - Missisquoi River Area
 - Richelieu River Area
 - St. Lawrence River Area
 - Access Direction Maps to Facilities
- Portland Pipe Line Corporation Spill Response Field Document

*The Geographic Response Plans and Maine Environmental Sensitivities Maps are maintained by the Maine DEP and are held in hard copy by South Portland based PMPL plan holders. Electronic copies can be found on the Maine DEP website at: <http://www.maine.gov/dep/rwm/emergspillresp/geoplans.htm> and <http://www.maine.gov/dep/rwm/emergspillresp/evi/intro.htm>.

There are also a series of maps created by Environment Canada stating all the vulnerable areas along the St. Lawrence River.

Remember these maps are to be utilized as guidelines only. During a real response effort federal, provincial, state, municipal and local agencies should be contacted to provide further assistance in the proper identification and protection of the various environmental and socio-economic sensitive areas.

FIGURE 6.2

ENDANGERED/THREATENED SPECIES LISTING
Maine, New Hampshire, Vermont and Quebec

Inland Fisheries & Wildlife

[Home](#) → [Wildlife](#) → [Endangered and Threatened Wildlife](#) → [State List](#)

State List of Endangered & Threatened Species

Endangered and Threatened inland fish and wildlife species in Maine are listed either under [Maine's Endangered Species Act \[MESA\]](#), the [U.S. Endangered Species Act \[ESA\]](#), or both. Species listed under MESA receive state protection; species listed under ESA receive federal protection; and species listed under both receive state and federal protection.

The Maine Department of Inland Fisheries and Wildlife holds management responsibility for inland fish and wildlife listed under MESA, and shares responsibility with the [U.S. Fish and Wildlife Service \[USFWS\]](#) for inland fish and wildlife listed under ESA.

Endangered and Threatened marine species are listed under [Maine's Marine Endangered Species Act](#) or ESA. The [Maine Department of Marine Resources \[MDMR\]](#) has responsibility for these species.

The Maine Endangered Species Act applies only to animals - plants are not included in the legislation. The [Maine Natural Areas Program](#) maintains an "official" list of rare and endangered plants in Maine.

There are currently 22 inland fish and wildlife species listed as Endangered and 23 listed as Threatened under Maine's Endangered Species Act [MESA], some of which are also listed under the U.S. Endangered Species Act [ESA].

Information about the status, life history, and conservation of each listed species is available in a fact sheet linked to the species name in the following lists. Fact sheets are available in PDF format.

Species listed through the Maine Department of Inland Fisheries and Wildlife under Title 12 § 12803. Marine species listed separately through the Maine Department of Marine Resources under Title 12 § 6975, and federally listed species not listed under Maine's Endangered Species Act, are not included in this list.

To view the PDF documents below, you will need the [free Adobe Reader](#). If you need assistance, view our [PDF Help page](#), [email us](#) or call us at **(207) 287-8000**.

Maine's Endangered Species

October 15, 2015

Birds

- [American Pipit \(PDF\)](#)
(*Anthus rubescens*) (breeding population only) ([species plan](#))
- Black-crowned Night Heron
(*Nycticorax nycticorax*)
- [Black Tern \(PDF\)](#) (*Chlidonias niger*)
- [Golden Eagle \(PDF\)](#) (*Aquila chrysaetos*) ([species plan](#))
- [Grasshopper Sparrow \(PDF\)](#)
(*Ammodramus savannarum*)
- Least Bittern (*Ixobrychus exilis*)
- [Least Tern \(PDF\)](#) (*Sterna antillarum*) ([species plan](#))
- [Peregrine Falcon \(PDF\)](#)
(*Falco peregrinus*) (breeding population only)
- [Piping Plover \(PDF\)](#)
(*Charadrius melodus*) ([species plan](#))**
- [Roseate Tern \(PDF\)](#) (*Sterna dougallii*) ([species plan](#))*
- [Sedge Wren \(PDF\)](#)
(*Cistothorus platensis*)

Fish

- Redfin Pickerel (*Esox americanus americanus*)

Invertebrates

Beetles

- Cobblestone Tiger Beetle
(*Cicindela marginipennis*)

Butterflies and Skippers

- [Edwards' Hairstreak \(PDF\)](#) (*Satyrrium edwardsii*)
- Frigga Fritillary (*Boloria frigga*)
- [Hessel's Hairstreak \(PDF\)](#) (*Callophrys hesseli*)
- Juniper Hairstreak (*Callophrys gryneus*)
- [Katahdin Arctic \(PDF\)](#) (*Oenis polixenes katahdin*)

Dragonflies and Damselflies

- Rapids Clubtail (*Gomphus quadricolor*)

Snails

- Six-whorl Vertigo (*Vertigo morsei*)

Mammals

- Little Brown Bat (*Myotis lucifugus*)
- New England Cottontail (*Sylvilagus transitionalis*) ([species plan](#))
- Northern Long-eared Bat (*Myotis septentrionalis*)**

Reptiles

Snakes

- [Black Racer \(PDF\)](#) (*Coluber constrictor*) ([species plan](#))

Turtles

- [Blanding's Turtle \(PDF\)](#) (*Emydoidea blandingii*) ([species plan](#))

- [Box Turtle \(PDF\)](#) (*Terrapene carolina*) ([species plan](#))

Maine's Threatened Species

October 15, 2015

Birds

- [Arctic Tern \(PDF\)](#) (*Sterna paradisaea*) ([species plan](#))
- [Atlantic Puffin \(PDF\)](#) (*Fratercula arctica*) ([species plan](#))
- [Barrow's Goldeneye](#) (*Bucephala islandica*) ([species plan](#))
- [Common Gallinule](#) (*Gallinula chloropus*)
- [Great Cormorant](#) (*Phalacrocorax carbo*) (Breeding population only)
- [Harlequin Duck \(PDF\)](#) (*Histrionicus histrionicus*) ([species plan](#))
- [Razorbill \(PDF\)](#) (*Alca torda*) ([species plan](#))
- [Short-eared Owl](#) (*Asio flammeus*) (Breeding population only)
- [Upland Sandpiper \(PDF\)](#) (*Bartramia longicauda*) ([species plan](#))`

Fish

- [Swamp Darter \(PDF\)](#) (*Etheostoma fusiforme*)

Invertebrates

Butterflies and Skippers

- [Clayton's Copper \(PDF\)](#) (*Lycaena dorcas claytoni*) ([species plan](#))
- [Purple Lesser Fritillary](#) (*Boloria chariclea grandis*)
- [Sleepy Duskywing](#) (*Erynnis brizo*)

Dragonflies and Damselflies

- [Boreal Snaketail](#) (*Ophiogomphus colubrinus*)
- [Ringed Boghaunter \(PDF\)](#) (*Williamsonia lintneri*)

Freshwater Mussels

- [Brook Floater \(PDF\)](#) (*Alasmidonta varicosa*)
- [Tidewater Mucket \(PDF\)](#) (*Leptodea ochracea*)
- [Yellow Lampmussel \(PDF\)](#) (*Lampsilis cariosa*)

Mayflies

- [Roaring Brook Mayfly \(PDF\)](#) (*Epeorus frisoni*)
- [Tomah Mayfly](#) (*Siphonisca aerodromia*)

Moths

- [Pine Barrens Zanclognatha \(PDF\)](#) (*Zanclognatha martha*)
- [Twilight Moth \(PDF\)](#) (*Lycia rachelae*)

Mammals

- Eastern Small-footed Bat (*Myotis leibii*)
- [Northern Bog Lemming \(PDF\)](#) (*Synaptomys borealis*)

Reptiles

- [Spotted Turtle \(PDF\)](#) (*Clemmys guttata*) ([species plan](#))

* ***Federally listed as Endangered***

** ***Federally listed as Threatened***

Credits

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ENDANGERED AND THREATENED *Wildlife of New Hampshire*

ENDANGERED



BLANDING'S TURTLE ©NHFG

Endangered wildlife are those native species that are in danger of extinction in New Hampshire because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to ensure these species' continued existence as viable members of the state's wildlife community.



PIPING PLOVER ©NHFG

INVERTEBRATES

Dwarf wedge mussel, *Alasmidonta heterodon***
 Brook floater mussel, *Alasmidonta varicosa*
 Ringed boghaunter, *Williamsonia lintneri*
 Cobblestone tiger beetle, *Cicindela marginipennis*
 Puritan tiger beetle, *Cicindela puritana**
 Frosted elfin butterfly, *Callophrys irus*
 Karner blue butterfly, *Lycaeides melissa samuelis***
 White Mountain fritillary, *Boloria titania montinus*
 Persius duskywing skipper, *Erynnis persius*

FISH

American brook lamprey, *Lethenteron appendix*
 Shortnose sturgeon, *Acipenser brevirostrum***

REPTILES

Blanding's turtle, *Emydoidea blandingii*
 Eastern hognose snake, *Heterodon platirhinos*
 Timber rattlesnake, *Crotalus horridus*

AMPHIBIANS

Marbled salamander, *Ambystoma opacum*

BIRDS

Northern harrier, *Circus cyaneus*
 Golden eagle, *Aquila chrysaetos*
 Common nighthawk, *Chordeiles minor*
 Piping plover, *Charadrius melodus**
 Upland sandpiper, *Bartramia longicauda*
 Roseate tern, *Sterna dougallii***
 Least tern, *Sterna antillarum*
 Sedge wren, *Cistothorus platensis*

MAMMALS

Small-footed bat, *Myotis leibii*
 New England cottontail, *Sylvilagus transitionalis*
 Canada lynx, *Lynx canadensis**
 Gray wolf, *Canis lupus***

* Federally Threatened ** Federally Endangered

THREATENED



COMMON TERN ©DAN HAYWARD

Threatened wildlife are those native species that are likely to become endangered in the near future, if conditions surrounding them begin, or continue, to decline.



AMERICAN MARTEN ©USFWS

INVERTEBRATES

Pine pinion moth, *Lithophane lepida lepida*
 White Mountain arctic, *Oeneis melissa semidea*

FISH

Bridle shiner, *Notropis bifrenatus*

REPTILES

Spotted turtle, *Clemmys guttata*
 Black racer, *Coluber constrictor*

AMPHIBIANS (none)

BIRDS

Pied-billed grebe, *Podilymbus podiceps*
 Common loon, *Gavia immer*
 Bald eagle, *Haliaeetus leucocephalus*
 Peregrine falcon, *Falco peregrinus*
 Common tern, *Sterna hirundo*
 American three-toed woodpecker, *Picoides dorsalis*
 Grasshopper sparrow, *Ammodramus savannarum*

MAMMALS

American marten, *Martes americana*
 Northern long-eared bat, *Myotis septentrionalis**

History of Endangered Wildlife Protection in New Hampshire

- 1973** – The Endangered Species Act, a federal law, was passed. It protects wildlife and plant species in danger of nationwide extinction.
- 1979** – The New Hampshire Endangered Species Conservation Act was passed, giving New Hampshire Fish and Game Department the authority to protect wildlife in danger of becoming extinct in New Hampshire.
- 1980** – The first list of New Hampshire threatened and endangered wildlife was created.
- 1987 & 2000** – The New Hampshire threatened and endangered wildlife list was revised.
- 2006** – The first New Hampshire Wildlife Action Plan took effect.
- 2008** – The current New Hampshire threatened and endangered wildlife list took effect on 9/20/08.
- 2015** – The New Hampshire Wildlife Action Plan is revised and updated.

The list of New Hampshire's endangered and threatened wildlife is maintained by the New Hampshire Fish and Game Department. This list is current as of May 4, 2015 and is used to determine protection and management actions necessary to ensure the survival of the state's endangered and threatened wildlife. State and federal agencies and numerous New Hampshire nonprofit conservation organizations work cooperatively to protect and manage the state's wildlife. The Fish and Game Department has legal authority regarding all wildlife, game, nongame and endangered or threatened species.

This work is made possible through federal grants, the sale of N.H. Conservation License Plates (moose plates) and private contributions. Donations to the Nongame Program are matched by state dollars. With your help we are able to protect New Hampshire's wildlife.

For more information about the Nongame and Endangered Wildlife Program, to report a sighting of endangered or threatened wildlife, or to make a contribution, contact:



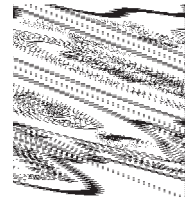
Nongame and Endangered Wildlife Program

New Hampshire Fish and Game Department

11 Hazen Drive, Concord, NH 03301

(603) 271-2461

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Thank you for visiting the New Hampshire Fish and Game Department website. <http://www.wildlife.state.nh.us/>



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Endangered and Threatened Wildlife of NH



Endangered wildlife are those native species whose prospects for survival in New Hampshire are in danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to ensure continued existence as a viable component of the state's wildlife community.

Threatened wildlife are those species which may become endangered if conditions surrounding them begin, or continue, to decline.

- [Printable list of Endangered and Threatened Wildlife of New Hampshire](#)
- [Critical Habitats and Associated Species in New Hampshire](#)
- [Species of Special Concern List](#)

- * = Federally threatened
- ** = Federally endangered.

This list was updated in May 2015.

SPECIES LIST	
MAMMALS	
Endangered:	Threatened:
* Canada lynx, <i>Lynx canadensis</i>	American marten, <i>Martes americana</i> (formerly pine marten)
small-footed bat , <i>Myotis leibii</i>	*Northern long-eared bat, <i>Myotis septentrionalis</i>
** Gray wolf, <i>Canis lupus</i>	
New England cottontail , <i>Sylvilagus transitionalis</i>	
BIRDS	
Endangered:	Threatened:
common nighthawk, <i>Chordeiles minor</i>	common loon, <i>Gavia immer</i>
northern harrier , <i>Circus cyaneus</i>	American three-toed woodpecker, <i>Picoides dorsalis</i>
golden eagle , <i>Aquila chrysaetos</i>	grasshopper sparrow, <i>Ammodramus savannarum</i>
* piping plover , <i>Charadrius melodus</i>	pied-billed grebe, <i>Podilymbus podiceps</i>

upland sandpiper, <i>Bartramia longicauda</i>	bald eagle, <i>Haliaeetus leucocephalus</i>
** roseate tern, <i>Sterna dougallii</i>	peregrine falcon, <i>Falco peregrinus</i>
least tern, <i>Sterna antillarum</i>	common tern, <i>Sterna hirundo</i>
sedge wren, <i>Cistothorus platensis</i>	
FISH	
Endangered:	Threatened:
American brook lamprey, <i>Lethenteron appendix</i>	Bridle shiner, <i>Notropis bifrenatus</i>
** shortnose sturgeon, <i>Acipenser brevirostrum</i>	
REPTILES	
Endangered:	Threatened:
timber rattlesnake, <i>Crotalus horridus</i>	spotted turtle, <i>Clemmys guttata</i>
Blanding's turtle, <i>Emydoidea blandingii</i>	black racer snake, <i>coluber constrictor</i>
Eastern hognose snake, <i>Heterodon platyhinus</i>	
AMPHIBIANS	
Endangered:	Threatened:
marbled salamander, <i>Ambystoma opacum</i>	(none currently listed)
INVERTEBRATES	
Endangered:	Threatened:
cobblestone tiger beetle, <i>Cicindela marginipennis</i>	pine pinion moth, <i>Lithophane lepida lepida</i>
** dwarf wedgemussel, <i>Alasmidonta heterodon</i>	White Mountain Arctic, <i>Oeneis melissa semidea</i>
brook floater, <i>Alasmidonta varicosa</i>	
frosted elfin butterfly, <i>Callophrys irus</i>	
** Karner blue butterfly, <i>Lycaeides melissa samuelis</i>	
Persius dusky wing skipper, <i>Erynnis persius persius</i>	
ringed bog haunter dragonfly, <i>Williamsonia lintneri</i>	
* puritan tiger beetle, <i>Cicindela puritana</i>	
White Mountain fritillary, <i>Boloria titania montinus</i>	

Endangered Species

Ecological Services

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Endangered and Threatened Species in New Hampshire



Green sea turtle.

Credit: Keenan Adams / USFWS

The [green sea turtle](#) (*Chelonia mydas*) has a heart-shaped shell, small head and single-clawed flippers. Generally found in fairly shallow waters inside reefs bays and inlets, except when migrating, green sea turtles eat sea grasses and marine algae. They can reach up to 400 pounds and reach 43 inches in length. Juvenile green sea turtles are omnivorous and are found in southern tropical waters. A major factor contributing to their decline worldwide is commercial harvest for eggs and meat. [More on this turtle.](#)



Hawksbill sea turtle.

Credit: Caroline S. Rogers / NOAA

The [hawksbill sea turtle](#) (*Eretmochelys imbricate*) can grow up to three feet in length and weigh up to 300 pounds. This marine turtle is extremely rare in Northeast waters. It frequents rocky areas, coral reefs and shallow coastal areas, feeding primarily on sponges. The population of the endangered hawksbill sea turtle declined primarily due to illegal exploitation of its shell. Other threats include loss of nesting habitat from coastal development and nest predation. [More on this turtle.](#)



Leatherback sea turtle.

USFWS

The [leatherback sea turtle](#) (*Dermochelys coriacea*) is the largest, deepest diving, most migratory and wide ranging turtle of all sea turtles. Adults can reach four to eight feet in length and weigh 500 to 2,000 pounds. Leatherbacks are named after their leathery shells, which comprise a mosaic of small bones covered by firm, rubbery skin with seven longitudinal ridges or keels. These endangered turtles migrate to deep ocean waters to feed on jellyfish and squid. Adult females require sandy nesting beaches with proximity to deep water and generally rough seas. The crash of the leatherback population resulted from the harvest of eggs and meat, loss of nesting habitat, disorientation of hatchlings by beachfront lighting, and marine pollution and debris. [More on this turtle.](#)



Loggerhead sea turtle.

USFWS

[Loggerhead sea turtles](#) (*Caretta caretta*) are the most common sea turtle along the coast of Maryland, Virginia, and Delaware. Loggerheads are listed as threatened. Adults can reach up to 40 inches in length and 400 pounds, although it's mostly juveniles averaging 28 inches that are found in Northeast coastal waters while foraging on blue crab, horseshoe crab, whelk, fishes, and sea grasses. When turtles reach maturity at about 20 to 30 years, females will typically head to warm temperate or tropical beaches to nest. [More on this turtle.](#)

Birds

The [piping plover](#) (*Charadrius melodus*) is a small, stocky, sandy-colored bird resembling a sandpiper. Piping plovers are found along the entire Atlantic coast in open, sandy habitat on outer beaches, where



Piping plover.

USFWS

they feed and nest. Its current decline is attributed to increased development and recreational use of beaches. The most recent surveys place the Atlantic population at less than 2,000 pairs. In a [recent survey in the Bahamas](#), biologists counted more than 1,000 individual piping plovers, distinguishing the Bahamas as hosting the second-highest wintering population in the world. [More on the piping plover.](#)



Red knot.

Credit: Gregory Breese / USFWS

The [red knot](#) (*Calidris canutus rufa*) is truly a master of long-distance aviation. On wingspans of 20 inches, red knots fly more than 9,300 miles twice a year, making this shorebird one of the longest-distance migrants in the animal kingdom. It depends on the fuel supplied by billions of horseshoe crab eggs at major North Atlantic staging areas, notably the Delaware Bay and Cape May peninsula. The increased harvest of horseshoe crabs for bait in the 1990s may be a major factor in the decline in red knots. Another necessary condition for red knots' survival is the continued existence of Arctic habitat for breeding. Red knots could be particularly affected by global climate change, which may have the greatest impact at the latitudes where this species breeds and winters. [More on the red knot.](#)

Mammals

For information about whales off the coast, [click here.](#)



Canada lynx.

Credit: USFWS

The [Canada lynx](#) (*Lynx canadensis*) is a secretive forest-dwelling cat, common throughout the boreal forest of Alaska and Canada. Habitat areas include large, young, dense stands of spruce and fir that support snowshoe hare, which comprise more than 75 percent of the Canada lynx's diet. In recent years, adult lynx and their kittens have been documented in northern Vermont and New Hampshire. [More about the lynx.](#)



New England cottontail.

Credit: Anne Schnell / USFWS

[New England cottontail](#) (*Sylvilagus transitionalis*) population numbers are declining. As recently as 1960, New England cottontails were found east of the Hudson River in New York, across all of Connecticut, Rhode Island and Massachusetts, north to southern Vermont and New Hampshire, and into southern Maine. Today, this rabbit's range has shrunk by about 86 percent. Its numbers are so greatly diminished that it can no longer be found in Vermont and has been reduced to only five small populations throughout its historic range. [More about this rabbit.](#)

Mussels and other invertebrates



Dwarf wedgemussel.

Credit: Susi von Oettingen / USFWS

The endangered [dwarf wedgemussel](#) (*Alasmodonta heterodon*) lives in streams along the Atlantic Coast from New Hampshire to North Carolina. Collection, poor water quality and deteriorating habitat conditions led to its decline and continue to threaten remaining populations. Specific causes include impoundments, dredged, channelized or altered stream channels (i.e., mining, bank stabilization), chemical contaminants, and sedimentation. Their decline often signals a decline in the water quality of streams and rivers. Biologists have focused on working with landowners to improve stream conditions for the species. [More about this mussel.](#)



Karner blue butterfly.

Joel Trick, USFWS

The **Karner blue butterfly** (*Lycaeides melissa samuelis*) has fought a tough battle for survival with a limited diet of wild lupine leaves in the larval stage and nectar from other native flowers as adults. Loss of habitat played a major contributing factor to its population decline. Loss of habitat is a major contributing factor to their decline in populations. But on a positive note, school children in New Hampshire are helping these beautiful blue creatures by growing lupine in their classrooms and replanting it in the wild to help provide more habitat for Karner blues. In addition, these butterflies are raised in captivity before released into the wild, and extensive habitat work has been done in New Hampshire. [More about this butterfly.](#)

Plants



Jesup's milk-vetch.

Credit: © Lisa Mattei / NEWS

Jesup's milk-vetch (*Astragalus robbinsii* var. *jesupii*) is known to occur in only three locations along the Connecticut River in New Hampshire and Vermont. Found in the crevices of rocks, the plant emerges after the winter ice and spring floods have receded, usually sometime in April, with small violet flowers that bloom in May. Plant heights range from eight inches to nearly 2four inches. The main threats to this rare plant are non-native plant species, climate change, trampling and dams that change the river's flow, making flooding less frequent. [More on this plant.](#)



Northeast bulrush.

Credit: USFWS

A wetland plant first identified in 1962, the **northeastern bulrush** (*Scirpus ancistrochaetus*) is tall, with narrow leaves and a drooping flower head with chocolate brown florets. It is difficult to find and recognize, and it is threatened by habitat destruction and deterioration of some areas in which it grows, including sinkhole ponds and wet depressions. Biologists continue to study the habitat requirements of this plant. [More on this plant.](#)



small-whorled pogonia.

Credit: USFWS

The **small-whorled pogonia** (*Isotria medeoloides*) is a rare orchid that grows in older hardwood forests of beech, birch, maple, oak and hickory with an open understory. The primary threat to the small-whorled pogonia is the past and continuing loss of habitat due to urban development, logging and other land disturbances. And as is the case with all rare orchids, the small-whorled pogonia is vulnerable to collection for commercial and personal use. [More on this plant.](#)

Last updated: February 3, 2014

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**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN NEW HAMPSHIRE**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Belknap	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Meredith, Alton and Laconia
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Carroll	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Albany, Brookfield, Eaton, Effingham, Madison, Ossipee, Wakefield and Wolfeboro
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Coos	Canada Lynx	Threatened	Regenerating softwood forest, usually with a high density of snowshoe hare.	All Towns
	Dwarf wedgemussel	Endangered	Connecticut River main channel and Johns River	Northumberland, Lancaster and Dalton
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Cheshire	Dwarf wedgemussel	Endangered	S. Branch Ashuelot River and Ashuelot River	Swanzy, Keene and Surry
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Grafton	Dwarf wedgemussel	Endangered	Connecticut River main channel	Haverhill, Piermont, Orford and Lyme
	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Holderness
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hillsborough	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Manchester, Weare
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Merrimack	Karner Blue Butterfly	Endangered	Pine Barrens with wild blue lupine	Concord and Pembroke
	Small whorled Pogonia	Threatened	Forests	Bow, Danbury, Epsom, Loudon, Warner and Allenstown
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN NEW HAMPSHIRE**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Rockingham	Piping Plover	Threatened	Coastal Beaches	Hampton and Seabrook
	Roseate Tern	Endangered	Atlantic Ocean and nesting at the Isle of Shoals	
	Red knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal towns
	Small whorled Pogonia	Threatened	Forests	Deerfield, Northwood, Nottingham, and Epping
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Strafford	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Middleton, New Durham, Milton, Farmington, Strafford, Barrington, and Madbury
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Sullivan	Northeastern bulrush	Endangered	Wetlands	Acworth, Charlestown, Langdon
	Dwarf wedgemussel	Endangered	Connecticut River main channel	Plainfield, Cornish, Claremont and Charlestown
	Jesup's milk-vetch	Endangered	Banks of the Connecticut River	Plainfield and Claremont
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

¹Migratory only, scattered along the coast in small numbers

-Eastern cougar, gray wolf and Puritan tiger beetle are considered extirpated in New Hampshire.

-Endangered gray wolves are not known to be present in New Hampshire, but dispersing individuals from source populations in Canada may occur statewide.-There is no federally-designated Critical Habitat in New Hampshire



Endangered and Threatened Plants of Vermont
Vermont Natural Heritage Inventory
Vermont Fish & Wildlife Department
28 March 2015



The following species are protected by **Vermont's Endangered Species Law (10 V.S.A. Chap. 123)**. There are 69 state-endangered and 94 state-threatened plants in Vermont. Those with a federal status of Threatened or Endangered are also protected by the **Federal Endangered Species Act (P.L. 93-205)**. Note that not all synonyms are included.

For further information contact the Vermont Natural Heritage Inventory, Vermont Fish & Wildlife Department, 1 National Life Drive, Montpelier, VT 05620-3702. (802) 828-1000.

Scientific Name	Common Name	State Status	Federal Status
Vascular Plants			
<i>Adiantum viridimontanum</i>	Green Mountain Maidenhair-fern	T	
<i>Agastache nepetoides</i>	Yellow Giant Hyssop	T	
<i>Agastache scrophulariifolia</i>	Purple Giant Hyssop	T	
<i>Allium canadense</i> var. <i>canadense</i>	Wild Garlic	T	
<i>Ammophila breviligulata</i> ssp. <i>champlainensis</i>	Champlain Beach Grass	E	
<i>Anemone multifida</i> var. <i>multifida</i>	Early Thimbleweed	E	
<i>Anthoxanthum monticola</i> ssp. <i>monticola</i>	Alpine Sweet-grass	T	
<i>Anticlea glauca</i>	White Camas	E	
<i>Aplectrum hyemale</i>	Putty-root	T	
<i>Arabidopsis lyrata</i>	Lyre-leaved Rock-cress	T	
<i>Arethusa bulbosa</i>	Arethusa	T	
<i>Arisaema dracontium</i>	Green Dragon	T	
<i>Asclepias amplexicaulis</i>	Blunt-leaved Milkweed	T	
<i>Asclepias tuberosa</i>	Butterfly-weed	T	
<i>Asclepias verticillata</i>	Whorled Milkweed	E	
<i>Asplenium montanum</i>	Mountain Spleenwort	T	
<i>Asplenium viride</i>	Green Spleenwort	T	
<i>Astragalus canadensis</i> var. <i>canadensis</i>	Canada Milk-vetch	T	
<i>Astragalus robbinsii</i> var. <i>jesupii</i>	Jesup's Milk-vetch	E	LE
<i>Betula minor</i>	Dwarf Birch	E	
<i>Blephilia hirsuta</i> var. <i>glabrata</i>	Smooth Wood-mint	T	
<i>Blephilia hirsuta</i> var. <i>hirsuta</i>	Hairy Wood-mint	T	
<i>Boechera stricta</i>	Drummond's Rock-cress	E	
<i>Botrychium minganense</i>	Mingan Moonwort	E	
<i>Braya humilis</i>	Northern Rock-cress	T	
<i>Calamagrostis pickeringii</i>	Pickering's Reed-grass	E	
<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	Bentgrass	E	

Scientific Name	Common Name	State Status	Federal Status
<i>Calypto bulbosa</i> var. <i>americana</i>	Fairy Slipper	T	
<i>Calystegia spithamea</i> ssp. <i>spithamea</i>	Low Bindweed	T	
<i>Carex arcta</i>	Contracted Sedge	E	
<i>Carex atratiformis</i>	Blackish Sedge	T	
<i>Carex buxbaumii</i>	Buxbaum's Sedge	E	
<i>Carex capillaris</i> ssp. <i>capillaris</i>	Capillary Sedge	T	
<i>Carex chordorrhiza</i>	Creeping Sedge	E	
<i>Carex foenea</i> Willd. Synonym: <i>Carex aenea</i> Fern.	Bronze Sedge	E	
<i>Carex garberi</i>	Garber's Sedge	T	
<i>Carex livida</i>	Pale Sedge	T	
<i>Carex muehlenbergii</i> var. <i>enervis</i>	Nerveless Muehlenberg Sedge	T	
<i>Carex muehlenbergii</i> var. <i>muehlenbergii</i>	Muehlenberg's Sedge	T	
<i>Carex oligocarpa</i>	Few-fruited Sedge	E	
<i>Carex richardsonii</i>	Richardson's Sedge	E	
<i>Carex siccata</i>	Hay Sedge	E	
<i>Carex vaginata</i>	Sheathed Sedge	E	
<i>Castilleja septentrionalis</i>	Northern Painted-cup	T	
<i>Ceanothus herbaceus</i>	Prairie Redroot	E	
<i>Corallorhiza odontorhiza</i> var. <i>odontorhiza</i>	Autumn Coral-root	T	
<i>Cornus florida</i>	Flowering Dogwood	T	
<i>Corydalis aurea</i>	Golden Corydalis	T	
<i>Crocanthemum bicknellii</i>	Plains Frostweed	T	
<i>Crotalaria sagittalis</i>	Rattlebox	T	
<i>Cynoglossum virginianum</i> var. <i>boreale</i>	Northern Wild Comfrey	T	
<i>Cyperus diandrus</i>	Low Cyperus	E	
<i>Cyperus houghtonii</i>	Houghton's Cyperus	T	
<i>Cypripedium arietinum</i>	Ram's Head Lady's-slipper	T	
<i>Desmodium cuspidatum</i>	Large-bracted Tick-trefoil	E	
<i>Desmodium rotundifolium</i>	Prostrate Tick-trefoil	T	
<i>Diapensia lapponica</i> ssp. <i>lapponica</i>	Diapensia	E	
<i>Draba cana</i> Synonym: <i>Draba breweri</i> var. <i>cana</i>	Hoary Draba	T	
<i>Draba glabella</i>	Smooth Draba	T	
<i>Dracocephalum parviflorum</i>	American Dragonhead	T	
<i>Dryopteris filix-mas</i>	Male Fern	T	
<i>Eleocharis quinqueflora</i>	Few-flowered Spikerush	T	
<i>Equisetum palustre</i>	Marsh Horsetail	T	
<i>Eupatorium sessilifolium</i>	Sessile-leaved Boneset	E	
<i>Fimbristylis autumnalis</i>	Autumn Fimbristylis	E	
<i>Galium labradoricum</i>	Bog Bedstraw	T	
<i>Gentiana andrewsii</i>	Fringe-top Closed Gentian	T	
<i>Gentianella amarella</i>	Felwort	T	

Scientific Name	Common Name	State Status	Federal Status
<i>Gentianella quinquefolia</i>	Stiff Gentian	T	
<i>Glyceria acutiflora</i>	Sharp Manna-grass	E	
<i>Hackelia deflexa ssp. americana</i>	Nodding Stickseed	T	
<i>Helianthus strumosus</i>	Harsh Sunflower	T	
<i>Hippuris vulgaris</i>	Mare's-tail	E	
<i>Hudsonia tomentosa</i>	Beach Heather	E	
<i>Hydrastis canadensis</i>	Golden-seal	E	
<i>Hydrophyllum canadense</i>	Broad-leaved Waterleaf	T	
<i>Hypericum ascyron</i>	Great St. John's-wort	T	
<i>Isoetes engelmannii</i>	Engelmann's Quillwort	T	
<i>Isoetes viridimontana</i>	Green Mountain Quillwort	E	
<i>Isotria medeoloides</i>	Small Whorled Pogonia	E	LT
<i>Isotria verticillata</i>	Large Whorled Pogonia	T	
<i>Juncus greenei</i>	Greene's Rush	E	
<i>Juncus militaris</i>	Soldier Rush	E	
<i>Juncus secundus</i>	Secund Rush	E	
<i>Juniperus horizontalis</i>	Creeping Juniper	T	
<i>Lactuca hirsuta</i>	Hairy Lettuce	T	
<i>Lathyrus japonicus var. maritimus</i>	Beach Pea	T	
<i>Lathyrus palustris</i>	Marsh Vetchling	T	
<i>Lechea mucronata</i>	Hairy Pinweed	E	
<i>Lespedeza frutescens</i> ¹ Synonym: <i>Lespedeza violacea</i>	Violet Bush-clover	T	
<i>Lespedeza hirta ssp. hirta</i>	Hairy Bush-clover	T	
<i>Liparis liliifolia</i>	Lily-leaved Twayblade	T	
<i>Liriodendron tulipifera</i>	Tulip Tree	E	
<i>Ludwigia polycarpa</i>	Many-fruited False-loosestrife	E	
<i>Lupinus perennis</i>	Wild Lupine	E	
<i>Lygodium palmatum</i>	Climbing Fern	E	
<i>Malaxis monophyllos var. brachypoda</i>	White Adder's-mouth	T	
<i>Minuartia marcescens</i>	Marcescent Sandwort	T	
<i>Minuartia rubella</i>	Marble Sandwort	T	
<i>Morus rubra</i>	Red Mulberry	T	
<i>Nabalus boottii</i>	Boott's Rattlesnake-root	E	
<i>Neottia auriculata</i> Synonym: <i>Listera auriculata</i>	Auricled Twayblade	E	
<i>Neottia bifolia</i> Synonym: <i>Listera australis</i>	Southern Twayblade	E	
<i>Nymphaea leibergii</i>	Pygmy Water-lily	E	
<i>Omalotheca sylvatica</i>	Woodland Cudweed	E	
<i>Panicum flexile</i>	Stiff Witch-grass	E	
<i>Petasites frigidus var. palmatus</i>	Sweet Coltsfoot	T	
<i>Physostegia virginiana</i>	Obedient Plant	T	

¹ *Lespedeza violacea* (L.) Pers. is now what was formerly known as *L. intermedia* (S. Watts) Britton and is not listed. The currently accepted name, *Lespedeza frutescens*, is synonymous with *Lespedeza violacea* of authors other than (L.) Pers.

Scientific Name	Common Name	State Status	Federal Status
<i>Pinus banksiana</i>	Jack Pine	T	
<i>Piptatheropsis pungens</i> Synonym: <i>Piptatherum pungens</i>	Slender Mountain-rice	T	
<i>Platanthera flava</i> var. <i>herbiola</i>	Tuberclad Orchis	T	
<i>Platanthera hookeri</i>	Hooker's Orchis	T	
<i>Polemonium vanbruntiae</i>	Eastern Jacob's Ladder	T	
<i>Polygonum douglasii</i>	Douglas' Knotweed	E	
<i>Polymnia canadensis</i>	White-flowered Leafcup	E	
<i>Potentilla litoralis</i>	Northern Cinquefoil	E	
<i>Primula mistassinica</i>	Bird's-eye Primrose	T	
<i>Prunus americana</i>	Wild Plum	T	
<i>Prunus susquehanae</i>	Susquehanna Sand Cherry	E	
<i>Pterospora andromedea</i>	Pinedrops	E	
<i>Pycnanthemum incanum</i>	Hoary Mountain-mint	E	
<i>Pyrola asarifolia</i> ssp. <i>asarifolia</i>	Bog Wintergreen	T	
<i>Pyrola minor</i>	Lesser Pyrola	E	
<i>Quercus ilicifolia</i>	Scrub Oak	E	
<i>Quercus prinoides</i>	Dwarf Chinquapin Oak	E	
<i>Ranunculus allegheniensis</i>	Allegheny Crowfoot	T	
<i>Rhexia virginica</i>	Virginia Meadow-beauty	T	
<i>Rhodiola rosea</i>	Roseroot	T	
<i>Rhododendron maximum</i>	Great Laurel	T	
<i>Rhynchospora capillacea</i>	Capillary Beak-rush	T	
<i>Rorippa aquatica</i>	Lake-cress	T	
<i>Rosa acicularis</i> ssp. <i>sayi</i>	Needle-spine Rose	E	
<i>Salix planifolia</i>	Tea-leaved Willow	T	
<i>Salix uva-ursi</i>	Bearberry Willow	E	
<i>Sanicula canadensis</i> var. <i>canadensis</i>	Short-styled Snakeroot	T	
<i>Sanicula canadensis</i> var. <i>grandis</i>	Greater Short-styled Snakeroot	T	
<i>Scheuchzeria palustris</i>	Pod-grass	T	
<i>Scirpus ancistrochaetus</i>	Barbed-bristle Bulrush	E	LE
<i>Senna hebecarpa</i>	Wild Senna	T	
<i>Solidago odora</i> ssp. <i>odora</i>	Sweet Goldenrod	T	
<i>Solidago ulmifolia</i>	Elm-leaved Goldenrod	E	
<i>Sparganium natans</i>	Lesser Bur-reed	T	
<i>Sphenopholis nitida</i>	Shiny Wedgegrass	E	
<i>Sphenopholis obtusata</i>	Blunt Sphenopholis	E	
<i>Sporobolus compositus</i>	Rough Dropseed	E	
<i>Taenidia integerrima</i>	Yellow Pimpernel	T	
<i>Triantha glutinosa</i>	Sticky False-asphodel	T	
<i>Trichophorum planifolium</i>	Bashful Bulrush	E	
<i>Triglochin maritima</i>	Arrow-grass	E	
<i>Triphora trianthophora</i>	Three-bird Orchid	T	

Scientific Name	Common Name	State Status	Federal Status
<i>Ulmus thomasii</i>	Rock Elm (Cork Elm)	T	
<i>Utricularia resupinata</i>	Northeastern Bladderwort	T	
<i>Vaccinium stamineum</i>	Deerberry	E	
<i>Valeriana uliginosa</i>	Marsh Valerian	E	
<i>Veronicastrum virginicum</i>	Culver's-root	E	
<i>Viburnum edule</i>	Squashberry	T	
<i>Viola lanceolata ssp. lanceolata</i>	Lance-leaved Violet	T	
<i>Vulpia octoflora</i>	Eight-flowered Fescue	E	
<i>Woodsia alpina</i>	Alpine Woodsia	E	
<i>Woodwardia virginica</i>	Virginia Chain-fern	T	
<i>Xyris montana</i>	Yellow-eyed Grass	T	

Bryophytes

<i>Plagiobryum zieri</i>	A Moss	E	
<i>Sphagnum subfulvum</i>	A Peatmoss	E	

State Status - Legal protection under Vermont Endangered Species Law (10 V.S.A. Chap. 123)

E = Endangered: in immediate danger of becoming extirpated in the state

T = Threatened: with high possibility of becoming endangered in the near future

Federal Status - Legal protection under the federal Endangered Species Act, U.S. Fish & Wildlife Service

LE = Listed Endangered

LT = Listed Threatened

SC = Species of Concern (does not denote legal protection)

C = Candidate for Listing (does not denote legal protection)



Endangered and Threatened Animals of Vermont
Vermont Natural Heritage Inventory
Vermont Fish & Wildlife Department
28 March 2015



The species in the following list are protected by Vermont's Endangered Species Law (10 V.S.A. Chap. 123). There are 36 state-endangered and 16 state-threatened animals in Vermont. Those with a federal status of Threatened or Endangered are also protected by the Federal Endangered Species Act (P.L. 93-205).

For further information contact the Vermont Natural Heritage Inventory, Vermont Fish & Wildlife Department, 1 National Life Drive, Montpelier, VT 05620-3702. (802) 828-1000.

Common Name	Scientific Name	State Status	Federal Status
Fishes			
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	E	
American Brook Lamprey	<i>Lethenteron appendix</i> Synonym: <i>Lampetra appendix</i>	T	
Lake Sturgeon	<i>Acipenser fulvescens</i>	E	
Stonecat	<i>Noturus flavus</i>	E	
Eastern Sand Darter	<i>Ammocrypta pellucida</i>	T	
Channel Darter	<i>Percina copelandi</i>	E	
Amphibians			
Fowler's Toad	<i>Anaxyrus fowleri</i>	E	
Boreal Chorus Frog	<i>Pseudacris maculata</i>	E	
Reptiles			
Spotted Turtle	<i>Clemmys guttata</i>	E	
Spiny Softshell (Turtle)	<i>Apalone spinifera</i>	T	
Common Five-lined Skink	<i>Plestiodon fasciatus</i> Synonym: <i>Eumeces fasciatus</i>	E	
North American Racer	<i>Coluber constrictor</i>	T	
Eastern Ratsnake	<i>Pantherophis alleghaniensis</i> Synonym: <i>Elaphe obsoleta</i>	T	
Timber Rattlesnake	<i>Crotalus horridus</i>	E	
Mammals			
Eastern Small-footed Bat	<i>Myotis leibii</i>	T	
Little Brown Bat	<i>Myotis lucifugus</i>	E	
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	E	LT

Common Name	Scientific Name	State Status	Federal Status
Indiana Bat	<i>Myotis sodalis</i>	E	LE
Tri-colored Bat	<i>Perimyotis subflavus</i> Synonym: <i>Pipistrellus subflavus</i>	E	
Canadian Lynx	<i>Lynx canadensis</i>	E	LT
Eastern Mountain Lion	<i>Puma concolor cougar</i> Synonym: <i>Felis concolor cougar</i>	E	LE
American Marten	<i>Martes americana</i>	E	
Birds			
Spruce Grouse	<i>Falcapennis canadensis</i>	E	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	E	
Upland Sandpiper	<i>Bartramia longicauda</i>	E	
Red Knot	<i>Calidris canutus</i>	T*	LT
Black Tern	<i>Chlidonias niger</i>	E	
Common Tern	<i>Sterna hirundo</i>	E	
Eastern Whip-poor-will	<i>Antrostomus vociferus</i> Synonym: <i>Caprimulgus vociferus</i>	T	
Common Nighthawk	<i>Chordeiles minor</i>	E	
Loggerhead Shrike	<i>Lanius ludovicianus</i>	E	
Sedge Wren	<i>Cistothorus platensis</i>	E	
Rusty Blackbird	<i>Euphagus carolinus</i>	E	
Henslow's Sparrow	<i>Ammodramus henslowii</i>	E	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	T	
Amphipods			
Taconic Cave Amphipod	<i>Stygobromus borealis</i>	E	
Freshwater Mussels			
Eastern Pearlshell	<i>Margaritifera margaritifera</i>	T	
Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>	E	LE
Brook Floater	<i>Alasmidonta varicosa</i>	T	
Cylindrical Papershell	<i>Anodontoidea ferussacianus</i>	E	
Pocketbook	<i>Lampsilis ovata</i>	E	
Fluted-shell	<i>Lasmigona costata</i>	E	
Fragile Papershell	<i>Leptodea fragilis</i>	E	
Black Sandshell	<i>Ligumia recta</i>	E	

* Red Knot (*Calidris canutus rufa*) was added to the Federal list on 12 January 2015. Listed in Vermont by default, per statute; has not undergone rule-making in Vermont.

Common Name	Scientific Name	State Status	Federal Status
Pink Heelsplitter	<i>Potamilus alatus</i>	E	
Giant Floater	<i>Pyganodon grandis</i>	T	
Beetles			
Hairy-necked Tiger Beetle	<i>Cicindela hirticollis</i>	T	
Cobblestone Tiger Beetle	<i>Cicindela marginipennis</i>	T	
Puritan Tiger Beetle	<i>Cicindela puritana</i>	T	LT
Bees			
Rusty-patched Bumble Bee	<i>Bombus affinis</i>	E	
Ashton Cuckoo Bumble Bee	<i>Bombus ashtoni</i>	E	
Yellow-banded Bumble Bee	<i>Bombus terricola</i>	T	

State Status - Legal protection under Vermont Endangered Species Law (10 V.S.A. Chap. 123)

E = Endangered: in immediate danger of becoming extirpated in the state

T = Threatened: with high possibility of becoming endangered in the near future

Federal Status - Legal protection under the federal Endangered Species Act, U.S. Fish & Wildlife Service

LE = Listed Endangered

LT = Listed Threatened

SC = Species of Concern (does not denote legal protection)

C = Candidate for Listing (does not denote legal protection)

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN VERMONT**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Addison	Indiana bat	Endangered	Forests and Woodlots.	Ferrisburg, Panton, Addison, Bridport, Shoreham, Orwell, Whiting, Cornwall, Weybridge, Vergennes, Waltham, New Haven, Monkton, Starksboro, Bristol, Middlebury, Salisbury, and Leicester
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Bennington	Indiana bat	Endangered	Hibernacula (caves and mines)	Dorset, Manchester and Sandgate
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Caledonia	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Chittenden	Indiana bat	Endangered	Forests and Woodlots	Charlotte, Hinesburg and St. George
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Essex	Dwarf wedgemussel	Endangered	Connecticut River main channel	Bloomfield, Maidstone, Guildhall, Lunenburg, and Concord
	Canada lynx	Threatened	Regenerating softwood forest, usually with a high snowshoe hare density	All
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Franklin	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Grand Isle	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN VERMONT**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Lamoille	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Orange	Dwarf wedgemussel	Endangered	Connecticut River main channel	Newbury, Bradford, Fairlee, and Thetford
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Orleans	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Rutland	Indiana bat	Endangered	Forests and Woodlots	Benson, Brandon, Sudbury, Fair Haven, Pittsford and West Haven
			Hibernacula (caves and mines)	Brandon and Chittenden
	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Washington	Northern Long-eared Bat	Proposed Endangered	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Windham	Dwarf wedgemussel	Endangered	Connecticut River main channel	Rockingham
	Northeastern bulrush	Endangered	Connecticut River Watershed wetlands	Rockingham, Grafton, Townsend, Athens, Westminster, Newfane, Brookline, Putney, Dummerston
Windsor	Jesup’s milkvetch	Endangered	Banks of the Connecticut River	Weathersfield, Hartland
	Dwarf wedgemussel	Endangered	Connecticut River main channel	Springfield, Weathersfield, Windsor, Hartland
	Northeastern bulrush	Endangered	Connecticut River Watershed wetlands	Chester, Springfield

-Endangered gray wolves are not known to be present in Vermont, but dispersing individuals from source populations in Canada may occur statewide.

-There is no federally-designated Critical Habitat in Vermont.

MODIFICATIONS¹ À LA LISTE DES ESPÈCES FLORISTIQUES SUSCEPTIBLES D'ÊTRE DÉSIGNÉES MENACÉES OU VULNÉRABLES²

Décembre 2015

Lorsque le nom d'une espèce est accompagné du nom d'une région administrative du Québec suivie de son numéro, cela indique que seules les populations situées dans cette région sont légalement protégées.

PLANTES VASCULAIRES

AJOUTS (34)

Nom scientifique

Asplenium trichomanes subsp. *quadrivalens*
Braya linearis
Carex sterilis
Cerastium arcticum
Cerastium regelii
Cochlearia tridactylites
Cynoglossum virginianum var. *boreale*
Cyperus dentatus
Cyperus houghtonii
Cystopteris laurentiana
Draba cana
Draba cayouettei
Draba cinerea
Epilobium brachycarpum
Epilobium saximontanum
Erigeron pulchellus var. *pulchellus*
Galium brevipes
Hackelia deflexa subsp. *americana*
Hedeoma pulegioides
Juncus torreyi
Najas gracillima
Packera indecora
Pedicularis palustris subsp. *palustris*
Penstemon hirsutus
Persicaria arifolia
Plantago eriopoda

Nom en français

Doradille tétraploïde
Braya à fruits linéaires
Carex stérile
Céraiste arctique
Céraiste de Regel
Cranson tridactyle
Cynoglosse boréale
Souchet denté
Souchet de Houghton
Cystoptère laurentienne
Drave lancéolée
Drave de Cayouette
Drave cendrée
Épilobe d'automne
Épilobe des Rocheuses
Vergerette délicate
Gaillet à pédicelles courts
Hackélia d'Amérique
Hédéoma faux-pouliot
Jonc de Torrey
Naïade grêle
Séneçon sans rayons
Pédiculaire des marais
Penstémon hirsute
Renouée à feuilles d'arum
Plantain à base velue

¹ Pour plus d'information sur les modifications apportées à la liste par le passé, contacter votre [direction régionale](#) ou le [Centre d'information](#) du ministère.

² Liste des espèces floristiques menacées ou vulnérables susceptibles d'être ainsi désignées publiée en annexe de l'Arrêté ministériel 2013 de la Gazette officielle du Québec du 26 juin 2013, partie 2, page 2627.

Nom scientifique

Potamogeton strictifolius
Potentilla bimundorum
Puccinellia andersonii
Sabulina litorea
Sabulina rossii
Salix amygdaloides
Utricularia radiata
Veronica alpina

Nom en français

Potamot à feuilles raides
 Potentille des deux mondes
 Puccinellie d'Anderson
 Sabline des grèves
 Sabline de Ross
 Saule à feuilles de pêcher
 Utriculaire rayonnante
 Véronique alpine

RETRAITS (16)

Nom latin

Adiantum aleuticum
Carex appalachica
Carex petricosa var. *misandroides*
Cirsium muticum var. *monticola*
Cyperus lupulinus subsp. *macilentus*
Festuca hyperborea
Gratiola neglecta var. *glaberrima*
Halenia deflexa subsp. *brentoniana*
Hedysarum boreale var. *mackenziei*
Juniperus communis var. *megistocarpa*
Lathyrus ochroleucus
Lindernia dubia var. *inundata*
Poa laxa subsp. *fernaldiana*
Polygonum articulatum
Solidago ptarmicoides
Sporobolus cryptandrus

Nom commun

Adiante des Aléoutiennes
 Carex des Appalaches
 Carex misandroïde
 Chardon des montagnes
 Souchet grêle
 Fétuque hyperboréale
 Gratiolle du Saint-Laurent
 Halénie de Brenton
 Sainfoin de Mackenzie
 Genévrier à gros fruits
 Gesse jaunâtre
 Lindernie estuarienne
 Pâturin de Fernald
 Polygonelle articulée
 Verge d'or faux-ptarmica
 Sporobole à fleurs cachées

CHANGEMENTS TAXONOMIQUES OU DE NOMENCLATURE

Nom précédent

Achillea alpina
Astragalus australis
Boechera canadensis
Boechera laevigata
Botrychium oneidense
Botrychium rugulosum
Braya humilis
Calamagrostis purpurascens

Desmodium nudiflorum
Diplazium pycnocarpon
Gymnocarpium jessoense subsp. *parvulum*
Lathyrus venosus var. *intusus*
Listera borealis

Nom révisé

Achillea alpina subsp. *multiflora*
Astragalus australis var. *glabriusculus*
Borodinia canadensis
Borodinia laevigata
Sceptridium oneidense
Sceptridium rugulosum
Braya humilis subsp. *humilis*
Calamagrostis purpurascens subsp.
purpurascens
Hylodesmum nudiflorum
Homalosorus pycnocarpus
Gymnocarpium continentale
Lathyrus venosus
Neottia borealis

Nom précédent

Lycopus americanus var. *laurentianus*
Minuartia michauxii
Oxytropis deflexa var. *foliolosa*
Oxytropis hudsonica
Oxytropis viscida
Panicum philadelphicum
Pedicularis interior
Polygala verticillata
Prunus susquehanae
Solidago simplex subsp. *randii* var. *monticola*
Solidago simplex subsp. *randii* var. *racemosa*
Vicia americana
Viola affinis

Nom révisé

Lycopus laurentianus
Sabulina michauxii
Oxytropis deflexa subsp. *foliolosa*
Oxytropis borealis var. *hudsonica*
Oxytropis borealis var. *viscida*
Panicum philadelphicum subsp. *philadelphicum*
Pedicularis sudetica subsp. *interior*
Polygala ambigua
Prunus pumila var. *susquehanae*
Solidago randii
Solidago racemosa
Vicia americana var. *americana*
Viola sororia var. *affinis*

PLANTES INVASCULAIRES**AJOUTS (50)****Nom latin**

Anastrophyllum assimile
Anastrophyllum cavifolium
Arctoa anderssonii
Barbilophozia quadriloba
Bryum gemmiferum
Bryum longisetum var. *longisetum*
Bryum muehlenbeckii
Buxbaumia piperi
Cephalozia catenulata
Cephaloziella rubella var. *sullivantii*
Chiloscyphus coadunatus var. *rivularis*
Cladopodiella francisci
Cyrtomnium hymenophyllum
Dicranella staphylina
Diplophyllum albicans
Drummondia prorepens
Encalypta brevipes
Ephemerum crassinervium
Fissidens exilis
Fissidens minutulus
Grimmia atrata
Grimmia sessitana
Grimmia teretinervis
Hygrohypnum smithii

Nom commun

Gorgone lustrée
Gorgone à feuilles creuses
Faux-dicrane arctique
Barbille patte-de-lion
Bryum à petites gemmules
Bryum à soie longue
Bryum à feuilles concaves
Gnome mat
Céphalozie chaînon
Céphalozielle bois-pourri
Tourmentine élégante
Vénusté des forêts
Mnie membraneuse
Dicranelle des champs
Fausse-scapanie blanchâtre
Houpe rampante
Petit éteignoir
Éphémère à nervure épaisse
Fissident mince
Fissident minuscule
Grimmie du cuivre
Grimmie ambiguë
Grimmie à nervure cylindrique
Riverine rigide

Nom latin

Jamesoniella undulifolia
Jungermannia crenuliformis
Jungermannia polaris
Marsupella brevissima
Mielichhoferia elongata
Moerckia blyttii
Plagiochila porelloides var. *subarctica*
Racomitrium panschii
Riccardia palmata
Riccia sorocarpa
Sarmentypnum tundrae
Scapania glaucocephala
Schistidium atrichum
Schistochilopsis grandiretis
Schistochilopsis laxa
Sphagnum arcticum
Sphagnum austinii
Sphagnum perfoliatum
Sphagnum pylaesii
Sphagnum venustum
Splachnum pensylvanicum
Stegonia latifolia var. *pilifera*
Timmia norvegica var. *norvegica*
Tortula leucostoma
Tortula nevadensis
Zygodon rupestris

Nom commun

Sylphide ondulée
 Jongermanne crénelée
 Jongermanne polaire
 Petite marsupelle
 Cuivrine élancée
 Colerette des montagnes
 Plumette subarctique
 Frangine arctique
 Riccardie palmée
 Riccie grisâtre
 Lamie nordique
 Scapanie glauque
 Grimmie glabre
 Lophozie à ventre noir
 Lophozie lâche
 Sphaigne arctique
 Sphaigne d'Austin
 Sphaigne perfoliée
 Sphaigne de La Pylaie
 Sphaigne charmante
 Splanc étroit
 Stégonie porte-poil
 Timmie fragile
 Tortule blanche
 Tortule édentée
 Houppe des rochers

RETRAITS (17)

Nom latin

Aloina rigida
Andreaea rothii
Bryum blindii
Ceratodon heterophyllus
Cynodontium strumulosum
Dicranella crispa
Frullania selwyniana
Grimmia anodon
Lophozia debiliformis
Lophozia ventricosa var. *longiflora*
Oligotrichum hercynicum
Orthotrichum alpestre
Scapania uliginosa

Nom commun

Aloina rigide
 Lanterne noire
 Bryum minuscule
 Cératodon varié
 Cynodonte discret
 Dicranelle crispée
 Frullanie des cèdres
 Grimmie édentée
 —
 Lophozie des sphaignes
 Polytric à feuilles droites
 Houppe des montagnes
 Scapanie des marécages

Nom latin

Sphagnum steerei
Tortella arctica
Tortula hoppeana
Tortula porteri

Nom commun

Sphaigne de Steere
Tortelle arctique
Tortule nordique
Tortule méridionale

CHANGEMENTS TAXONOMIQUES OU DE NOMENCLATURE

Nom précédent

Acaulon muticum
Sciuro-hypnum glaciale
Sciuro-hypnum latifolium
Ptychostomum calophyllum
Ptychostomum cryophilum
Ptychostomum cyclophyllum
Imbribryum gemmiparum
Ptychostomum knowltonii
Ptychostomum longisetum
Ptychostomum marratii
Rosulabryum rubens
Ptychostomum warneum
Ptychostomum wrightii
Cnestrum glaucescens
Cnestrum schisti
Ditrichum pallidum
Encalypta affinis
Encalypta longicolla
Grimmia poecilostoma
Gymnocolea acutiloba
Lophozia schusteriana
Orthothecium chryseum var. *cochlearifolium*
Lophozia capitata
Lophozia incisa subsp. *opacifolia*
Stegonia latifolia

Nom révisé

Acaulon muticum var. *muticum*
Brachythecium glaciale
Brachythecium latifolium
Bryum calophyllum
Bryum cryophilum
Bryum cyclophyllum
Bryum gemmiparum
Bryum knowltonii
Bryum longisetum var. *labradorensis*
Bryum marratii
Bryum rubens
Bryum warneum
Bryum wrightii
Cynodontium glaucescens
Cynodontium schisti
Distichium pallidum
Encalypta affinis subsp. *affinis*
Encalypta longicollis
Grimmia crinitoleucophaea
Gymnocolea inflata subsp. *acutiloba*
Lophozia schusteriana
Orthothecium chryseum var. *cochleariifolium*
Schistochilopsis capitata
Schistochilopsis incisa var. *opacifolia*
Stegonia latifolia var. *latifolia*

QUEBEC

In 1976, the Canadian government created the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to determine and monitor the status of wildlife in Canada. This committee is composed of representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Museum of Nature, Canadian Parks Service, Canadian Wildlife Service and Department of Fisheries and Oceans) and the following national conservation organizations: the Canadian Nature Federation, the Canadian Wildlife Federation and World Wildlife Fund (Canada). These representatives usually have a biology-based scientific background or traditional community knowledge of species at risk. If COSEWIC is alerted that a species is suspected of decreasing in numbers, it commissions a status report (funding permitting) and classifies the species in one of five categories: vulnerable, threatened, endangered, extirpated or extinct.

Of the 10 provinces in Canada, four have specific endangered species legislation: Manitoba, New Brunswick, Ontario and Quebec. Even though COSEWIC creates an endangered species list, the provinces are under no obligation to recognize this list. Ultimately it is a government minister who designates which species are to appear on a province's list.

The legislation in Quebec contains provisions that ensure that the protection of endangered species is a coordinated effort between the Ministère du Développement Durable, de l'Environnement et Lutte Contre les changements climatiques ("MDDELCC") and the Ministère du ressources naturelles et de la fauna. You will find in Figure 6.2 the endangered and threatened species listing for Quebec.

FIGURE 6.2 (cont'd)

ENDANGERED/THREATENED SPECIES LISTING, QUEBEC

Following pages obtained from: <http://www3.mrnf.gouv.qc.ca/faune/especes/menacees/liste.asp>



The list of species **designated as** threatened or vulnerable in Quebec, under the **Endangered Species Act or vulnerable** (LEMV) includes **38 species**, of which **20 are classified as endangered** and **18 vulnerable**. There is also the **list of wildlife species likely to be designated threatened or vulnerable**, which includes **115 species**.

It should be noted that, for purposes of applying the LEMV, the term "species" includes species, subspecies or population of a species.

List of species of wildlife designated as threatened or vulnerable

- [Vulnerable species](#)
- [Threatened Species](#)

Vulnerable species

Pisces	
Shad	<i>Alosa sapidissima</i>
River Redhorse	<i>Moxostoma carinatum</i>
Smelt rainbow sky, people of southern Gulf of St. Lawrence	<i>Osmerus mordax</i>
Darter	<i>Percina copelandi</i>
Bridle Shiner	<i>Notropis bifrenatus</i>
▲	
Amphibians	
Chorus Frog Western	<i>Pseudacris triseriata</i>
Salamander	<i>Gyrinophilus porphyriticus</i>
▲	
Turtles	
Wood turtle	<i>Glyptemys insculpta</i>
Map turtle	<i>Graptemys geographica</i>
▲	
Birds	
Golden Eagle	<i>Aquila chrysaetos</i>

FIGURE 6.2 (cont'd)

ENDANGERED/THREATENED SPECIES LISTING, QUEBEC

<u>Harlequin</u>	<i>Histrionicus histrionicus</i>
<u>Peregrine falcon</u>	<i>Falco peregrinus anatum</i>
<u>BAGQ</u>	<i>Bucephala islandica</i>
<u>Bicknell's Thrush</u>	<i>Catharus bicknelli</i>
<u>Least Bittern</u>	<i>Ixobrychus exilis</i>
<u>Bald Eagle</u>	<i>Haliaeetus leucocephalus</i>



Mammals	
<u>Woodland caribou, forest ecotype</u>	<i>Rangifer tarandus</i>
<u>Polar bear</u>	<i>Ursus maritimus</i>

Threatened Species

Pisces	
<u>Redhorse</u>	<i>Moxostoma hubbsi</i>
<u>Sand Darter</u>	<i>Ammocrypta pellucida</i>
<u>Northern Brook Lamprey</u>	<i>Ichthyomyzon fossor</i>



Amphibians	
<u>Mountain Dusky Salamander</u>	<i>Desmognathus ochrophaeus</i>



Turtles	
<u>Leatherback Turtle</u>	<i>Dermodochelys coriacea</i>
<u>Blanding</u>	<i>Emys blandingii</i>
<u>Musk turtle</u>	<i>Sternotherus odoratus</i>
<u>Spiny Softshell</u>	<i>Apalone spinifera</i>



Birds	
<u>Horned Grebe</u>	<i>Podiceps auritus</i>
<u>Cerulean Warbler</u>	<i>Dendroica cerulea</i>
<u>Loggerhead Shrike</u>	<i>Lanius ludovicianus</i>
<u>Red-headed Woodpecker</u>	<i>Melanerpes erythrocephalus</i>
<u>Piping Plover</u>	<i>Charadrius melodus</i>
<u>Yellow Rail</u>	<i>Coturnicops noveboracensis</i>
<u>Caspian Tern</u>	<i>Sterna caspia</i>
<u>Roseate tern</u>	<i>Sterna dougallii</i>



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FIGURE 6.2 (cont'd)

ENDANGERED/THREATENED SPECIES LISTING, QUEBEC

Mammals	
<u>Beluga population of the St. Lawrence</u>	<i>Delphinapterus leucas</i>
<u>Wolverine</u>	<i>Gulo gulo</i>
<u>Woodland caribou, mountain ecotype, Gaspésie population</u>	<i>Rangifer tarandus</i>
▲	
Insects	
<u>Maritime ringlet</u>	<i>Coenonympha nipisiquit</i>

List of wildlife species likely to be designated threatened or vulnerable

- Pisces
- Amphibians
- Snakes
- Turtles
- Birds
- Mammals
- Bivalves
- Gastropods
- Insects

Pisces	
American eel	<i>Anguilla rostrata</i>
Yellow bullhead	<i>Ameiurus natalis</i>
Pickrel	<i>Esox Niger</i>
<u>Pickrel</u>	<i>Esox americanus vermiculatus</i>
Cusk	<i>Tusk tusk</i>
Fourhorn	<i>Myoxocephalus quadricornis</i>
Deepwater Sculpin	<i>Myoxocephalus thompsonii</i>
Madtom Rapids	<i>Noturus flavus</i>
<u>Margined madtom</u>	<i>Noturus insignis</i>
<u>Spring Cisco</u>	<i>Coregonus artedi</i>
Long-eared sunfish	<i>Lepomis megalotis</i>
<u>Dard arc-en-ciel</u>	<i>Etheostoma caeruleum</i>
<u>Sturgeon</u>	<i>Acipenser fulvescens</i>
<u>Sturgeon</u>	<i>Acipenser oxyrinchus</i>
Wolffish	<i>Anarhichas denticulatus</i>
Wolffish	<i>Anarhichas lupus</i>
Spotted wolf	<i>Anarhichas minor</i>
Porbeagle	<i>Lamna nasus</i>
<u>Brassy minnow</u>	<i>Hybognathus hankinsoni</i>
Cod, Maritimes population	<i>Gadus morhua</i>
Atlantic cod, Laurentian North population	<i>Gadus morhua</i>
<u>Char oquassa</u>	<i>Salvelinus alpinus oquassa</i>

FIGURE 6.2 (cont'd)

ENDANGERED/THREATENED SPECIES LISTING, QUEBEC

Winter Skate	<i>Leucoraja ocellata</i>
Blue shark	<i>Prionace glauca</i>
Pink head	<i>Notropis rubellus</i>



Amphibians	
<u>Pickereel Frog</u>	<i>Lithobates palustris</i>
<u>Boreal Chorus Frog</u>	<i>Pseudacris maculata</i>
<u>Four-toed salamander</u>	<i>Hemidactylium scutatum</i>
<u>Northern Dusky Salamander</u>	<i>Desmognathus fuscus</i>



Snakes	
Snake	<i>Diadophis punctatus</i>
<u>Brown snake</u>	<i>Storeria dekayi</i>
<u>Water Snake</u>	<i>Nerodia sipedon</i>
<u>Milksnake</u>	<i>Lampropeltis triangulum</i>
Ribbonsnake	<i>Thamnophis sauritus</i>
Green snake	<i>Liochlorophis vernalis</i>



Turtles	
<u>Spotted Turtle</u>	<i>Clemmys guttata</i>



Birds	
Red Knot <i>rufa</i>	<i>Calidris canutus rufa</i>
<u>Nelson's Sparrow</u>	<i>Ammodramus nelsoni</i>
<u>Grasshopper Sparrow</u>	<i>Ammodramus savannarum</i>
Barn Owl	<i>Tyto alba</i>
Whip-poor-	<i>Caprimulgus vociferus</i>
Nighthawk	<i>Chordeiles minor</i>
Peregrine <i>tundrius</i>	<i>Falco peregrinus tundrius</i>
<u>Short-eared Owl</u>	<i>Asio flammeus</i>
Chimney Swift	<i>Chaetura pelagica</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Leach's Storm-Petrel	<i>Oceanodroma leucorhoa</i>
<u>Warblers</u>	<i>Vermivora chrysoptera</i>
Canada Warbler	<i>Wilsonia canadensis</i>
Louisiana Waterthrush	<i>Seiurus Motacilla</i>
Rusty	<i>Euphagus carolinus</i>

FIGURE 6.2 (cont'd)

ENDANGERED/THREATENED SPECIES LISTING, QUEBEC

<u>Sedge Wren</u>	<i>Cistothorus platensis</i>
▲	
Mammals	
<u>Whale</u>	<i>Eubalaena glacialis</i>
<u>Weasel</u>	<i>Mustela nivalis</i>
<u>Beluga population of eastern Hudson Bay</u>	<i>Delphinapterus leucas</i>
<u>Beluga population of Ungava Bay</u>	<i>Delphinapterus leucas</i>
<u>Rock vole</u>	<i>Microtus chrotorrhinus</i>
<u>Southern bog lemming Cooper</u>	<i>Synaptomys cooperi</i>
<u>Pine vole</u>	<i>Microtus pinetorum</i>
<u>Silver-haired bat</u>	<i>Lasionycteris noctivagans</i>
<u>Hoary bat</u>	<i>Lasiurus cinereus</i>
Bat Eastern Pygmy	<i>Myotis leibii</i>
<u>Red bat</u>	<i>Lasiurus borealis</i>
<u>Cougar</u>	<i>Puma concolor</i>
Porpoise	<i>Phocoena phocoena</i>
Morse	<i>Odobenus rosmarus</i>
<u>Gaspé shrew</u>	<i>Sorex gaspensis</i>
Shrew longicauda	<i>Sorex dispar</i>
<u>Flying squirrel</u>	<i>Glaucomys volans</i>
<u>Harbor seal Lacs des Loups Marins</u>	<i>Phoca vitulina mellonae</i>
<u>Eastern Pipistrelle</u>	<i>Perimyotis subflavus</i>
<u>Blue Whale</u>	<i>Balaenoptera musculus</i>
<u>Fin</u>	<i>Balaenoptera physalus</i>
▲	
Bivalves	
Rough Brook	<i>Alasmidonta marginata</i>
Alewite floater	<i>Anodonta implicata</i>
Elliptio for strong teeth	<i>Elliptio crassidens</i>
Elliptio sharp	<i>Elliptio dilatata</i>
Leptodée fragile	<i>Leptodea fragilis</i>
Pearl mussel-East	<i>Margaritifera margaritifera</i>
Hickorynut olive	<i>Obovaria olivaria</i>
Potamile winged	<i>Potamilus alatus</i>
▲	
Gastropods	
Limpet freshwater sharp	<i>Mountain Acroloxus coloradensis</i>

FIGURE 6.2 (cont'd)

ENDANGERED/THREATENED SPECIES LISTING, QUEBEC

Somatogyre globular *Birgel subglobosus*

Insects	
Acronicta commas to reddish	<i>Acronicta rubricoma</i>
Hawker Cyrano	<i>Nasiaeschna pentacantha</i>
Hawker pygmy	<i>Gomphaeschna furcillata</i>
Bourdon red spot	<i>Bombus affinis</i>
Bourdon soilborne	<i>Bombus terricola</i>
White tiger beetle	<i>Cicindela lepida</i>
Pine green tiger beetle	<i>Cicindela patruela</i>
Ladybug two points	<i>Adalia bipunctata</i>
Ladybug nine points	<i>Coccinella novemnotata</i>
Cordula dusky	<i>Williamsonia fletcheri</i>
Cordula curved	<i>Somatochlora incurvata</i>
Coppery Saltmarsh	<i>Lycaena dospassosi</i>
<i>Dolichoderus mariae</i>	<i>Dolichoderus mariae</i>
Dynast rhino	<i>Xyloryctes jamaicensis</i>
Erythema ponds	<i>Erythemis simplicicollis</i>
Erythrodiplax coastal	<i>Erythrodiplax berenice</i>
False longhorn scarab	<i>Cephaloon unguare</i>
Dark fairy with long antennae	<i>Adela caeruleella</i>
Variegated fritillary	<i>Euptoieta claudia</i>
Gomphi potbellied	<i>Gomphus ventricosus</i>
Skipper to Glassywing	<i>Pompeius verna</i>
Skipper Dione	<i>Euphyes dion</i>
Spotted Skipper	<i>Erynnis martialis</i>
<i>Lasius minutus</i>	<i>Lasius minutus</i>
Morning Leste	<i>Lestes vigilax</i>
Mélanople Gaspé	<i>Melanoplus gaspesiensis</i>
Northern ribbed white Gaspé	<i>Oeneis boron gaspeensis</i>
Motley Ophiogomphe	<i>Ophiogomphus anomalus</i>
Spotted-necked Phymatode	<i>Phymatodes maculicollis</i>
Spondyle mealworm	<i>Neospondylis upiformis</i>
Sympetrum brawler	<i>Sympetrum corruptum</i>
Trechine to large scapes	<i>Trechus crassiscapus</i>

Updated: March 2010

7.0 PPL / MPL SPECIFIC PLANS

7.1 PPL SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLAN

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE (SPCC) PLAN

PORTLAND PIPE LINE CORPORATION TANK STORAGE FACILITIES AND ASSOCIATED PIPING

Issued December 2008

**Portland Pipe Line Corporation
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South Portland, ME 04106
PHONE: (207) 767-3231
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Prepared by:

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SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN

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OTHER SPCC DATA

ICP-A Regulatory Cross References
 ICP-K Miscellaneous Forms
 ICP-L Glossary of Terms and Acronyms

PROFESSIONAL ENGINEER CERTIFICATION

By means of this Professional Engineer Certification, I hereby attest to the following:

- I am familiar with the requirements of 40 CFR Part 112 and have verified that this Plan has been prepared in accordance with the requirements of this Part.
- I or my agent have visited and examined the Facility(s).
- I have verified that this Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards.
- I have verified that the required inspection and testing procedures have been established as described in this Plan.
- I have verified that the Plan is adequate for the Facility.
- My certification of this Plan in no way relieves the owner/operator of the Facility(s) of their duty to prepare and fully implement the Plan in accordance with the requirements of 40 CFR Part 112. I in no way assume any liability of whatsoever kind or nature by my certification.
- The owner/operator, by "Management Approval" located on the following page, acknowledges this certification and the compliance measures described herein.

(Seal)



Registered Professional Engineer

A handwritten signature in black ink, appearing to read "Eric G. Politte", written over a horizontal line.

Eric G. Politte, P.E.
O'Brien's Response Management Inc.
State of Texas Registration No: 77962

Date: December 17 2008

PROFESSIONAL ENGINEER CERTIFICATION FOR SPECIFIC FACILITY MODIFICATION

Facility Modification

- Date of Review: March 2011
- Description of Change: 1. Restoration of original secondary containment.
- Impact of Change: 1. Attestation on secondary containment's ability to retain spilled oil until cleanup occurs remains unchanged.
2. Secondary containment volume is adequately sized based on survey provided to O'Brien's Response Management Inc.

Professional Engineer Certificate

- I have evaluated the change in Facility design and have determined that it does not materially affect the Facility's potential for a discharge of oil into or upon the navigable waters of the United States or adjoining shorelines.
- This Technical Amendment is only valid for the certification of the item(s) listed above and further certified below.

(Seal)



Registered Professional Engineer

A handwritten signature in blue ink, appearing to read "Gautam K. Agrawala".

Gautam K. Agrawala, Ph.D., P.E.
Compliance Consultant
O'Brien's Response Management Inc.
State of Texas Registration No.101909

Date: 03/29/2011

MANAGEMENT APPROVAL

- Owner/Operator responsible for Facility: Portland Pipe Line Corporation
- Facility Name and (Physical) Location: South Portland Tank Farm - Hill and Dunscomb Street, South Portland, ME 04106; Raymond Station, 338 Meadow Road, Raymond ME 04071; North Waterford Station, 471 Hunts Corner Road, North Waterford, ME 04267; Shelburne Station, U.S. Route 2, Coos County, NH 03581; Lancaster Station, U.S. Route 2, Coos County, NH 03584; Sutton Station, U.S. Route 5, Caledonia County, VT 05867
- By signature below, the Manager approves this Plan and acknowledges that the elements identified within this Plan have been implemented.
- This page may be used for the initial Management Approval or for subsequent change of management and/or change of designated person accountable.

- This SPCC Plan will be implemented as herein described.

Signature: _____	Designated person accountable for oil spill prevention at the Facility:
Name: <u>J.C. Gillies</u>	Name: <u>J.C. Gillies</u>
Date: <u>November 20, 2020</u>	Title: <u>President</u>
Title: <u>President</u>	

- This SPCC Plan will be implemented as herein described.

Signature: _____	Designated person accountable for oil spill prevention at the Facility:
Name: _____	Name: _____
Date: _____	Title: _____
Title: _____	

- This SPCC Plan will be implemented as herein described.

Signature: _____	Designated person accountable for oil spill prevention at the Facility:
Name: _____	Name: _____
Date: _____	Title: _____
Title: _____	

LOG OF PLAN REVIEW AND AMENDMENTS					
<p>NON TECHNICAL AMENDMENTS</p> <ul style="list-style-type: none"> ● Non-technical amendments are not certified by a Professional Engineer. ● Examples of changes include, but are not limited to, phone numbers, name changes, or any non-technical text change(s) 					
<p>TECHNICAL AMENDMENTS</p> <ul style="list-style-type: none"> ● Technical amendments are certified by a Professional Engineer. ● Examples of changes include, but are not limited to, commissioning or decommissioning containers; replacement, reconstruction, or movement of containers; reconstruction, replacements, or installation of piping systems; construction or demolition that might alter secondary containment structures; changes or product or service; or revision of standard operation or maintenance procedures at a facility. ● An amendment made under this section will be prepared within six (6) months of the change and implemented as soon as possible but not later than six (6) months following preparation of the amendment. 					
<p>MANAGEMENT REVIEW</p> <ul style="list-style-type: none"> ● Management will review this SPCC Plan at least each five (5) years and document the review on the form below. 					
Review/Amend Date	Signature	Amend Plan (will/will not)	Description of Review Amendment	Affected Page(s)	P.E. Certification (Y/N)
02.04.09	(b) (6)	Will Not	Edited figure references to align with consolidated ICP; clarified wording, combined section 9 drawing list to one page	1-1, 1-4, 2-1, 3-1, 4-2, 9-10, Contents	N
August 2009	(b) (6)	Will Not	Edited Section 1 to remove reference to loading truck; edited Section 4 to clarify storm water drainage procedures; and edited Section 8 to remove reference to oil product pump starter and modify starter controls accordingly.	1-1, 4-2, 8-1	N
September 2009	(b) (6)	Will	Dikes of Tanks 25 and 10 joined to provide stated retention within intermediate dikes. Dike 23 lowered for access during construction. Add Mobile Fueling Container	9-3	Y
March 2011	(b) (6)	Will	Dikes of Tanks 23, 25 and 10 returned to original configuration. Removed Mobile Fueling Container. Removed references to Loading rack systems. Clarified buried tank testing. Added reference to lube oil drums in maintenance building. Noted 40 CFR 112.7(K)(1) is met.	FWD-iva, FWD-vi, 1-5, 5-1, 5-2, 7-1, 9-1 thru 9-11, Figure 9-10(j) and (k)	Y

Review/Amend Date	Signature	Amend Plan (will/will not)	Description of Review Amendment	Affected Page(s)	P.E. Certification (Y/N)
November 2012	(b) (6)	Will Not	Added additional 1-866-253-7351 emergency number, removed Director of Safety and Environmental Protection and added four security cameras to South Portland Tank Farm facility.	FWD i, 1-3, 8-1	N
December 5, 2013	(b) (6)	Will Not	I have completed review and evaluation of the SPCC plan for Portland Pipe Line Corporation on December 5, 2013 and will not amend the plan as a result	N/A	N
January 2016	(b) (6)	Will Not	Updated Section 9 to align with 2015 Rectifier updates at the SP Tank Farm and Pier 2	9-3 thru 9-7	N
December 3, 2018	(b) (6)	Will Not	I have completed review and evaluation of the SPCC plan for Portland Pipe Line Corporation on December 3, 2018 and will not amend the plan as a result	N/A	N
December 13, 2023	(b) (6)	Will Not	I have completed review and evaluation of the SPCC plan for Portland Pipe Line Corporation on December 13, 2023 and will not amend the plan as a result	N/A	N

1.0 INTRODUCTION, ADMINISTRATION AND COMPLIANCE

1.1 FACILITY DESCRIPTION

This Spill Prevention, Control, and Countermeasure (SPCC) Plan has been developed in accordance with the regulatory requirements of 40 CFR Part 112 (EPA) for the Portland Pipe Line Corporation Tank Storage Facilities and Associated Piping (hereinafter referred to as "Facility"). The Facility has the following general operating and design characteristics:

- The Facility is an onshore (type) Facility and is attended 24 hours per day.
- The Facility typically stores the following products:
 - Crude oil;
 - No. 2 fuel oil;
 - Transformer oil; and
 - Rectifier oil.
- The Facility receives product in via ship.
- The Facility ships products out via pipeline.
- Drums (i.e. waste oil, fuel oil) and other portable containers deliveries are transferred via truck.
- See ICP Figures 1.5 – 1.10 for additional details of the physical layout.
- The "Potential Spill Sources and Container Identification" table is provided in SPCC Section 9.
- Diagrams of the Facility are provided in SPCC Section 9.0 and ICP Appendices.

1.2 PLAN PURPOSE/OBJECTIVES

The specific objectives of this Plan are to define the spill prevention, control, and countermeasures for the Facility and to assist Facility personnel in establishing and maintaining an efficient and effective program. This is accomplished in the Plan by addressing:

- Personnel, Training and Spill Prevention Procedures.
- Inspections and Records.
- Facility Drainage.
- Bulk Storage Containers and Qualified Oil-Filled Operational Equipment.
- Transfer Operations, Pumping, and In-Plant Processes.
- Tank Truck Unloading.
- Security.

1.3 PLAN DISTRIBUTION PROCEDURES

The Plan Administrator shall have the responsibility for distribution of the Plan. Distribution will be handled in the following manner:

- Distribution of the Plan is controlled by the number on the cover page.
- The Facility shall maintain a complete copy of the Plan at the Facility if it is normally attended at least four (4) hours per day, or at the nearest field office if the Facility is not so attended. The Plan will be available to the Regional Administrator for on-site review during normal working hours.

1.4 PLAN REVIEW AND UPDATE PROCEDURES

The "Designated Person Accountable for Oil Spill Prevention" (identified on the Management Approval page in the Foreword) with support from the Plan Administrator will coordinate the following plan review and update procedures:

Facility Changes requiring Plan Revision

- This Plan will be revised when there are changes in the Facility's design, construction, operation, or maintenance that materially affects the Facility's potential for the discharge of oil into or upon the navigable waters of the United States or adjoining shorelines. Such amendments shall be prepared within six (6) months, and implemented as soon as possible, but not later than six (6) months following preparation of the amendment.

Changes requiring revision may include, but are not limited to:

- Commission or decommission of containers.
- Replacement, reconstruction, or movement of containers.
- Reconstruction, replacement, or installation of piping systems.
- Construction or demolition that might alter secondary containment structures and/or drainage systems.
- Changes of product or service.
- Revision of standard operating or maintenance procedures at the Facility.

Revisions that are made to the Plan are classified into either "Technical Amendments" or Non-Technical Amendments".

Technical Amendments

- All technical amendments, such as the ones listed earlier in this Section and on the "Log or Plan Review and Amendments" page must be certified by a Registered Professional Engineer to satisfy the requirements of 40 CFR Part 112.

Non-Technical Amendments

- All non-technical amendments such as changes to phone numbers and/or contacts or other non-technical text changes need only to be signed off by management. The "Log of Plan Review and Amendments" located in the Foreword will be used to record such changes.

1.4 PLAN REVIEW AND UPDATE PROCEDURES (Cont'd)

- Each certified technical amendment will be stamped and dated in its appropriate section of Plan and recorded on the "Log of Plan Review and Amendments" located in the Foreword.

Inclusion of Amendments into the Plan

- The Operations Manager will coordinate the word processing, publication, and distribution efforts of completing the revisions and maintaining the Plan.
- The **plan holder**, immediately upon receipt of any revisions, shall review and insert the revised pages into the Plan and discard the obsolete pages. This action should then be recorded on the "Log of Plan Review and Amendments" and "Revision Record" page in the Foreword.

Five-Year Review

- At least once each five (5) years the Facility will complete a review and evaluation of this SPCC Plan and make amendments within six (6) months of the review. This review will include, at a minimum, a review of the following:
 - Applicability of new prevention and control technology which may significantly reduce the likelihood of a spill event from the Facility if such technology has been field-proven at the time of the review.
 - Accuracy of the SPCC Plan as compared to the current Facility operation and SPCC Regulations.
 - Capacity and structural integrity of secondary containment structures.
 - SPCC inspection and record files to ensure continuity for a minimum period of three (3) years.

Training and Emergencies

Opportunities to review the Plan may arise from regularly scheduled training sessions or actual emergencies which require the activation of the Plan.

- Examples of these types of opportunities may occur during:
 - Tabletop Exercises
 - Discharge Prevention Meetings
 - Actual emergency responses

1.5 REGULATORY COMPLIANCE

This plan addresses the following regulatory requirements:

- Federal Spill Prevention, Control, and Countermeasures Regulations: U.S. EPA Final Rule for Oil Pollution Prevention; Non-Transportation Related On-shore and Offshore Facilities (40 CFR Part 112 - as published on July 17, 2002).

1.5 REGULATORY COMPLIANCE (Cont'd)

A detailed cross-reference between the format of this Plan and that of the regulations is provided in Appendix A of the ICP "Cross Reference".

General Applicability

This requirement applies to owners or operators of non-transportation-related onshore and offshore facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil and oil products, and that meet each of the following criteria:

- Due to their location, could reasonably be expected to discharge oil in harmful quantities into or upon the navigable waters of the United States or adjoining shorelines **and**;
- Has an aggregate aboveground storage capacity in excess of 1,320 gallons, excluding containers less than 55 gallons **or**;
- Completely buried storage capacity in excess of 42,000 gallons, excluding any tanks, connected underground piping, underground ancillary equipment, and containment systems subject to the technical requirements of 40 CFR Part 280 or 281.

Submission of Spill Documentation

The Facility shall submit the documentation required by 40 CFR Part 112.4 (Appendix K of the ICP) to the EPA Regional Administrator within sixty (60) days whenever the Facility has a discharge event(s) which meets one of the following conditions:

- Discharges more than 1,000 gallons of oil (or oil products) into or upon the navigable waters of the United States or adjoining shorelines in a single spill event **or**,
- Discharges more than 42 gallons of oil (or oil products) into the navigable waters of the United States in two (2) spill events within any 12-month period.

1.6 CONFORMANCE WITH OTHER REQUIREMENTS

- The State of Maine does not have more stringent discharge prevention and containment procedures than federal regulations.
- The State of New Hampshire does not have more stringent discharge prevention and containment procedures than federal regulations.
- The State of Vermont does not have more stringent discharge prevention and containment procedures than federal regulations.

1.7 QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT (AS APPLICABLE)

Per the 40 CFR 112.7 (k), select Oil-Filled Operational Equipment (see table listing in SPCC Section 9) has been identified as “qualified” for general secondary containment requirement exemption.

- Scheduled rounds are made at all locations by Facility personnel. Inspection for equipment failure and discharge is conducted in accordance with Company procedures during scheduled rounds.
- The Facility has an Integrated Contingency Plan (ICP) in place which provides considerable detail of the Facility’s response capability including notification procedures, response actions, clean-up capabilities (including contractor capabilities), response equipment available at the Facility, response team organization and identification of environmental and socio-economic sensitivities.
- The Facility meets the discharge history for qualified oil filled operational equipment per 40 CFR 112.7(K)(1)

2.0 NOTIFICATION AND RESPONSE PROCEDURES

This section is a guide for notification and response procedures that should be implemented immediately after discovering a discharge incident and securing the source (if at all possible). All notifications are of extreme importance and must be completed in a timely manner.

2.1 COUNTERMEASURES

The Facility discharge discovery, response and cleanup capabilities are described as follows:

- The discharge discovery capabilities of the Facility are provided by the engineering controls (see SPCC Sections 4, 5, 6, 7, and 8) and the training and inspection programs (see SPCC Section 3) in place at the Facility.
- The discharge response and notification capabilities of the Facility have been summarized in this Section.
- The Facility has an Integrated Contingency Plan (ICP) in place which provides considerable detail of the Facility's response capability including notification procedures, response actions, clean-up capabilities (including contractor capabilities), response equipment available at the Facility, response team organization and identification of environmental and socio-economic sensitivities.
- Oil Spill Response Contract Agreements are located at the Facility and in Appendix C of the ICP.

2.2 INTERNAL NOTIFICATION

- Internal notifications are discussed in ICP Section 2.3.

2.3 EXTERNAL NOTIFICATION

- External notifications are discussed in ICP Section 2.4.

2.4 RESPONSE PROCEDURES

- Response procedures are discussed in ICP Section 3.0.

2.5 DISPOSAL METHODS

The Facility has established the following methods of disposal for recovered materials in accordance with applicable legal requirements:

- Disposal methods are discussed in ICP Appendix F, Waste Disposal.

2.6 PREVENTION

In addition to being prepared to respond to an oil spill, the Facility also has prevention measures in place to minimize the chances of an accidental discharge. The Facility discharge prevention measures, including procedures for routine handling of products (loading, unloading, and facility transfers, etc.), are described as follows:

- The Company's training and briefing program ensures oil-handling personnel are familiar with the Plan and are capable of reporting a discharge (see SPCC Section 3).
- The Facility has been designed, and is maintained, in order to prevent discharges as described in this Plan (see SPCC Sections 4, 5, 6 and 7).
- Security measures prevent access of unauthorized persons to the Facility (see SPCC Section 8).

3.0 TRAINING AND INSPECTIONS

3.1 PERSONNEL, TRAINING, AND DISCHARGE PREVENTION PROCEDURES

Training (Initial)

- The Facility provides the following minimum initial training to oil-handling personnel:
 - Operation and maintenance of equipment to prevent oil discharges;
 - Oil discharge procedure protocols;
 - Applicable oil spill prevention (State & Federal) laws, rules, and regulations;
 - General facility operations; and,
 - The contents of the facility SPCC Plan and applicable pollution control laws, rules, and regulations.
- Operations personnel receive training by trained and competent Company instructors. General training includes study of the Company's oil transfer and storage systems and related equipment. Operational training covers gauging and inspection practices, along with operation of tank roof drains, dike drain valves, reservoir control valves, fixed and portable pumping units and vacuum equipment used in controlling, containing and removing any spilled oil. Training also includes instruction on the hazards of crude oil, applicable Federal, State and City regulations governing storage and transfer of crude oil, and emergency notification procedures as listed in the Oil Spill Contingency Plans.
- The Training Program is conducted by:
 - Computer-based Training Program
 - Classroom instruction
 - On-the-Job Training (Operation & Maintenance)
- Training records are maintained at the Facility for a minimum period of three (3) years.

Briefings (Annual)

- The Facility conducts prevention briefings for oil-handling personnel at least once a year to assure adequate understanding of the SPCC Plan for the Facility.
- These briefings include discussion of potential discharges or component failures and precautionary measures.
- Briefing records are maintained at the Facility for a minimum period of three (3) years.
- A sample Discharge Prevention Briefing Log is provided in Appendix K of the ICP.

3.2 INSPECTIONS, TESTS AND RECORDS

3.2.1 Container Testing and Inspections

- All aboveground containers are integrity tested on a regular schedule and when material repairs are made.
- Comparative records are kept. Comparative records are maintained at the Facility in South Portland, Maine.
- The container's supports and foundations are inspected. Tank bottom inspections; five year elevation shot cycle; and routine visual inspection throughout the week.
- The container inspection programs conducted and maintained by Facility personnel are as follows:
 - The containers are visually inspected by operating personnel for signs of deterioration, leaks, or the accumulation of liquids inside the containment areas.
 - Each storage container is inspected per company policy, as required by age, condition, and service. (Refer to Portland Pipe Line Corporation Storage Tank and Connected Piping Testing and Inspection Program).
 - Based on these conditions, the aboveground storage containers are professionally inspected and non-destructive thickness testing is performed.
- The required inspections are divided into three categories:
 - Routine, in-service inspections
 - In-service, external inspections
 - Out-of-service, internal inspections
- If a field-constructed aboveground container undergoes a repair, alteration, reconstruction, or change in service that might affect the risk of a discharge or failure due to brittle fracture, the container will be evaluated (see Sample Log in Appendix K of the ICP).
- Drums, totes or mobile refueling tanks brought on-site are built or tested to the standard(s) or in-process inspection and testing procedures established by the drum manufacturer or the drum recycler, as applicable.
- While on-site, the drums, totes or mobile refueling tanks will be visually inspected at least monthly.

3.2 INSPECTIONS, TESTS AND RECORDS (Cont'd)

3.2.1 Container Testing and Inspections (Cont'd)

- Each crude oil storage tank is equipped with an automatic tank gauge. The tanks have Saab radar gauging system and transmitter. Tank level and tank valve status are communicated to a computer display that is monitored by the Controller in the Control Center on a 24-hour basis. For static tanks, the computer continuously monitors for unexpected changes in gauge level, and provides a “creep” alarm to the Controller if such a change is detected. Tanks that are being pumped to the mainlines are continuously monitored for a volumetric imbalance associated with the pipeline operations. The computer system provides an alarm to the Controller when an imbalance occurs. PPLC personnel verify the automatic gauge by hand gauging each tank on a regular basis.
- Each crude oil storage tank is equipped with two independent high level transmitters which activate audible and visual alarms if the safe filling height of a tank is exceeded. The alarm system also activates remote indicators located at Pier 2, alerting vessel personnel to immediately stop transfer operations when an alarm is received. The “high/high alarm” also activates the alarms in the control center of PPLC’s system monitoring company who notify the South Portland Fire Department. Operations personnel test the alarm system on each tank once a month.

3.2.2 Above Ground Valves and Pipelines Inspections

The Facility's above ground valves and pipelines are examined as follows:

- All aboveground valves and pipes/pipelines are regularly examined during operating personnel rounds. During these examinations, operating personnel assess the general condition and necessity for corrective actions of items such as:
 - Flange joints
 - Valve glands and bodies
 - Pipe supports
 - Metal surfaces
 - Expansion joints
 - Catch pans
 - Valves locks and/or seals
 - Other appurtenances
- Periodic pressure testing may be warranted for piping in areas where facility drainage is such that a failure might lead to a spill event.

3.2 INSPECTIONS, TESTS AND RECORDS (Cont'd)

3.2.2 Above Ground Valves and Pipelines Inspections (Cont'd)

- Pipe supports are designed to minimize abrasion and corrosion and allow for expansion and contraction. Most of the pipelines within the Tank Farm are buried; however, the common suction and discharge line to each tank is above-ground within the tank dike area for approximately 75 feet. This piping is designed with two 90° elbows to allow for normal expansion and contraction. Near the elbow closest to the tank, an adjustable spring hanger is installed to hold all of the weight of the piping in that area, thus reducing the stress on the shell of the tank. The underside of the piping that rests on the supports is protected by a pad on the pipe to eliminate any abrasion to the pipe.
- T-1 and T-2 manifolds are within an impervious lined enclosure. Drainage from these areas is via a manually operated valve into the Facility's stormwater system.

3.2.3 Buried Piping Inspections

- Buried piping is present at the Facility.
- Buried piping integrity and leak testing is performed at the time of installation, modification, construction, relocation, or replacement.
- The unloading lines are subject to a program of periodic internal inspections, using intelligent pipe pigs to document pipe condition and integrity.

3.2.4 Documentation

- Records of the inspections and tests (including those maintained under usual and customary business practices), signed by the appropriate supervisor or inspector are retained on file at the Facility and/or other Corporate location for a minimum period of three (3) years.
- Sample inspection and test records are provided in Appendix K of the ICP.

4.0 FACILITY DRAINAGE

4.1 DIKED STORAGE AREA DRAINAGE SYSTEMS

Drainage of storm water or other liquids accumulated within the Facility's diked storage area is controlled as follows:

- Drainage from diked storage area(s) is restrained by manually controlled valves.
- Dike drain valves are secured in the closed position when not draining containment area(s).
- Flapper-type drain valves are not used to drain diked areas.
- Stormwater drainage from diked area(s) is manually activated and emptied by gravity.
- Water is visually inspected for product and discharged only if no product sheen is visible.
- The preferred method of removal of accumulated storm water is by natural evaporation providing that the accumulation does not damage the equipment/structures or inhibit operations conducted within the containment area.
- Storm water which does accumulate within the diked area, and does not dissipate naturally, is drained in accordance with the stormwater drainage procedures.
- Facility drainage does not flow directly into an open watercourse. It goes through the oil/water separator and is collected in a retention pond that is segregated by a manual valve into an adjacent creek.
- The dike drainage at the tank farm is conveyed by storm drains and ditches to the facility oil/water separator and spill retention reservoir.
- The oil/water separator is located at the inlet end of the reservoir. The reinforced concrete separator design includes six under-and-over baffle/weirs to separate and retain oil. The separator treats the drainage from both diked and undiked areas of the tank farm. A trash rack and gate valve at the separator inlet control the influent flow.
- The containment area(s) is/are capable of containing product until clean-up occurs because of the clay liner, native soil with sufficient impermeability, and ponded water observed.

4.0 FACILITY DRAINAGE

4.2 UNDIKED AREA DRAINAGE

Drainage from undiked areas is controlled as follows:

- The Facility drainage system is designed in a manner that will enable undiked areas with the potential for discharge to flow into the spill retention reservoir.
- Drainage from the tank farm is directed to the facility spill retention reservoir, at the downstream end of the oil/water separator. The reservoir has a capacity of approximately 64,000 barrels. The discharge from the reservoir passes through a skimmer box, flow-control gate valve, and storm drain to the municipal separate storm sewer that discharges into Anthoine Creek.
- In the unlikely event of an oil release within the tank farm, oil collected within the reservoir would be recovered using skimmers and vacuum trucks. Recovered oil would be returned to the oil storage tanks in the Tank Farm.
- The spill retention reservoir is not located in areas subject to periodic flooding.
- Drainage of stormwater from other undiked areas (non-storage) of the Facility is not controlled due to its origination from non-spill potential areas. Oil, which may get into these areas would be cleaned up immediately and not allowed to drain off the property.

4.3 STORM WATER DRAINAGE PROCEDURES

The procedure for supervising the drainage of storm water from secondary containment into a storm drain or an open watercourse is as follows:

- Drainage from the firewalls of the two (2) 268 Mbbl terminal crude oil storage tanks is discharged under supervision to the municipal separate storm sewer. The two (2) 138 Mbbl terminal crude oil storage tanks are not equipped with drains; captured precipitation is lost to evaporation.
- At the Tank Farm, the Facility does not have a wastewater treatment plant nor does it treat water prior to discharge off site, other than the treatment provided for storm water by the oil/water separator and storm water reservoir. Drainage from the firewalls of the 19 Tank Farm crude oil storage tanks is discharged as follows:
 - Uncontaminated rainwater is inspected to ensure compliance with applicable water quality standards and will not cause a harmful discharge as defined in 40 CFR 110.
 - Adequate records are kept of such drainage events.
 - Records of drainage events are maintained at the Facility.
 - A sample Drainage Record is provided in Appendix K of the ICP.

4.4 EFFLUENT TREATMENT FACILITIES

The Facility does have a mechanical oil water separator at the retention pond but does not have an effluent treatment facility to chemically treat the water.

5.0 BULK STORAGE CONTAINERS

5.1 CONTAINER DESIGN AND CONSTRUCTION

Aboveground Bulk Storage Containers

The Facility's bulk oil and oil products storage containers have the following design characteristics, materials of construction, and fail-safe engineering features:

- Containers are constructed of a material that is compatible with the oil and oil products stored and the conditions of storage (including pressure and temperature).
- Most bulk storage containers have high and high-high liquid level computer alarms at a constantly manned operation or surveillance station.
- The Facility does use a fast response system for determining the liquid level of each bulk storage tank such as digital computers and direct vision gauges.
- Visible oil leaks which result in a loss of product from containers sufficiently large to cause the accumulation of product in diked areas will be promptly corrected and removed.
- Tanks are operated within "Safe Fill" levels positioned below the operating limits of the tank.
- Tank bottoms and associated buried appurtenances are cathodically protected.

Secondary Containment

The secondary containment system provided for the bulk oil and oil product storage containers has the following design and construction characteristics:

- Containment or diversionary structures or equipment to prevent oil from reaching navigable waters are practicable.
- Diked areas are sufficiently impervious to contain spilled oil.
- All bulk storage tank installations are constructed so that a secondary means of containment is provided for the entire contents of the largest single container plus sufficient freeboard to allow for precipitation.
- The containment areas other than the fuel oil storage tank, are constructed of compacted earthen material.

5.1 CONTAINER DESIGN AND CONSTRUCTION (Cont'd)

- Each crude oil storage tank is situated within earthen dike (firewall) secondary containment. The firewalls are designed to contain 110% of the volume capacity of the largest tank within each containment area. The firewalls were constructed with a core of lower-permeability soil materials to inhibit the flow of liquid through the walls. The firewall design includes sideslopes of 1 ½ to 1, and a three (3) foot wide walkway on top. The firewall design, tank spacing and layout conform to the City of South Portland and State of Maine Codes in effect at the time the installation was constructed. The #2 fuel oil storage tank is surrounded by a reinforced concrete dike designed to contain 125% of the volume of the tank.
- Earthen tank dikes are inspected monthly for integrity as part of the informal monthly inspection program. Any deficiencies are reported to the maintenance department, repairs are made and when necessary, an animal control contractor is scheduled to trap, remove and relocate unwanted burrowing animals that may compromise dike integrity.

5.2 COMPLETELY AND PARTIALLY BURIED TANKS

- The Facility does have one completely buried metallic sump tank that was installed on or after January 10, 1974, and is not covered by 40 CFR Part 280 or 281. The tank is located at the South Portland Tank Farm near the pump rooms.
 - Corrosion protection is provided by cathodic protection.
 - Completely buried tank is regularly pressure tested to confirm its integrity.
- The Facility does not have partially buried or bunkered metallic tanks.

5.3 MOBILE OR PORTABLE OIL STORAGE CONTAINERS

- Mobile or portable oil storage containers (drums) are located at the Facility.
- A secondary means of containment, such as dikes or catchment basins, is provided for the largest single compartment or container plus sufficient freeboard for precipitation.

5.4 INTERNAL HEATING COILS

- The Facility does not utilize internal steam heating coils.
- When necessary, the crude oil from the storage tanks is heated by transferring the oil through the external heat exchanger located near the tank farm heating plant.

6.0 TRANSFER OPERATIONS, PUMPING, AND IN-PLANT PROCESS

6.1 BURIED PIPING INSTALLATIONS

The Facility's buried piping installations are provided with corrosion protection as follows:

- The Facility does have buried piping.
- Buried piping installations are wrapped and coated to reduce corrosion.
- When a section of buried line is exposed for any reason, it is examined for deterioration.
- If corrosion damage is found, additional examination and corrective action will be taken as indicated by the magnitude of damage.

6.2 CATHODIC PROTECTION OF UNDERGROUND PIPING

- If installed, buried piping, new or replaced after August 16, 2002, will be:
 - Protectively wrapped and coated.
 - Cathodically protected, unless a corrosion expert determines the location is not to be corrosive enough to cause it to have a release due to corrosion during its operating life.

6.3 OUT-OF-SERVICE PIPING

- Out of service piping terminal connections will be capped or blank-flanged and marked when the piping is not in service or in standby service for extended periods.

6.4 VEHICLE WARNING PROCEDURES

The procedures for warning vehicles entering the Facility to avoid damaging aboveground piping or other equipment is as follows:

- Vehicular traffic granted entry into the Facility are warned by barriers to be sure that the vehicle will not endanger aboveground piping.
- Vehicle access to all oil storage areas and any construction involving excavating, welding, burning or the use of any equipment or tools not classified as "explosion proof" (Class I, Group D) is strictly controlled by written internal Safe Work Permit (Exhibit 4). All safe work permits must be signed by a qualified pipe line representative and may be issued only following an on-site inspection and discussion with a contractor's representative relative to specific testing and safety procedures which must be followed in conducting the work involved. Above-ground piping is protected from damage by vehicles by suitable above-ground barricades or by being set back at a distance from traffic surfaces.

7.0 TANK CAR AND TANK TRUCK LOADING/UNLOADING RACK

7.1 FACILITY OPERATIONS

- Truck loading operations are not conducted at this Facility.
- Vacuum Trucks may discharge recovered oil to a tank during spill response.
- Tank car (rail) operations are not conducted at this Facility.
- Loading/unloading procedures meet the minimum requirements and regulations established by the Department of Transportation.

7.2 LOADING/UNLOADING RACK CONTAINMENT SYSTEM

- There is not a loading rack at this Facility.

7.3 WARNING SYSTEMS

Not Applicable

7.4 UNLOADING PROCEDURES

Not Applicable

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION
(Any container that stores oil)

Container I.D.	Substance Stored (Oil & Haz. Substance)		Maximum Capacity (Gallons)	Container Type (i.e. floating roof, fixed roof, etc.)	Year Built	Potential Failure (Leak/Rupture/Overflow)	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity** (Volume - Gallons)
SOUTH PORTLAND - BULK STORAGE CONTAINERS										
1	Crude	(b) (7)(F)		Floating	1941	Rupture	----	Overflow due to incorrect remote tank gauge readings. 74,340 gal. loss to containment (5/29/75)	Note "A"	(b) (7)(F)
2	Crude	(b) (7)(F)		Floating	1941	Rupture	----	N/A		
27	Crude	(b) (7)(F)		Floating	1966	Rupture	----	N/A	Note "B"	
28	Crude	(b) (7)(F)		Floating	1969	Rupture	----	N/A		
3	Crude	(b) (7)(F)		Floating	1950	Rupture	----	N/A	Note "C"	
4	Crude	(b) (7)(F)		Floating	1950	Rupture	----	N/A		
5	Crude	(b) (7)(F)		Floating	1950	Rupture	----	N/A		
6	Crude			Floating	1950	Rupture	----	N/A		
8	Crude			Floating	1944	Rupture	----	N/A		
9	Crude			Floating	1944	Rupture	----	N/A		
10	Crude			Floating	1941	Rupture	----	Overflow when wrong tank opened to receive oil from vessel. 10,080 gal. loss to containment. (10/5/60)		
11	Crude	(b) (7)(F)		Floating	1941	Rupture	----	N/A		
12	Crude			Floating	1941	Rupture	----	N/A		
13	Crude			Floating	1941	Rupture	----	N/A		
18	Crude			Floating	1971	Rupture	----	N/A		
19	Crude			Floating	1953	Rupture	----	N/A		

* Varies from pinpoint leak to catastrophic collapse.

** The containment volumes were supplied by Portland Pipe Line Corporation and were presented to RMA as a third-party survey company's verification of containment.

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION

(Any container that stores oil)

Container I.D.	Substance Stored (Oil & Haz. Substance)	Average Quantity Stored (Gallons)	Maximum Capacity (Gallons)	Container Type (i.e. floating roof, fixed roof, etc.)	Year Built	Potential Failure (Leak/Rupture/Overflow)	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity** (Volume - Gallons)
SOUTH PORTLAND - BULK STORAGE CONTAINERS (Cont'd)										
20	Crude	(b) (7)(F)		Floating	1953	Rupture	----	N/A	Note "C"	
21	Crude			Floating	1955	Rupture	----	N/A		
22	Crude			Floating	1955	Rupture	----	N/A		
23	Crude			Floating	1960	Rupture	----	N/A		
24	Crude			Floating	1965	Rupture	----	N/A		
25	Crude			Floating	1965	Rupture	----	N/A		
26	Crude			Floating	1957	Rupture	----	N/A		
#2 Fuel Oil Storage Tank	Fuel Oil			Horizontal	1983	Leak	----	N/A		
Waste Oil/Rags Drums Storage	Waste Oil & Rags			55 Gal Drums	----	Leak	----	N/A		Note "F"
Pier 2 Diesel Generator Tank	Diesel Fuel			----	2002	Leak	----	N/A	Note "A"	
Maintenance Building Lube Oil Storage	Lubricating oil			55 Gal Drums	----	Leak	----	N/A		Note "F"
TOTALS:										
PIPELINE PUMP STATIONS - BULK STORAGE CONTAINERS										
Raymond	Lube Oil/Waste			55 Gal Drums	----	Leak	----	N/A	Note "E"	Note "F"
North Waterford	Lube Oil/Waste			55 Gal Drums	----	Leak	----	N/A		
Shelburne	Lube Oil/Waste			55 Gal Drums	----	Leak	----	N/A		
Lancaster	Lube Oil/Waste			55 Gal Drums	----	Leak	----	N/A		
Sutton	Lube Oil/Waste			55 Gal Drums	----	Leak	----	N/A		
TOTALS:										

* Varies from pinpoint leak to catastrophic collapse.

** The containment volumes were supplied by Portland Pipe Line Corporation and were presented to RMA as a third-party survey company's verification of containment.

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION (Any container that stores oil)

Equipment I.D.	Substance Stored (Oil & Haz. Substance)	Average Quantity Stored (Gallons)	Maximum Capacity (Gallons)	Equipment Type (i.e. transformer, oil-filled equipment, etc.)	Year Built	Potential Failure	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity**
SOUTH PORTLAND – OPERATIONAL EQUIPMENT										
Boiler #1	Fuel Oil	█	(b) █	Boiler	1983	Leak/Rupture	----	N/A	Note "C"	█
Boiler #2	Fuel Oil	█	█	Boiler	1983	Leak/Rupture	----	N/A		█
Pier 2 Genset	Diesel Fuel	█	█	Generator	Unk	Leak/Rupture	----	N/A	Note "A"	█

SOUTH PORTLAND – QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT										
Glycol/Oil Heat Exchanger	Glycol/Oil	█	█	Heat Exchanger	1983	Leak/Rupture	----	N/A		Note "D"
TRF1 @T1	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF2 @T1	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF3 @T1	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF1 @ Ops Bldg	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF2 @ Ops Bldg	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF3 @ Ops Bldg	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
Spare @ Ops Bldg	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		

* Varies from pinpoint leak to catastrophic collapse.

** The containment volumes were supplied by Portland Pipe Line Corporation and were presented to RMA as a third-party survey company's verification of containment.

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION
(Any container that stores oil)

Equipment I.D.	Substance Stored (Oil & Haz. Substance)	(b) (7) (F)	Maximum Capacity (Gallons)	Equipment Type (i.e. transformer, oil-filled equipment, etc.)	Year Built	Potential Failure	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity
SOUTH PORTLAND – QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT (Cont'd)										
TRF5 @ Ops Bldg	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A	Note "C"	Note "D"
TRF6 @ Ops Bldg	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
TRF7 @ Ops Bldg	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
TRF8 @ Ops Bldg	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
TRF9 @ Ops Bldg	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
TRF10 @ Ops Bldg	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
TRF @ Eng Bldg	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
Pier 1 Rectifier for TK 1 & 2	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A	Note "A"	
Pier 1 Rectifier #2 (East)	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 1 Rectifier #3 (West)	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		

* Varies from pinpoint leak to catastrophic collapse.

** The containment volumes were supplied by Portland Pipe Line Corporation and were presented to RMA as a third-party survey company's verification of containment.

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION
(Any container that stores oil)

Equipment I.D.	Substance Stored (Oil & Haz. Substance)	(b) (7) (F)	Maximum Capacity (Gallons)	Equipment Type (i.e. transformer, oil-filled equipment, etc.)	Year Built	Potential Failure	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity
SOUTH PORTLAND - QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT (Cont'd)										
Pump 5 Area TRF1	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A	Note "B"	Note "D"
Pump 5 Area TRF2	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
Pump 5 Area TRF3	Mineral Oil	■	■	Transformer	Unk	Leak/Rupture	----	N/A		
Pump 5 Area Rectifier for TK 27 & 28	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Unloading Arm Hydraulic Unit	Hydraulic Oil	■	■	Hydraulic Unit	Unk	Leak/Rupture	----	N/A	Note "A"	
Pier 2 Rectifier A-1	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Rectifier D	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Rectifier F	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Rectifier G	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Rectifier J	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Rectifier 1	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Rectifier 2	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Pier 2 Rectifier 3	Mineral Oil	■	■	Rectifier	Unk	Leak/Rupture	----	N/A		
Gangway Hydraulic Unit	Hydraulic Oil	■	■	Hydraulic Unit	Unk	Leak/Rupture	----	N/A		

Fire Monitor 1 Hydraulic Unit	Hydraulic Oil	█	█	Hydraulic Unit	Unk	Leak/Rupture	----	N/A		
Fire Monitor 2 Hydraulic Unit	Hydraulic Oil	█	█	Hydraulic Unit	Unk	Leak/Rupture	----	N/A		
TOTALS:		(b) (7)	█							

* Varies from pinpoint leak to catastrophic collapse.

** The containment volumes were supplied by Portland Pipe Line Corporation and were presented to RMA as a third-party survey company's verification of containment.

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION (Any container that stores oil)

Source I.D.	Substance Held (Oil & Haz. Substance)	Average Quantity (Gallons)	Maximum Capacity (Gallons)	Source Type (i.e. piping, separation equipment, etc.)	Year Built	Potential Failure	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity (Volume)
RAYMOND (b) (7)(F) – QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT										
TRF1	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A	Southeast towards Hemlock Lane	Note "D"
TRF2	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF3	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF3	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TOTALS:		█	█							
NORTH WATERFORD PUMP STATION – QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT										
TRF1	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A	Southeast towards Fisk Road	Note "D"
TRF2	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF3	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF4	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TOTALS:		█	█							
SHELBURNE PUMP STATION – QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT										
TRF1	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A	Northwest towards pond	Note "D"
TRF2	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF3	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TRF4	Mineral Oil	█	█	Transformer	Unk	Leak/Rupture	----	N/A		
TOTALS:		█	█							

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION
(Any container that stores oil)

Source I.D.	Substance Held (Oil & Haz. Substance)	Average Quantity (Gallons)	Maximum Capacity (Gallons)	Source Type (i.e. piping, separation equipment, etc.)	Year Built	Potential Failure	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity (Volume)
LANCASTER PUMP STATION – QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT										
TRF1	Mineral Oil	(b)		Transformer	Unk	Leak/Rupture	----	N/A	Southeast towards creek	Note "D"
TRF2	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
TRF3	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
TRF4	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
TRF5	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
Spare TRF	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
TOTALS:										
SUTTON PUMP STATION – QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT										
									West towards Sutton River	Note "D"
TRF2	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
TRF3	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
TRF3	Mineral Oil			Transformer	Unk	Leak/Rupture	----	N/A		
TOTALS:										

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION (Any container that stores oil)

Source I.D.	Substance Held (Oil & Haz. Substance)	Average Quantity (Gallons)	Maximum Capacity (Gallons)	Source Type (i.e. piping, separation equipment, etc.)	Year Built	Potential Failure	Rate of Flow *	Failure / Cause (Record cause and date of any Tank failure which has resulted in a loss of tank contents)	Direction of Flow	Secondary Containment Capacity** (Volume)
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SOUTH PORTLAND - OTHER POTENTIAL SPILL SOURCES

Glycol Expansion TK	Glycol***	█	█	Horizontal	1983	Leak/Rupture	----	N/A	Note "A"	1,450
	(b) (7)(F)	█	█							

* Varies from pinpoint leak to catastrophic collapse.

** The containment volumes were supplied by Portland Pipe Line Corporation and were presented to RMA as a third-party survey company's verification of containment.

*** Chemical

POTENTIAL SPILL SOURCES AND CONTAINER IDENTIFICATION
(Any container that stores oil)

Source I.D.	Substance Held <i>(Oil & Haz. Substance)</i>	Average Quantity <i>(Gallons)</i>	Maximum Capacity <i>(Gallons)</i>	Potential Failure	Rate of Flow *	Failure / Cause <i>(Record cause and date of any Tank failure which has resulted in a loss of tank contents)</i>	Direction of Flow	Secondary Containment Capacity** <i>(Volume)</i>
SOUTH PORTLAND – COMPLETELY BURIED TANKS								
Sump Tank	Oil	█	█	Overflow/Rupture	---	N/A	█	█
	(b) (7)(F)	█	█					

HAZARD IDENTIFICATION SURFACE IMPOUNDMENTS (SI)
(Surface Impoundment = natural topographic depression, man-made excavation, or diked area)

SI Number	Substance Stored	Quantity Stored <i>(Gallons)</i>	Maximum Capacity <i>(Gallons)</i>	Surface Area	Year Built	Failure / Cause <i>(Record cause and date of any SI failure which has resulted in the loss of SI contents)</i>
There are no Surface Impoundments at this Facility used for Product Storage						

* Varies from pinpoint leak to catastrophic collapse.

** The containment volumes were supplied by Portland Pipe Line Corporation and were presented to RMA as a third-party survey company's verification of containment.

- Note^A:** Primary drainage is to the containment area. Drainage outside of, or escaping containment would flow northwest to Portland Harbor.
- Note^B:** Primary drainage is to the containment area. Drainage outside of, or escaping containment would flow north across Pickett Street towards Portland Harbor.
- Note^C:** Primary drainage is to the containment area. Drainage outside of, or escaping containment would more than likely flow through either storm drains or ditches to the oil/water separator and reservoir. The chance does exist that a spill could reach Portland Harbor to the northwest.
- Note^D:** Identified as Qualified Oil-Filled Operational Equipment for which alternate requirements (see SPCC §1.7) to general secondary containment are in place per 40 CFR 112.7 (k).
- Note^E:** 55 gallon drums are stored inside Pump Station buildings. Any Drainage out of the supplied containment would pool inside the building.
- Note^F:** 55 gallon drum is stored on factory produced drum containment pallet sufficient to hold the entire contents.

FACILITY DRAWINGS

The following drawings are attached for reference:

SOUTH PORTLAND TANK FARM DRAINAGE DIAGRAMS

- Figure 9-10(a) D4923: Drainage and Hydrants – Tank Farm
Figure 9-10(b) D4924: Drainage and Hydrants - Terminal
Figure 9-10(c) B1154: Drainage Diagram – Tank Farm & Anthoine Creek
Figure 9-10(d) B1153: Drainage Diagram – Terminal and Mill Cove

MAIN LINE PUMP STATIONS PLOT PLANS

- Figure 9-10(e) D2819: Plot Plan - Raymond Station
Figure 9-10(f) D2421: Plot Plan - North Waterford Station
Figure 9-10(g) D2824: Plot Plan - Shelburne Station
Figure 9-10(h) B2424: Plot Plan - Lancaster Station
Figure 9-10(i) B2829: Plot Plan - Sutton Station

SPCC SITE PLAN AND DIAGRAM

- Figure 9-10(j) D4925: Piping, Transformers, Rectifiers - Tank Farm
Figure 9-10(j) D4926: Piping, Transformers, Rectifiers - Terminal
Figure 9-10(k) D4927: Piping, Transformers, Rectifiers - Pier 2

7.0 PPL / MPL SPECIFIC PLANS

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS

Canada Specific Reporting Requirements:

The Canada Energy Regulator (CER) and the Transportation Safety Board of Canada (TSB) have agreed to introduce single-window reporting during pipeline incidents/occurrences. Arrangements have been made for the TSB to receive these reports on behalf of both agencies. All incidents and occurrences should be reported to the TSB Occurrence Hotline (819) 997-7887. Preliminary and detailed incidents reports should also be reported to the TSB. The TSB will forward all applicable reports to the CER.

TSB Contact Information

24 Hour Occurrence Hot Line: (819) 997-7887

Email: PipelineNotifications@tsb.gc.ca

Preliminary reports will be directed to the TSB at:

Transportation Safety Board of Canada

Place du centre, 4th floor

200 Promenade du Portage

Hull, Quebec

K1A 1K8

Facsimile: 819-953-7876

Section 1 of the Onshore Pipeline Regulations “Incident” means an occurrence that results in:

- (a) The death of or serious injury to a person
- (b) A significant adverse effect on the environment
- (c) An unintended fire or explosion
- (d) An unintended or uncontained release of LPV hydrocarbons in excess of 1.5 m³
- (e) An unintended or uncontrolled release of gas or HPV hydrocarbons
- (f) The operation of a pipeline beyond its design limits as defined under CSA Z662 or CSA Z276 or any operating limits imposed by the Board

The CER’s top priority in any emergency is to make sure that people are safe and secure, and that property and the environment are protected. Any time there is a serious incident CER Inspectors may attend the site to oversee a company’s immediate response. The CER will require that all reasonable actions are taken to protect employees, the public, and the environment. Further, the CER will verify that the regulated company conducts adequate and appropriate clean-up and remediation of any environmental effects caused by the incident.

As lead regulatory agency, the CER:

- Monitors, observes and assesses the overall effectiveness of the company’s emergency response in terms of:
 - Emergency Management
 - Safety
 - Security
 - Environment
 - Integrity of operations and facilities: and
 - Energy Supply

7.2MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

- Investigates the event, either in cooperation with the Transportation Safety Board of Canada, under Canada Labor Code, or as per the *National Energy Board Act (repealed)*, *Canadian Energy Regulator Act* or *Canada Oil & Gas Operations Act* (whichever is applicable).
- Inspects the pipeline or facility
- Examines the integrity of the pipeline or facility
- Requires appropriate repair methods are being used
- Requires appropriate environmental remediation of contaminated areas is conducted
- Coordinates stakeholder and Aboriginal community feedback regarding environment clean-up and remediation
- Confirms that a company is following its Emergency Procedures Manuals(s), commitments, plans, procedures, and CER regulations and identifies non-compliance
- Initiates enforcement actions as required
- Approves the restart of the pipeline

CER 24/7 Incident Line: (403) 299-2773

CER's Online Event Reporting System (OERS) (<https://apps.cer-rec.gc.ca/ers>)

The TSB roles and responsibilities are to advance transportation safety in the marine, pipeline, rail and air modes of transportation by

- Conducting independent investigations, including public inquiries when necessary, into selected transportation occurrences in order to make findings as to their causes and contributing factors;
- Identifying safety deficiencies, as evidenced by transportation occurrences;
- Making recommendations designed to eliminate or reduce any such safety deficiencies, and
- Reporting publicly on our investigations and on the findings in relation thereto.

As part of its ongoing investigations, the TSB also reviews developments in transportation safety and identifies safety risks that it believes government and the transportation industry should address to reduce injury and loss.

The TSB is an independent agency, separate from other government agencies, and departments, that reports to Parliament through the President of the Queen's Privy Council for Canada.

In making its findings as to the causes and contributing factors of a transportation occurrence, it is not the function of the Board to assign fault or determine civil or criminal liability. However, the Board does not refrain from fully reporting on the causes and contributing factors merely because fault or liability might be inferred from the Board's findings. No findings of the Board should be construed as assigning fault or determining civil or criminal liability. Findings of the Board are not binding on the parties to any legal, disciplinary, or other proceedings.

The Canada Energy Regulator is responsible for regulating pipelines under federal jurisdiction. The TSB is responsible for advancing transportation safety in marine, pipeline, rail and air modes of transportation through the conduct of independent investigations, the identification of safety deficiencies, and the making of recommendations to eliminate or reduce such deficiencies.

When the TSB investigates an accident, no other federal department (except the Department of National Defense and the Royal Canadian Mounted Police) may investigate for the purpose of making findings as to the causes and contributing factors of the accident. Transport Canada and the Canada Energy Regulator may investigate for any other purpose, such as regulatory infractions.

The main vulnerable areas outside the MPL property limits are described in the following table (Figure 7.1) and can also be found in each of the Oil Spill Specific Plans in Section 7.2 following

**Figure 7.1
MPL VULNERABLE AREAS**

Type of Activity / Area	Location
Lakes and Streams:	Missisquoi River Dufour Brook Brock River Ruitter Brook Sutton Creek Yamaska River, South-West River À la barbue River Richelieu River, Lahaise Brook Bessette-Charbonneau Brook Des Trentes Brook Voghel-Lusignan Brook Voghel Brook Small Leboeuf Brook Brodeur Brook/Voghel-Blanchard Brook Ducharme Brook Richer Brook de l'Église Brook Coderre Brook Grand des Trente Brook des Chênes Brook de la Rouchière Brook La Prade Brook des Atocas Brook Décharge du Trait Carré (Outlet) Raimbault Brook des Prairies Brook St.Lawrence River
(b) (7)(F)	[REDACTED]
Recreational areas: marinas, beaches, campgrounds, boat launches, etc.	Figure 7.3 - Campgrounds in the Missisquoi River area Figure 7.5 – Nautical Activities and Campgrounds in the Richelieu River area Figure 7.7 – Nautical Activities, Campgrounds and Parks in the St.Lawrence River area
Spawning areas and wetlands	Figure 7.7 - Environmental Sensitivities – St. Lawrence River Figure 7.4 - Richelieu River – General Information
Parks	Missisquoi National State Park, Vermont Lake Carmi State Park Bellerive Park, Saint-Ours St.Lawrence Park, Repentigny Lebel Island Park, Repentigny Island of Boucherville Provincial Park Pointe-aux-Prairies Nature Park, Montreal
Navigational Locks	Saint-Ours Lock, Saint-Ours
Commercial and Industrial area	Figure 7.9 – Montreal East – Environmental, Socio Economic Sensitivities

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

7.2.1 MISSISQUOI RIVER - Oil Spill Specific Response Plan

The purpose of this section is to provide the necessary information to enable a quick and efficient response in case of a crude-oil spill in the Missisquoi River.

U. S. and Canadian topographic maps (United States Geological Survey, 1:24 000 and Department of Energy, Mines and Resources, Canada, 1:50 000) should be used during emergency operations since they present the concerned section of the Missisquoi River downstream from the pipeline and constitute good information sources.

These maps are essential working tools and are presented in Appendix A. General information is contained in the first parts of this section. Figures 2.8 & 2.13 show the mandatory notifications for the United States. Figure 7.3 provides information on environmental socio-economic sensitivities.

Figure 7.2
Missisquoi River General Information

Description of the area

The Missisquoi River is the largest tributary of the Missisquoi Bay Drainage Basin. It can be described as a transborder system covering an area of 2231 km² / 864 mi² crossing the Eastern Townships Region in Quebec and the northern part of Vermont (Franklin County). The river valley is characterized by a large "U" shape flood plain. The Missisquoi River Drainage Basin is located in the Appalachian Mountains and Foothills Geological Region.

The Missisquoi River sections, which would be threatened, in the event of a pipeline rupture are represented by the sector between Highwater and Swanton (Missisquoi Bay). This segment encompasses a total distance of about 105 km / 65 mi of which 20 km / 12 mi falls into Quebec's Territory while 85 km is located inside U.S. Territory.

In Quebec

The Missisquoi river segment in Quebec follows a large valley, generally cultivated, which is created by the Sutton Mountains and Jay Peak Foothills. The river takes sinuous forms (meanders), measuring about fifteen (15) m / (16) yd in width by one (1) m/yd in depth, and flowing over a rocky soil.

This Quebec section is largely used for recreational purposes. Camping, canoeing, cycling and fishing represent some of the most common outdoor activities associated with the valley. Mostly occupied by forests the area is sparsely populated. Drinking water is supplied in a large proportion by artesian wells. With the exception of the Highwater Pumping Station and an old Talc Mine, there is no identified industry along the river, which could be impacted by a petroleum spill.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

Figure 7.2
Missisquoi River General Information (cont'd)

Many fish species such as trout, pike, small-mouth bass and perch have been seen in the Missisquoi river. There are also many species of amphibians and reptiles, which colonize the river. Forest Turtles, quite common in this sector, might also be impacted by a petroleum spill. Many mammals are identified in the Missisquoi River Valley. Amongst the most common, there are raccoons, minks, muskrats, foxes and deer.

No section of the river is identified as representing a high value from a biological standpoint. However, small stream and ditch discharge areas can offer excellent access ramps for turtles and mammals, taking into account that the riverbanks are generally steep (about 1 to 2 m/yard in height). In case of an eventual oil spill into the river, special attention should be given to these affluents.

On the Quebec side, access by roads to the Missisquoi River is quite simple and efficient. Two roads border the valley. On the north bank, the riverbed can be reached by taking the Missisquoi valley road. To access it, one must take Route 243, to the East, or Route 139 (by the Scenic road), to the West. On the south bank, the Burnett road and Quebec-Estrie railway line provide access points along the river. To access them, one must cross the river by taking bridges located either at Glen Sutton or Highwater. Leisure boating is limited to small crafts (rowboat, canoe, etc.) due to physical river constraints. There is a boat-launching ramp located at the "Carrefour des Campeurs" Campground, near Highwater, and another one, not developed, near the Glen Sutton bridge.

In Vermont

The U.S. river segment in question crosses Franklin County from East to West. By studying this sector, one can observe that the riverbed takes sinuous forms and flows inside a "U" shape valley. This valley is set up between a hill system corresponding to the Appalachian Mountains and Foothills. The Missisquoi river ends its course by crossing part of the Champlain Lake Lowlands. In Swanton, the river measures 100 m in width. It discharges from a large and shallow marshy delta into the Missisquoi Bay.

The main activity of the region is agriculture. Numerous farms are present but only few industries, most of which corresponding to hydroelectric dams and small to medium enterprises. Recreational activities along the Missisquoi river are not well developed. Most of them are taking place in the Missisquoi National Wildlife Refuge near Swanton (fishing sites, migratory and aquatic bird observation areas, spawning grounds, etc.). In addition, some campgrounds are found close to the river (see Figure 7.3). There is no water intake along the Vermont part of the River.

In Vermont, it is also quite easy to access the river by road. Route 105 follows the valley, between the border and the village of Sheldon Junction. After that, Route 78 follows up to the Missisquoi Delta. The same route crosses the Champlain Lake. A railway network is present all along the valley. The Central Vermont R.Y manages this network. There is also an airport in the municipality of Swanton, near Route 78. The only two boat launching ramps are found in Swanton, downstream from the dam.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

Figure 7.2
Missisquoi River General Information (cont'd)

Currents and Weather Information

Current speeds in the Missisquoi River vary considerably depending on the season. This river is recognized for its high fluctuation in water levels, which play also an important role in current speed. Water level is highly influenced by the quantity of precipitation in the drainage basin.

According to data recorded by the Hydrometric Division of the United States Geological Survey (USGS) at the East Berkshire Station (b) (7)(F) the average monthly rate of flow in the Missisquoi river from 1984 to 1988 is presented in the following table.

Average Flow of the Missisquoi River

Month	Average Flow (m ³ /sec)	Average Flow (ft ³ /sec)
January	15.91	9.36
February	14.74	8.68
March	38.35	22.57
April	83.74	49.29
May	38.38	22.59
June	18.01	10.60
July	10.55	6.21
August	10.22	6.02
September	12.10	7.12
October	20.16	11.87
November	28.20	16.60
December	23.89	14.06

Based on table above it is observed that current speeds (flows) are at their fastest during the spring, between the months of March and May, and at their slowest during the summer, between June and September.

In order to assess the drift speed of an oil slick on the river, Orion-type floaters designed to travel like an oil slick on water were placed in the River at the pipeline level and their drift has been followed during the course of two consecutive days. These tests were carried out in April of 1998.

The resulting average drift speed during the tests was about 1.7 km/hr (1 mi/hour). However, this speed will vary significantly according to precipitations, as the river collects part of the water coming from the surrounding mountains.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

Figure 7.2
Mississiquoi River General Information (cont'd)

During a spill, it is possible that the oil slick might drift more quickly or more slowly, depending on the time of the year or level of rainfall during the previous days. Consequently, it will be important to measure the real drift speed between two markers on a map and readjust the delays accordingly.

The wind speed and direction also play an important role in the speed and direction of an oil slick. Wind data from various weather stations have been collected. Abercorn and Philipsburg Stations were retained. At the Abercorn Station, prevailing winds are coming from the south and the southwest. Average wind speeds on an annual basis along these two directions are respectively 8.16 km/hr (5 mi/hr) and 9.81 km/hr (6 mi/hr). At the Philipsburg Station, data show that winds are coming mainly from the south, the southwest and the west.

Average wind speeds along these directions are respectively 17.81 km/hr (11 mi/hr), 16.93 km/hr (10.5 mi/hr) and 15.87 km/hr (10 mi/hr). By applying these observations to a petroleum spill, it can be predicted that the oil slick will follow the riverbank opposite to the wind direction. As prevailing winds are mostly coming from the south, there is a strong likelihood that the oil slick (depending on the river segment) will drift along the north riverbank.

From the Abercorn meteorological station (45°02'N 72°40'W) located 19 km/ 11.8 mi west of Highwater, the average temperature in the area is 5.4°C / 42°F, ranging from a mean temperature of -10.7°C / 12.7°F in January to 19.3°C / 66.7°F in July (75 days during the year show maximum temperatures below 0°C / 32°F).

The yearly mean precipitation is 1265.4 mm / 49.8 in; 76% is in the form of rain, while 24% is snow.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.3
Missisquoi River Environmental Socio-Economic Sensitivities

(b) (7)(F)

Campgrounds and Parks

➤ Brookside Campground North (26 sites)	802-933-4376
➤ RD 2, Enosburg, Vermont 802-933-8309 Carrefour des campeurs Campground (119 sites) – Boat Launching Ramp 2733, Vallée Missisquoi Rd., Mansonville.....	819-292-3737
➤ Champlain Valley Campground (79 sites) Swanton, Vermont.....	802-524-5146
➤ Diable Vert Mountain Station Campground (25 sites)	450-538-5639
168, Staines Rd., Sutton.....	888-779-9090
➤ Lake Carmi State Park	Summer: 802-933-8383
RD 1, Swanton, Vermont.....	Winter: 802-879-5674
➤ Lakewood Campground (262 sites) Tabor Rd. Swanton, Vermont.....	802-868-7270
➤ Missisquoi National Wildlife Refuge Swanton, Vermont.....	802-868-4781

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

7.2.2 RICHELIEU RIVER - Oil Spill Specific Response Plan

The purpose of this section is to provide the necessary information to enable a quick and efficient response in case of a crude-oil spill in the Richelieu River.

- For ease of photocopying and electronic transmission, the marine maps showing the portion of the Richelieu River downstream from the pipelines have been divided into 17 sheets, each measuring 216 cm X 280 cm (8.5" X 11"), (See Figure 6.1 and the Montreal Pipe Line Limited Oil Spill Specific Response Plans binder. For each sheet, the information pertaining to the area shown on the map is presented on the adjoining page.

General information is contained in Figure 7.4. Figure 7.5 presents the environmental socio-economic sensitivities of the region.

FIGURE 7.4 RICHELIEU RIVER – General Information

Description of the Area

The Richelieu River is the largest southern tributary of the St. Lawrence River. It flows south to north across the St. Lawrence lowlands and joins the St. Lawrence River near Sorel.

The River area that would be threatened in the case of a pipeline break near Saint-Mathias is known as the Lower Richelieu area.

This section of the River is widely used for recreational purposes such as pleasure boating, and is also a source of drinking water. Four water plants draw their drinking water downstream from the pipelines to supply more than twenty (20) municipalities in the region. In addition, a golf club located in Sorel-Tracy draws water from the River to water its grounds (consult Figure 7.5). The River is inhabited by a number of fish species: 60 to 116 freshwater fish species in Quebec live in the River and at least 25 reproduce in it. Due to urbanization, the construction of artificial riverbanks, industrialization and agricultural activities the water is considered of poor quality.

Although the riverbanks have largely been artificially remodelled, there are still some natural wetlands, mainly around the islands. Some waterfowl (ducks, geese, seagulls, shore birds, etc.) live on the River during the summer season or stop there during migration.

In the Lower Richelieu area, there is one lock (Saint-Ours), six marinas or boating clubs and several private docks. The banks are generally accessible via Route 133 (des Patriotes Road) on the east bank and via Route 223 (Richelieu and Saint-Roch Roads) on the west bank. However, there are relatively few points giving public access to the River.

Generally, private homes are built on lots along the east bank, while the road separates homes from the River on the west bank, except downstream from the Saint-Ours lock where there are numerous houses along both banks.

In some places the banks are taken up by agricultural land, and on occasion cattle can be seen bathing at the River's edge.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.4 (cont'd)
RICHELIEU RIVER – General Information

Currents and Weather Information

Current speeds in the Richelieu River vary considerably depending on the season, which is due mostly to the artificial regulation of the flow rate by valves at the Saint-Ours locks. Water levels also play an important role in current speed. Water level is highly influenced by the quantity of precipitation in the drainage basin.

Average rate of flow in the River for 1984-1985, according to data recorded by Environment Canada's hydrometric division at the Fryer's Station [REDACTED] (b) (7) [REDACTED] (F) [REDACTED] are presented in the table following:

Average Flow of the River Richelieu

Month	Average Flow (m ³ /sec)	Average Flow (ft ³ /sec)
January	256	151
February	248	146
March	361	212
April	708	417
May	688	405
June	467	275
July	274	161
August	183	108
September	159	94
October	194	114
November	251	148
December	278	164

Based on the data above, it can be seen that currents are at their fastest during the months of April and May, and at their slowest during the months of August and September.

In order to assess the drift speed of an oil slick on the River, Orion-type floaters designed to travel like an oil slick on water were placed in the River at the pipeline level and their drift have been followed over the course of three (3) consecutive days. These tests were carried out in July of 1997.

The average drift speed obtained during these tests was about 0.75 km/hr (0.5 mi/hr). The approximate location of the floaters was recorded every 1/2 hour on the maps, presented in the Montreal Pipe Line Limited Oil Spill Specific Response Plans binder. These locations may serve as indicators of the response time of an oil slick.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.4 (cont'd) RICHELIEU RIVER – General Information

During a real spill, it is possible that the oil might drift more quickly or more slowly, depending on the time of the year or level of precipitation during the previous days. It is important to measure the real drift time between two markers on the map and to adjust the time limits accordingly. For example, if the oil slick reaches in 30 minutes instead of one hour marker + 1.0 h on map No. 01, it is necessary to divide all indicated times by 2 in order to determine the time limits available for a response.

NOTE: In order to estimate the drift time for the entire section of the River up to the St. Lawrence River, certain measurements have been extrapolated from observed measurements.

Wind speed and direction also play an important role in the speed and direction of an oil slick. An oil slick will follow the shoreline opposite the direction of the wind. As the region's dominant winds come mostly from the west, there is a strong likelihood that an oil slick will drift along the east bank.

From the Rougemont meteorological station (45°26'N 73°06'W), the average temperature in the area is 6°C / 42.8°F, ranging from a mean temperature of -10.5°C / 13°F in January to 20.6°C / 69°F in July (80 days during the year show maximum temperatures below 0°C). The yearly mean precipitation is 1051.9 mm / 41.4 in; 80% is in the form of rain, while 20% is snow.

During the winter season, the River's surface is entirely frozen over.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.5
Environmental Socio-Economic Sensitivities – Richelieu River (cont'd)

➤ Phare de Beloeil Marina	
700 Richelieu St., Beloeil.....	450-464-5257
➤ Saint-Mathias Marina	
874 des Patriotes Rd., Saint-Mathias-sur-Richelieu.....	450-467-6845
➤ Saint-Charles Boating Harbour	
219 des Patriotes Rd., Saint-Charles-sur-Richelieu.....	450-584-2017
<u>Locks</u>	
➤ Saint-Ours	
2930 des Patriotes Rd., Saint-Ours.....	450-785-2212

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

7.2.3 ST.LAWRENCE RIVER - Oil Spill Specific Response Plan

The purpose of this section is to provide the necessary information to enable a quick and efficient response in case of a crude oil spill in the St. Lawrence River.

Canadian marine maps (Hydrographic Service of Canada, nos. 1310 and 1311), represent the geographical scope of this specific response plan, downstream from the pipeline, up to Verchères. These maps constitute good information sources and are essential working tools. They are presented in the Montreal Pipe Line Limited Oil Spill Specific Response Plans binder.

This section presents a description of the area and a general description of the currents and weather conditions in the area. Figure 7.7 covers the environmental sensitivities of the region.

FIGURE 7.6 ST. LAWRENCE RIVER General Information

Description of the Area

The St. Lawrence River stretches over 1 167 km and is the major tributary of the Great Lakes. It drains a total area of 1 420 000 km² / 550,000 mi² (including the drainage basin of the Great Lakes). Its major tributaries are: the Outaouais River, the Richelieu River, the Saint-François River, the Saint-Maurice River, the Chaudière River, and the Saguenay River. The width of the St. Lawrence increases progressively from 3 km / 1.86 mi to 145 km / 90 mi at its meeting point with the Atlantic Ocean, where its average recorded discharge is 14 000 m³/s (18,311 yd³/sec).

A spill in the river would have an impact on the recreational activities, the St. Lawrence seaway and on the water intakes for some municipalities and industries.

The River sustains many different fish species, some of commercial interest. Many spawning areas have been documented by Environment Canada and numerous marshes are located on the riverbanks. These marshes sustain life for many fish species but also for migratory and native waterfowl, as well as for small mammals.

Many islands are located in the area and houses are built directly on the riverbanks, both on the north and the south shore. Numerous federal and private harbours/peers (3), boat launches (3), marinas or nautical clubs (6), and parks are right on the St. Lawrence's banks and are used by the population. Access is easy from both sides of the River but may be more difficult on the many islands present in this section of the River.

The area of the St. Lawrence River covered in this plan is the area that would be threatened in the event of a pipeline leak at Boucherville. This area comprises some of the Boucherville islands (Dufaut and Grosbois Islands), the Islands of Varennes, the Sainte-Thérèse Island, and the Islands of Verchères. This segment encompasses a total distance of about 20 km / 12.4 mi downstream of the pipeline crossing from Boucherville to the city of Verchères.

Other areas of the River, downstream from Verchères, could also be at risk if a major spill occurred at Boucherville. Although these areas are not covered in this document, the time the oil slick would take to reach these areas would be sufficient to allow for complete information gathering.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.6 ST. LAWRENCE RIVER General Information (Cont'd)

Currents and Weather

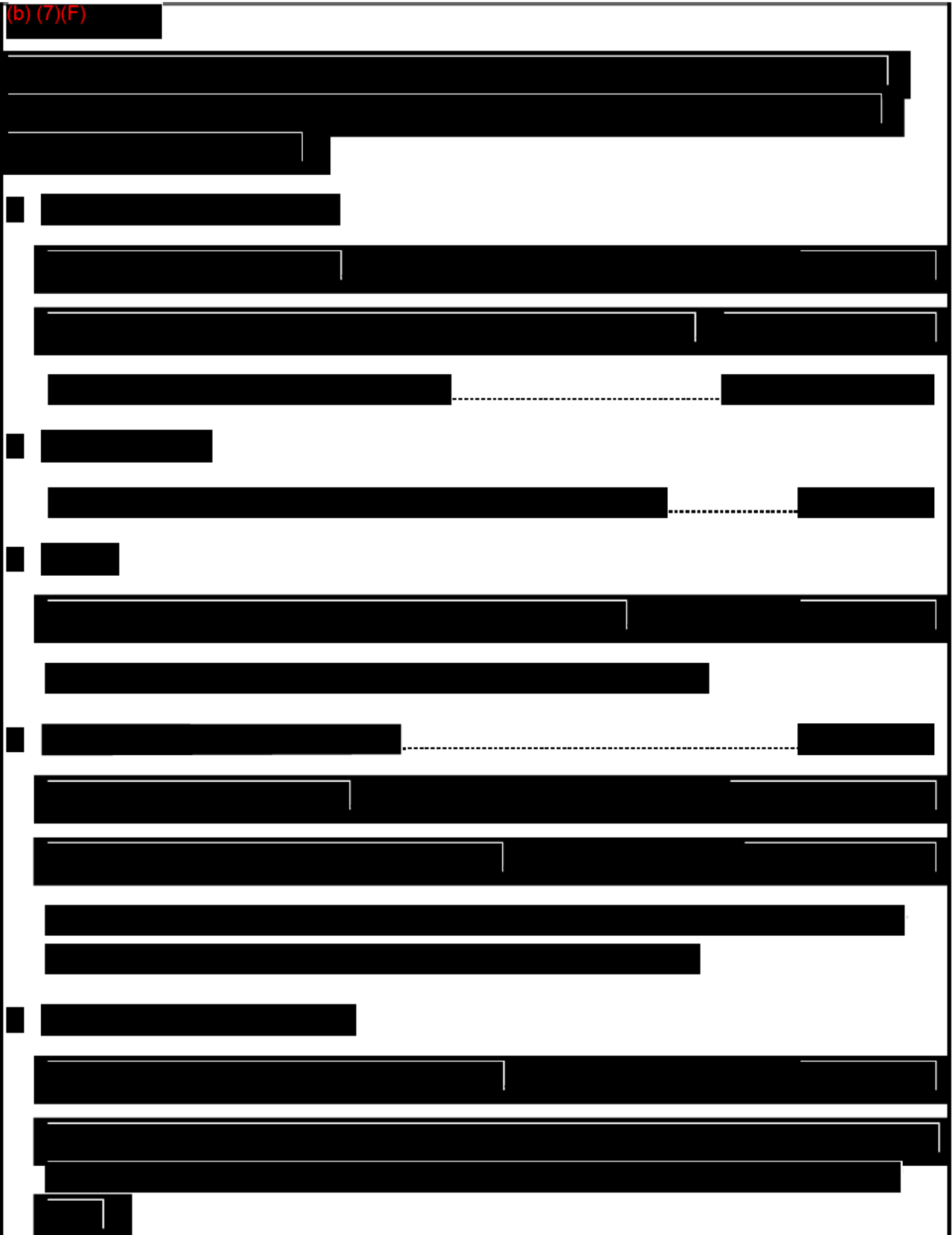
Current speeds in the St. Lawrence River vary considerably depending on the season. Precipitations (rain and snow) will influence the speed of the currents as well as the water level. In order to assess the drift speed of an oil slick on the River, drift experiments were made. These results are presented graphically in the Montreal Pipe Line Limited Oil Spill Specific Response Plans binder.

From the Verchères meteorological station (45°46'N 73°22'W), the average temperature in the area is 5.9°C / 42.6°F , ranging from a mean temperature of -10.5°C / 13°F in January to 20.8°C / 69.4°F in July (86 days during the year show maximum temperatures below 0°C / 32°F). The yearly mean precipitation is 988.3 mm / 38 in; 79% is in the form of rain, while 21% is snow. During the winter season, the navigable route stays clear of ice but the riverbanks are frozen. Wind speed and direction also play an important role in the speed and direction of an oil slick. An oil slick will follow the shoreline opposite the direction of the wind. As the region's dominant winds come mostly from the west, there may be accumulation of oil in bays facing west (south shore of River), or on the shoreline of islands facing the dominant winds.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.7

Environmental Socio-Economic Sensitivities – St. Lawrence River



7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.7 (cont'd)
Environmental Socio-Economic Sensitivities – St. Lawrence River

Spawning Areas

- **Fisheries and Oceans (24 hour)**.....418-775-0500
- Spawning area west of the Islands of Boucherville and Varennes
 - Spawning area east of Boucherville and Varennes Islands
 - Spawning area around the Islands of Varennes
 - Spawning area between the Island aux Vaches and Sainte-Thérèse Island
 - Spawning area at the Assomption River's mouth
 - Spawning area around the Islands north of Sainte-Thérèse Island
 - Spawning area on the north shore of the St. Lawrence, in front of Repentigny
 - Spawning area north of Beauregard Island
 - Spawning area on the west bank of Verchères Islands
 - Spawning area between Verchères Islands and the Island aux Prunes

Wetlands

- **MDDELCC– Regional Direction**.....514-873-3636
- 24 hour.....1-866-694-5454

There are wetlands south of the Islands of Verchères (Island Beauregard); on the majority of the St. Lawrence's banks, islands of Verchères, along the Richelieu River (upstream from Saint-Antoine up to Laplante's Brook, upstream from Danvard Island up to Lahaise's Brook).

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.7 (cont'd)
Environmental Socio-Economic Sensitivities – St. Lawrence River

<u>Nautical Activities</u>	
➤ Beach (windsurfing launch and swimming) – Municipality of Boucherville	
Michel Huguerot.....	450-449-8233
➤ Boat Launch – St. Lawrence Park	
290 Notre-Dame St., Repentigny	
Public Works (24 hour).....	514-236-5691
➤ Bouchard Island Peer - Municipality of Saint-Sulpice	
Michel Deschesne.....	514-386-3191
➤ Boucherville Nautical Club inc.	
535 Marie-Victorin Blvd., Boucherville.....	450-655-9247
➤ Federal Peers/Wharves and Boat Launches – Fisheries and Oceans	
Roland Lévesque.....	418-648-5507
➤ Jean Beaudoin Marina inc.	
2594 Pointe-aux-Trembles Av., Montreal.....	514-642-4521
Security System (Reliance Protectron).....	800-268-9797
➤ Mezy Nautical Club	
16 Mezy St., Boucherville	
President : Jean-Claude Vallée.....	450-655-0249
Pierre Chartier.....	450-641-2408
➤ Montreal Harbour	
Harbour Master's Office.....	514-283-7039
Deputy Harbour Master, Shore Division.....	514-283-7026
➤ Pointe-aux-Trembles Marina inc.	
12746 Notre-Dame East St., Montreal.....	514-645-4400
Alain Valcourt.....	514-645-5419

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

FIGURE 7.7 (cont'd)
Environmental Socio-Economic Sensitivities – St. Lawrence River

➤ Repentigny Marina	
364 Notre-Dame St., Repentigny.....	450-581-7071
➤ Rive-Nord Marina	
9 Babin St., Repentigny.....	450-585-1125
<u>Campgrounds and Parks</u>	
➤ Islands of Boucherville Provincial Park	
55 Sainte-Marguerite Island, Boucherville Administrative Office.....	450-928-5089
➤ Lebel Island Park	
396 Notre-Dame, Repentigny Public Safety (24 hour).....	450-654-2380
➤ Le Marquis Campground	
1630 Notre-Dame, Saint-Sulpice.....	450-589-5147
➤ Pointe-aux-Prairies Nature Park	
Administrative Office - Rivière-des-Prairies Information Centre 12 980, Gouin Blvd. East, Montreal	514-280-6767
Cabin Héritage (Chalet Héritage) 14 905 Sherbrooke East St., Montreal.....	514-280-6691
Pavilion des Marais 12 300 Gouin St. East, Montreal.....	514-280-6688

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

7.2.4 MONTREAL-EAST TERMINAL - Emergency Procedures

FIGURE 7.8 MONTREAL EAST Weather Information

From the Montreal Jar Bot meteorological station (45°34'N 73°33'W), the average temperature in the area is 6.6°C / 43.9°F, ranging from a mean temperature of -10°C/ 14°F in January to 21.6°C / 70.9°F in July (80 days during the year show maximum temperatures below 0°C). The yearly mean precipitation is 1044.4 mm / 41.1 in; 78% is in the form of rain, while 22% is snow.

FIGURE 7.9 MONTREAL EAST Environmental Socio-Economic Sensitivities

There are many industries neighbouring the Montreal-East Terminal. During an emergency, special attention must be paid in order to minimize the impacts to these industries. If there is a risk that the emergency will impact the neighbouring industries, the Incident Commander will communicate with them. The IC will also communicate with municipal authorities if there is a risk to the neighbouring population. The municipal authorities will be responsible for the evacuation of the population.

Evacuation Procedures

Consult Appendix D.

7.2.5 NORTH TANK FIELD - Oil Spill Specific Response Plan

Weather Information

Consult FIGURE 7.8

Environmental Socio-Economic Sensitivities

Consult FIGURE 7.9

Specific Response Actions – Control of Spill

In the event of an oil spill and/or a fire, valves installed on the drainage conduits located at the base of the tank retention dykes can be operated, as needed, to confine the product into the tank retention basin, transfer it to an adjacent tank basin or in the main drainage ditches which discharge in the drainage collection basin. Depending on prevailing conditions, accumulated product in one or another of these locations could then be recovered by a contractor with vacuum oil recovery trucks.

For detailed scenarios of intervention, consult Appendix F.

Emergency Operation Centre

The main office of MPL's Terminal in Montreal-East will be used as the Emergency Operation Centre in case of an emergency.

Evacuation Procedure

Consult Appendix D.

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

7.2.5 NORTH TANK FIELD - Oil Spill Specific Response Plan (Cont'd)

Fire Protection System and Alarms at the North Tank Field

The fire protection system and equipment in the North Tank Field are shown on the plan found in Appendix A. A description of the network is presented below.

Fire protection System Tank 663 and Tank 665

The fire protection system for Tank 663 and Tank 665 is composed of two semi-fixed installations (redundant).

Tank 663 and Tank 665 are equipped with fixed discharge outlets connected to piping that terminates at a safe distance. The necessary foam-producing materials are transported from the foam tank 101 located at 20e Avenue (east NTF) or foam tank 102 along 21e Avenue to Tank 663 or Tank 665 via the fixed piping. The mixture of water and foam will be delivered through the fixed piping using the Montreal-Est Fire Department pumping trucks.

The fire protection system is connected to the municipal water distribution system and requires a flow rate of 14,385 liters (3800 US gallons) per minute for 65 minutes to properly protect the tanks and deliver the foam effectively.

Fire Hydrants Network

Fire hydrants are located along the service road provided at the top of the retention dikes in periphery of the three (3) groups of tanks. The hydrants are connected to the municipal water distribution system which can supply, in normal operating conditions, a water flow rate of approximately 30,280 litres (8,000 US gallons) per minute to the North Tank Field.

Estimates from the Montreal-East Fire Department indicate that a water flow rate of 37 850 litres (10,000 gallons) per minute would be necessary to protect the intervention team, to control a fire on a tank and to secure the other tanks.

In the event additional water would be required, it will be possible to supply water from six (6) fire hydrants located on both sides of the Henri-Bourassa Boulevard, northeast of the North Tank Field. As the hydrants are directly connected to the main water distribution loop of the Island of Montreal, they could supply by themselves the targeted water flow rate of 37 850 litres (10,000 gallons) per minute.

7.2.6 SAINT-CESAIRE PUMP STATION - Oil Spill Specific Response Plan

Containment of Surface Water for Saint-Césaire Pump Station

Saint-Césaire pump station is located in the Montérégie region, a fertile plain in the rich Saint-Lawrence valley. The natural landscape of the area is flat with a minimal slope of 1 to 3%. The station sits at 136 feet (41.4m) MSL.

The station itself is surrounded by crop fields on the north and east sides, a major roadway on its southerly side and an abutting farm with a well groomed yard on its west side. Three ditches surround the station yard on the north, south and east sides.

The natural and man made slope of the yard and the adjacent ditches is in a south

axis toward a retention area before the roadside ditch. A manually operated valve prevents surface run-off from entering the ditch. This ditch in turn crosses the roadway through a culvert located about 200 feet west of the station and leading to a natural depression heading into the Sud-Ouest river which is a tributary of the Yamaska river.

Monitoring wells (deep and shallow) have been installed at strategic locations in the station yard to monitor the conditions of the groundwater. Periodic checks and sample analysis are done to ensure there is no underground water contamination and to undertake the appropriate intervention measures if necessary. Ad hoc checks/sampling would be done on an as needed basis in case of a spill or seepage on the ground to assess the effect on the underground water and to determine what action might need to be taken.

Control of the surface water in case of a spill occurring at the station could be done by keeping the retention area valve closed .

7.2 MPL OIL SPILL SPECIFIC RESPONSE PLANS (cont'd)

7.2.6 SAINT-CESAIRE PUMP STATION - Oil Spill Specific Response Plan (Cont'd)

Water/oil could also be intercepted at the entrance of the culvert crossing the road or at the foot of the depression prior to entering the Sud-Ouest River where containment or skimming dams could be built depending on the needs.

Ultimately, crude oil containment could be achieved by using a boat ramp located at the end of Union street in Saint-Césaire to launch equipment and deploy booms by navigating upstream of the Yamaska river up to the junction with the Sud-Ouest river.

7.2.7 HIGHWATER PUMP STATION - Oil Spill Specific Response Plan

Highwater pump station is located in the Eastern Township region, in a rather hilly part of the Townships and sits at the foothills of Jay and Sutton mountains. The elevation of the station is 868 feet (264.6m) MSL.

The pump station is located atop a knoll right along the U.S.-Canada border and is surrounded by wooded areas on all sides, except for a small road leading to the pump station and running on its west side. Two ditches surround the station: one that runs along the road and one partially piped on its south side, inside the yard itself.

The slope of the yard is toward the southwest corner of the pump station. From there the slope increase drastically toward the west, running along the boundary and heading toward a small brook leading to the Missisquoi river. MPLL has created a retention area to collect surface run-off with a manually operated valve.

Monitoring wells (deep and shallow) have been installed at strategic locations in the station yard to monitor the conditions of the groundwater. Periodic checks and sample analysis are done to ensure there is no underground water contamination and to undertake the appropriate intervention measures if necessary. Ad hoc checks/sampling would be done on an as needed basis in case of a spill or seepage on the ground to assess the effect on the underground water and to determine what action might need to be taken.

Control of the surface water or any spill occurring at the station could be done

bykeeping the retention area valve closed. Water/oil could also be intercepted at the water collecting pond in the brook running down to the Missisquoi River, behind the 18-inch sub-station, where containment or skimming dams could be built depending on the needs.

Ultimately, crude oil containment could be achieved at the crossing of Chemin Lafond and Chemin de la Mine, approximately two miles (3 km) downstream of the station where the brook is about to enter the Missisquoi river.

7.3 MPL FIRE CONTROL FACILITIES

7.3.1 North Tank Field	Dwg D-4248
7.3.2 Highwater	Dwg D-3835
7.3.3 St. Cesaire	Dwg D-3834
7.3.4 Montreal East	Dwg D-3833

